



PSEG

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

Salem Generating Station

July 5, 1989

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

Dear Sir:

SALEM GENERATING STATION
LICENSE NO. DPR-70
DOCKET NO. 50-272
UNIT NO. 1
SUPPLEMENTAL SPECIAL REPORT 88-3-11

This supplemental Special Report addresses additional fire barrier penetration seal impairments which have not been restored to functional status within seven (7) days. These impairments have been identified by the Penetration Seal Task Force. This report has been prepared in accordance with the reporting requirements of Technical Specification Action Statement 3.7.11.a pursuant to Technical Specification 6.9.2.

Sincerely yours,

L. K. Miller
General Manager -
Salem Operations

MJP:pc

Distribution

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PLANT IDENTIFICATION:

Salem Generating Station - Units 1 & 2
Public Service Electric & Gas Company
Hancock's Bridge, New Jersey 08038

IDENTIFICATION OF OCCURRENCE:

Technical Specification 3.7.11: Fire Barriers Impaired For Greater Than 7 Days

Event Date(s): 7/20/88, 8/09/88, 9/07/88, 10/11/88, 11/07/88,
12/07/88, 1/05/89, 2/06/89, 3/7/89, 4/6/89, 5/9/89
6/7/89

Report Date: 7/05/89

This report was initiated by Incident Report Nos. 88-268, 88-531, 88-536, 88-537, 88-544, 89-050, 89-075, 89-086, 89-091, 89-092, 89-127, 89-287, and 89-349.

CONDITIONS PRIOR TO OCCURRENCE:

N/A

DESCRIPTION OF OCCURRENCE:

As identified in PSE&G letter NLR-N88037 dated March 4, 1988, PSE&G has initiated a comprehensive review/inspection of fire barrier penetration seals. Due to the additional review by the Penetration Seal Task Force, penetrations found impaired are not being repaired within seven days as specified by Technical Specification Action Statement 3.7.11.a. This report summarizes the task force findings and Technical Specification 4.7.11 surveillance activity findings associated with inadequate penetration seals for both Unit 1 and Unit 2. The inadequate penetration seals found, to the date of issue of this report, include:

On July 13, 1988 two fire Barrier cable penetration were found degraded. The penetration contained electrical sleeving containing an electrical cable surrounded by foam type fire sealant. The area (approximately 1/8" gap and 1/4" gap respectively) surrounding the electrical sleeves were not sealed thereby constituting an impaired seal. The fire barrier is in the east wall of the 100' Elevation Relay Room.

On July 25, 1988 three (3) degraded fire barrier cable penetration seals were found on the south wall in the 100' Elevation Relay Room. Two (2) of these penetrations are 3" in diameter and the other is 5.5" (located ~18 feet above the floor). The 3" penetrations contain fire wrapped cabling. This fire wrap extends over the penetration. There is no foam behind the fire wrap. It provides a 1 hour rated barrier, however, the wall is a 3 hour barrier. The 5.5" penetration contains a 4" conduit surrounded by foam. The foam contains an 1/8" gap at the base of the conduit.

On July 28, 1988 one (1) 3.5" degraded fire barrier cable

DESCRIPTION OF OCCURRENCE: (cont'd)

penetration seal was found on the north wall in the 100' Elevation Relay Room. The penetration contains cabling surrounded by foam. The foam contains an 1/2" diameter hole.

Between August 2, 1988 and August 30, 1988, 138 additional penetration seals were found impaired of which 134 penetrations are located in the Unit 1 Relay Room and 4 penetrations are located in the Unit 1 1A 125 V Battery Room. The penetrations range in size from ~3 inches to ~6 inches in diameter. The nature of the impairments include 6 with no seal, 14 with a hole in the seal (unknown cause), 2 with foreign material imbedded in the seal (one imbedded with a rag and the other with duct tape), 30 with a void in the seal (due to inadequate quantity of foam injection upon installation), 6 with apparent degradation (e.g., cable pulled through) 47 with inadequate color/cell structure (reference LER 272/88-013-00) and 32 that are not deep enough into the penetration per design (less than 6 inches).

Between August 31, 1988 and June 30, 1989, 6420 Unit 1 penetration seals and 2275 Unit 2 penetration seals were reviewed. Of these, 1743 penetration seals were determined to be impaired. The majority of penetrations range in size from ~3 inches to ~6 inches in diameter. There were 154 penetrations which were larger than 6 inches in diameter. These penetrations ranged from 3"x5" to 169"x25".

