



PSEG

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

Salem Generating Station

December 11, 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
LICENSEE EVENT REPORT 89-032-00

This Licensee Event Report is being submitted pursuant to the requirements of the Code of Federal Regulations 10CFR 50.73(a)(2)(i)(B). This report is required within thirty (30) days of discovery.

Sincerely yours,

L. K. Miller
General Manager -
Salem Operations

MJP:pc

Distribution

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LICENSEE EVENT REPORT (LER)

FACILITY NAME (1) Salem Generating Station - Unit 1	DOCKET NUMBER (2) 0 5 0 0 0 2 7 2	PAGE (3) 1 OF 0 8
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TITLE (4)
Tech. Spec. 3.0.3 Entry - Table 3.3-1 Action 2a Noncompliance Due To Personnel Error

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)																
1	1	0	9	8	9	8	9	0	3	2	0	0	1	2	1	1	8	9			0	5	0	0	0		

OPERATING MODE (9) 1	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more of the following) (11)									
POWER LEVEL (10) 1 1 0 1 0	<input type="checkbox"/> 20.402(b)	<input type="checkbox"/> 20.406(e)	<input type="checkbox"/> 50.73(a)(2)(iv)	<input type="checkbox"/> 73.71(b)						
	<input type="checkbox"/> 20.406(a)(1)(i)	<input type="checkbox"/> 50.36(c)(1)	<input type="checkbox"/> 50.73(a)(2)(v)	<input type="checkbox"/> 73.71(c)						
	<input type="checkbox"/> 20.406(a)(1)(ii)	<input type="checkbox"/> 50.36(c)(2)	<input type="checkbox"/> 50.73(a)(2)(vi)	OTHER (Specify in Abstract below and in Text, NRC Form 366A)						
	<input type="checkbox"/> 20.406(a)(1)(iii)	<input checked="" type="checkbox"/> 50.73(a)(2)(i)	<input type="checkbox"/> 50.73(a)(2)(viii)(A)							
	<input type="checkbox"/> 20.406(a)(1)(iv)	<input type="checkbox"/> 50.73(a)(2)(ii)	<input type="checkbox"/> 50.73(a)(2)(viii)(B)							
<input type="checkbox"/> 20.406(a)(1)(v)	<input type="checkbox"/> 50.73(a)(2)(iii)	<input type="checkbox"/> 50.73(a)(2)(x)								

LICENSEE CONTACT FOR THIS LER (12)		TELEPHONE NUMBER	
NAME M. J. Pollack - LER Coordinator		AREA CODE 6 0 9	3 3 9 - 4 0 2 2

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
<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)

On 11/9/89, a Turbine Volumetric Flow Test was initiated. As part of the test, the Nuclear Instrumentation System power range channels' gain potentiometers were to be adjusted, by procedure, as T_{av} decreased. When the 1N44 channel could not be adjusted to 100% power as per calorimetrics, due to the bottoming out of the "fine gain" potentiometer, the channel was declared inoperable at 0540 hours. Technical Specification 3.3.1 Table 3.3-1 Action 2 was entered. Maintenance personnel were contacted to adjust the N44 drawer coarse gain. The channel was not made operable nor were the bistables tripped within one (1) hour as required; therefore, Technical Specification 3.0.3 was entered. The root cause of this event has been attributed to personnel error. Operations shift personnel did not maintain command and control of actions taken to mitigate inoperability of the 1N44 ENIS channel. Operations directives are being reviewed to ensure the interpretation of Code of Federal Regulations 10CFR 50.72 reportability criteria, as it applies to Technical Specification Action Statement 3.0.3, is clear. This review will be complete by December 21, 1989. Operations procedure IV-10.3.1 was revised. Administrative guidance will be developed for the conduct of special tests and projects. This event will be reviewed by the PSE&G Nuclear Training Center. Lessons learned will be incorporated into Licensed Operator requalification training. Operations department and I&C department procedures will be reviewed to ensure consistent application of required Technical Specification action requirements.

