



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

**Nuclear Business Unit**

**JUL 26 1996**  
LR-N96026

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

Gentlemen:

**LER 272/94-015-02**  
**SALEM GENERATING STATION - UNIT 1**  
**FACILITY OPERATING LICENSE NO. DPR-70**  
**DOCKET NO. 50-272**

This Licensee Event Report Supplement entitled "Refueling Water Storage Tank Volume Less Than Required" is being submitted pursuant to the requirements of the Code of Federal Regulations 10CFR50.73(a)(2)(i)(B).

Sincerely,

David F. Garchow  
General Manager -  
Salem Operations

Attachment

SORC Mtg. 96-098

DVH/tcp

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LER File 3.7

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The power is in your hands.

JUL 26 1996

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Attachment A

The following item represents the commitments that Public Service Electric & Gas (PSE&G) made to the Nuclear Regulatory Commission (NRC) relative to this LER (272/94-015-02). The commitments are as follows:

1. The transmitters were properly adjusted and RWST level was returned within specification. Subsequent quarterly calibrations (performed since November 1994) show both transmitters operating within specification.
2. The respective Unit 2 RWST level transmitters were found functioning within specification prior to entering Hot Shutdown, following the Unit 2 refueling outage, 2R8.
3. Instrument calibration procedures (for 1LT-920, procedure S1.IC-SC.SJ-0173(Q), Revision 2 and for 1LT-921, S1.IC-LC.SJ-0211(Q), Revision 5 both titled "Refueling Water Storage Tank Level,") were revised to provide additional guidance on draining and returning the transmitter to service.

**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 Generating Station-Unit 1</b>	DOCKET NUMBER (2) <b>05000 272</b>	PAGE (3) <b>1 OF 5</b>
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TITLE (4)  
**Refueling Water Storage Tank Volume Less Than Required**

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
10	18	94	94	015	02	07	24	96		05000
										05000

  

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>100</b>	20.2201(b)	20.2203(a)(2)(v)	<input checked="" type="checkbox"/>	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)		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 368A					
	20.2203(a)(2)(iv)	50.36(c)(2)		50.73(a)(2)(vii)						

LICENSEE CONTACT FOR THIS LER (12)

NAME <b>Dennis V. Hassler, LER Coordinator</b>	TELEPHONE NUMBER (Include Area Code) <b>(609) 339-1989</b>
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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)

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

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

Following calibration of the Refueling Water Storage Tank (RWST) level transmitters, 1LT921 and 1LT920, on September 29, 1994 and October 1, 1994, a review determined that since January 20, 1994, the RWST minimum required water volume of 364,500 gallons was potentially not met at various times, due to an indication error equivalent to 8,900 gallons. 1LT921 and 1LT920 were found with indication errors of +13 inches (+2.4%) and +11 inches (+1.9%) at the high end. A low end level indication error of +6 inches (+1%) was common to both transmitters. Vendor testing and investigation by the Public Service Electric & Gas Maintenance Department have not been able to identify the cause of this event.

The transmitters were properly adjusted and RWST level was returned within specification. In addition instrument calibration procedures were revised to provide additional guidance on draining and returning the transmitter to service.

This event is reportable under 10CFR50.73(a)(2)(i)(B), Operation or Condition Prohibited by Technical Specifications.

LICENSEE EVENT REPORT (LER)  
TEXT CONTINUATION

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)
Salem Generating Station-Unit 1	05000 272	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	2 OF 5
		94	- 015	- 02	

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

## PLANT AND SYSTEM IDENTIFICATION:

Westinghouse - Pressurized Water Reactor

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

## IDENTIFICATION OF OCCURRENCE:

Refueling Water Storage Water Volume Level Less Than Required

Discovery Date: 10/18/94

This report was initiated by Incident Report No. 94-281.

## CONDITIONS PRIOR TO OCCURRENCE:

Mode 1 Reactor Power 100% - Unit Load 1145 Mwe

## DESCRIPTION OF OCCURRENCE:

Following calibration of the Refueling Water Storage Tank (RWST) {BQ/TK} level transmitters, 1LT921 and 1LT920, on September 29, 1994 and October 1, 1994, a review determined that since January 20, 1994, the RWST minimum required water volume of 364,500 gallons was potentially not met at various times, due to an indication error equivalent to 8,900 gallons. 1LT921 and 1LT920 (both Rosemount Model No. 1153) were found with respective indication errors of +13 inches (+2.4%) and +11 inches (+1.9%) at the high end. A low end level indication error of +6 inches (+1%) was common to both transmitters.

## ANALYSIS OF OCCURRENCE:

Minimum required RWST volume ensures sufficient water is available for the injection phase of the Emergency Core Cooling System (ECCS) and for switch-over to the recirculation phase in the event of a Loss of Coolant Accident (LOCA). During the injection phase, 193,000 gallons of water volume must be provided to the containment sump to ensure adequate Net Positive Suction Head for the Residual Heat Removal (RHR) Pumps, prior to reaching the RWST low level alarm. Adequate volume must be available to provide time for the operators to shift to the recirculation phase. The tank low level alarm, at level 15 feet, 2.88 inches (equivalent to 150,492 gallons), is provided from a separate level switch 1LD9634 not affected by the indication error.