Page 3 of this report contains a table of the penetration seals found impaired, between August 2, 1988 and June 30, 1989, in relation to the fire zone where they were found. The impairment designator terms include:

No Seal	NOS
Hole in Seal	HOL
Void in Seal	VIS
Depth Not Great Enough	DPT
Color/Cell Structure	CEL
Seal Degradation	DEG
Foreign Material Imbedded	FMT
Planned Impairment	PIM

An hourly fire watch patrol had been established for the above areas previously due to other fire protection concerns. Therefore, the requirements of Tech. Spec. Action Statement 3.7.11.a are met.

Unit 1 Technical Specification 3.7.11 states:

"All fire penetrations (including cable penetration barriers, fire doors and fire dampers), in fire zone boundaries, protecting safety related areas shall be functional."

Unit 1 Technical Specification Action Statement 3.7.11.a states:

"With one or more of the above required fire barrier penetrations non-functional, within one hour either establish a continuous fire watch on at least one side of the affected penetration, or verify the OPERABILITY of fire detectors on at

DESCRIPTION OF OCCURRENCE: (cont'd)

least one side of the non-functional fire barrier and establish an hourly fire watch patrol. Restore the non-functional fire barrier penetration(s) to functional status within 7 days or, in lieu of any other report required by Specification 6.9.1, prepare and submit a Special Report to the Commission pursuant to Specification 6.9.2 within the next 30 days outlining the action taken, the cause of the non-functional penetration and plans and schedule for restoring the fire barrier penetration(s) to functional status."

NOTE - Unit 1 Technical Specification 3.7.11 differs from Unit 2. The words "functional" and "non-functional" are replaced by the words "OPERABLE and "inoperable".

TABLE OF INOPERABLE PENETRATION SEALS
8/02/88 - 6/30/89

<u>AREA</u>	<u>NOS</u>	<u>HOL</u>	<u>VIS</u>	<u>DPT</u>	<u>CEL</u>	<u>DEG</u>	<u>FMT</u>	<u>PIM</u>
U-1 Relay Room	15	34	52	72	193	7	3	1**
U-1 1A D/G Control Room	1	2		2	13			
U-1 1B D/G Control Room				1	16		1	
U-1 1C D/G Control Room		1	1	10	8			
U-1 1A 125 V Battery Room	2			3		2		
U-1 1C 125 V Battery Room	20	1		1				
U-1 #1 250 V Battery Room			1	1	5			
U-1 #3 Stairwell	7			1	5			
U-1 64' Elevation, Aisle #1 Auxiliary Building		3	1	6	17			
U-1 84' Elevation, Aisle #1 Auxiliary Building	6	4		6	7	1		
U-1 122' Elevation, N2 Bottle Storage Area		1				1		
U-1 84' Corridor: Unit 1 & 2 Common East & West *		3			3			
U-1 78' Electrical Penetra. Area		1	1	1	7			
U-1 100' Boric Acid Transfer Pump Area		1		4	2			
U-1 100' El. Mechanical Penetration Area - Blowdown Tanks	1	5		2	8	3	1	

TABLE OF INOPERABLE PENETRATION SEALS (cont'd)
8/02/88 - 6/30/89

<u>AREA</u>	<u>NOS</u>	<u>HOL</u>	<u>VIS</u>	<u>DPT</u>	<u>CEL</u>	<u>DEG</u>	<u>FMT</u>	<u>PIM</u>
U-1 100' El. Corridor Service Building		2	3	2		1	1	
U-1 100' Elevation, Aisle #1 Auxiliary Building	4	4	2	5	14	1		
U-1 100' Corridor; Unit 1 & 2 Common East & West *	15	10	8	30	61		1	
U-1 84' Corridor; Unit 1 & 2 Common North & South	2	7		14	11	2	1	
U-1 84' Corridor; Unit 1 & 2 Common East & West *		3			3			
U-1 100' Lobby		1						
U-1 64' Lobby		1						
U-1 11/12 Containment Spray Pumps & Spray Add. Tank Area	4	4		6	14		1	
U-1 100' Corridor; Unit 1 & 2 Common North & South	2	4	3	1	185		2	
U-1 100' Elevation Counting Room	6			1	1			
U-1 #11 Diesel Oil Tk Room		1	1		3			
U-1 #12 Diesel Oil Tk Room				2				
U-1 84' Elev. Control Area #1 Transformer Bus Rm.	23	6	1	18	79			1
U-1 Spent Fuel Pit Heat Exchanger & Pump Area	3	3		6	16			
U-1 1A Diesel Generator Area				5	1	1		
U-1 1B Diesel Generator Area	1			7			6	
U-1 1C Diesel Generator Area	3		1	2	2			
U-1 Waste Evaporator Room	4			11	4	1	1	
U-1 100' Elevation Mechanical Penetration Area	8	4			7			
U-1 UPS Battery Room	2							
U-1 Containment Rad Mon Room	4	1		10	10			

