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C. K. McCoy  
Vice President, Nuclear  
Vogtle Project

November 18, 1994



LCV-0505

Docket No. 50-424

U. S. Nuclear Regulatory Commission  
ATTN: Document Control Desk  
Washington, D. C. 20555

Gentlemen:

**VOGTLE ELECTRIC GENERATING PLANT  
LICENSEE EVENT REPORT - PIPING PENETRATION AREA  
FILTRATION AND EXHAUST SYSTEM RENDERED INOPERABLE**

In accordance with the requirements of 10 CFR 50.73, Georgia Power Company submits the enclosed report related to an event which was discovered on October 27, 1994.

Sincerely,

*C.K. McCoy*  
C. K. McCoy

CKM

Enclosure: LER 50-424/1994-08

cc: Georgia Power Company  
Mr. J. B. Beasley, Jr.  
Mr. M. Sheibani  
NORMS

U. S. Nuclear Regulatory Commission  
Mr. S. D. Ebnetter, Regional Administrator  
Mr. D. S. Hood, Licensing Project Manager, NRR  
Mr. B. R. Bonser, Senior Resident Inspector, Vogtle

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NRC FORM 366 (5-92)		U.S. NUCLEAR REGULATORY COMMISSION		APPROVED OMB NO. 3150-0104 EXPIRES: 5/31/95	
<b>LICENSEE EVENT REPORT (LER)</b>				ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 50.0 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH (MNB7714), 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.	
FACILITY NAME (1) Vogtle Electric Generating Plant - Unit 1				DOCKET NUMBER (2) 5   0   0   0   4   2   4   1   OF   5	
TITLE (4) <b>PIPING PENETRATION AREA FILTRATION AND EXHAUST SYSTEM RENDERED INOPERABLE</b>					
EVENT DATE (5)		LER NUMBER (6)		REPORT DATE (7)	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER
1   0	2   7	9   4	9   4	- 0   0   8	- 0   0   1
				MONTH DAY YEAR	
				1   1   1   8   9   4	
FACILITY NAME		DOCKET NUMBER(S)			
		0   5   0   0   0			
FACILITY NAME		0   5   0   0   0			
THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR ? (Check one or more of the following) (11)					
OPERATING MODE (9)		20.402(b)		20.405(c)	
POWER LEVEL (10)		20.405(a)(1)(i)		50.73(a)(2)(vi) X	
1   0   0		20.405(a)(1)(ii)		50.73(a)(2)(vii)	
		20.405(a)(1)(iii) X		50.73(a)(2)(viii)(A)	
		20.405(a)(1)(iv)		50.73(a)(2)(viii)(B)	
		20.405(a)(1)(v)		50.73(a)(2)(ix)	
OTHER (Specify in Abstract below and in Text, NRC Form 366A)					
LICENSEE CONTACT FOR THIS LER (12)					
NAME Mehdi Sheibani, Nuclear Safety and Compliance				TELEPHONE NUMBER (include area code)	
				AREA CODE	
				7   0   6   8   2   6   -   3   2   0   9	
COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)					
CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS	
SUPPLEMENTAL REPORT EXPECTED (14)					
YES (If yes, complete EXPECTED SUBMISSION DATE)				X NO	
				EXPECTED SUBMISSION DATE (15)	
				MONTH DAY YEAR	
ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-space typewritten lines) (16)					
<p>On October 19, 1994, while implementing a design change to delete the Electrical Penetration HVAC System, personnel removed fourteen circuit cards for both Train A and Train B of the system. On October 28, 1994, personnel investigating the cause of a damper problem in the Train A Piping Penetration Area Filtration and Exhaust System (PPAFES) determined that the removal of two of these circuit cards had rendered the exhaust dampers for both trains of the PPAFES inoperable. This represented a degraded condition of a safety function of a system needed to control the release of radioactive material. Technical Specification 3.0.3 was entered for 23 minutes until one train of PPAFES was restored to service.</p> <p>The design change process did not identify that certain circuits for both the Electrical Penetration HVAC System and PPAFES were contained on the same circuit cards. Several engineering drawings did not contain an engineering aid to advise the user that other circuits were contained on these circuit cards. Another key reference, the "card load list," contained better information, but was not referenced during the design change process. Vendor drawings are being corrected. The card load list has been updated and will be available for use when reviewing future design changes to determine the impact of pulling cards on system operation.</p>					

