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*A Member of the
Constellation Energy Group*



February 28, 2000

U.S. Nuclear Regulatory Commission
Washington, DC 20555

ATTENTION: Document Control Desk

SUBJECT: Calvert Cliffs Nuclear Power Plant
Unit No. 1; Docket No. 50-317; License No. DPR 53
Licensee Event Report 2000-002
Emergency Core Cooling Pump Room Ventilation Surveillance Test Failure

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 that reads 'Peter E. Katz'. The signature is written in a cursive style with a large, prominent 'K'.

PEK/TWG/dlm

Attachment

cc: R. S. Fleishman, Esquire
J. E. Silberg, Esquire
Director, Project Directorate I-1, NRC
A. W. Dromerick, NRC

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

JE22

NRC FORM 366 (6-1998)	U.S. NUCLEAR REGULATORY COMMISSION LICENSEE EVENT REPORT (LER) (See reverse for required number of digits/characters for each block)	APPROVED BY OMB NO. 3150-0104 EXPIRES 06/30/2001 Estimated burden per response to comply with this mandatory information collection request: 50 hrs. Reported lessons learned are incorporated into the licensing process and fed back to industry. Forward comments regarding burden estimate to the Records Management Branch (T-6 F33), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, and to the Paperwork Reduction Project (3150-0104), Office of Management and Budget, Washington, DC 20503. If 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.
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TITLE (4)
Emergency Core Cooling Pump Room Ventilation Surveillance Test Failure

EVENT DATE (5)			LER NUMBER (6)			REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
01	28	2000	2000	- 002	- 00	02	28	2000		050000

OPERATING MODE (9)	POWER LEVEL (10)	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11)			
		20.2201(b)	20.2203(a)(2)(v)	50.73(a)(2)(i)	50.73(a)(2)(viii)
1	100	20.2203(a)(1)	20.2203(a)(3)(i)	50.73(a)(2)(ii)	50.73(a)(2)(ix)
		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)	X 50.73(a)(2)(v)	Specify in Abstract below
		20.2203(a)(2)(iv)	50.36(c)(2)	50.73(a)(2)(vii)	or in NRC Form 366A

LICENSEE CONTACT FOR THIS LER (12)

NAME T. W. Grover	TELEPHONE NUMBER (Include Area Code) 410-495-2064
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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
X	VF	FLT	A220	Y					

SUPPLEMENTAL REPORT EXPECTED (14)				EXPECTED SUBMISSION DATE (16)		
YES (If yes, complete EXPECTED SUBMISSION DATE).	X	NO		MONTH	DAY	YEAR

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

On January 28, 2000, during performance of a surveillance test, a condition was discovered at Calvert Cliffs that could have prevented the Emergency Core Cooling System (ECCS) Pump Room Exhaust Filtration System (PREFS) from fulfilling its safety function to control the release of radioactive material during the recirculation phase of a Loss-of-Coolant Accident. Specifically, during an in-place test of the ECCS PREFS charcoal adsorber to show a penetration and system bypass less than or equal to 1.0 percent, the test showed a penetration and system bypass greater than 50 percent. The test failed due to loose nuts holding in the ECCS charcoal trays. The test was repeated with satisfactory results after the nuts were tightened. The ECCS PREFS could have been incapable of performing its safety function since the last time it was tested on November 8, 1999, a period of 82 days.

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I. DESCRIPTION OF EVENT

On January 28, 2000, at approximately 0535, operators entered Technical Specification 3.7.10 [Emergency Core Cooling System (ECCS) Pump Room Exhaust Filtration System (PREFS)], Action b after taking the ECCS PREFS out-of-service for maintenance. Later that day, prior to returning the system to service, a surveillance test procedure (STP) was commenced to verify the operability of the charcoal adsorber filter in the ECCS PREFS following painting in No. 11 ECCS Pump Room, a ventilation zone communicating with the ECCS PREFS. Unit 1 was at 100 percent power, normal operating temperature, and pressure.

At approximately 1300, on January 28, 2000, the surveillance test was commenced. In accordance with the STP, instrument shop technicians first conducted a visual inspection to verify all charcoal adsorber trays were installed, and inspected the charcoal adsorber and mounting frames for any gross damage, physical defects, easily discernible holes, physical damage to gaskets, and non-uniform gasket compression. No discrepancies were noted during the visual inspection. Next, the instrument shop technicians removed a sample of the charcoal adsorber for laboratory testing in accordance with the STP. Following removal of the sample, the instrument shop technicians reinstalled the sample test tray in accordance with the STP. The installation of the sample test tray was second-checked by an independent reviewer. No discrepancies were noted during the installation of the sample test tray.

The instrument shop technicians then performed the in-place test of the charcoal adsorber to verify the amount of penetration and system bypass is within limits in accordance with the STP. The applicable sections of the STP implement Regulatory Positions C.5.a and C.5.d of Regulatory Guide 1.52, Revision 2, "Design, Testing, and Maintenance Criteria for Post Accident Engineered-Safety-Feature Atmosphere Cleanup System Air Filtration and Adsorption Units of Light-Water-Cooled Nuclear Power Plants," and Technical Specification 5.5.11.b system flowrate test condition requirements. The instrument shop technicians started freon gas injection and recorded gas readings upstream and downstream of the charcoal adsorbers. The test showed a penetration and system bypass greater than 50 percent. A penetration and system bypass greater than 1.0 percent constitutes a failed test. As required by the STP, the instrument shop technicians notified the Shift Manager that the ECCS PREFS charcoal adsorber failed to meet penetration and system bypass test acceptance criteria. An Issue Report was initiated to document the failure. The failure of the ECCS PREFS charcoal adsorber to meet penetration and system bypass testing acceptance criteria constitutes a condition that could have prevented the fulfillment of the safety function of the ECCS PREFS that is needed to control the release of radioactive material during the recirculation phase of LOCA.

