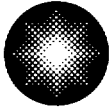


**Peter E. Katz**  
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**Constellation  
Nuclear**

**Calvert Cliffs  
Nuclear Power Plant**

*A Member of the  
Constellation Energy Group*

March 20, 2002

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 2002-001  
Pump Flexible Drive Gear Wear Causes Emergency Diesel Generator  
Inoperability

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,

PEK/CDS/bjd

Attachment

cc: R. S. Fleishman, Esquire  
J. E. Silberg, Esquire  
Director, Project Directorate I-1, NRC  
D. M. Skay, NRC

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

IE22

Estimated burden per response to comply with this mandatory information 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 Management Branch (T-6 E6), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to bjs1@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOF-10202 (3150-0104), Office of Management and Budget, Washington, DC 20503. If a means used to impose 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.

**LICENSEE EVENT REPORT (LER)**

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

<b>1. FACILITY NAME</b> Calvert Cliffs, Unit 2	<b>2. DOCKET NUMBER</b> 05000 318	<b>3. PAGE</b> 1 OF 004
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**4. TITLE**  
Pump Flexible Drive Gear Wear Causes Emergency Diesel Generator Inoperability

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
01	24	02	2002	- 01	00	03	20	2002		05000
									FACILITY NAME	DOCKET NUMBER
										05000

<b>9. OPERATING MODE</b> 1	<b>11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR :</b> (Check all that apply)									
	20.2201(b)	20.2203(a)(3)(ii)	50.73(a)(2)(ii)(B)	50.73(a)(2)(ix)(A)						
<b>10. POWER LEVEL</b> 100	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)	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**

<b>NAME</b> Craig Sly, Licensing Consultant	<b>TELEPHONE NUMBER (Include Area Code)</b> 410-495-4858
--	---

**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
B	EJ	GR	F010	Y					

<b>14. SUPPLEMENTAL REPORT EXPECTED</b>				<b>15. EXPECTED SUBMISSION DATE</b>		
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)

On January 24, 2002 during a routine inspection of Calvert Cliffs 2A Emergency Diesel Generator (EDG), it was discovered that the pump flexible drive gear that drives auxiliary pumps necessary for diesel operation, was pitted. The EDG was required to remain out-of-service for a time period greater than allowed under the plant's Technical Specifications. Enforcement discretion was requested and granted by Nuclear Regulatory Commission to allow the Unit to continue operation until February 2, 2002 while the pump flexible drive gear was replaced. The gear was replaced and 2A EDG was returned to service at 2:35 pm on January 31, 2002.

The cause of the event was misalignment of the pump flexible drive gear. This caused abnormal pitting to occur on the pump flexible drive gear.

The other similar EDGs at Calvert Cliffs were inspected for similar problems and none were found. A root cause analysis is in progress and additional actions will be implemented based on the results.

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CALVERT CLIFFS, UNIT 2	05000 318	2002	- 001	- 00	02	OF 004

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

I. DESCRIPTION OF EVENT

On January 24, 2002, during a biennial inspection of the Calvert Cliffs Unit 2, 2A Emergency Diesel Generator (EDG) (Fairbanks-Morse), abnormal wear (pitting) was noted on the pump flexible drive gear. This gear drives the auxiliary pumps necessary for operation of the diesel generator, including the cooling water pumps, oil pump, governor, air start distributor, and fuel oil pump. The amount of wear discovered was unexpected because the gear had only approximately 50 hours of operation since the last biennial inspection and only about 3000 hours of total run time. A vendor representative was contacted, inspected the gear, and concluded that the amount of wear was not normal. At the time the problem was discovered, Calvert Cliffs Unit 2 was operating at 100 percent rated thermal power.

Unit 2 had entered Technical Specification 3.8.1, "AC Sources-Operating," Condition B at 3:00 am on January 24, 2002 to conduct the biennial inspection. After discovery of the abnormal wear on the pump flexible drive gear, the Unit remained in Technical Specification 3.8.1, Condition B. Condition B specifies that, when in Modes 1-4, with one of the separate and independent EDGs inoperable, the inoperable EDG must be restored to operable status within 72 hours. If the inoperable EDG is not restored to operable status, Condition H must be entered. Condition H specifies that the Unit be placed in Mode 3 within six hours and Mode 5 within 36 hours.

Calvert Cliffs personnel evaluated the situation and came to the conclusion that:

1. Replacement of the pump flexible drive gear would take more time than allotted in the Technical Specifications (72 hours) prior to requiring a Unit shutdown.
2. Based on the apparent root cause of the pump flexible drive gear pitting and the estimated time to complete repairs, a Unit 2 shutdown was not warranted.

