

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

Nuclear Business Unit

JAN 07 1998

LR-N970806

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

LER 311/97-010-01 SALEM GENERATING STATION - UNIT 1 and 2 FACILITY OPERATING LICENSE NOS. DPR 70 and DPR 75 DOCKET NOS. 50-272 and 50-311

Gentlemen:

This Licensee Event Report supplement entitled "Technical Specification Required

Shutdown - Position Indication Systems" is being submitted pursuant to provide

additional information relative to the root cause determination.

Sincerely,

A. C. Bakken III General Manager -Salem Operations

Attachment

EHV/tcp

C Distribution LER File 3.7

> 9801140146 980105 PDR ADOCK 05000311 S PDR

The power is in your hands.



TERRY

NRC FORM 366 U.S. NUCLEAR REGULATORY COMMISSION (4-95)							APPROVED BY OMB NO. 3150-0104 EXPIRES 04/30/98								
LICENSEE EVENT REPORT (LER)							ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS MANDATORY INFORMATION COLLECTION REQUEST: 50.0 HRS. REPORTED LESSONS LEARNED ARE INCORPORATED INTO THE LICENSING PROCESS AND FED BACK TO INDUSTRY. FORWARD COMMENTS REGADING SUPPEN ESTIMATE TO THE INFORMATION								
(See reverse for required number of digits/characters for each block)							AND 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.								
FACILITY NAME (1) SALEM GENERATING STATION UNIT 2						DOCKET NUMBER (2) 05000311					PAGE (3) 1 of 4				
TITLE (4) TECHNI	CAL	SPECI	FICATIO	N REQUIRE	ED SHU	ITDOW	N - PO	SITIO	n in	NDIC	ATIO	N SYSTEM	 S		
EVENT DATE (5)			LER NUMBER (6) REPORT DATE					Έ(7)	OTHER FACILITIES INVOLVED (8)						
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	MONTH	DAY	YEAR	FACILITY NAME Salem Generating Static			ion	DOCKET NUMBER 05000272		
08 1	9	97	97	010	01	1	5	98	FACILITY NAME ONLY DOCKET NUM			1UMBER 5000			
OPERAT	ING '9)		THIS REP	ORT IS SUBMI	TTED PU	RSUANT			IREN		SOF 10	CFR §: (Che	ck one or	more) (11) Ka)(2)(viii)
POWE	R		20.22	03(a)(1)		20.2203	3(a)(3)(i))		50.73(a)(2)(i)				50.73(a)(2)(viii)	
LEVEL (10)		20.22	03(a)(2)(i)		20.2203	B(a)(3)(ii)		50.73(a)(2)(iii)			73.71		
			20.22	03(a)(2)(ii)		20.2203	B(a)(4)			50.73(a)(2)(iv)			OTHER		
			20.22	$\frac{03(a)(2)(iii)}{03(a)(2)(iv)}$)(2)(iii)		50.36(c)(1)			50.73(a)(2)(v)			S; or	or in NRC Form 366A	
			20.22			SEE CON			SI FI	R (12)		<u> </u>	l		
NAME			<u></u> .							TELEP	HONEN	UMBER (Include A	rea Code)		
E. H. Villar, Station Licensing Engineer (609) 339-5456															
			COMPLE	TE ONE LINE F	OR EAC	H COMPC	NENT F	AILUR	E DESCRIBED IN THIS REPORT (13)						
CAUSE	SI	STEM	COMPONENT MANUFACTURER REPO		ORTABLE CAUS		SE			MANUFAC	MANUFACTURER REPORTABLE TO NPRDS				
· · · · · · · · · · · · ·															
:															
		SU	PPLEMEN	TAL REPORT	XPECTE	D (14)	1 1 1 1 1 1 1			Ī	EXP	ECTED	MONTH	DAY	YEAR
YES (If yes, complete EXPECTED SUBMISSION DATE). X NO SUBMISSION DATE (15)															
ABSTRAC	î (Lin	hit to 140	0 spaces,	i.e., approxima	ately 15 s	single-spa	aced typ	oewritte	en lin	nes) (1	16)				
On August 18, 1997, during performance of low power reactor physics testing, two analog rod position indicators showed two rods deviating by more than 12 steps from their group demand counter. Technical Specification action statement 3.1.3.2.1 b was entered at 2238 hours. On August 19, 1997, at 0005 hours control room operators initiated a plant shutdown to comply with the requirements of the Technical Specifications, and at 0024 hours completed the shutdown by entering (Mode 3) where the Specification is no longer applicable.															
The apparent cause of this event has been attributed to Deficiencies in Design, Manufacturing Construction/Installation. Contributing factors were inadequate calibration procedural guidance and insufficient management pursuit of technical specification relief.															
Corrective action taken was the successful recalibration of the rod position indication system. A long term corrective action taken was the submittal of a license change request to increase the allowable rod deviation to \pm 18 steps (power dependent). Amendment 183, which approved the license change request, was issued on September 10, 1997.															
This condition is being reported in accordance with 10CFR50.73 (a) (2) (i). A one hour report was made in accordance with 10CFR50.72 on August 19, 1997.															

