PSE&G

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

Salem Generating Station

November 22, 1993

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

LICENSEE EVENT REPORT 93-016-00

This Licensee Event Report is being submitted pursuant to the requirements of the Code of Federal Regulation 10CFR50.73(a)(2)(iv). This report is required to be issued within thirty (30) days of event discovery.

Sincerely yours,

C. A. Vondra
General Manager -
Salem Operations

MJPJ:pc

Distribution

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NRC FORM 366 (6-89) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED OMB NO. 3150-0104
EXPIRES: 4/30/92

ESTIMATED BURDEN PER RESPONSE TO COMPLY WTH 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.

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
Salem Generating Station - Unit 1	0 5 0 0 0 2 7 2	1 OF 0 6

TITLE (4)

ESF Actuation; Diesel Generator Blackout Signal Loading of 1A & 1C 4KV Vital Bus.

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)
												0 5 0 0 0
1 0	2 1	9 3	9 3	–	0 1 6	–	0 0	1 1	2 2	9 3		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)	20.405(c)	X	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)	50.36(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)(i)		50.73(a)(2)(viii)(A)		
		20.405(a)(1)(iv)	50.73(a)(2)(ii)		50.73(a)(2)(viii)(B)		
		20.405(a)(1)(v)	50.73(a)(2)(iii)		50.73(a)(2)(x)		

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER
	AREA CODE
M. J. Pastva, Jr. - LER Coordinator	6 0 9 3 3 9 – 5 1 6 5

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)

CAUSE	SYSTEM	COMPONENT	MANUFAC-TURER	REPORTABLE TO NPRDS		CAUSE	SYSTEM	COMPONENT	MANUFAC-TURER	REPORTABLE TO NPRDS	

SUPPLEMENTAL REPORT EXPECTED (14)		EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR
YES *(If yes, complete EXPECTED SUBMISSION DATE)*	X NO				

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

On 10/21/93, at 1525 hours, the infeed breakers to 1A and 1C 4 Kilo-Volt (KV) buses tripped on an undervoltage (UV) signal, resulting in automatic starting and "blackout signal" loading of the buses from 1A and 1C Diesel Generators (D/Gs). At approximately 2030 hours (same day), infeed power to the buses from 12 Station Power Transformer (SPT) was restored and the D/Gs were secured and returned to standby. The root cause of this event is electrical shorting within the 4KV switchgear, due to personnel error associated with ongoing relay maintenance activities. The electrical shorting most probably occurred between adjacent terminals on the 12 SPT undervoltage (UV) relay circuit within the B vital bus 12BSD breaker cubicle. As a result of this event, work associated with SPTs and 4KV vital switchgear was reevaluated to ensure minimized plant safety risk. Increased coordination of activities and the importance of exercising caution in the vicinity of 4KV switchgear and protective relays was emphasized with key supervisory personnel and workers. A vital bus and switchyard work standdown was imposed by the station General Manager, to allow review of remaining outage-related activities. Station outage management will review scheduling of similar activities to ensure incorporation of lessons learned into future outage schedules.

PLANT AND SYSTEM IDENTIFICATION:

Westinghouse - Pressurized Water Reactor

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

IDENTIFICATION OF OCCURRENCE:

Engineered Safety Feature Actuation; Diesel Generator Blackout Signal Loading of 1A and 1C 4KV Vital Buses

Event Date: 10/21/93

Report Date: 11/22/93

This report was initiated by Incident Report No. 93-427.
This event is reportable per 10CFR50.73(a)(2)(iv)

CONDITIONS PRIOR TO OCCURRENCE:

11th Refueling in progress; Reactor defueled.

1B 4 Kilo-Volt (KV) Vital Bus {EB} and 11 Station Power Transformer (SPT) were cleared and tagged and 12 SPT was supplying 1A and 1C 4KV Vital buses. Maintenance testing, of 1B 4KV Vital Bus overload protection and the undervoltage and transfer circuits was in progress.

DESCRIPTION OF OCCURRENCE:

On October 21, 1993, at 1525 hours, the infeed breakers to 1A and 1C 4 KV buses tripped on an undervoltage (UV) signal resulting in automatic starting and "blackout signal" loading of the buses from their respective Diesel Generators (D/Gs) (1A and 1C) {EK}. At 1709 hours (same day) the Nuclear Regulatory Commission (NRC) was notified of this event, in accordance with 10CFR50.72(b)(2)(ii). At approximately 2030 hours (same day), infeed power to the buses from 12 SPT was restored and the D/Gs were secured and returned to standby.