HRC FORM 366A (5-92)		U.S. NUCLEAR REGULATORY COMMISSION		APPROVED OMB NO. 3150-0104 EXPIRES: 5/31/95			
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FACILITY NAME (1)		DOCKET NUMBER (2)		LER NUMBER (6)		PAGE (3)	
Vogtle Electric Generating Plant - Unit 1		05000424		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
				94	-008	-00	2 OF 5
TEXT (If more space is required, use additional copies of NRC Form 366A)(17)							
A. REQUIREMENT FOR REPORT							
<p>This report is required per 10 CFR 50.73 (a)(2)(v) because a degraded condition of a safety function of a system needed to control the release of radioactive material existed when the Piping Penetration Area Filtration and Exhaust System (PPAFES) was rendered inoperable.</p> <p>This report is also required per 10 CFR 50.73 (a)(2)(i) because the unit operated per Technical Specification (TS) 3.0.3 when both trains of the PPAFES were inoperable.</p>							
B. UNIT STATUS AT TIME OF EVENT							
<p>At the time of the discovery of this event, Unit 1 was operating in Mode 1 (power operations) at 100 percent of rated thermal power. Other than that described herein, there was no inoperable equipment that contributed to the occurrence of this event.</p>							
C. DESCRIPTION OF EVENT							
<p>On October 19, 1994, while implementing a design change to delete the Electrical Penetration HVAC System, personnel removed fourteen circuit cards for both Train A and Train B of the system. Some of these cards controlled the Electrical Penetration HVAC System exhaust dampers' ability to open and close.</p> <p>On October 27, 1994, at 2230 EDT, personnel performing a surveillance of a different system, the Train A PPAFES, observed that an exhaust damper was not automatically opening as expected. A Limiting Condition for Operation (LCO) was entered for Train A and an investigation of the damper problem was initiated. The performance of the surveillance represented the first opportunity for operators to detect this damper problem.</p> <p>On October 28, 1994, at 1007 EDT, TS 3.0.3 was entered when personnel investigating the cause of the PPAFES exhaust damper problem determined that the removal of two of the circuit cards from the Electrical Penetration HVAC System had rendered the exhaust dampers inoperable for both Train A and Train B of PPAFES. The two Electrical Penetration HVAC System cards were utilized in common with PPAFES. Therefore, the ability of PPAFES to maintain a negative pressure boundary was affected. TS 3.0.3 was exited at 1030 EDT, when the circuit cards were reinstalled and Train A of PPAFES was restored to service. Train B of PPAFES was restored to service at 1140 EDT.</p>							

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<b>LICENSEE EVENT REPORT (LER) TEXT CONTINUATION</b>		

FACILITY NAME (1)  Vogtle Electric Generating Plant - Unit 1	DOCKET NUMBER (2)  0   5   0   0   0   4   2   4	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th colspan="3">LER NUMBER (6)</th> </tr> <tr> <th style="width: 33%;">YEAR</th> <th style="width: 33%;">SEQUENTIAL NUMBER</th> <th style="width: 33%;">REVISION NUMBER</th> </tr> <tr> <td>9   4</td> <td>-   0   0   8</td> <td>-   0   0</td> </tr> </table>	LER NUMBER (6)			YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	9   4	-   0   0   8	-   0   0	PAGE (3)  3 OF 5
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TEXT (If more space is required, use additional copies of NRC Form 366A)(17)

During the period of time from the removal of the circuit cards on October 19, 1994, to the restoration of PPAFES on October 28, 1994, a degraded condition of a safety function of a system needed to control the release of radioactive material existed. The plant safety analysis assumes iodine leakage from the piping penetration rooms and emergency core cooling system (ECCS) equipment to both offsite and control room locations during post-LOCA conditions. To mitigate this, the PPAFES maintains a negative pressure boundary on the piping penetration area rooms, ensuring that only filtered air leaves the area.

#### D. CAUSE OF EVENT

The design change process did not identify that circuits for both the Electrical Penetration HVAC System and PPAFES were contained on the same circuit cards. Consequently, personnel pulling the circuit cards were not aware that PPAFES components would be affected by their actions.

Inadequacies in the design change process included:

- 1) The engineer reviewing the design change was accustomed to seeing a continuation symbol on interconnection wiring diagrams (IWDs) when circuits other than those shown on the drawing are affected. In fact, the continuation symbol was often used by the original designer as an engineering aid to reference other circuit drawings. However, this aid was not applied on all similar drawings and was not on the drawing legend as a standard symbol. The lack of this symbol on the affected drawings led the reviewing engineer to believe that no other circuits were affected.
- 2) A card load list, which shows all circuits affected by specific cards, was not considered to be current by the reviewing engineers, and was not used during the review.
- 3) The design change itself was originally designated as a "minor design change", since the change was initially considered to be a minor modification and because the system was not in use. When the scope of the change later expanded, the additional scope did not receive an appropriate multi-disciplinary engineering review.

