

October 31, 2005

L-PI-05-096  
10 CFR 50.73

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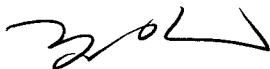
Prairie Island Nuclear Generating Plant Unit 2  
Docket 50-306  
License No. DPR-60

LER 2-05-02, Supplement 1, Unit 2 Shutdown Required by Technical Specifications  
Due to Inoperable Emergency Diesel Generator

Supplement 1 to the Licensee Event Report (LER) for this occurrence is attached. Notification of this event as required by 10 CFR 50.72(b)(2)(i) was made on April 15, 2005. The original LER was submitted via letter dated June 14, 2005. Please contact us if you require additional information related to this event.

Summary of Commitments

This letter contains no new commitments and no revisions to existing commitments. With this LER supplement, NMC completes the commitment made in the original LER.



Thomas J. Palmisano  
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 2-05-02  
SUPPLEMENT 1**

4 pages follow

<b>NRC FORM 366</b> <b>U.S. NUCLEAR REGULATORY COMMISSION</b> (6-2004)				<b>APPROVED BY OMB NO. 3150-0104</b> <b>EXPIRES 6-30-2007</b>						
<b>LICENSEE EVENT REPORT (LER)</b> (See reverse for required number of digits/characters for each block)										
<b>FACILITY NAME (1)</b> Prairie Island Nuclear Generating Plant Unit 2				<b>DOCKET NUMBER (2)</b> 05000 306		<b>PAGE (3)</b> 1 of 4				
<b>TITLE (4)</b> Unit 2 Shutdown Required by Technical Specifications Due to Inoperable Emergency Diesel Generator										
<b>EVENT DATE (5)</b>			<b>LER NUMBER (6)</b>			<b>REPORT DATE (7)</b>			<b>OTHER FACILITIES INVOLVED (8)</b>	
MO	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REV NO	MO	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
4	15	05	05	-- 02 --	1	10	31	05	FACILITY NAME	DOCKET NUMBER
<b>OPERATING MODE (9)</b>		1		<b>THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR 3: (Check all that apply) (11)</b>						
<b>POWER LEVEL (10)</b>		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)		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)		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)						
<b>LICENSEE CONTACT FOR THIS LER (12)</b>										
<b>NAME</b> Jeff Kivi								<b>TELEPHONE NUMBER (Include Area Code)</b> 651.388.1121		
<b>COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)</b>										
CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX	
<b>SUPPLEMENTAL REPORT EXPECTED (14)</b>								<b>EXPECTED SUBMISSION DATE (15)</b>		
<b>YES</b> (If yes, complete EXPECTED SUBMISSION DATE).				<b>X NO</b>				MONTH	DAY	YEAR
<b>ABSTRACT</b> <p>On April 11, 2005, the Train A Unit 2 Emergency Diesel Generator (D5) was removed from service for a monthly slow start test. At approximately 0830 CDT the test was halted on indications of high crankcase pressure on Engine 2 (D5 is a tandem engine generator). The test procedure specifies shutting down the diesel generator (DG) if crankcase pressure exceeds 30mm for more than a few minutes (the setpoint for the crankcase pressure trip is 52 mm). During the test crankcase pressure increased to 48 mm and D5 was unloaded early per the procedure.</p> <p>With D5 inoperable, Technical Specification 3.8.1 (AC Sources – Operating), Required Action B.4, requires returning the inoperable diesel generator to operable status within seven days. A troubleshooting plan was initiated and actions were taken to diagnose and return D5 to operable status. An assessment of the scope of work to return D5 to operable status and the schedule for completing the work indicated that repairs could not be completed within the 7 days allowed outage time. Based on this assessment an orderly shutdown of Unit 2 was initiated on April 15, 2005. Unit 2 entered Mode 5 (Cold Shutdown) on April 17, 2005.</p> <p>D5 engines were rebuilt and D5 was declared operable and returned to service on April 25, 2005.</p>										

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

**EVENT DESCRIPTION**

On April 11, 2005, the Train A Unit 2 Emergency Diesel Generator<sup>1</sup> (D5) was removed from service for a monthly slow start test. At approximately 0830 CDT the test was halted on indications of high crankcase pressure on Engine<sup>2</sup> 2 (D5 is a tandem engine generator). The test procedure specifies shutting down the DG if crankcase pressure exceeds 30mm for more than a few minutes (the setpoint for the crankcase pressure trip is 52 mm). During the test crankcase pressure increased to 48 mm and D5 was unloaded early per the procedure.