Instrument shop technicians systematically eliminated potential cause candidates to isolate the root cause of the out-of-tolerance penetration and system bypass. This testing demonstrated that the charcoal filter bypass damper was not bypassing flow. The instrument shop technicians then inspected

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the charcoal trays, their mounting frames and the nuts holding in the charcoal trays. Approximately 10 nuts were discovered finger loose on approximately five trays. In order to confirm or possibly eliminate the loose nuts as the cause of the failed test, the instrument shop technicians tightened all loose nuts holding in the charcoal adsorber trays. A total of approximately 24 nuts were tightened. To test the single action of tightening the nuts on the charcoal trays, the penetration and system bypass test was re-performed without disturbing the lineup and without cycling the bypass damper. The test results were satisfactory. On January 28, 2000, at approximately 2355, Operators exited Technical Specification 3.7.10, Action b after the ECCS PREFS was returned to service.

II. CAUSE OF EVENT

Thus far, the root cause assessment has identified that the loose nuts caused the ECCS PREFS charcoal adsorber penetration and system bypass test failure. The nuts were last installed wrench tight in 1995. This was sufficiently tight to pass the penetration and system bypass test performed following installation and each of the five subsequent tests performed since 1995. The last test was performed in November 1999. An investigation into how the nuts became sufficiently loose to result in a test failure is continuing. The investigation into how the nuts became loose currently centers around the long-term effects of minimal vibration. The root cause assessment is still in progress to determine other causal factors and evaluate generic implications.

III. ANALYSIS OF EVENT

The ECCS PREFS filters air from the area of the active ECCS components during the recirculation phase of a LOCA.

The ECCS PREFS consists of two independent and redundant fans, a prefilter, a high efficiency particulate air (HEPA) filter, and an activated charcoal adsorber section for removal of gaseous activity (principally iodines). Ductwork, valves or dampers, and instrumentation also form part of the system.

The ECCS PREFS operates during normal unit operations. During normal operation, flow goes through the pre-filter and HEPA filters, but flow through the charcoal adsorbers is bypassed. During emergency operations, the ECCS PREFS dampers are realigned to initiate charcoal adsorber filtration. The stream of ventilation air discharges through the system filter trains and out the plant stack.

Technical Specification 3.7.10 requires the ECCS PREFS to be operable in Modes 1-4. The ECCS PREFS is considered operable when the individual components necessary to maintain the ECCS Pump Room filtration are operable. The list of components that are necessary include a charcoal adsorber that is capable of performing its filtration function and an operable charcoal adsorber bypass damper.

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The system is not required to limit offsite dose to within 10 CFR Part 100 limits, and its operation is not assumed in the Safety Analysis section (Chapter 14) of our Updated Final Safety Analysis Report. However, the ECCS PREFS ensures that radioactive materials leaking from the ECCS equipment within the pump room following a LOCA are filtered prior to reaching the environment as a layer of defense.

An analysis contained in Section 14.16.2 of the Preliminary Safety Analysis Report concluded that with a leakage of 1,000 gallons of reactor coolant into the pump room from a failed low pressure safety injection pump seal, one percent failed fuel, and the release of 10 percent of the contained iodine, that the dose at the site boundary would increase by 14 mrem if the system was operating with filters bypassed. This dose is relatively small compared with 10 CFR Part 100 limits for total radiation dose of 25 rem to the whole body and 300 rem to the thyroid from iodine exposure. Therefore, the potential risk posed by an inoperable ECCS PREFS charcoal adsorber during a LOCA is minimal. The maximum amount of time that the ECCS PREFS could have possibly been incapable of performing its safety function was from November 8, 1999 to January 28, 2000, a period of 82 days. There were no actual safety consequences associated with the event.

An ECCS PREFS failure is not an accident initiator; therefore, this event did not increase the probability of an accident. During emergency operations, an inoperable ECCS PREFS would not result in a significant reduction in the protection to the health and safety of the public. There were no safety consequences resulting from this event. This event is reportable pursuant to the requirements of 10 CFR 50.73(a)(2)(v) as a condition that alone could have prevented the fulfillment of the safety function of a system that is needed to control the release of radioactive material.

IV. CORRECTIVE ACTIONS

- A. An Issue Report was initiated to document the test failure.
- B. The loose nuts holding in the ECCS PREFS charcoal adsorber trays were tightened.
- C. The Unit 2 ECCS PREFS charcoal adsorber was tested to show the amount of penetration and system bypass. The test results were within acceptable limits.
- D. Maintenance activities have been initiated to inspect the charcoal trays in the other Engineered Safety Feature ventilation systems.
- E. A formal root cause assessment is in progress to determine causal factors, evaluate generic implications and establish additional corrective actions as required.

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V. ADDITIONAL INFORMATION

A. Affected Component Identification:

Component or System	IEEE 803 EIIIS Funct	IEEE 805 System ID
PREFS	AHU	VF
Charcoal Filter	FLT	VF
Damper	DMP	VF

B. Previous similar events:

A review of Calvert Cliffs' licensee event reports over the past several years was performed. The review did not identify any similar reportable events where the operability of a ventilation system was challenged by inadequately secured charcoal trays.