#### E. ANALYSIS OF EVENT

The Safety Evaluation Report dated July 9, 1992, assumes iodine leakage from the piping penetration rooms and emergency core cooling system (ECCS) equipment to both offsite and control room locations during post-LOCA conditions. However, PPAFES functions to maintain a negative pressure boundary on the piping penetration area rooms and to filter the exhaust from those areas.

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<p>Had the ECCS leakage risen to the design basis analyzed value of 2 gpm with the PPAFES exhaust dampers closed, the offsite dose would have remained within the 10 CFR 100 limits, and the control room dose would also have remained within the General Design Criteria 19 acceptance criteria.</p> <p>Several other factors also existed that would have mitigated the consequences of this scenario:</p> <ol style="list-style-type: none"> <li>1) Although the PPAFES exhaust dampers were inoperable and would have resulted in an increase of radioactivity release, the filter and recirculation function of the PPAFES was operable and would have filtered out a majority of the airborne radiation resulting from ECCS leakage.</li> <li>2) ECCS leakage which might have occurred would enter the auxiliary building in interior rooms below grade, and have to diffuse through several rooms or be transported via the filter system to rooms bordering on the exterior of the building prior to release. After filtration, the expected discharge flow would have been returned with the recirculation flow to the various ECCS rooms. These rooms are typically provided with sealed penetrations and solid doors (not wire mesh) maintained closed for flood protection, radiation protection, fire protection, etc., and would provide a substantial barrier to radioactivity release. Therefore, the majority of the leakage would be processed through the PPAFES filters, perhaps being recirculated several times, prior to release. Furthermore, since both trains of PPAFES could have been used, the filtering capacity would have been more than the analyzed value. In addition, the leakage which bypasses the filters would have a long winding pathway to follow prior to exiting the auxiliary building and would be subject to natural removal processes along the way, such as settling and plateout.</li> <li>3) The PPAFES charcoal filter iodine removal efficiency is supplemented by heaters that aid in decreasing humidity. Since the expected relative humidity at the charcoal filter inlet (following the guidance of Regulatory Guide 1.52) is much closer to the controlled environment value of 70 percent than to the uncontrolled environment value of 95 percent, the PPAFES efficiency of iodine removal would be greater than that taken credit for in the design basis dose analysis. In addition, the filter actually has a bed depth of four inches as opposed to the two inches taken credit for in the accident analysis. Therefore, the recirculation/filtration which would occur would be more effective than discussed above.</li> </ol> <p>Finally, there was no leakage event during the period of time involved. Based on these considerations, there was no adverse effect on plant safety or on the health and safety of the public as a result of this event.</p>																



LICENSEE EVENT REPORT (LER)  
TEXT CONTINUATION

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Vogtle Electric Generating Plant - Unit 1	05000424	94-008-000	5 OF 5			

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## F. CORRECTIVE ACTIONS

- 1) The two circuit cards involved were reinstalled and both trains of PPAFES were restored to service. All work associated with the Electrical Penetration HVAC System deletion was halted.
- 2) The IWDs involved were corrected to include card continuation symbol, and the symbol was added to the drawing legend to standardize the use of this engineering aid.
- 3) The card load list has been updated and appropriate personnel have been advised that the update is completed and that it will be available for use for future design changes to determine the impact of pulling cards on system operation. Personnel will also be advised that the card load list will, in the future, be maintained current.
- 4) All minor design changes being implemented were suspended and reviewed to determine if additional multi-disciplinary engineering review should be performed. The plant review board will continue to review minor design changes until the procedure for minor design changes is revised to strengthen the controls for engineering reviews and to address the scope of such changes. The procedure is expected to be revised by 12-31-94.

## G. ADDITIONAL INFORMATION

- 1) Failed Components:  
None
- 2) Previous Similar Events:  
LER 50-424/1994-003, dated May 26, 1994. This previous PPAFES inoperability event occurred in April 1994, due to operator errors and inadequate work planning. Because the causes were different, corrective actions were not applicable to the prevention of the October 28, 1994, event. However, corrective actions to alert operators to potential problems with PPAFES and to establish a wider range of damper movements allowed operators to recognize the damper problem at the first available opportunity following the circuit cards' removal.
- 3) Energy Industry Identification System Code:  
Piping Penetration Area Filtration and Exhaust System - VF  
Emergency Core Cooling System - BJ, BP  
Electrical Penetration HVAC System - VF