

**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.

<b>FACILITY NAME (1)</b> SALEM GENERATING STATION UNIT 1	<b>DOCKET NUMBER (2)</b> 05000272	<b>PAGE (3)</b> 1 of 16
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**TITLE (4)**  
Inadequate Technical Specification Testing - Feedwater System Isolation Functional Test/Component Cooling Water Heat Exchanger Service Water Flow Control Valves

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
12	18	97	96	005	15	1	19	98	Salem Unit 2	05000311
									FACILITY NAME	DOCKET NUMBER

<b>OPERATING MODE (9)</b>	N	<b>THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11)</b>								
<b>POWER LEVEL (10)</b>	000	20.2201(b)	20.2203(a)(2)(v)	X	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 366A				
		20.2203(a)(2)(iv)	50.36(c)(2)		50.73(a)(2)(vii)					

**LICENSEE CONTACT FOR THIS LER (12)**

<b>NAME</b> R. Knieriem, Licensing Engineer	<b>TELEPHONE NUMBER (Include Area Code)</b> 609-339-1782
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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)**

<b>YES</b> (If yes, complete EXPECTED SUBMISSION DATE).	X	<b>NO</b>	<b>EXPECTED SUBMISSION DATE (15)</b>	<b>MONTH</b>	<b>DAY</b>	<b>YEAR</b>

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

In December 1995, a Technical Specification Surveillance Improvement Project (TSSIP) was initiated for the Salem Units. The program, described in LER 311/95-008-00, was not completed as expected by December 31, 1997. The Generic Letter 96-01 scope of this project is complete for both units. A reforecast for completion of the balance of the project will be forwarded under separate cover by January 31, 1998. Most of the TS non-compliances have been found in the area of surveillance requirement implementation deficiencies and will be (are being) reported as supplements to this LER-272/96-005.

This supplemental LER documents two TS requirement non-compliances identified by the TSSIP. The first involved the failure to properly implement TS 4.3.2.1.1, Feedwater Isolation functional test. The second involved the failure to properly implement TS 4.3.2.1.3, as it relates to time response testing of Component Cooling Water heat exchanger Service Water flow control valves. These events placed Salem Unit 2 in a condition prohibited by TS and in Limiting Condition for Operation 3.0.3 without the knowledge of the operators.

The cause of these occurrences has been attributed to a lack of adequate controls and understanding of the development and maintenance of Technical Specification surveillance procedures. This weakness was previously identified in LER 311/95-008. These events are reportable in accordance with 10 CFR 50.73(a)(2)(i)(B), any condition prohibited by the plant's Technical Specifications.

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

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
SALEM GENERATING STATION UNIT 1	05000272	96	005	15	2 OF 16

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

**PLANT AND SYSTEM IDENTIFICATION**

Westinghouse - Pressurized Water Reactor

- Tavg Instrumentation (RCP) {AB/-}\*
- Sustained Degraded Voltage Instrumentation (4KV) {EB/-}
- Auxiliary Building Ventilation System (AB) {VF/-}
- Fuel Handling Building (FHB) Ventilation System {VG/-}
- Containment Fan Coolers {BK/CLR}
- Containment Sump {NH/-}
- Control Area Ventilation {VI/-}
- Auxiliary/Emergency Feedwater System (AFW) {BA}
- 230 and 460 Volt Vital Bus {ED}
- Chemical Volume Control System {CB}
- Reactor Coolant System {AB/ISV}
- Feedwater System {SJ/ISV}
- Rod Control System {AA}
- Engineered Safety Features Actuation {JE/IEL}
- Steam Generator Blowdown System {WI/FI}
- Reactor Trip System Instrumentation {JC/-}
- 125 VDC and 28 VDC {EJ/-}
- Service Water System {BI/-}
- Component Cooling {CC/-}

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

**CONDITIONS PRIOR TO OCCURRENCE**

At the time of identification, Salem Unit 1 was defueled and Salem Unit 2 was at 100% power.

**DESCRIPTION OF OCCURRENCE**

As a Corrective Action from LER 311/95-008 a Technical Specification (TS) Surveillance Improvement Project (TSSIP) has been initiated. Additional deficiencies found during the TSSIP will be documented in supplements to this LER.