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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:

Technical Specification 3.0.3 entry; Technical Specification Table 3.3-1 Action 2a not complied with due to personnel error

Event Date: 11/09/89

Report Date: 12/11/89

This report was initiated by Incident Report No. 89-696.

CONDITIONS PRIOR TO OCCURRENCE:

Mode 1 Reactor Power 100% - Unit Load 1143 MWe

Turbine Volumetric Flow Test In Progress to support Salem rerating study; Rod Control in manual; and Main Steam Governor valve control in "Impulse Pressure In"

DESCRIPTION OF OCCURRENCE:

On November 9, 1989, a Turbine Volumetric Flow Test (TVFT) was initiated. This test was being performed as part of a Unit power re-rating study. As part of the test, the Excore Nuclear Instrumentation System (ENIS) {IG} power range (1N41 through 1N44's) channels' gain potentiometers were to be adjusted, by procedure, as T_{av} decreased. When the 1N44 channel could not be adjusted to 100% power as per calorimetrics, due to the bottoming out of the "fine gain" potentiometer, the channel was declared inoperable at 0540 hours that day. Technical Specification 3.3.1 Table 3.3-1 Action 2 was entered which states:

"With the number of OPERABLE channels one less than the Total Number of Channels, STARTUP and/or POWER OPERATION may proceed provided the following conditions are satisfied:

- a. The inoperable channel is placed in the tripped condition within 1 hour.
- b. The Minimum Channels OPERABLE requirement is met; however, one additional channel may be bypassed for up to 2 hours for surveillance testing per Specification 4.3.1.1.
- c. Either, THERMAL POWER is restricted to less than or equal to 75% of RATED THERMAL and the Power Range, Neutron Flux trip setpoint is reduced to less than or equal to 85% of RATED THERMAL POWER within 4 hours; or the QUADRANT POWER TILT RATIO is monitored at least once per 12 hours.

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DESCRIPTION OF OCCURRENCE: (cont'd)

- d. The QUADRANT POWER TILT RATIO, as indicated by the remaining three detectors, is verified consistent with the normalized symmetric power distribution obtained by using the movable in-core detectors in the four pairs of symmetric thimble locations at least once per 12 hours when THERMAL POWER is greater than 75% of RATED THERMAL POWER.

When the 1N44 channel was declared inoperable, Maintenance-I&C personnel were contacted to adjust the N44 drawer coarse gain. The channel was not made operable nor were the bistables tripped within one (1) hour as required by Table 3.3-1 Action 2a; therefore, Technical Specification Action Statement 3.0.3 was entered.

Technical Specification Action Statement 3.0.3 states:

"When a Limiting Condition for Operation is not met except as provided in the associated ACTION requirements, within one hour action shall be initiated to place the unit in a MODE in which the specification does not apply by placing it, as applicable, in:

1. At least HOT STANDBY within the next 6 hours,
2. At least HOT SHUTDOWN within the following 6 hours, and
3. At least COLD SHUTDOWN within the subsequent 24 hours.

Where corrective measures are completed that permit operation under the ACTION requirements, the ACTION may be taken in accordance with the specified time limits as measured from the time of failure to meet the Limiting Condition of Operation. Exceptions to these requirements are stated in the individual specifications."

The Nuclear Regulatory Commission was notified of this event on November 30, 1989 at 1510 hours as required by Code of Federal Regulations 10CFR 50.72(b)(1)(i)(a). The report was made late because it was initially determined, based on a review of the Emergency Classification Guide (ECG), that Unit shutdown initiation meant actual load reduction. In this event load reduction did not occur while the Unit was in Technical Specification Action Statement 3.0.3; although, preparations for load reduction were in progress. Subsequent review of the regulations has shown that the NRC must be notified within one hour of commencement of load reduction.