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

ANALYSIS OF OCCURRENCE: (cont'd)

Besides providing input for Control Room indication of RWST level, 1LT920 provides input to the tank low level backup alarm, at level 11 feet 6 inches (equivalent to 119,000 gallons), and the tank low-low level alarm, at indicated level 0.0 feet (equivalent to 21,200 gallons - unusable). These alarms ensure the Control Operator will complete switch-over from injection to recirculation prior to the tank low-low level alarm. Redundant control room indication of RWST level, without alarm functions, is provided by 1LT921.

In December 1993 and January 1994, the transmitters were relocated within the local instrument panel, as part of design change package (DCP) 1EC-3266 and were rescaled with new calibration data. Acceptable as-found data was obtained by different technicians on December 3 (1LT920), and December 18, 1993 (1LT921), during the calibration. On January 20, 1994, the 1LT920 transmitter sensor was verified correct with a HEISE gauge, following maintenance to repair freezing of the transmitter sensing lines.

CAUSE OF OCCURRENCE

One of the transmitters, Unit 1 transmitter 1LT920, was returned to the vendor for testing. The vendor could not duplicate the transmitter indication error. Throughout testing the transmitter performed within design specifications. As a result of this testing, it was determined that component failure was not a contributor to the cause of this event.

As part of the investigation into the occurrence, and to provide assurance that a repeat of the occurrence would not occur, the following additional actions have been completed: 1) Unit 2 level transmitters were verified to be functioning properly, 2) subsequent quarterly calibrations of the level transmitters have verified both Unit 1 transmitters have been operating within specification since November 1994, and 3) since improper draining was postulated to have caused the drift, instrument calibration procedures were revised to provide additional guidance on draining and returning the transmitter to service. However, none of these actions could provide conclusive evidence for the cause of the original failures.

Vendor testing and exhaustive investigation by the Public Service Electric & Gas Maintenance Department has resulted in an impasse with no further potential causes identified. PSE&G has not been able to identify the cause of this event. Therefore the cause is indeterminate and no further actions are planned.

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

**PRIOR SIMILAR OCCURRENCES:**

There have been no other reportable occurrences involving excessive instrument drift within the last two years.

**SAFETY CONSEQUENCES AND IMPLICATIONS:**

The Updated Final Safety Analysis Report (UFSAR) assumes an uncertainty of 21,000 gallons water volume (equivalent level 29.7 inches) for RWST level instrumentation. More accurate instrument channel uncertainties were determined by the Instrument Setpoint Calculation Program (Calculation SC-SJ006-01, Revision 01R2). This calculation identified a combined uncertainty between the Technical Specification level indication of 40 feet 6 inches (364,500 gallons) and the low level alarm of 15 feet 2.88 inches (150,492 gallons) of 10,632 gallons. This is well within the uncertainty assumed in the UFSAR. The instrument indication shift at the required Technical Specification level of 40 feet 6 inches resulted in an error of -8,900 gallons.

This event had no safety consequences since the required 193,000 gallons, for injection into the containment sump for RHR NPSH was satisfied. This is based upon the availability of a minimum volume of 194,476 gallons, due to the application of instrument uncertainties from the Instrument Setpoint Calculation Program. The minimum inventory during the subject period was calculated to have been 349,097 gallons (equivalent to 38 feet 7.8 inches). The calculated inventory of 349,097 gallons includes the indication error and the instrument indication shift. The maximum inventory at low level switch operation was calculated to be 154,691 gallons (equivalent to 15 feet 8.72 inches). The difference is 194,476 gallons which exceeds the required 193,000 gallons.

Considering an available volume of approximately 150,500 gallons at the low level alarm, an inaccuracy of 8,900 gallons would not have significantly reduced the time available for the operators to recognize the need to switch to the recirculation phase. Initiation of switch-over on low level would not have been affected, because the low level alarm is provided by a separate level switch that does not have the indication error. In addition, Emergency Operating Procedures (EOP)-LOCA-1 and EOP-LOCA-2 direct the Control Operator to initiate switch-over, in response to the RWST low level alarm from the unaffected transmitter. Therefore, it is unlikely that the inaccuracy in 1LT920 and 1LT921 would have resulted in a significant delay in the switch-over.

Based on the above, this event had no impact on the health and safety of the public.

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TEXT CONTINUATION

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

CORRECTIVE ACTIONS:

1. The transmitters were properly adjusted and RWST level was returned within specification. Subsequent quarterly calibrations (performed since November 1994) show both transmitters operating within specification.
2. The respective Unit 2 RWST level transmitters were found functioning within specification prior to entering Hot Shutdown, following the Unit 2 refueling outage, 2R8.
3. Instrument calibration procedures (for 1LT-920, procedure S1.IC-SC.SJ-0173(Q), Revision 2 and for 1LT-921, S1.IC-LC.SJ-0211(Q), Revision 5 both titled "Refueling Water Storage Tank Level,") were revised to provide additional guidance on draining and returning the transmitter to service.