



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

OCT 3 1997  
LR-N970653

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

LER 311/97-012-00  
SALEM GENERATING STATION - UNIT 2  
FACILITY OPERATING LICENSE NO. DPR-75  
DOCKET NO. 50-311

Gentlemen:

This Licensee Event Report entitled "Entry into Technical Specification 3.0.3 Due to the Inoperability of Two Overtemperature-Differential Temperature (OTDT) Channels" is being submitted pursuant to the requirements of the Code of Federal Regulations \*\*\*\*10CFR50.73 (a) (2) (i) (B)\*\*\*\*.

Sincerely,

A. C. Bakken III  
General Manager  
Salem Operations

Attachment

PJD/tcp

C Distribution  
LER File 3.7

IE22%

142043

9710150004 971003  
PDR ADOCK 05000311  
S PDR



The power is in your hands.

**LICENSEE EVENT REPORT (LER)**

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

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 REGARDING BURDEN ESTIMATE TO THE INFORMATION 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) <b>SALEM UNIT 2</b>		DOCKET NUMBER (2) <b>05000311</b>	PAGE (3) <b>1 OF 4</b>
--	--	--------------------------------------	---------------------------

TITLE (4)  
**Entry into Technical Specification 3.0.3 Due to the Inoperability of Two Overtemperature-Differential Temperature (OTDT) Channels.**

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
9	7	97	97	012	00	10	03	97	FACILITY NAME	DOCKET NUMBER

OPERATING MODE (9) <b>1</b>	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11)									
POWER LEVEL (10) <b>45%</b>	20.2201(b)	20.2203(a)(2)(v)	<input checked="" type="checkbox"/>	50.73(a)(2)(i)(B)	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)		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 <b>Philip J. Duca Jr., Salem Licensing Engineer</b>	TELEPHONE NUMBER (Include Area Code) <b>(609) 339-2381</b>

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)										
CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS		CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS

SUPPLEMENTAL REPORT EXPECTED (14)				EXPECTED SUBMISSION DATE (15)			
YES (If yes, complete EXPECTED SUBMISSION DATE).	<input checked="" type="checkbox"/>	NO			MONTH	DAY	YEAR
					XX	XX	XX

**ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines) (16)**

On September 7, 1997 Reactor Coolant Loop 24 Overtemperature Differential Temperature (OTDT) was declared inoperable due to differential temperature being lower than acceptable. Loop 23 protection circuit was already inoperable in support of ongoing maintenance work. Thus two channels of OTDT were inoperable, requiring entry into Technical Specification 3.0.3 at 0750. The maintenance work was terminated, Loop 23 OTDT was returned to an operable state and Technical Specification 3.0.3 was exited at 0840. The unacceptable differential temperature was caused by a change in 24 Loop hot leg temperature (T-hot) streaming profile from the previous cycle, and the conservatively set NIS indication. The expected differential temperature was based on last cycle's streaming profile (the only information available) which caused the differential temperature to appear low. Corrective action included a check of the instrumentation calibration, collection of data to determine the new streaming profile and rescaling of Loop 24 instrumentation to reflect the current cycle streaming profile.

This event is reportable per 10CFR50.73(a)(2)(i)(B), a condition prohibited by the plant's Technical Specifications.

**LICENSEE EVENT REPORT (LER)**  
**TEXT CONTINUATION**

FACILITY NAME ( )	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)
SALEM UNIT 2	05000311	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	2 OF 4
		97	-- 012	-- 00	

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

PLANT AND SYSTEM IDENTIFICATION

Westinghouse - Pressurized Water Reactor

Temperature Monitoring System {IM/-}

Nuclear Instrumentation System {IG/-}

Reactor Coolant System {AB/-}

\* Energy Industry Identification System (EIIS) codes and component function identifier codes appear as {SS/CC}

IDENTIFICATION OF OCCURRENCE

Entry into Technical Specification 3.0.3. due to the inoperability of two channels of Overtemperature Differential Temperature instrumentation.

CONDITIONS PRIOR TO OCCURRENCE

At the time of the occurrence Salem Unit 2 was in Mode 1 at 45% reactor power.

DESCRIPTION OF OCCURRENCE

On September 7, 1997 the Unit 2 Reactor Operator (RO) noted, during a channel check, that Overtemperature Differential Temperature (OTDT) actual Differential Temperature indication {IM/TI} on Reactor Coolant Loop 24 was out of the acceptable range when compared to a calculated comparison value for differential temperature (2.5 degrees low compared to + or - 2.0 degrees). As a result, Loop 24 OTDT was declared inoperable. Differential temperatures in the other three loops were within the acceptable range. Since the Loop 23 protection circuit was already inoperable (bistables placed in the tripped position) in support of ongoing maintenance work on Loop 23 pressurizer level instrumentation {AB/LT} , two channels of OTDT were inoperable. Technical Specification 3.3.1.1 requires a minimum of three channels operable for OTDT (Item 7 of Table 3.3-1). Since action statements for inoperable channels do not address inoperability of two (2) or more channels, Technical Specification 3.0.3 was entered at 0750. The maintenance work was terminated, Loop 23 protection circuit was returned to an operable state, the bi- tables were returned to the untripped position, Loop 23 OTDT was declared operable and Technical Specification 3.0.3 was exited at 0840.

