

AUG 01 2002



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U. S. Nuclear Regulatory Commission
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Washington, DC 20555

**SPECIAL REPORT 311/02-003-01
SALEM GENERATING STATION - UNIT 2
FACILITY OPERATING LICENSE NO. DPR-75
DOCKET NO. 50-311**

Gentlemen:

This Supplemental Special Report entitled "Failure To Maintain Elements Of The Salem Fire Protection Program" is being submitted to update the cause of occurrence and corrective actions associated this event.

Sincerely,

A handwritten signature in black ink, appearing to read "D. F. Garchow".

D. F. Garchow
Vice President -
Operations

Attachment

BJT

C Mr. H. J. Miller, Administrator - Region I
USNRC Region I
475 Allendale Road
King of Prussia, PA 19406

Distribution
LER File 3.7

IE 22

LICENSEE EVENT REPORT (LER)

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

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 bjst1@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-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.

1. FACILITY NAME SALEM GENERATING STATION UNIT 2	2. DOCKET NUMBER 05000311	3. PAGE 1 OF 5
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4. TITLE
FAILURE TO MAINTAIN ELEMENTS OF THE SALEM FIRE PROTECTION PROGRAM.

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
05	21	02	02	- 003	- 01	08	01	02	Salem Unit 1	05000272
									FACILITY NAME	DOCKET NUMBER
										05000

9. OPERATING MODE	1	11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR 5: (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)	X 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)	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 Brian J. Thomas, Licensing Engineer	TELEPHONE NUMBER (Include Area Code) 856-339-2022
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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		
X	YES (If yes, complete EXPECTED SUBMISSION DATE)	NO		MONTH	DAY	YEAR
				08	02	2002

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

At approximately 1730 hours on May 20, 2002, preliminary test results were obtained for tracer gas tests being performed for the Unit 1 Elevation 78 Lower Electrical Penetration Area and the Unit 1 Elevation 64' 4160 Volt Switchgear Room. Results from these tests identified room leakage sufficient to prevent the carbon dioxide system in these areas from maintaining the required concentration of 50% for a hold time of 20 minutes as required by NFPA-12. At the time the results were presented, a review of data from tests being performed in the Unit 2 Elevation 78' Lower Electrical Penetration Area indicated that similar results would be expected for this area as well. An extent of condition review was performed considering that the primary leakage was through the CO₂ isolation dampers and it was determined that the Unit 2 4160 Volt Switchgear Room, and the Unit 1 & 2 460 Volt Switchgear Rooms may also be affected such that these rooms may not be capable of maintaining the carbon dioxide concentration of 50% for the hold time of 20 minutes. As a result the carbon dioxide systems for these six fire areas were impaired and fire watches were established in accordance with the Fire Protection Program.

The cause of the excessive leakage from these fires areas is a misapplication of the carbon dioxide isolation damper design (original design specification) for continued operation of the Switchgear and Penetration Area Ventilation (SPAV) system supply fans during a carbon dioxide discharge. Appropriate compensatory measures have been established in accordance with the fire protection program until design or configuration changes can be implemented to correct the excessive leakage..

This report is being made in accordance with Unit 2 License Condition 2.I, which requires reporting any violation of the Fire Protection Program (License Condition 2.C.10).

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

PLANT AND SYSTEM IDENTIFICATION

Westinghouse – Pressurized Water Reactor

Carbon Dioxide Suppression System (LW/-)

* Energy Industry Identification System {EIS} codes and component function identifier codes appear as (SS/CCC)

CONDITIONS PRIOR TO OCCURRENCE

Salem Unit 1 and Unit 2 were in Mode 1 at 100% power at the time of discovery.

DESCRIPTION OF OCCURRENCE

At approximately 1730 hours on May 20, 2002, preliminary test results were obtained for tracer gas tests being performed for the Unit 1 Elevation 78 Lower Electrical Penetration Area and the Unit 1 Elevation 64' 4160 Volt Switchgear Room. Results from these tests identified room leakage sufficient to prevent the carbon dioxide system in these areas from maintaining the required concentration of 50% for a hold time of 20 minutes as required by NFPA-12. At the time the results were presented, a review of data from tests being performed in the Unit 2 Elevation 78' Lower Electrical Penetration Area indicated that similar results would be expected for this area as well. An extent of condition review was performed considering that the primary leakage was through the CO₂ isolation dampers and it was determined that the Unit 2 4160 Volt Switchgear Room, and the Unit 1 & 2 460 Volt Switchgear Rooms may also be affected such that these rooms may not be capable of maintaining the carbon dioxide concentration of 50% for the hold time of 20 minutes. As a result the carbon dioxide systems for these six fire areas were impaired and fire watches were established in accordance with the Fire Protection Program. Tracer gas testing has been performed in the following fire areas at Salem Unit 1 and 2:

- (1) Unit 1 EL. 78' Lower Electrical Penetration Area
- (2) Unit 1 EL. 64' 4160 Volt Switchgear Room
- (3) Unit 2 EL. 78' Lower Electrical Penetration Area
- (4) Unit 2 EL. 64' 4160 Volt Switchgear Room

