



Public Service Electric and Gas Company P.O. Box 236 Hancocks Bridge, New Jersey 08038

Salem Generating Station

December 30, 1991

U. S. Nuclear Regulatory Commission
Document Control Desk
Washington, DC 20555

Dear Sir:

SALEM GENERATING STATION
LICENSE NO. DPR-75
DOCKET NO. 50-311
UNIT NO. 2

LICENSEE EVENT REPORT 91-018-00

This Licensee Event Report is being submitted pursuant to the requirements of the Code of Federal Regulations 10CFR 50.73(a)(2)(iv). This report is required within thirty days of discovery.

Sincerely yours,

C. A. Vondra
General Manager -
Salem Operations

BWL:pc

Distribution

9201060283 911230
PDR ADOCK 05000311
S PDR

The Energy People

LICENSEE EVENT REPORT (LER)

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 50.0 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE RECORDS AND REPORTS MANAGEMENT BRANCH (P-530), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

FACILITY NAME (1) Salem Generating Station - Unit 2	DOCKET NUMBER (2) 0 5 0 0 0 3 1 1 1	PAGE (3) 11 OF 06
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TITLE (4)
4 ESF Actuation Signals: 2 Auto Switch of Control Rm Vent. & 2 Cent. Vent. Isol.

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 NAMES	DOCKET NUMBER(S)
11	29	91	91	018	00	12	30	91		0 5 0 0 0
										0 5 0 0 0

OPERATING MODE (9) 6	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more of the following) (11)									
POWER LEVEL (10) 0 0 0	20.402(b)		20.406(c)	<input checked="" type="checkbox"/>	50.73(a)(2)(iv)		73.71(b)			
	20.405(a)(1)(i)		50.38(c)(1)		50.73(a)(2)(v)		73.71(c)			
	20.405(a)(1)(ii)		50.38(c)(2)		50.73(a)(2)(vii)		OTHER (Specify in Abstract below and in Text, NRC Form 366A)			
	20.405(a)(1)(iii)		50.73(a)(2)(ii)		50.73(a)(2)(viii)(A)					
	20.405(a)(1)(iv)		50.73(a)(2)(iii)		50.73(a)(2)(viii)(B)					
20.405(a)(1)(v)		50.73(a)(2)(iii)		50.73(a)(2)(ix)						

LICENSEE CONTACT FOR THIS LER (12)	
NAME B. W. Leap	TELEPHONE NUMBER AREA CODE: 6 1 0 9 3 1 3 9 - 2 2 1 1 1

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)										
CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS	

SUPPLEMENTAL REPORT EXPECTED (14)			EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR
<input type="checkbox"/> YES (If yes, complete EXPECTED SUBMISSION DATE)	<input checked="" type="checkbox"/> NO					

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

This LER addresses four (4) Engineered Safety Feature (ESF) signals initiated through the Radiation Monitoring System (RMS). Two (2) were for the automatic switching of the Control Room Ventilation from normal to the emergency mode of operation. (11/29/91, 0835 hrs - 2R1A spiked high) & (12/05/91, 0640 hrs - 2R1A failed low). Two (2) were for Containment Purge/Pressure Vacuum Relief System isolation. (11/30/91, 1404 hrs - 2R45B spiked high, causing 2R41C to deenergize) & (12/02/91, 1100 hrs - 2R12A spiked high). The root cause of the 2R1A RMS channel spike/failure, 2R45B RMS and 2R12A channel spikes is attributed to design/equipment concerns, specifically susceptibility to voltage transients. The type of detector system used for the majority of the Salem Unit 2 RMS channels is manufactured by Victoreen. Periodic problems with this system have been experienced as indicated in prior LERs (e.g., 311/91-010-00 and 311/91-019-00). Since the 12/05/91, event, the channels have been operating satisfactorily. In each case, the affected channels were checked and returned to service. Engineering has investigated the concerns with the Unit 2 RMS channels. Several system design modifications are being implemented to eliminate spurious ESF actuation signals.

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PLANT AND SYSTEM IDENTIFICATION:

Westinghouse - Pressurized Water Reactor

Energy Industry Identification System (EIIS) codes are identified in the text as {xx}

IDENTIFICATION OF OCCURRENCE:

4 Engineered Safety Feature signals initiated from the Radiation Monitoring System

Event Dates: 11/29/91, 11/30/91, 12/2/91, and 12/5/91

Report Date: 12/30/91

This report was initiated by Incident Report Nos. 91-867, 91-873, 91-878, and 91-886.