LER 272/96-005-00 described an event that occurred due to the identification of a Technical Specification (TS) surveillance test inadequacy. This supplement describes additional occurrences of a Technical Specification surveillance implementation deficiencies identified during the Technical Specification Surveillance Improvement Project (TSSIP) review.

On March 25, 1996, during a review of the implementation of Technical Specification Surveillance Requirement 4.3.2.1.1, the TSSIP team identified a Technical Specification violation regarding Channel Checks. Surveillance Requirement 4.3.2.1.1 requires a Channel Check on the instrument channels listed in Table 4.3-2. Items 1.f and 4.d of Table 4.3-2 list Engineered Safety Feature Actuations which occur on Steam Flow in Two Steam Lines--HIGH coincident with Tavg--LOW-LOW or Steam Line Pressure--LOW. The Channel Check requirements apply such that a comparison of the Steam Line Flow {SB/-} indications is to be made once per shift in Modes 1, 2 and 3, as are comparisons of the Tavg instruments, and the Steam Line Pressure instruments. A further review determined that Channel Checks

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

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
SALEM GENERATING STATION UNIT 1	05000272	96	005	15	3 OF 16

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

**DESCRIPTION OF OCCURRENCE (cont'd)**

were not being performed on the Tavq instruments since at least November 23, 1979 as required in Modes 1, 2 and 3.

On April 3, 1996, during a review of the implementation of Technical Specification Surveillance Requirement 4.3.2.1.1, the team identified a Technical Specification violation regarding Channel Checks. Surveillance Requirement 4.3.2.1.1 requires a Channel Check on the instrument channels listed in Table 4.3-2. Item 7.b of Table 4.3-2 lists Engineered Safety Feature Actuations which occur upon a Vital Bus Sustained Degraded Voltage. The three (3) Vital Bus Sustained Degraded Voltage instruments on each 4KV bus require Channel Checks once per shift in Modes 1, 2 and 3. The TSSIP determined that the Vital Bus Sustained Degraded Voltage instruments were not adequately Channel Checked in Modes 1, 2 and 3 as required by Technical Specification 4.3.2.1.1.

The Sustained Degraded Voltage instrumentation was added to Salem Unit 1 and 2 vital 4KV buses in April of 1982 and June of 1983, respectively. The Technical Specifications for both units were revised to reflect the Sustained Degraded Voltage instrumentation effective July 23, 1982 by Amendments 45 (Unit 1) and 10 (Unit 2). A review of historical documentation concluded that the Channel Check requirements specified in the revised Technical Specifications were not implemented.

The review also identified that the Channel Check requirements for 4KV Vital Bus Undervoltage instruments were apparently not satisfied from initial plant operation of either unit until 1989. These checks were required in Modes 1, 2 and 3 by Item 7 of Table 4.3-2 in the original issue of Unit 1 and 2 Technical Specifications, which became Item 7.a when the Sustained Degraded Voltage instruments were installed. This conclusion is based on the oldest record found which was a Unit 1 log taken for Modes 1 through 4, dated November 23, 1979, and review of subsequent revisions to the same log.

In January of 1988, the Unit 1 Sustained Degraded Voltage instrumentation was changed from a 2 out of 3 bus logic to a 2 out of 3 per bus logic in response to the Salem Unit 2 event of August 26, 1986, which resulted in the Unit 2 vital buses transferring back and forth between Station Power Transformers 21 and 22 until they finally separated from offsite power. Salem Unit 2 was similarly modified in March of 1990. The Technical Specifications for both units were revised by Amendments 102 (Unit 1) and 79 (Unit 2), effective September 25, 1989, to address the modifications.

The review of available documentation concluded that the Channel Check requirements specified in the revised Technical Specifications were not implemented. As described above, a Channel Check of the 4KV Vital Buses was added to the Operating Logs for Modes 1-4 in 1989.

On May 6, 1996, the TSSIP Team identified an inadequacy in the bypass testing of the Auxiliary Building (AB) {NF} and Fuel Handling Building (FHB) {ND} ventilation systems. Salem Units 1 and 2 Technical Specification surveillances for the AB exhaust air leakage filtration systems, TS 4.7.7.1.b.1 (TS 4.7.7.b.1) for units 1 and 2 respectively, and FHB area ventilation system (TS 4.9.12.b.1) were not adequately met. Specifically, the surveillance did not demonstrate that the total bypass flow of ventilation system to the facility plant vent, including leakage through the ventilation system diverting valves, is less than or equal to 1% when the system is tested by admitting cold Dioctyl Phthalate (DOP) at the system intake.

