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December 9, 2003

U.S. Nuclear Regulatory Commission
Washington, DC 20555

ATTENTION: Document Control Desk

SUBJECT: Calvert Cliffs Nuclear Power Plant
Unit No. 2; Docket No. 50-318; License No. DPR 69
Licensee Event Report 2003-004
Technical Specification Exceeded Due to Extended Repair of Diesel Generator

The attached report is being sent to you as required under 10 CFR 50.73 guidelines. Should you have questions regarding this report, we will be pleased to discuss them with you.

Very truly yours,

A handwritten signature in black ink, appearing to read "KJ Nietmann", written over a horizontal line.

KJN/MJY/bjd

Attachment: As stated

cc: J. Petro, Esquire
J. E. Silberg, Esquire
Director, Project Directorate I-1, NRC
G. S. Vissing, NRC

H. J. Miller, NRC
Resident Inspector, NRC
R. I. McLean, DNR

IE22

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LICENSEE EVENT REPORT (LER)

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

1. FACILITY NAME Calvert Cliffs Nuclear Power Plant, Unit 2	2. DOCKET NUMBER 05000 318	3. PAGE 1 OF 06
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4. TITLE
Technical Specification Exceeded Due to Extended Repair of Diesel Generator

5. EVENT DATE			6. LER NUMBER			7. REPORT DATE			8. OTHER FACILITIES INVOLVED	
MO	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REV NO	MO	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
10	11	03	2003	- 04	- 00	12	09	2003		05000
									FACILITY NAME	DOCKET NUMBER
										05000
9. OPERATING MODE		1		11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR '': (Check all that apply)						
10. POWER LEVEL		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
				20.2203(a)(2)(iii)		50.46(a)(3)(ii)		50.73(a)(2)(v)(C)		Specify in Abstract below or in NRC Form 366A
				20.2203(a)(2)(iv)		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)		

12. LICENSEE CONTACT FOR THIS LER

NAME M. J. Yox	TELEPHONE NUMBER (Include Area Code) 410-495-6652
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13. COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT

CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX

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

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

During a routine inspection of No. 2A Diesel Generator (DG) standby lube oil circulating pump strainer on October 8, 2003, maintenance personnel discovered metal particles lodged in the strainer. The material was identified as aluminum, which is used as bearing material in Fairbanks-Morse DGs. All engine bearing clearances were measured. The No. 10 upper main bearing clearance was determined to be excessive and light scoring was subsequently found on the bearing surface. Limiting Condition for Operation (LCO) 3.8.1, requires two operable DGs and allows one DG to be out of service for 72 hours. Because repairs to the No. 2A DG could not be completed in the allowed time, repair and testing of the DG required enforcement discretion from the Nuclear Regulatory Commission for Unit 2 to remain in operation during completion of the repair. This regional enforcement discretion request was approved at 5:45 p.m., October 10, 2003 following a phone discussion with Nuclear Regulatory Commission staff at 2:00 p.m. that same day. At 2:00 a.m. on October 11, 2003 the No. 2A DG exceeded the 72 hour LCO Completion Time. Unit 2 remained in the LCO 3.8.1, Condition H until No. 2A DG was tested, and returned to service after completing repairs to No. 10 upper main bearing.

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

I. DESCRIPTION OF EVENT

During a routine inspection of No. 2A Diesel Generator (DG) standby lube oil circulating pump strainer on October 8, 2003, maintenance personnel discovered metal particles lodged in the strainer. The material was identified as aluminum, which is used as bearing material in Fairbanks-Morse DGs. All engine bearing clearances were measured. The No. 10 upper main bearing clearance was determined to be excessive and light scoring was subsequently found on the bearing surface. Limiting Condition for Operation (LCO) 3.8.1, requires two operable DGs and allows one DG to be out of service for 72 hours. Because repairs to the No. 2A DG could not be completed in the allowed time, repair and testing of the DG required enforcement discretion from the Nuclear Regulatory Commission for Unit 2 to remain in operation during completion of the repair. This regional enforcement discretion request was approved at 5:45 p.m., October 10, 2003 following a phone discussion with Nuclear Regulatory Commission staff at 2:00 p.m. that same day. At 2:00 a.m. on October 11, 2003 the No. 2A DG exceeded the 72 hour LCO Completion Time.

The degradation of the bearing was unexpected because the standard vendor recommended bearing inspections were performed successfully during the Unit 2 2003 outage. Unit 2 remained in LCO 3.8.1, Condition H, until No. 2A DG was returned to service.