TABLE OF INOPERABLE PENETRATION SEALS (cont'd)
8/02/88 - 6/30/89

<u>AREA</u>	<u>NOS</u>	<u>HOL</u>	<u>VIS</u>	<u>DPT</u>	<u>CEL</u>	<u>DEG</u>	<u>FMT</u>	<u>PIM</u>
U-1 #11 Chg. & SI Pump Room		1		4				
U-1 #12 Chg. & SI Pump Room				1				
U-1 #13 Chg. & SI Pump Room				2				
U-1 84' El. Pipe Trench	125	1	1		16	2		
U-1 100' El. Baling & Storage	3	1		2	1		1	
U-1 110' El. Control Console				1	6			
U-1 78' El. Contain. Rad Mon. Room				1	1			
U-1 84' El. #11 Comp. Cool. Heat Xgr. & 12 CC Pp Room	14			1				
U-1 100' Elec. Penetra. Area	13	4		16	6	5		
U-1 Laundry, Chem Pump Area	5	3		2	19		4	
U-1 64' El. Control Area #1 4KV Bus	3	4		18	9		1	
U-1 #1 Letdown Heat Exch.		1						
U-1 84' El. #12 Comp. Cool. Heat Xgr. & 12 & 13 CC Pp Room				3	2			
U-1 #11 SI Pump Room		1			1			
U-1 Pipe Trench	6	2	1	20	13		2	
U-1 Rx Coolant Filter Area		1						
U-1 84' Spent Resin Xfer Pp Rm				2				
U-1 11 & 12 Mon. Tank Room	8	1			5	2		
U-1 84' Elevator Lobby					1			
U-1 Aux Feed Pumps				3				
U-1 Valve Alley	1	2		3				
U-1 Seal Water Heat XChg				3	1			
U-1 84' El. Corridor		2		2	1			
U-1 A/C & Boric Acid Tank Room	5			9	42			

TABLE OF INOPERABLE PENETRATION SEALS (cont'd)
8/02/88 - 6/30/89

<u>AREA</u>	<u>NOS</u>	<u>HOL</u>	<u>VIS</u>	<u>DPT</u>	<u>CEL</u>	<u>DEG</u>	<u>FMT</u>	<u>PIM</u>
U-1 A/C Equipment Rm	1	2				4		
U-1 Boric Acid Evap. & Gas Stripper Unit	2					3	1	
U-1 Water Recirc Heater	3	1		1	2			
U-1 #1 Stairwell	6				5			
U-1 #1 Conc. Filter Area	1							
U-1 Rm Next To #11 Chg Pp				2		2		
U-1 Diesel Oil CO2 Area	4				1			
U-1 Motor Control Center		2		1		1		
U-1 Elevator - E1	2	1			1			
U-1 N2 Bottle Storage								3
U-1 #12 RHR XGR Room	1							
U-1 55' El. Walkway	2							
U-1 Future Mixed Bed Demin	7							
U-1 #11 Mixed Bed Demin	2							
U-1 #1 Cation Bed (NW)	2							
U-1 #1 Cation Bed (SW)	8							
U-1 #11 Deborating Demin	3							
U-1 #12 Deborating Demin	2						1	
U-2 #5 Stairwell					3			1
U-2 100' El. Mechanical Pene. Area - Blowdown Tanks		2						
U-2 100' El. Corridor		1						
U-2 100' Elevation Mechanical Penetration Area	1	1						3
U-2 AC & Boric Acid Tank Room	2							
U-2 Relay Room	4	8	2	3	17	1		