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

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)
SALEM GENERATING STATION UNIT 1	05000272	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	4 OF 16
		96	- 005	- 15	

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

**DESCRIPTION OF OCCURRENCE (cont'd)**

During the FHB ventilation testing, the test gas is injected at a common point upstream of the normal and emergency filter units. The downstream sample, however, is only taken inside the emergency filter unit. While this test setup satisfied the requirement for the HEPA filter in-place efficiency test required by TS 4.7.7.1.B.3 (TS 4.7.7.1.B.2), it does not adequately measure the bypass flow leakage through the normal filtration unit as required by TS, which isolates during an accident or a high radiation signal. Similar test setup conditions existed during the AB ventilation system testing.

On May 8, 1996, the TSSIP Team also identified a testing inadequacy with respect to maintaining a negative pressure in the spent fuel pool area. TS surveillance 4.9.12.d.4 (4.9.12.d.3) requires that a negative pressure be maintained between the spent fuel pool area and the outside atmosphere during system operations. Procedure SC.RP-TI.ZZ-1140, Fuel Handling Building Ventilation System Negative Pressure Test, which is used to perform this test, does not adequately demonstrate compliance with the TS requirement. The procedure verifies that a negative pressure is maintained using the normal operation (HEPA filter bank only) system lineup. The intent of the surveillance is to demonstrate that a negative pressure can be maintained with the system in its accident mode lineup (HEPA plus Charcoal).

On May 8, 1996, the TSSIP Team also identified a deficiency in the implementation of TS 3.3.2.1, Engineered Safety Feature Actuation Signal (ESFAS) Table 3.3-5, item 2H. Specifically, TS 3.3.2.1 Table 3.3-5, item 2H, Containment Fan Coolers (BK), for both Salem units, requires a total instrumentation channel response time of less than or equal to 40 seconds in Modes 1 - 3, when the initiation signal is generated by the containment high pressure sensors. Procedure S1(2).IC-TR.ZZ-0002, Unit 1(2) Master Time Response, calculates the total instrumentation channel response time by adding the inputs from a series of implementing response time procedures. The result for each instrumentation channel is then compared to the TS Table 3.3-5 acceptance criteria. When reviewing the calculation results for Item 2H, it was noted that the response time for containment high - high was utilized instead of containment high. A review and recalculation of past completed surveillances for item 2H indicates that the TS required time response was not exceeded.

On May 22, 1996, the Salem Technical Specification Surveillance Improvement Project (TSSIP) identified that the control and implementation of procedure SC.RP-TI.ZZ-1102, Containment Entries At Power, was not adequate to meet the visual inspection or mode applicability requirements of the Technical Specification Surveillance 4.5.2.c.2. Surveillance 4.5.2.c.2 requires a daily visual inspection of the areas affected within the containment by containment entry when Containment Integrity is established. The daily visual inspection is only required if Containment entry has occurred since the last visual inspection. Technical Specification 4.5.2 is applicable in Modes 1 through 4, and Containment Integrity is a prerequisite to entry into Mode 4.

Investigation determined that responsibility for Technical Specification Surveillance 4.5.2.c.2 was transferred from the Operations Department to the Radiation Protection Department in late 1983. The transfer of responsibility was not sufficiently controlled to assure compliance with the mode applicability and visual inspection requirements of Technical Specification Surveillance 4.5.2.c.2. Since 1983, the Radiation Protection procedure implementing Technical Specification 4.5.2.c.2 was revised numerous times. This provided opportunities to identify that the mode applicability and visual inspection requirements were not being properly implemented.

LICENSEE EVENT REPORT (LER)  
TEXT CONTINUATION

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
SALEM GENERATING STATION UNIT 1	05000272	96	005	15	5 OF 16

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

**DESCRIPTION OF OCCURRENCE (cont'd)**

On July 11, 1996 a review determined the testing of the Auxiliary Building Ventilation, Control Area Ventilation and the Fuel Handling Ventilation systems charcoal canisters did not meet the Salem Unit 2 Technical Specifications surveillance requirements. The Salem Unit 2 Technical Specifications 4.7.6.1.b.2, 4.7.6.1.c, 4.7.7.b.3, 4.7.7.c, 4.9.12.b.3 and 4.9.12.c require analysis of a representative carbon sample obtained in accordance with Regulatory Position C.6.b of Regulatory Guide 1.52, Revision 2, 1978. The Regulatory Guide references ANSI N509-1976 which defines the method of filling the test canisters and requirements for leak and resistance testing of the test canisters.