Nuclear Regulatory Commission (NRC) Region I was contacted on January 26, 2002 to request regional enforcement discretion from Technical Specification 3.8.1. Regional enforcement discretion was verbally granted at 12:15 am on January 27, 2002. A written follow-up request for regional enforcement discretion was submitted to NRC Region I on January 29, 2002 [letter from C. H. Cruse (CCNPP) to Document Control Desk (NRC), dated January 29, 2002, Request for Regional Enforcement Discretion]. The NRC issued a written Notice of Enforcement Discretion (NOED) on January 31, 2002 (NOED No. 2002-01-01).

The NOED exercised discretion not to enforce compliance with Technical Specification 3.8.1 for the six day period starting at 3:00 am on January 27, 2002 and ending at 3:00 am on February 2, 2002. The NOED was contingent upon the following compensatory measures being in place:

1. Postponement of elective maintenance on the redundant Unit 2, 2B EDG.

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		2002	- 001	- 00		

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

2. Suspension of discretionary maintenance or testing on any Unit 2 safety-related equipment or the off-site power system.
3. Ensuring that all four offsite power circuits were available, even though only two were required to be operable by Technical Specifications.
4. A commitment to shutdown Unit 2 if threatened by severe weather with the potential to interrupt offsite power.
5. Training and stationing a dedicated operator to utilize the non-safety-related 5400 kW OC EDG to power either Unit 2 vital bus in event of a loss-of-offsite power, as well as cross-connect key motor control centers to provide power to necessary equipment.
6. Assigning an operator to control the auxiliary feedwater flow control valves in the event that flow control was lost following a loss-of-offsite power.

These compensatory measures were implemented and maintained until the EDG was returned to service. Various pumps and pump drive gears including the pump flexible drive gear were replaced. Number 2A EDG passed its post-maintenance testing and was declared operable at 2:35 pm on January 31, 2002.

II. CAUSE OF EVENT

After performing many measurements and inspections of the pump flexible drive gear and associated equipment, Calvert Cliffs personnel discovered several installation errors and two out-of-specification conditions. First the backlash between the lube oil pump drive gear and the lube oil pump driven gear was zero (specification is 0.004 to 0.008 inches). Second, alignment of the two bearing bores in the pump flexible drive gear assembly exceeded the manufacturers specifications. Calvert Cliffs believes the installation errors and bearing bores caused the gears to be mis-aligned and resulted in the abnormal gear wear. However, since the errors would have occurred over 25 years ago, the human performance aspects of the out-of-specification conditions could not be validated.

A formal root cause analysis is still in progress.

III. ANALYSIS OF EVENT

The EDGs provide onsite electrical power to vital plant systems in the event that offsite electrical power is interrupted. Calvert Cliffs Unit 2 has two safety-related EDGs, 2A and 2B. Calvert Cliffs also has a high quality non-safety-related diesel generator that can be manually aligned to either of the Unit 2 4 kV busses that are served by 2A and 2B EDG.

The 2A EDG was actually out-of-service from January 24, 2002 at 3:00 am until January 31, 2002 at 2:35 pm. The risk significance of 2A EDG being out-of-service from January 24 until

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

February 2, 2002 was evaluated by Calvert Cliffs personnel and NRC (Reference NOED 2002-01-01) and concluded not to involve any undue impact on the health and safety of the public. Based on these conclusions, this event had no adverse impact on the health and safety of the public.

This event is considered reportable in accordance with 10 CFR 50.73(a)(2)(i)(B), Any event or condition prohibited by the plants Technical Specifications. Although NRC Region I granted enforcement discretion for Technical Specification 3.8.1 for a period of six days, the plant was not in compliance with the Technical Specification from 03:00 on January 27, 2002 until 2A EDG was returned to service at 2:35 pm on January 31, 2002.

IV. CORRECTIVE ACTIONS

The following corrective actions were taken as a result of this event:

1. Various pumps and pump drive gears including the pump flexible drive gear were replaced and the 2A EDG was returned to service on January 31, 2002. The replaced parts will be sent to the manufacturer for inspection.
2. The other similar EDGs (Fairbanks-Morse) at Calvert Cliffs were inspected for a similar problem with their pump flexible drive gears. No abnormal wear or conditions were found.
3. A formal root cause analysis concerning this event is in progress. Additional corrective actions may be implemented as determined by the results of this causal analysis.

V. ADDITIONAL INFORMATION

A. Affected Component Identification

Component or System	IEEE 803 EIS Function	IEEE 805 System ID
Emergency Diesel Generator	DG	EK
Flexible Drive Gear	GR	EK
Auxiliary Feedwater Flow Control Valve	FCV	BA

B. Previous Similar Events

There have been no previous similar events at Calvert Cliffs involving a failure or degradation of the pump flexible drive gear.