SEQUENCE OF EVENTS:

The sequence of events, which occurred on November 9, 1989, from initiation of the turbine volumetric flow test until the eventual exit of Technical Specification Action Statement 3.0.3 include:

<u>TIME</u> (hrs)	<u>EVENT</u>
0130	Operating shift verifies portions of TVFT prerequisites
0144	Steam Generator (S/G) blowdown secured as per TVFT procedure

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SEQUENCE OF EVENTS: (cont'd)

<u>TIME</u> (hrs)	<u>EVENT</u>
0148	CVCS mixed bed demineralizers bypassed per TVFT procedure
0204	Reactor Coolant System (RCS) (AB) and pressurizer boron concentration verified
0225	Manual Control Rods selected per TVFT procedure; baseline calorimetric performed and pretest briefing conducted (I&C not present)
0300	Ten (10) gallon boration made
0315	Eight (8) gallon boration made
0330	T _{av} = 569° F - Calorimetric being taken
0339	Console Alarm - "RC Tavg-Tref deviation" illuminated T _{av} reduction operations begin (time limit of sixteen (16) hours per Westinghouse safety evaluation for TVFT)
0350	Power Range NI's adjusted to 99.4% per Calorimetric
0400	Fifteen (15) gallon boration made
0415	T _{av} = 567° F; 14 Governor Valve indicates "full open" on console and EHC cabinet
0450	T _{av} = 567° F; Calorimetric data being taken
0520	NI gain adjustment initiated for calorimetric; 1N41, 1N42, and 1N43 gain adjustment satisfactory; 1N44 gain adjustment "bottomed out" prior to channel meeting acceptance criteria of calorimetric
0540	I&C contacted and informed to perform coarse gain adjustment for the 1N44 channel; the 1N44 channel is declared inoperable (as per discussion between the SNSS, NSS and the Test Director)
0620	I&C contacted to expedite 1N44 coarse adjustment or have associated bistables tripped prior to 0640
0630	I&C contacted to trip the 1N44 bistables and the TVFT was suspended
0640	Technical Specification Table 3.3-1 Action 2a exceeded; Technical Specification Action Statement 3.0.3 entered
0641	I&C completes tripping of 1N44 bistables; however, NSS notes the permissive P-10 jumper is not installed as required by

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SEQUENCE OF EVENTS: (cont'd)

- 0641 (cont'd) Operations procedure IV 10.3.1, "Removing, Returning To Service and Loss of Protective System Channel"
- 0736 P-10 jumper installed by I&C; Bistables re-energized for "High Flux Rate Trip, High Flux Trip (high setpoint) and High Flux Trip (low setpoint)"
- 0750 Jumper removed and bistables returned to tripped condition; RCS boron dilution initiated to return T_{av} to program value and to initiate a Unit shutdown from normal operation conditions
- 0840 $T_{av} = 569^{\circ}\text{F}$ - Calorimetric taken
- 0940 Power range ENIS adjusted per calorimetric of T_{av} of 569°F ; all four channels in service and in calibration; 1N44 declared operable and Technical Specification Action Statement 3.0.3 and Table 3.3-1 Action 2 exited
- 0959 $T_{av} = 570.5^{\circ}\text{F}$; calorimetric data taken
- 1045 Final NI adjustment at $T_{av} = T_{ref}$ 100% power

APPARENT CAUSE OF OCCURRENCE:

The root cause of this event has been attributed to personnel error. Operations shift personnel did not maintain command and control of actions taken to mitigate inoperability of the 1N44 ENIS channel.

When the 1N44 channel was declared inoperable, operations personnel did not adequately inform the I&C technician of the one hour time constraint associated with either adjusting the 1N44 coarse gain or trip the bistables and install a jumper across permissive P-10.