The charcoal trays were sent offsite to a vendor and filled, packed and tested in accordance with Technical Specification requirements. However the test canisters were refilled onsite by the Maintenance Department personnel. The work orders and procedures for replacing the canisters and refilling did not contain the ANSI N509 requirements for filling, and leak and resistance testing the canisters. Because these requirements were not performed for the test canisters, this constitutes a missed surveillance.

On September 25, 1996, a review determined that Technical Specification (TS) Surveillance Requirement 4.7.1.2.c.2 for Units 1 and Units 2 was not being performed prior to entry into Mode 3 for the 13(23) turbine-driven AFW pumps. Surveillance 4.7.1.2.c.2 requires that at least once per 18 months during shutdown that each auxiliary feedwater pump starts as designed automatically upon receipt of each auxiliary feedwater actuation test signal. This technical specification is applicable in Modes 1, 2 and 3. Since January 1994, Salem Units 1 and 2 have each made two operational mode changes from Mode 4 to Mode 3 without testing the start of the turbine-driven AFW pumps prior to entry into Mode 3 constituting a violation of TS 4.0.4.

TSs normally require completion of the specified surveillance test within the stated periodicity to prove operability of a safety system or component before entry into a Mode or operational condition that requires the system or component to be operable and capable of performing its required function. However, some components can not be adequately tested in a lower Mode or operating condition. Because of this, special provisions that allow entry into the applicable Mode (provided surveillances are promptly performed to verify operability) are included in TS. This is accomplished by a specific exemption to TS 4.0.4 in the applicable TS.

TDAFW pump operability testing at Salem is a specific example of the need for a provision to exempt compliance with TS 4.0.4. The steam pressure needed to properly test the pumps is not available in Mode 4, but the pumps are required to be operable in Modes 1, 2 and 3. Past practice at Salem has been to perform the test when in Mode 3 when adequate steam pressure is available.

The review of TS 4.7.1.2.c.2 also identified that the procedures used to test that each actuation signal starts the TDAFW pump do not ensure that each actuation signal opens the steam supply valve to the TDAFW pump. This condition has existed since the initial startup of Salem Units 1 and 2 and constitutes a violation of TS 4.7.1.2.c.2.

On October 11, 1996, a review determined that TS surveillance requirement 4.3.2.1.1, Table 4.3-2, Item 1.b, was not being performed prior to entry into Mode 4 for the Main Turbine and Feedwater Isolation automatic actuation circuitry. This is contrary to the requirements of TS 4.0.4 which requires that surveillance testing be performed prior to entering the applicable operational mode of the Limiting Condition for Operation. The

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

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)
SALEM GENERATING STATION UNIT 1	05000272	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	6 OF 16
		96	- 005	- 15	

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

**DESCRIPTION OF OCCURRENCE (cont'd)**

automatic actuation circuitry is required to be operational in Modes 1, 2, 3 and 4. Specifically, testing of Solid State Protection System (SSPS) relay K-621 (for the main turbine trip and feedwater isolation) was not being performed until after entry into Mode 3. The instructions provided in Integrated Operating Procedure IOP-2 allowed the deferral of testing relay K621 until entry into Mode 3 although the TS surveillance requirement 4.3.2.1.1 does not contain an exemption to TS 4.04. A review of surveillance testing conducted in the past four years revealed that Salem Unit 1 transitioned from Mode 5 to Mode 4 on July 30, 1992 and January 6, 1994, and Salem Unit 2 transitioned from Mode 5 to Mode 4 on April 1, 1992, December 23, 1994, and March 4, 1995, before completing the surveillance testing of the K-621 relay.

