PSEG

Public Service Electric and Gas Company P.O. Box 236 Hancocks Bridge, New Jersey 08038-0236

Nuclear Business Unit

JUN 17 1999

LR-N990291

Regional Administrator
U.S. Nuclear Regulatory Commission
Region 1
475 Allendale Road
King of Prussia, PA 19406-1415

Gentlemen:

LICENSEE EVENT REPORT 99-004-00
SALEM GENERATING STATION – UNIT 1
FACILITY OPERATING LICENSE NO DPR 70
DOCKET NO. 50-272

This Licensee Event Report entitled " UNPLANNED REACTOR TRIP DUE TO NEGATIVE FLUX RATE TRIP." is being submitted in accordance with the requirements of 10CFR50.73(a)(2)(iv) Licensees shall report "any event or condition that resulted in a manual or automatic actuation of any Engineered Safety Feature (ESF), including the Reactor Protection System (RPS)"

Sincerely,

John F. Robertson
for

David F. Garchow
General Manager-
Salem Operations

Attachment

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

/JCN
Distribution:
LER File 3.7

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The power is in your hands.

NRC FORM 366 U.S. NUCLEAR REGULATORY COMMISSION (6-1998)

LICENSEE EVENT REPORT (LER)

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

APPROVED BY OMB NO. 3150-0104 EXPIRES 06/30/2001

Estimated burden per response to comply with this mandatory information collection request: 50 hrs. Reported lessons learned are incorporated into the licensing process and fed back to industry. Forward comments regarding burden estimate to the Records Management Branch (T-6 F33), 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. If an 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.

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TITLE (4)

UNPLANNED REACTOR TRIP DUE TO NEGATIVE FLUX RATE TRIP.

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 NAME	DOCKET NUMBER
										05000
05	20	99	99	4	00	06	17	99	FACILITY NAME	DOCKET NUMBER 05000

OPERATING MODE (9)	1	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11)			
POWER LEVEL (10)	100	20.2201(b)	20.2203(a)(2)(v)	50.73(a)(2)(i)	50.73(a)(2)(viii)
		20.2203(a)(1)	20.2203(a)(3)(i)	50.73(a)(2)(ii)	50.73(a)(2)(x)
		20.2203(a)(2)(i)	20.2203(a)(3)(ii)	50.73(a)(2)(iii)	73.71
		20.2203(a)(2)(ii)	20.2203(a)(4)	X 50.73(a)(2)(iv)	OTHER
		20.2203(a)(2)(iii)	50.36(c)(1)	50.73(a)(2)(v)	Specify in Abstract below or in NRC Form 366A
		20.2203(a)(2)(iv)	50.36(c)(2)	50.73(a)(2)(vii)	

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER (Include Area Code)
John C. Nagle Senior Licensing Engineer	856-339-3171

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

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX

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 15 single-spaced typewritten lines) (16)

On 5/20/99, at approximately 2137 hours, the reactor tripped from 100% power due to a negative flux trip signal from the nuclear instrumentation. The negative flux rate resulted from a dropped control rod which was caused by a loss of power to the stationery gripper coil. The loss of power was determined to be the result of a blown fuse. Investigation identified a low insulation resistance pathway on the control cable at the containment penetration seal. The junction box for this seal was found to have an accumulation of rust on the lower panel area with some warpage of the side plates, possibly resulting from a previous service water leak which may have impinged on the junction box. The cable in question was rerouted through a spare cable "feedthrough" in the penetration assembly and returned to service. The penetration seal continues to serve the mechanical sealing function without degradation. All systems functioned as designed in response to the trip. The fuse functioned properly to protect the penetration. The root cause of the cable failure has not been determined.

A report was made to the NRC as required by the plant's Emergency Classification Guide and 10CFR50.72(b)(2)(ii). This report is being made in accordance with 10CFR50.73(a)(2)(iv) Licensees shall report "any event or condition that resulted in a manual or automatic actuation of any Engineered Safety Feature (ESF), including the Reactor Protection System (RPS)".

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

ANT AND SYSTEM IDENTIFICATION

Westinghouse - Pressurized Water Reactor

Control Rod Drive System/Cable {AA/CAB}*

* Energy Industry Identification System (EIIS) codes and component function identifier codes appear as {SS/CCC} in the text.