TABLE OF INOPERABLE PENETRATION SEALS (cont'd)

8/02/88 - 6/30/89

<u>AREA</u>	<u>NOS</u>	<u>HOL</u>	<u>VIS</u>	<u>DPT</u>	<u>CEL</u>	<u>DEG</u>	<u>FMT</u>	<u>PIM</u>
U-2 22 RHR Xgr Room	3							
U-2 84' Control Area Trans- former Bus Room					10			
U-2 Rad. Detector Panel	1							
U-2 Battery Room 2C 125VDC	3							

* - The opposite room for the north and east walls is the Unit 2 Relay Room.

** - The Relay Room PIM was resealed thirteen days after opening

APPARENT CAUSE OF OCCURRENCE:

The cause of the degraded fire barrier penetrations could not be positively determined.

The east wall penetrations (discovered 7/13/88) from the Relay Room side "appeared" sealed visually due to the use of a bushing on the sleeve which hid the gap. The 3.5" south wall penetrations (discovered 7/25/88) also appeared sealed from the Relay Room side, as described in the Description of Occurrence section. Closer inspection, as required by the Seal Penetration Review Group procedures, revealed the nature of the impairments. Technical Specification Surveillance 4.7.11 requires verification of the functional status of fire barrier penetrations every eighteen months via a visual inspection. This inspection would not necessarily identify the non-functional status of the subject penetrations.

The 5.5" south wall penetration (found July 25) is located in a difficult to reach location. The gap in the seal may have formed due to shrinkage. It does not appear as though a cable was pulled (forming the gap).

The 3.5" north wall penetration (found July 28) is also located in a difficult to reach location. The gap in the seal appears to have formed as a result of a cable pull. It has not been determined when or by whom the cable was pulled.

The penetrations with non-functional seals, found between August 2, 1988 and June 30, 1989, are similar in configuration (except as noted) to the penetrations identified in the original issue of this Special Report. The cause of their degraded condition also could not positively be determined.

ANALYSIS OF OCCURRENCE:

The functional integrity of the penetration fire barriers ensures that fires will be confined or adequately retarded from spreading to

ANALYSIS OF OCCURRENCE: (cont'd)

adjacent portions of the facility. This design feature minimizes the possibility of a single fire involving several areas of the facility. The fire barrier penetration seals are a passive element in the facility fire protection program and are subject to periodic inspections. This report satisfies the reporting requirements of Technical Specification 3.7.11.a pursuant to Technical Specification 6.9.2 since the time between discovery and eventual repair of the fire barrier impairments is greater than seven (7) days. Appropriate actions were already in place in accordance with the requirements of Technical Specification Action Statement 3.7.11.a to establish a one hour roving fire watch for the impaired fire barriers once the impairments were identified.

The subject fire area contains detection in addition to the roving fire watch patrol. Therefore, it is reasonable to assume that a fire in either area would be detected before it could involve an adjacent area. This occurrence therefore involved no undue risk to the health or safety of the public.

CORRECTIVE ACTION:

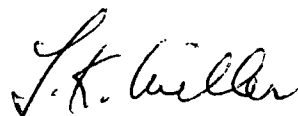
The hourly fire watch, as addressed in the Description of Occurrence section, will continue until all fire protection concerns associated with these areas are resolved.

The repair of the penetrations was not accomplished within seven (7) days due to the additional review being conducted by the Penetration Seal Task Force. Upon completion of this review the penetrations will be sealed.

The majority of those penetrations in the Unit 1 and Unit 2 Relay Rooms (halon discharge areas) which either have no seal or holes through the seal have been sealed using approved station procedure M3Y, "Installation and Repair of Fire Barrier and Flood Protection Seals".

This review and corrective action will be completed in accordance with PSE&G letter NLR-N88037, dated March 4, 1988, to the NRC which discusses the Penetration Seal Review Program schedule and the telecommunication between PSE&G and the NRC Region 1 office conducted on August 26, 1988.

Penetration seal repair work has been initiated. The Unit 1 Relay Room is the first area being worked. To date, 1361 penetrations have been sealed and accepted by the Penetration Seal Task Force.



General Manager -
Salem Operations

MJP:pc

SORC Mtg. 89-070