TS Table 4.3-2 Item 1.b Note 2 requires the automatic actuation logic to be tested at least every 62 days on a staggered test basis. Since there are two trains of automatic actuation logic, staggered testing requires that one train of actuation logic needs to be tested every 31 days. After the first train is tested, the second train needs to be tested 31 days later. The review of surveillance testing conducted in the past four years for Salem Unit 2 revealed that the automatic actuation logic circuitry was not always tested on a staggered basis following a plant outage.

The automatic actuation logic testing for both trains has been typically performed concurrently prior to returning the Units to service following an outage. Following completion of the surveillance testing, a new work order activity is generated in the Managed Maintenance Information System (MMIS) database to perform the next surveillance test. The MMIS database automatically generates the due date of the next surveillance test based on the technical specification surveillance interval. For the case of the automatic actuation logic, MMIS sets the due date of the next surveillance 62 days from the last date the surveillance test was completed. To start the staggered testing, the scheduled date for performance of one train is shortened to 31 days. For the periods of time identified above, although the scheduled date was changed in MMIS to start the staggered testing, the TS due date field in MMIS was not revised. The TS due date field in MMIS should identify the last date the surveillance can be performed to meet the normal surveillance test interval. By not revising the TS due date, this allowed personnel to change the schedule of the surveillance testing without identifying that the staggered testing criteria was not being met. Although testing of each train was performed within the surveillance test interval, not performing the testing of the automatic actuation logic on a staggered frequency is contrary to TS 4.3.2.1.1 Table 4.3-2 Item 1.b.

On November 6, 1996, the TSSIP team identified that there were no procedural controls to perform Salem Unit 1 and 2 TS surveillances 4.8.2.1 and 4.8.2.2 for the 230 volt and 460 volt vital (class 1E) busses (ED/-). TS surveillance requirements 4.8.2.1 and 4.8.2.2 require that:

"The specified AC busses shall be determined OPERABLE and energized from AC sources other than the diesel generators at least once per 7 days by verifying correct breaker alignment and indicated power availability."

The specified AC busses are the 4 Kv, 460 volt, 230 volt, and 115 volt busses. The review of surveillance test procedures identified that voltage indication is verified for the 4 Kv and 115 VAC busses, however, there was no voltage verification for the 230 volt and 460

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

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
SALEM GENERATING STATION UNIT 1	05000272	96	005	15	7 OF 16

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

**DESCRIPTION OF OCCURRENCE (cont'd)**

volt busses. The voltage verification for the 4 KV and 115 VAC busses was being performed using the installed bus voltage indication; however, the 230 and 460 VAC busses do not have any installed voltage indication meters. Failure to perform the bus voltage indication verification for the 230 and 460 VAC busses is contrary to TS surveillance requirements 4.8.2.1 and 4.8.2.2.

On January 2, 1997, a discrepancy was discovered in the Reactor Coolant System (RCS) Pressure Isolation Valve (PIV) testing methodology. The discrepancy could result in the TS 3.4.7.2 limit for PIV leakage (1.0 gpm) and the total identified leakage (10 gpm) being exceeded. The test methodology for the PIV did not account for: 1) the pressure on the upstream side of the PIV, and 2) the impact of standing water when calculating the leakage rate. The pressure on the upstream side of the PIV was assumed to be 0, when in fact, some minimal back pressure could be present on the upstream side of the PIV. This back pressure on the upstream side of the PIV would be from the Chemical Volume Control System Hold up tanks. The normal operating pressure of the CVCS Hold up tanks is 0.5 to 5 psig, with the maximum pressure being control by relief valves set at 12 psig. The impact of standing water on differential pressure varies due to the physical location of the PIVs in the plant. This impact has been determined and will be accounted for in the revised procedures.

On January 16, 1997, a determination was made that the frequency and method for stroke testing the motor operators on the 21-24BF22 valves did not meet the surveillance requirements of Technical Specification 4.0.5. The subject valves motor operators had not been included in the In-Service Testing (IST) program. The motor operator stroke testing was being performed in accordance with the GL 89-10 program. The testing frequency of GL 89-10 does not meet the requirements of Technical Specification 4.0.5 for stroking and timing the operators. In addition, this testing is required prior to entering Mode 4 and was not performed as required in the past.