The calculated comparison differential temperature is dependent on average indicated reactor power (NIS) {IG/JI} and expected full power differential temperature. NIS was conservatively reading 47% as compared to 45% power determined using a calorimetric calculation. Differential temperature compared to a comparison value based on the calorimetric reactor power (45%) was within the acceptable range. After consultation with Reactor Engineering, NIS was adjusted downward to bring indicated power closer to power as determined by

**LICENSEE EVENT REPORT (LER)**  
**TEXT CONTINUATION**

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)
SALEM UNIT 2	05000311	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	3 OF 4
		97	-- 12	-- 00	

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

calorimetric calculation. This resulted in an acceptable Loop 24 indicated OTDT and the channel was returned to an operable status.

This event is reportable per 10CFR.73(a)(2)(i)(B), a condition prohibited by the plant's Technical Specifications.

ANALYSIS OF OCCURRENCE

Loop 24 Differential Temperature when compared to the calculated comparison value read low by greater than the 2 degrees allowable. The other three loops were within the acceptable range. Prior to the event, power as indicated on the NIS instrumentation was reading 47% while calorimetric calculated power was 45%. The NIS was intentionally not adjusted downward to agree with the calorimetric value to ensure that NIS was indicating conservatively. This is in accordance with Salem's response to Westinghouse Technical Bulletin ESBU-TB-92-14-R1. This ensures that the overpower trip would occur conservatively in the event of a transient. The conservatism is necessary due to potential de-calibration effects at lower power levels and is typically maintained until adjustments are performed above 70% power in accordance with Technical Specifications and procedural requirements.

A calorimetric power calculation was performed shortly after the event and the NIS was adjusted downward by 1% after concurrence by Reactor Engineering in accordance with Salem's response to Westinghouse Technical Bulletin ESBU-TB-92-14-R1. Since the other three loops were within acceptable limits, it appeared that Loop 24 temperature instrumentation could be out of calibration low. A check of the 24 Loop temperature instrumentation showed the instrument loop to be accurate.

"State point" data is typically collected near 100% power to allow adjustment of the reactor protection system to the specific characteristics of the current cycle conditions. "State point" data taken on 9/21/97 at 90% power showed Loop 24 T-hot streaming profile to be different from the previous cycle. Collection of the data allowed Reactor Engineering to identify the change in T-hot streaming. The change in streaming profile resulted in the reference full power differential temperature being higher than it should have been and the actual differential temperature appearing lower than it should have been in relation to the calculated comparison differential temperature. Loop 24 values were then rescaled to reflect the new full power differential temperature based on the existing streaming profile. Loop 24 differential temperature was within the acceptable range subsequent to the rescaling.

PRIOR SIMILAR OCCURRENCES

No similar occurrences could be found.

**LICENSEE EVENT REPORT (LER)**  
**TEXT CONTINUATION**

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
SALEM UNIT 2	05000311	97	12	00	4 OF 4

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

CAUSE OF OCCURRENCE

The cause of Loop 24 differential temperature appearing to be outside the acceptable range was the change in the T-hot streaming profile. The calculated comparison value was based on the expected full power differential temperature which assumed the streaming profile from the previous cycle. This was the only streaming information available at the time. This resulted in the expected full power differential temperature being overstated high and the Loop 24 differential temperature being observed low.

The conservative setting of NIS in relation to calorimetric power, at 45% power, resulting in the unsatisfactory differential channel check, provided an early indication of the T-hot streaming profile change and prompted the 90% state point data collection and subsequent rescaling of 24 Loop instrumentation.

ASSESSMENT OF SAFETY CONSEQUENCES AND POTENTIAL IMPLICATIONS

This event had no safety consequences or potential implications. NIS was conservatively set above the calorimetric value of 45% power. Two of the total of four OTDT channels will trip the reactor. Three of the four channels passed the channel check. At the time of the event one of these channels was already in the safe condition (tripped) to support ongoing maintenance. Even if one of the two remaining operable channels failed, the logic would have responded to an actual condition and performed its safety function.

Based on the above, the Health and Safety of the public was not affected.

CORRECTIVE ACTIONS

(1) Immediate corrective actions included: return of the Loop 23 pressure instrumentation to service, which allowed exiting Technical Specification 3.0.3; performance of a calorimetric calculation; and adjustment of the NIS downward 1%, which returned 24 Loop Differential Temperature to within acceptable limits.

(2) A work order was written to check Loop 24 Differential Temperature calibration. This effort showed the instrument loop was in calibration.

(3) As the plant approached 90% power, state point data was collected. Analysis of this data led to the discovery that the Loop 24 T-hot streaming had changed. Loop 24 values were then rescaled to reflect the new full power differential temperature based on the existing streaming profile.