ANALYSIS OF OCCURRENCE:

The Salem Safeguards Systems design basis includes the requirement that the station must be safely shutdown during a loss of coolant accident (LOCA) and a coincident loss of offsite power (Blackout). All electrical equipment needed during a LOCA is powered from the vital buses, which can be powered from the standby alternating current

ANALYSIS OF OCCURRENCE: (cont'd)

diesel generators. Safeguards Equipment Control (SEC) is a logic system, comprised of three control systems, that provide proper actions in response to any accident and/or blackout condition. Each SEC (A, B, or C) is physically and electrically isolated from the other, is associated with its own DG and vital bus, and responds to accident (safety injection) and vital bus UV input signals. Based upon the combination of these signals, the respective SEC will actuate to strip the vital buses, start the D/Gs, and reload the vital buses.

On October 21, 1993, at shortly before 1525 hours, the Unit 1 11th Refueling was in progress with the Reactor defueled. 1B 4KV Vital Bus and its associated D/G and 11 SPT were cleared and tagged for maintenance and outage-related activities and 12 SPT was supplying 1A and 1C 4KV Vital buses. In addition, maintenance testing, of 1B 4KV Vital Bus overload protection and the undervoltage and transfer circuits was in progress. This included work within the breaker cubicle of 12BSD (4KV infeed breaker from 12 SPT to 1B Vital Bus).

At 1525 hours (same day), the 12 SPT UV Transfer Relays tripped 12ASD and 12CSD 4KV infeed breakers from 12 SPT to 1A and 1C Vital Buses. This normally would have initiated an automatic transfer of 1A and 1C vital buses' to the infeed breakers from 11 SPT. However, since 11 SPT was not energized (tagged out of service), the buses' 70% UV relays picked up which automatically started and loaded 1A and 1C D/Gs to their buses. The appropriate loads were automatically sequenced on by the SEC and spent fuel pit cooling was restored within approximately five minutes.

At approximately 2030 hours (same day), following assessment of the consequences and approximate root cause of the event, infeed power to 1A and 1C Vital buses from 12 SPT was restored.

Investigation determined this event resulted from an electrical fault. This fault caused the Potential Transformer (PT) fuses for B and C phases to experience a momentary high current and blow, which caused the 12 SPT UV Transfer Relays to trip the 12 SPT infeed breakers to the buses. This determination is based on results of testing, inspection, and examination of the blown fuses.

Interviews with personnel working within the 12BSD breaker cubicle, did not reveal any connection with the blown PT fuses. However, the electrical shorting most probably occurred between adjacent terminals on the 12 SPT UV relay circuit within the B vital bus 12BSD breaker

ANALYSIS OF OCCURRENCE: (cont'd)

cubicle.

As a result of this event the planning and scheduling of work associated with the SPTs and vital switchgear was reviewed to ensure that the potential is minimized for future similar occurrences. Methods identified to help minimize this include increased coordination of activities in the vicinity of 4KV switchgear and protection relays, as well as reemphasizing the importance of exercising caution during these activities. In addition, a vital bus and switchyard work standdown, for approximately 21 hours, was imposed by the station General Manager, to allow review of pending outage-related activities, including electrical work, to ensure proper planning and scheduling.

APPARENT CAUSE OF OCCURRENCE:

The root cause of this event is electrical shorting within the 4KV switchgear due to personnel error. The electrical shorting most probably occurred between adjacent terminals on the 12 SPT UV relay circuit within the B vital bus 12BSD breaker cubicle.

PREVIOUS OCCURRENCES:

Previous events involving undervoltage conditions on 4KV Vital Buses which resulted in automatic starting and loading of D/Gs have been reported in LERs 311/92-013-00 and 272/93-012. These occurrences involved personnel error due to misplacement of switches.

SAFETY SIGNIFICANCE:

This event did not affect the health and safety of the public. Equipment functioned as required during this event.

As a result of this event, 11 SFPP, which is supplied from 1A 460V vital bus, was automatically stripped from the bus. Within approximately five minutes of the event, the pump was then restarted to restore cooling to the Spent Fuel Pit. In addition, offsite power was available and the affected 4KV vital buses could have been restored to service from offsite power, if necessary.

CORRECTIVE ACTION:

As a result of this event, work associated with SPTs and 4KV Vital switchgear was reevaluated to ensure minimized plant safety risk.

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

Salem Generating Station	DOCKET NUMBER	LER NUMBER	PAGE
Unit 1	5000272	93-016-00	5 of 5

CORRECTIVE ACTION: (cont'd)

Increased coordination of activities and the importance of exercising caution in the vicinity of 4KV switchgear and protective relays was emphasized with key supervisory personnel and workers.

A vital bus and switchyard work standdown was imposed by the station General Manager, to allow review of remaining outage-related activities.

Station outage management will review scheduling of similar activities to ensure incorporation of lessons learned into future outage schedules.

General Manager -
Salem Operations

MJPJ:pc

SORC Mtg. 93-102