CONDITIONS PRIOR TO OCCURRENCE

The unit was operating at 100% power at the time of the event.

DESCRIPTION OF OCCURRENCE

At 2137 on 05/20/99, Unit 1 reactor automatically tripped from 100% power due to a nuclear instrumentation negative rate trip signal. The negative rate trip signal was due to the loss of the stationary gripper coil voltage for control rod #1A3, due to a blown fuse, permitting the control rod to drop into the core. This dropped rod caused a negative rate trip signal on nuclear instrument channels 2 and 4. The trip signal on two channels occurred because of the relative position of the rod with regard to the detectors. No testing was being conducted at the time of the trip. All control rods inserted completely. The auxiliary feed-water system actuated due to the low-low steam generator levels reached during the trip, as expected. No safety or relief valves lifted following the trip.

CAUSE OF OCCURRENCE

The cause of the loss of power to the stationery gripper coil was a blown fuse protecting the penetration and control cable to the coil. Investigation determined that there was low insulation resistance on cable feedthrough 18-1 at the Conax containment penetration seal assembly 1-11. The junction box housing the seal assembly was found to have an accumulation of rust on the lower panel area and some warping of the side plates. Inspection of the penetration seal assembly showed evidence of a deposition of indeterminate nature at the cable feedthrough. It is believed that the rust was the result of previous events where the junction box may have been inadvertently sprayed with service water from a leaking Containment Fan Cooler Unit. The physical condition of the junction box may have allowed water entry resulting in the deposit thus causing the low resistance pathway. The root cause of the failure has not been determined. It is believed that this failure was random and may have resulted from a cable insulation defect which, when

combined with the environmental conditions, ultimately resulted in the failure. The cause of the insulation defect is not known, however physical inspections of the penetrations in the 1995-1996 time frame may have moved the penetration feedthrough cable excessively thus initiating the defect.

The feedthrough cable part of the Conax penetration assembly is No. 6 solid copper conductor coated with polysulfone insulation material approximately 30 mils in thickness. Polysulfone is a very durable material with excellent resistance to environmental conditions. The use of polysulfone as an insulator is limited to Unit 1 Type B, C, and D feedthroughs of the 1/C 750 MCM, 3/C 2 AWG, and 9/C 6 AWG sizes.

PRIOR SIMILAR OCCURRENCES

The Salem and Hope Creek electronic correspondence databases have been reviewed to identify any Licensee Event Reports, Inspection Reports or other relevant correspondence which may have identified similar occurrences. No similar occurrences of cables failing at the containment penetration have been identified.

Industry data was also reviewed in attempt to identify similar events. No information was identified which aides in the understanding of this event or which indicates that there is a potential generic concern.

SAFETY CONSEQUENCES AND IMPLICATIONS

All systems performed as designed in response to the reactor trip. The fuse operated as designed and protected the penetration from damage. The design integrity of the penetration seal was maintained by the fuse protection and the penetration seal continues to perform the mechanical sealing role successfully. The sealing capability is demonstrated by the fact that the nitrogen pressure in the seal cavity is being maintained. All of the conductors utilizing this penetration seal are associated with the rod control system (RCS). The RCS electrical penetration circuits are non Class 1E.

The failure appears to be random in nature. This event was the only incidence of a cable failure at the penetration identified during a review of the Salem and Hope Creek correspondence database performed in support of the root cause investigation.

Rod control system maintenance activities routinely include checking of the insulation resistance of the cables.

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

CORRECTIVE ACTIONS

1) Inspection determined that one additional conductor feedthrough (18-8) on the penetration assembly also had a low resistance reading on the cable insulation. Both the cable to the gripper coil and the additional low resistance cable were rerouted through spare conductor feedthrough leads in the penetration assembly.

2) Three additional Unit 1 penetration junction boxes were opened and inspected. A discoloration was identified on one of these penetrations but the associated cable insulation resistance was found to be acceptable.

3) An inspection has been completed on similar junction box installations on Unit 2. Corrective Maintenance type Action Requests have been generated to open and inspect two Unit 2 penetration junction boxes identified as having some limited external rust noted. This activity will be completed as resources and plant conditions permit but in no case later than the completion of the next refueling outage (1R13).