As indicated in the Sequence of Events section, Reactor Engineering and Operations personnel were closely monitoring T_{av} indications since a reduction in T_{av} of 2°F would require adjustment of the power range ENIS channels. The power range ENIS channels required this adjustment twice. The first time, the channels were successfully adjusted using the fine gain. The second time, the 1N44 channel could not be adjusted using the fine gain. After discussion with Reactor Engineering personnel involved in the TVFT, the shift declared the 1N44 channel inoperable. This decision was based on the channel requiring a calorimetric adjustment due to the drop in T_{av} caused by the TVFT and not because of an equipment malfunction. Procedure IV-10.3.1, "Removing, Returning To Service and Loss of Protective System Channel" was applied. It adequately addresses how to remove a power range ENIS channel from service in accordance with the requirements of Technical Specification Table 3.3-1 Action 2a.

When it was determined that the fine gain was not able to adequately adjust the 1N44 channel, I&C was contacted and a Technician was directed to adjust the 1N44 channel's coarse gain. The technician

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APPARENT CAUSE OF OCCURRENCE: (cont'd)

although prepared with the necessary tools to complete the requested task, did not have the appropriate procedure to perform the adjustment. Subsequently, in obtaining the procedure ("Power Range Channel 1N44 Detector Current Adjustment" - 1IC-16.4-024), not enough time remained to complete the task. Therefore, at 0630 hours, the shift directed the technician to trip the bistables in accordance with the I&C procedure. The shift personnel were unaware that the procedure used by the I&C technician did not address the requirement to install the P-10 jumper. The 1IC-16.4.024 procedure is a technically correct procedure when used for routine maintenance.

As stated previously, Operations personnel applied procedure IV-10.3.1 when channel 1N44 was declared inoperable. This procedure adequately addresses the steps required to make an ENIS power range channel inoperable. However, it differs from the Maintenance-I&C procedure as indicated above. Operations personnel were not aware of this. Therefore, when they directed the I&C technician to remove the 1N44 channel from service (trip the bistables), it was assumed that the P-10 permissive would be jumpered.

In summary, Operations' communications with the I&C personnel were not adequate in defining the overall concern with the 1N44 channel operability and the Technical Specification requirements. Additionally, Operations did not follow procedure IV-10.3.1 step by step. Instead, they allowed I&C to use their procedure to remove the 1N44 channel from service.

Several conditions/events which contributed to exceeding the one (1) hour Table 3.3-1 Action 2a time constraint were: 1) I&C personnel were not involved with the briefings prior to initiation of the TVFT; (2) the I&C supervisor assigned to cover the TVFT job was new and therefore not fully cognizant of specific Technical Specification constraints; and (3) the 1IC-16.4-024 procedure is more involved than is necessary to support Technical Specification Table 3.3-1 Action 2a.

ANALYSIS OF OCCURRENCE:

The ENIS power range detectors are uncompensated ion chambers. They monitor reactor core power, via neutron leakage, during power operation and provide several protective functions. These functions include High Flux Rate Reactor Trip, High Flux Reactor Trips (low setpoint and high setpoint), Control Rod Stop, and several alarm indications.

The high flux rate reactor trip will occur if the rate of change of power (either increasing or decreasing) of 5% in two (2) seconds occurs as indicated on two (2) or more ENIS power range channels. The low setpoint high flux reactor trip will occur at 25% power. It can be blocked via permissive P-10 when power exceeds 10%. Indication of two (2) out of the four (4) power range ENIS channels is required. The high setpoint high flux reactor trip occurs if power exceeds 109% as indicated on two (2) of the four (4) power range ENIS channels. The control rod stop function blocks manual and automatic control rod

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ANALYSIS OF OCCURRENCE: (cont'd)

withdrawal when reactor power exceeds 103% on any one of the four (4) power range ENIS channels. Input to control room alarms (besides trip signals) include: high flux (> 109% on any one channel; high flux at low power operation where the flux exceeds 25% on any one channel (which can be blocked via permissive P-10); high flux rate change on any one channel; and channel deviation which alarms if any one channel deviates from any other channel by $\pm 2\%$.