CONDITIONS PRIOR TO OCCURRENCE:

Mode 6 (Refueling)

DESCRIPTION OF OCCURRENCE:

This LER addresses four (4) Engineered Safety Feature (ESF) signals initiated through the Radiation Monitoring System (RMS) {IL}. Two (2) were for the automatic switching of the Control Room Ventilation {VI} from normal to the emergency mode of operation (100% recirculation) and two (2) were for Containment Purge/Pressure Vacuum Relief (CP/P-VR) System {BF} isolation signals.

On November 29, 1991, at 0835 hours, the 2R1A Radiation Monitoring System (RMS) {IL} Control Room general area radiation monitor spiked high. This resulted in the Control Room ventilation to switch to the emergency mode of operation for both Salem Units (by design). When the channel indication returned to normal, 2R1A was blocked. A work order was written to investigate the event. One hour later, 2R1A spiked again.

On November 30, 1991, at 1404 hours, the 2R45B RMS (Plant Vent noble gas monitor) spiked high. Subsequently, by design, 2R41C (Plant Vent Radioactive Noble Gas Monitor) dennergized (failed low), resulting in a CP/P-VR System isolation and a closure signal for the 2WG41 valve (Waste Gas Decay Tank Vent Control Valve). A work order was written to investigate the event.

On December 2, 1991, at 1100 hours, 2R12A RMS (Containment Radioactive Noble Gas Monitor) channel spiked high resulting in a CP/P-VR System isolation. The channel was blocked and containment ventilation isolation was reset. A work order was written to investigate the event.

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DESCRIPTION OF OCCURRENCE: (cont'd)

On December 5, 1991, at 0640 hours, 2R1A RMS channel failed low. By design, when this RMS channel fails low it will conservatively initiate its ESF function, resulting in the Control Room ventilation to switch to the emergency mode of operation. A work order was written to investigate the event.

The switching of the Control Room ventilation system to its emergency mode of operation and the actuation of CP/P-VR System isolation signals are ESF functions. Therefore, the Nuclear Regulatory Commission was notified of the initiation of these functions as required by Code of Federal Regulations 10CFR 50.72(b)(2)(ii) on November 29, 1991, at 1029 hours, November 30, 1991, at 1549 hours, December 2, 1991, at 1145 hours and December 5, 1991, at 0717 hours (respectively).

APPARENT CAUSE OF OCCURRENCE:

The root cause of the 2R1A RMS channel spike/failure, 2R45B RMS channel spike, and 2R12A RMS channel spike are design/equipment concerns. The majority of the Salem Unit 2 RMS channel detectors are manufactured by Victoreen. The 2R45B RMS channel detector is manufactured by Eberline. Periodic problems with the Victoreen system have been experienced as indicated in prior LERs (e.g., 311/91-010-00 and 311/91-019-00). The Salem Unit 2 RMS is susceptible to voltage transients.

Investigation of the November 29, 1991, and December 5, 1991 events did not identify any specific equipment/component failures. Detailed visual inspections were performed of the modules (and their seating), scalar internals and cable connections. No concerns were noted (e.g., backplane pins appeared intact and detector connections were intact).

Investigation of the November 30, 1991, event revealed that control terminal (CT) -2 was locked up. The system was rebooted and the setpoints were reset. There was no evidence of any loose wiring, etc. The cause of the spike could not be duplicated and is attributed to a voltage transient.

Investigation of the December 2, 1991, event revealed that during the performance of the functional test of 2R11A RMS channel, after cycling the power to 2R11A to perform the required battery check, 2R12A RMS channel spiked high. The procedure was reviewed and was determined to be correct. The cause of this event is attributed to a voltage transient.

Since the December 5, 1991, event, the channels have been operating satisfactorily. Therefore, the 2R1A RMS channel spike/failure and 2R12A/2R45B RMS channel spikes have been attributed to voltage transients.

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2R1A ANALYSIS OF OCCURRENCE:

Generally, the Control Room dose rate would increase due to ventilation of radioactive materials. Therefore, the Control Room intake duct is isolated and the ventilation air is put in full recirculation through HEPA and Charcoal filters. This design is in accordance with the Updated Final Safety Analysis (UFSAR) which requires protection of Control Room personnel during a loss-of-coolant accident (LOCA), by limiting dose to 5 rem to the whole body, or its equivalent to any part of the body.