4.1.1

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NRC FORM 366A		U.S. NUCLEAR REGUL	ATORY COMMISSION					
LICENSEE EVENT REPORT (LER) TEXT CONTINUATION								
FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)	PAGE (3)					
	05000311	YEAR SEQUENTIAL REVIS	ION 2 OF 4					
SALEM GENERATING STATION UNIT 2		97 010 01						
TEXT (If more space is required, use additional copies of NRC Form	366A) (17)	He <u></u>	<u>ىرىن مىڭ مىر مىنى سىرى مىشى كالىرىپ،</u>					
PLANT AND SYSTEM IDENTIFICATION								
Westinghouse - Pressurized Water Reactor								
Rod Position Indication System (RPIS) {AA}*								
* Energy Industry Identification System (EIIS) codes and component function identifier codes appear in the text as {SS/CCC}.								
IDENTIFICATION OF OCCURRENCE								
Date Determined to be Reportable: August 19, 1997.								
CONDITIONS PRIOR TO OCCURRENCE								
Unit 1: Defueled, 0 % Reactor Power Unit 2: Mode 2, 0 % Reactor Power								
There were no structures, components, or systems that were inoperable at the start of the event that contributed to the event.								
DESCRIPTION OF OCCURRENCE								
On August 18, 1997 during the performance of reactor physics testing for control rod swaps, two control bank D rods were noted to deviate by more than 12 steps from their group demand counter. Technical Specifications 3.1.3.2.1 Action b was entered at 2238 hours, following the one hour thermal soak allowed by the Technical Specifications Limiting Condition for Operation. Technical Specification 3.1.3.2.1 Action b states, in part; "With two or more analog rod position indicators per bank inoperable, within one hour restore the inoperable rod position indicator(s) to OPERABLE status or be in HOT STANDBY within the next 6 hours"								
As a result of the reactor being open Power, the available neutron flux was determine the actual position of thes at 0005 hours control room personnel Standby, in accordance with the appli	rated at approx not sufficien se rods. There initiated a re cable Technica	imately 2% Rate t to perform a fore, on August actor shutdown I Specification	d Thermal flux map to 19, 1997 to Hot s					

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The shutdown was completed at 0024 hours, when the Unit was placed in a non applicable Mode (Hot Standby).

requirements.

NRC FORM 366A (4-95) U.S. NUCLEAR REGULATORY COMMISSION

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)				PAGE (3)		
	05000311	YEAR		REVISION NUMBER	3	OF	4	
SALEM GENERATING STATION UNIT 2		97	010	01				

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

SAFETY SIGNIFICANCE

There was no safety significance associated with this event. The control rods were declared inoperable due to a mismatch between their demanded vs. indicated position. However, the control rods were always capable of performing their safety function, which is to rapidly insert negative reactivity (fall) into the core following a loss of power.

APPARENT CAUSE OF OCCURRENCE

The apparent cause of this event has been attributed to Deficiencies in Design, Manufacturing Construction/Installation.

Rod position is determined by use of a linear voltage transformer consisting of primary and secondary coils alternately stacked on the steel support tube. This method of determining Rod Position Indication has experienced some difficulties with the calibration technique. Some of the basic problems encountered with calibrating the system are associated with;

1. The instrumentation readout design is based on the assumption that secondary voltage is a linear function of rod position. In fact, the steady-state calibration curve is more of an arc-shaped or even an S-shaped curve such that for some rods the steady-state Zero Span adjustment may not always be able to be calibrated to within the ± 12 steps, and

2. The instrument response is highly dependent on temperature changes, such as Reactor Coolant System temperature changes and temperature changes associated with rod motion itself. This "transient" thermal response has been categorized as "overshoot," and this transient indication error tends to be worse near the top of the core (rods withdrawn).

Additionally, the following contributing causes were determined to be applicable to this event.

The calibration procedure used to calibrate the rods was not adequate. The procedure failed to properly take advantage of the newly implemented plant computer modification.

Additionally, although a license change request had been developed to provide for a more flexible limiting condition for operation, this option was not proactively pursued prior to the unit restart.

NRC FORM 366A		U.S. NUCLEAR REGULATO	DRY COMMISSION
(4-95) LICENSEE EV TEXT C	ENT REPORT (LE	R)	
FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)	PAGE (3)
	05000311	YEAR SEQUENTIAL REVISION NUMBER NUMBER	4 OF 4
SALEM GENERATING STATION UNIT 2		97 010 01	
PRIOR SIMILAR OCCURRENCES			
Salem Units 1 and 2 have been shutdown There are no prior similar occurrence past two years. However the following been submitted in the past 3 years, p 1995; (1) Associated with docket No. 94-014, and 95-003, (2) Associated with 009, and 95-002.	wn since May ar es which have h ng LERs have be prior to Amendr 50-272; 94-004 ith docket No 5	nd June 1995, resp been identified wi een identified as ment 166/148 issue 4, 94-006, 94-010, 50-311; 94-001, 94	ectively. thin the having d May 3, 94-012, -003, 94-
Amendment 166/148 modified Technical that the loss of indication of more result in an automatic 3.0.3 entry by action time under the Limiting Condi	Specification than one positi y providing the tion for Operat	3.1.3.2.1 Action ion indicator woul operators with t tion Action Statem	b, such d not he same ent.
CORRECTIVE ACTIONS			
 On August 19, 1997, at 0005 hrs a with Technical Specifications 3.1. hrs. on August 19, 1997. 	Unit shutdown 3.2.1 Action b	was initiated in a , and was complete	accordance ed at 0024
2 The calibration procedure was revi	sed and the an	alog rod position	

3. A license change request has been submitted to expand the allowable deviation between demanded and indicated position from \pm 12 steps to \pm 18 steps (power dependent). Amendment 183, which approved the license change request, was issued on September 10, 1997.

indication system was successfully recalibrated.

- 4. Individual rod position scaling has been provided for each rod and has been applied to the position indication provided by the Plant Computer (P-250).
- 5. Licensing and Operations management meet periodically to discuss license change request priorities.