The turbine volumetric flow test was being performed as part of the investigative efforts in determining the feasibility of increasing the maximum allowable power output from the Unit. The test required the addition of boric acid to the core, which in turn would cause T_{av} to decrease. Subsequently, with the governor valves set in automatic operation, they would open more in order to maintain power at 100%.

The requirement to jumper P-10 when a power range ENIS is inoperable ensures that in the event of a different power range ENIS channel failure, the low setpoint flux reactor trips can be unblocked when reactor power is reduced to less than 10%. As indicated in the Sequence of Events section, when the jumper was installed (at 0736 hours) the tripped bistables re-energized. At the time this occurred Operations took prudent actions to restore the plant to normal operating conditions prior to initiating power reduction. The bistables re-energized due to the inherent design of the circuit and previous actions taken by the I&C technician in his attempt to adjust the channel coarse gain. The technician had disconnected the channel drawer high voltage and detector cables as per procedure. When the technician was directed to trip the bistables, he removed the associated "control power" fuses. The technician (at the direction of the shift) then installed the jumper to clear the P-10 permissive and the previously tripped bistables re-energized.

Normally, if the bistables of an inoperable NI channel are placed in their trip condition (using IV-10.3.1) and power is above 10% (P-10) the P-10 jumper installation would not cause previously tripped bistables to reset. However, in this event the channel drawer high voltage and detector cables were disconnected. This causes the input to the drawer to be 0% power causing the P-10 bistable to be active (115VAC output). When the control power fuses were removed power was removed from all active bistables (including P-10). Therefore, a jumper from the P-10 bistable output terminals to a 115VAC power supply is required to make the P-10 bistable active. Because of the state of the P-10 bistable, the power that was jumpered to it was allowed to feed back into the drawer control power circuitry, via transformer action, re-energizing the other bistable circuits which were tripped by removal of the control power fuses. If only Operations procedure IV-10.3.1 was used to put the 1N44 channel in its tripped condition, instead of both IV-10.3.1 and IIC-16.4.024, this would not have occurred.

Operations personnel took the prudent actions necessary to maintain control of plant conditions during this event. Therefore, this event did not affect the health or safety of the public; however, it is

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ANALYSIS OF OCCURRENCE: (cont'd)

reportable in accordance with Code of Federal Regulations 10CFR 50.73 (a)(2)(i)(B) due to the entry into Technical Specification Action Statement 3.0.3.

CORRECTIVE ACTION:

Operations management has reviewed the circumstances surrounding this LER. Operations personnel have been held accountable as to the inappropriate actions identified by this LER.


Operations directives are being reviewed to ensure the interpretation of Code of Federal Regulations 10CFR 50.72 reportability criteria, as it applies to Technical Specification Action Statement 3.0.3, is clear. This review will be complete by December 21, 1989.

Operations procedure IV-10.3.1 has been revised to address placement of permissive P-10 jumper cables to prevent inadvertent re-energization of tripped bistables.

Administrative guidance for the conduct of special tests and projects has been reviewed (i.e., DE-AP.ZZ-0012(Q), "Test Program"). This guidance addresses those administrative controls necessary to ensure compliance with all regulatory and station requirements. The specific responsibilities of the project manager/test director are clearly outlined. DE-AP.ZZ-0012(Q) is an Engineering Department procedure, it is not a station level document. Therefore, station procedure AP-32, "Implementing Procedure Program" is being revised to incorporate the administrative controls addressed by DE-AP.ZZ-0012(Q). This revision will be issued and implemented by February 1, 1990.

This event will be reviewed by the PSE&G Nuclear Training Center. Lessons learned will be incorporated into the next cycle of Licensed Operator requalification training.

Operations department and I&C department procedures will be reviewed to ensure consistent application of required Technical Specification action requirements. This will be completed as part of the procedure upgrade project which is scheduled to be completed by January 1992.


General Manager -
Salem Operations

MJP:pc

SORC Mtg. 89-119