The tracer gas testing was performed to determine actual field conditions for inclusion in a re-analysis of the carbon dioxide fire suppression system for these fire areas. As documented in NRC Inspection Report 05000272 & 05000311/1999010, the initial carbon dioxide concentration tests for the 4160 Volt Switchgear Rooms and the 78' Electrical Penetration Areas did not demonstrate that the required

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concentration of 50% was met for the established hold time of 20 minutes for these fire areas and subsequent test reports were not found that demonstrated this ability. A review of these test reports also identified that the as tested system configuration did not match the actual plant operational configuration. The re-analysis of the carbon dioxide fire suppression is being conducted to resolve this concern. The tracer gas tests were being performed to characterize the dilution of carbon dioxide in these areas following a discharge of carbon dioxide in order to perform adjustments to the system to ensure a carbon dioxide concentration of at least 50% concentration for the 20 minute hold time.

Subsequent results from testing of the Unit 2 Electrical Penetration Area and the Unit 2 4160 Volt Switchgear Room revealed similar results to the Unit 1 data that indicate the carbon dioxide system in these areas is not capable of maintaining a 50% CO₂ concentration for a hold time of 20 minutes.

Since the leakage of carbon dioxide appears to be due to excessive leakage through the Switchgear and Penetration Area Ventilation (SPAV) carbon dioxide isolation dampers, a conservative decision was made to conclude that the carbon dioxide system in the remaining area, the Unit 1 and 2 460 Volt Switchgear Rooms, within the SPAV ventilation system should also be declared inoperable.

On May 20, 2002, the carbon dioxide systems in all six of these fire areas (Unit 1 & 2 – 4160 Volt Switchgear, 460 Volt Switchgear, and 78' Electrical Penetration Area) were considered impaired. Compensatory measures in the form of fire watches were established in accordance with the Fire Protection Program.

Failure to meet the carbon dioxide concentration is a violation of the Fire Protection Program, License Condition 2.C.5 (Unit 1) and 2.C.10 (Unit 2). In accordance with Unit 2 License Condition 2.I, failure to meet License Condition requires a 24-hour report and a follow-up 14-day special report.

CAUSE OF OCCURRENCE

The cause of the excessive leakage from these fires areas is a misapplication of the carbon dioxide isolation damper design (original design specification) for continued operation of the Switchgear and Penetration Area Ventilation (SPAV) system supply fans during a carbon dioxide discharge. The original SPAV system design specification required that the SPAV supply fans continue to operate during a carbon dioxide discharge. The original carbon dioxide design specification required that the SPAV supply fans shut down during a carbon dioxide discharge. The original SPAV system design did not take into consideration the ability of the carbon dioxide isolation dampers to seal closed against a running fan.

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CAUSE OF OCCURRENCE (cont'd)

A review was performed to determine if the problem identified in this LER was applicable to the other areas protected by carbon dioxide systems at Salem. The remaining areas at Salem that utilize carbon dioxide suppression do not have the fans continuously running during the carbon dioxide discharge therefore an excessive differential pressure is not created across the dampers.

PRIOR SIMILAR OCCURRENCES

A review of LERs for Salem and Hope Creek for the previous two years did not identify any similar events to the one discussed in this LER.

SAFETY CONSEQUENCES

Although leakage from the ventilation supply and exhaust dampers affects the ability to achieve or maintain the carbon dioxide design concentration in accordance with NFPA-12, the carbon dioxide discharge into these areas still provides a fire suppression function until manual fire suppression activities can be initiated. Fire watches have been placed in these areas in accordance with the Fire Protection Program. These fire watches, along with the automatic early warning (ionization) fire detection will alert the dedicated onsite fire brigade who will respond and extinguish any fire using manual fire suppression methods. The fire brigade can manually activate an additional carbon dioxide system discharge as necessary to assist with the control or extinguishment of a fire. Based on the above, there is reasonable assurance that Salem Units 1 and 2 can achieve and maintain safe shutdown in the event of a fire in the 4160 Volt Switchgear Rooms, the 460 Volt Switch Rooms and the Electrical Penetration Areas.

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CORRECTIVE ACTIONS:

1. As an immediate corrective action, fire watches were established in accordance with the Fire Protection Program.
2. The carbon dioxide isolation dampers in the Salem Unit 2 4160 volt Switchgear Room were adjusted on May 21, 2002 and the tracer gas test was re-performed resulting in a reduction of leakage from the room.
3. A preventive maintenance request was generated to establish a PM for the replacement of the carbon dioxide isolation damper seals consistent with manufacturer's recommendations.
4. As an interim measure until corrective action 5 is completed, a procedure change is being considered to manually trip the SPAV supply fans during a carbon dioxide system discharge in the 4160 volt Switchgear Room, the 460 volt Switchgear Room and the Electrical Penetration Area.
5. To address the discrepancy between the SPAV system design and the carbon dioxide system design, PSEG is evaluating a design change to de-energize the SPAV supply fans during a carbon dioxide system discharge.

The above actions are being tracked in accordance with PSEG Nuclear's corrective action program.

COMMITMENTS

The corrective actions cited in this Special Report are voluntary enhancements and do not constitute commitments.