On July 7, 1997, a TSSIP review determined that prior to 1991 Technical Specification (TS) 3.1.3.3 (applicable in Mode 3), for Unit 1 was not complied with. Surveillance 4.1.3.3 was not performed prior to entry into Mode 3 (Tave greater than 350 deg F). The initial conditions specified for the rod drop test in TS 3.1.3.3 are that 1) the average temperature of the reactor coolant system be greater than 541 deg F, and 2) all reactor coolant pumps be in operation. These requirements, and specifically the temperature requirement, could not be attained prior to Mode 3 without a TS 4.0.4 exemption. Salem Unit 1 made operational mode changes from Mode 4 to Mode 3 without having completed the surveillance testing prior to entry into Mode 3. This constituted a violation of TS prior to the 1991 amendment, which modified TS 3.0.4.

In 1991 Amendment 131 modified TS 3.0.4 to allow entry into an Operational Mode that requires the system or component to be operable by relying in the action statement provided the action statement does not contain a shutdown requirement. However, prior to this amendment TS 3.0.4 required completion of the specified surveillance test prior to entry into the applicable Mode. This condition is not applicable to Unit 2 since the Mode applicability is 1 and 2.

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

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
SALEM GENERATING STATION UNIT 1	05000272	96	005	15	8 OF 16

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

**DESCRIPTION OF OCCURRENCE (cont'd)**

On August 15, 1997 the TSSIP review of the logic system circuit testing under Generic Letter 96-01 determined that the High Steam Flow Reference Interrupt relay contacts were not being tested to satisfy the operability requirements of TS 3.3.2.1.1, Table 3.3-3. These contacts function as a part of the High Steam Flow input to the ESFAS to reset the High Steam Flow SIS actuation signal to its no-load value following a reactor trip. The logic associated with this function is tested as part of the Reactor Trip Breaker and Reactor Bypass breaker P-4 Permissive test; however, this test did not verify the operation of the High Steam Flow Reference Interrupt relays or their associated contacts.

On August 18, 1997 a TSSIP review identified that the channel calibration of the Steam Generator Blowdown Flow Instrument loops was not being performed as required by TS. Specifically, TS 4.3.3.8, Table 4.3-12, item 3.B requires that a channel calibration be performed of the Steam Generator Blowdown Flow instrument. The TS specify that a channel calibration encompass the entire instrument channel including the required sensor, alarm, display, and trip functions. It may be performed by means of any series of sequential, overlapping or total channel steps so that the entire channel is calibrated. Contrary to this requirement, channel calibrations were performed which failed to provide the necessary overlap between the sensor calibration and the calibration of the remaining loop components.

On October 29, 1997 a TSSIP review identified that a portion of the Overpower Delta T channel {JC/-} was omitted from the channel calibration procedure. This trip function consists of four channels, each associated with one of the four Reactor Coolant loops, which trip the reactor on coincidence of two-out-of-four signals. TS 4.3.1.1.1, Table 4.3-1, Item 8 requires that a channel calibration be performed on each of the four channels every refueling outage. The TSSIP review of the channel calibration procedures identified that the procedure did not provide the necessary channel overlap from the loop average temperature (Tavg) signal summators to the Tavg dynamic compensator lead/lag controller.

On October 31, 1997 a TSSIP review identified that TS 4.3.2.1.1, Table 4.3-2, Item 7.B, Sustained Degraded Vital Bus Voltage {EB/-} channel functional testing, was not being adequately performed. Specifically, the procedure for channel functional testing did not adequately test the input to the Safeguards Equipment Controller (SEC) from the 95% Undervoltage relays. The testing was performed in a manner that allowed an indicating light that illuminates at the SEC to verify the Loss of Voltage (70% undervoltage) relay to mask the operation of the Sustained Degraded Voltage relay and associated contacts (95.1% undervoltage).

On November 14, 1997, a TSSIP review identified that the quarterly surveillance procedures for the 125 VDC and 28 VDC {EJ/-} batteries did not fully comply with the requirements of TS 4.8.2.3.2.b (which references TS Table 4.8.2.3-1) and 4.8.5.2.b.2. These surveillance requirements specify to correct the measured specific gravity of the electrolyte of each battery cell for electrolyte temperature. Contrary to these requirements, a review of the quarterly surveillance procedures for the 125 VDC and 28 VDC identified that the battery cell specific gravity was being corrected based on an average cell temperature and not for each battery cell temperature.