The 2R1A Control Room general area radiation monitor (a Victoreen 857-20, GM tube) monitors the ambient gamma radiation levels in the Unit 2 Control Room.

The 2R1B Control Room intake duct radiation monitor is used to corroborate the 2R1A channel readings. It did not show any increased activity in the Unit 2 Control Room during this event. It too has the same automatic ESF function.

2R45B ANALYSIS OF OCCURRENCE:

The 2R45B RMS channel monitor (a Eberline SA-14 energy compensated GM tube) is interlocked with the 2R41 detectors and sample pump to cause them to deenergize upon reaching the high level radiation level setpoint. This is designed to protect the 2R41 channel detectors. When the detectors are deenergized, a CP/P-VR System isolation signal is generated per conservative design.

The 2R41C RMS channel monitors the plant vent effluent releases for radioactive noble gas via representative sampling. The ESF actuation feature of CP/P-VR isolation, associated with this channel, is of conservative design. It is redundant to the 2R12A RMS channel. In addition to its ESF function, the channel will cause the isolation of the 2WG41 valve (Waste Gas Decay Tank Control Valve).

At the time of the event, a Containment Purge was in progress. The CP/P-VR isolation signal caused the closure of the Containment Ventilation valves as per design.

Corroborating RMS channels did not show any increased activity in the Containment at the time of the event.

2R12A ANALYSIS OF OCCURRENCE:

Isolation of the CP/P-VR System is an ESF. It mitigates the release of radioactive material to the environment after a design basis accident.

Air samples are pulled from the Containment atmosphere through filter paper which continuously moves past the 2R11A (Containment

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2R12A ANALYSIS OF OCCURRENCE: (cont'd)

Radioactive Particulate Monitor) detector. The air sample then passes through a charcoal cartridge (monitored by the 2R12B detector) and is then mixed into a fixed shielded volume where it is viewed by the 2R12A (Containment Radioactive Noble Gas Monitor) detector. The air sample is then returned to the Containment.

The 2R12A Containment Noble Gas Monitor, (a Victoreen Model M862CD-100-5 beta-gamma GM tube) monitors the radioactive noble gas activity in the Containment atmosphere. It is used to identify RCS leakage in conjunction with the containment sump level monitoring system, and either the containment fan cooler condensate flow rate monitoring system, or the containment radioactive particulate (2R11A) radioactivity monitoring system.

The Containment Ventilation valves were closed at the time of the event.

Corroborating RMS channels did not indicate any increased activity during this event.

Both the 2R11A and 2R12A RMS channels provide an alarm signal which will cause the automatic isolation of the CP/P-VR System.

SUMMARY OF ANALYSIS OF OCCURRENCES

During these events, RCS leakage within the Unit 2 Containment did not increase nor was there any indication of increasing Containment activity.

The switching of the Control Room ventilation system to its emergency mode of operation and actuation of the CP/P-VR System isolation signals were caused by design/equipment concerns and not high radiation levels. Therefore, these events did not effect the health and safety of the public. However, due to the automatic actuation signal of an ESF system, they are reportable in accordance with Code of Federal Regulations 10CFR 50.73(a)(2)(iv).

CORRECTIVE ACTION:

Upon successful completion of a channel calibration check, 2R1A RMS channel was returned to service on November 29, 1991, at 2234 hours.

Upon successful completion of a channel functional test, 2R45B RMS channel was returned to service on December 2, 1991, at 0230 hours.

Upon successful completion of a channel functional test, 2R12A RMS channel was returned to service on December 2, 1991, at 1503 hours.

Upon successful completion of a channel calibration check, 2R1A RMS channel was returned to service on December 8, 1991, at 1330 hours.

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CORRECTIVE ACTION: (cont'd)

The DC internal power supplies for the 2R45B RMS channel are being investigated to determine if they could be the source of the channel spiking.

As indicated in LER 311/91-013-00, Engineering has investigated the concerns with the Unit 2 RMS channels. Several system design modifications are being implemented to eliminate the spurious ESF actuation signals. These modifications include installation of an uninterruptable power supply (UPS) and replacement of selected RMS channels.



General Manager -
Salem Operations

BWL:pc

SORC Mtg. 91-131