The following project management schedule was developed to support the request for enforcement discretion:

- Disassemble engine – 12 hours
- Repair and reassemble the engine – 63 hours
- Activities associated with testing and inspection of the DG – 52 hours

These activities began at noon on October 8, 2003. To perform these activities, Calvert Cliffs requested enforcement discretion for three-days beyond the 72-hour Completion Time. Although the schedule time to complete these activities was less than six days, the additional time was requested for contingency activities beyond those already included in the schedule. Without enforcement discretion, Unit 2 would have commenced shutdown by 2:00 a.m. on October 11, 2003. Had additional problems been discovered during the repair process that could not be resolved in the approved timeframe, Unit 2 shutdown would have been required as soon as that determination was made. No. 10 upper main bearing cap was repaired at a vendor facility and a new No. 10 upper main bearing was installed in the No. 2A DG. Experienced technical representatives from the DG vendor were brought onsite to assist in the repair process. No. 2A DG was returned to operable status at 1:30 a.m., October 14, 2003 and the associated Technical Specification Condition was exited.

The return to service of No. 2A DG was delayed by several hours when oil foaming was observed during post-maintenance testing. Investigation revealed the foaming occurred after the DG crankcase was drained and refilled with new lubricating oil. The lubricating oil additive package

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formulation had been modified by the vendor without notice to site personnel. The suspect oil was replaced and testing verified the foaming condition was no longer present. Operability of No. 2A DG was not challenged because the oil with less than sufficient anti-foaming agent was only present while the DG was out-of-service. Operability of the remaining site DGs was not challenged because the suspect oil was not installed in other DGs prior to discovery of the condition. The degraded oil was also discovered before makeup oil could have been added to any other diesel generators in quantities sufficient to affect operability.

No additional systems, structures, or components were inoperable at the start of this event that would have contributed to its severity or that could have been used to mitigate this event. No automatic or manually initiated safety system responses occurred or were necessary to place the unit in a safe and stable condition as a result of the degraded condition on No. 2A DG. Due to the concern of common mode failure, an evaluation was performed to determine the operability of the other Fairbanks-Morse DGs (Nos. 1B and 2B DGs). The evaluation concluded the other DGs were operable. The standby lube oil circulating pump suction strainers for Nos. 1B and 2B DGs were inspected on October 9, 2003 and October 14, 2003, respectively. No metal particles were found in either strainer.

II. CAUSE OF EVENT

Vendor representatives were brought in to assist with engine repairs and support the root cause analysis, after measurements revealed excessive clearance on the No. 10 upper main bearing. The clearances of the other bearings on the No. 2A DG were measured and found to be within vendor specifications. The No. 10 upper main bearing was removed and inspection of this bearing showed minor degradation. The Nos. 9 and 11 upper main bearings (the bearings on either side of the No. 10 upper main bearing on the upper crankshaft) were removed for inspection. These bearings were found to be in good condition, with normal wear observed.

The No. 10 connecting rod bearing was also inspected, and was found to have very minor degradation. This was expected since the lubricating oil flows from the upper main bearing to the associated connecting rod bearing. The No. 10 connecting rod bearing was also replaced.

Other key points were checked on the No. 2A DG and found to be within vendor specifications. These checks included a straight edge test across the Nos. 9, 10, and 11 upper main bearing saddles. The oil supply line to the No. 10 upper main bearing was inspected and determined to be unobstructed and free of debris or foreign material. The upper crankshaft was checked for straightness using a dial indicator test and found to be straight. Also, the suction strainer for the standby lube oil pump for the No. 1B DG was checked and no debris was found. No. 2B DG standby lube oil pump suction strainer was verified free of debris after No. 2A DG was returned to operable status.

A dimensional check was also done on the bearing caps for the Nos. 9, 10, and 11 upper main bearings. The bearing caps for the Nos. 9 and 11 upper main bearings were found to be within vendor specifications. However, measurements taken of the No. 10 upper main bearing cap

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exceeded the vendor's inspection limits, indicating the cap was distorted. The cap was measured at 10.122 inches, while the acceptable factory tolerance was 10.125 +0.002/-0.001 inches. The bearing cap span was too narrow by 0.002 inches.

The degradation seen on the No. 10 upper main bearing resulted from distortion of the bearing cap. The distortion of the bearing cap most likely occurred in the 1995 time frame and can be attributed to vendor installation error. During the installation of the No. 10 upper main bearing in 1994, the bearing cap and bearing were not properly aligned. This misalignment likely resulted in distortion of the bearing cap. After approximately 170 hours of operation the No. 10 upper main bearing was found degraded on August 23, 1995, during a routine inspection. The installation process for the new No. 10 upper main bearing, in 1995, did not detect the distorted bearing cap and the bearing cap was reinstalled. The event investigation in 1995 identified the installation error as the root cause for the bearing degradation, but did not identify the bearing cap distortion. The distorted bearing cap was identified as the root cause of the current degraded bearing condition after similar degradation of the bearing was again seen in 2003 after 343 hours of operation. Other causes for the observed bearing degradation were evaluated, such as foreign material in the oil, and interruption in the flow of lubricating oil to the bearing. Each of these potential causes was eliminated.