With D5 inoperable, Technical Specification (TS) 3.8.1 (AC Sources – Operating), Required Action B.4, requires returning the inoperable diesel generator to operable status within seven days. A troubleshooting plan was initiated and actions were taken to diagnose and return D5 to operable status. An assessment of the scope of work to return D5 to operable status and the schedule for completing the work indicated that repairs could not be completed within the 7 days allowed outage time. Based on this assessment an orderly shutdown of Unit 2 was initiated on April 15, 2005. Unit 2 entered Mode 5 (Cold Shutdown) on April 17, 2005.

D5 engines were rebuilt and D5 was declared operable and returned to service on April 25, 2005. Six pistons and cylinder liners replaced within the previous year were examined by borescope, found to be acceptable and were not replaced.

**EVENT ANALYSIS**

Since Unit 2 was brought to Mode 3 as required by TS 3.8.1, Condition F, this shutdown is reportable per 10 CFR 50.73(a)(2)(i)(A).

**Impact on Safety System Functional Failure Performance Indicator**

On April 12, 2005, D6 was successfully tested to demonstrate its operability. While D6 had to be removed from service to conduct the test, this test was done in accordance with an approved procedure and TS. Therefore, the as-found condition of D5 did not result in loss of any safety function. Thus, this event is not reportable per 10 CFR 50.73(a)(2)(v)(C) as a Unit 2 Safety System Functional Failure (SSFF).

<sup>1</sup> (EIS Component Identifier: DG)

<sup>2</sup> (EIS Component Identifier: ENG)

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**SAFETY SIGNIFICANCE**

As power was being reduced (after the test had been halted), operators noted that, after D5 load was reduced to 4000 kW, crankcase pressure decreased rapidly to 0 mm. Both D5 and D6 have been noted to have crankcase pressure issues in the past and one consistent attribute is that the crankcase pressure excursions occur at high load. The acceptance criteria of the surveillance test is that the diesel generator be loaded to between 5100 kW and 5300 kW for one hour. However, the highest predicted load for any event is under 3700 kW. Thus, it is reasonable to assume that, had D5 been called upon in response to any event, it would have performed its specified safety function. Therefore, the as-found condition of D5 did not affect the health and safety of the public.

**CAUSE**

Nuclear Management Company, LLC, (NMC) conducted a root cause evaluation of this condition. The root cause of high crankcase pressure is the residual deposits from the Fuel Oil Lube Oil incompatibility problem from 2001. The deposits causes piston rings to stick at high operating loads. The formation of the hard deposits inside the piston ring groove caused piston ring sticking at high operating loads. The rings sticking at high operating loads allowed combustion gases to enter the crankcase, thus elevating the crankcase pressure. The deposits were formed because of Fuel Oil and Lube Oil incompatibility that had developed as the fuel oil sulfur content had been reduced.

**CORRECTIVE ACTION****Immediate:**

1. Unit 2 was shutdown per Technical Specification 3.8.1, Condition F.

**Subsequent:**

2. The D5 pistons and cylinder liners (that had not been replaced since June 2004) were replaced to preclude residual deposits from leading to crankcase pressure excursions (the lube oil being used was changed in 2001 to preclude formation of new deposits.)
3. Deposit samples have been analyzed and a sample of combustion chamber components have been sent to the manufacturer for inspection. These results were incorporated in the root cause evaluation.

**Planned:**

4. Calvert Cliffs SACM UD45 diesel maintenance practices, operating practices, operating conditions, and TS required testing will be reviewed and compared to Prairie Island's.
5. A long-term plan for the continued reduction of fuel oil sulfur content will be established.

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PREVIOUS SIMILAR EVENTS

Licensee Event Report 2-01-03 was submitted pursuant to 10 CFR 50.73(a)(2)(i)(B) for a Technical Specification required shutdown that was a result of Unit 2 emergency diesel generator inoperability.