The root cause of this event was found to be a failure to identify distortion of the bearing cap on the No. 2A DG in August 1995, following installation error of the No. 10 upper main bearing cap in 1994. An Operating Experience report has been issued to alert other utilities of this condition.

III. ANALYSIS OF EVENT

This event is reportable in accordance with the following:

10 CFR 50.73(a)(2)(i)(B); "Any operation or condition which was prohibited by the plant's Technical Specifications."

Calvert Cliffs Nuclear Power Plant Technical Specifications LCO 3.8.1.b for AC Sources – Operating, requires that two DGs shall be operable for each unit. Should one of the required DGs become inoperable, Technical Specification Required Action 3.8.1.B.4 requires restoration of the affected DG to operable status within 72 hours. The degraded condition identified on No. 2A DG resulted in a failure to return the DG to service within the required Completion Time. Regional enforcement discretion was obtained prior to exceeding the required Completion Time. The request for regional enforcement discretion was made to avoid an unnecessary plant transient as the result of full compliance with the Technical Specifications. No. 2A DG was returned to service within the allowed extension time of six days. Technical Specification LCO 3.8.1.b prohibited the inoperable condition of No. 2A DG from 2:00 a.m. on October 11, 2003 through 1:30 a.m. on October 14, 2003 while in Mode 1.

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The observed degradation was limited to the No. 10 upper main bearing on the No. 2A DG. No. 2A DG was determined to be operable with the degraded No. 10 upper main bearing via engineering evaluation.

No. 2B DG remained operable during the identified out-of-service period for No. 2A DG. Because an operable DG was available, there was no impact on the safety function of critical systems, structures, or components. The condition could not have prevented the fulfillment of a safety function during this period.

The DGs are designed to provide a dependable onsite power source capable of starting and supplying the essential loads necessary to safely shut down the plant and maintain it in a safe shutdown condition under all conditions. Four DGs are provided for the plant although each unit requires only one DG to supply the minimum power requirements for its engineered safety feature equipment.

The effect of remaining in Mode 1 for this extended time was evaluated using risk insights. The Unit 2 risk of operating for six days with the No. 2A DG out-of-service was determined using a Seismic, Fire, Wind, and Internal Events probabilistic risk assessment with average unavailabilities. This is the same model used in our DG Required Action Completion Time extension submittal. The only difference is the No. 0C DG heating, ventilation, and air conditioning seismic ruggedness modification is not complete. This evaluation indicated a minimal increase in overall risk.

The following qualitative issues were not considered in the above analysis:

- By limiting the performance of discretionary maintenance or testing, there was improved defense-in-depth. This resulted in a reduction in risk.
- Review of the operator actions to be taken on a loss of offsite power improved the likelihood of success of these actions. This resulted in a reduction in risk.
- The presence of all four offsite circuits maximized the reliability of offsite power. The Calvert Cliffs probabilistic risk assessment does not explicitly provide credit for the benefit of the third 500 kV high-line. A more detailed analysis of the benefit of the additional high-line results in a reduction in risk. No discretionary maintenance or testing on the offsite power system reduced the likelihood of losing offsite power. This specifically applied to switchyard maintenance. In addition, discussions with the System Load Dispatcher indicated no grid instabilities were expected during the requested extension period. Specifically, no severe weather was predicted and no maintenance was scheduled that would have impacted grid stability for the requested extension period.

The above qualitative actions were not quantified. Compensatory measures were taken to manage the qualitative issues described above.

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The qualitative portion of the risk assessment included multiple compensatory measures that were not included in the quantitative risk assessment. The qualitative risk reduction improved the quantitative risk assessment, such that there was no net increase in risk for the requested extension period.

IV. CORRECTIVE ACTIONS

- A. Repairs to No. 2A DG were completed on October 14, 2003.
- B. Inspections of similar engines (Nos. 1B and 2B DGs) were completed on October 14, 2003.
- C. A Contractor Sponsorship Program (MN-1-113) was implemented in November 1996 to enhance coordination and control of contractors working on-site.
- D. The Vendor Technical Manual for Fairbanks Morse Diesel Generator Crankshaft and Main Bearings was amended in November 1997 to include additional inspection criteria and repair processes for main bearing saddle distortion. (VTM 12310-168-1010)

V. ADDITIONAL INFORMATION

A. Component Identification

Component	IEEE 803 EIS Function	IEEE 805 System ID
Diesel Generator No. 2A	DG	EK

B. Previous Occurrences

Problems with upper main bearings on Fairbanks-Morse Diesel Engines were an industry issue due to nuclear service conditions from the early 1970's until prelubing of engines was instituted as standard practice. Calvert Cliffs Nuclear Power Plant is not aware of degradation of this kind in the commercial nuclear power industry on other Fairbanks-Morse DGs since engine prelubing became the accepted practice.