Salem Unit 1 was in mode defueled when the inadequate surveillance testing was identified. In this mode, the 125 VDC and 28 VDC batteries are not required to be operable per the Unit 1 Technical Specifications. However, Unit 2 was in mode 1 which required the 125 VDC and 28 VDC batteries to be operable. On November 14, 1997, the Unit 2 125 VDC and 28 VDC



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

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
SALEM GENERATING STATION UNIT 1	05000272	96	005	15	9 OF 16

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

**DESCRIPTION (cont'd)**

batteries were declared inoperable and TS 4.0.3 was entered due to the inadequate surveillance testing. The surveillance procedures were revised to comply with the requirements of the TS, and the Unit 2 125 VDC and 28 VDC batteries were satisfactorily tested within the 24-hour time period provided by TS 4.0.3. Upon completion of the above testing, the 125VDC and 28VDC batteries were returned to an operable status.

On December 25, 1997, a TSSIP review identified that the steam generator feed pump (SGFP) {SJ/ISV} trip valves may not be adequately tested. Technical Specification (TS) 4.3.2.1.1 Table 4.3-2, Item 1.A requires a manual initiation channel functional test of Safety Injection, Turbine Trip and Feedwater Isolation once per 18 months. The present TS surveillance test procedure does not fully test the Feedwater Isolation (FI) function, specifically verification that the SGFP trip valves close. The FI function is tested to the voltage drop across the main trip coil for the SGFP trip valves, but the actual closure of the valves is not verified. The SGFP normal operating procedure contains direction to test the trip function of these valves, however, this step is not mandatory and the procedure does not address record retention requirements. Therefore, it can not be concluded that this TS function has been consistently met.

On December 19, 1997, a TSSIP review identified that the TS required ESF time response testing of the 21 (22) Component Cooling Water {CC/-} heat exchangers' Service Water {BI/-} inlet flow control valves (21SW122 and 22SW122) was not being performed in a manner that encompassed all required components. Specifically, the surveillance performed to satisfy TS 4.3.2.1.3 under S2.OP-ST.SW-0008(Q) did not include a measurement of the actuation time of solenoid valves 2SV613 and 2SV614. During a design basis accident these valves are required to change position upon a loss of electrical power to close 21SW122 and 22SW122. The surveillance procedure that was used to stroke the 21SW122 and 22SW122 used the modulating controller loop. This method did not reposition the solenoid valves and thus did not include their actuation time in the total time response.

**CAUSE OF OCCURRENCE**

The cause of these occurrences has been attributed to a lack of adequate controls and understanding of the development and maintenance of Technical Specification surveillance procedures. This weakness was previously identified in LER 311/95-008.

**PRIOR SIMILAR OCCURRENCES**

A review of LERs for Salem Units 1 and 2 issued in the last two years identified twenty-one LERs (272/94-008, 272/95-004, 272/95-019, 272/95-013, 272/95-024, 272/95-028, 272/96-003, 272/96-004, 272/96-006, 272/96-008, 272/96-016, 272/96-023, 272/96-024, 311/94-012, 311/95-006, 311/95-008, 311/96-003, 311/96-005, 311/96-007, 311/96-010 and 311/96-011) that were a result of missed surveillances due to inadequate implementation of Technical Specification requirements. The identification of these programmatic issues resulted in the initiation of the Technical Specification Surveillance Improvement Program (TSSIP) described in LER 311/95-008. The TSSIP should ensure that Technical Specification surveillance requirements are adequately implemented.

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

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
SALEM GENERATING STATION UNIT 1	05000272	96	005	15	10 OF 16

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

**SAFETY CONSEQUENCES AND IMPLICATIONS**

**Tavg Channel Checks**

There were no safety consequences for this occurrence since plant operators monitor Tavg readings for each loop once every eight (8) hours in Modes 1 and 2, and every 30 minutes if the reactor is critical and Tavg is below 551°F with the Tavg-Tref in alarm. In addition, the RC Loops Tavg Deviation alarm provides a continuous monitor of the deviation between all Tavg channels - alarming at a preset value. While not a Technical Specification required function, this alarm would readily alert operators to any significant deviation between Tavg indications. The alarm response requires monitoring Tavg readings and initiating repairs to restore faulty instrumentation. Based on the above, the health and safety of the public were not affected.

**Undervoltage Instrument Channel Checks**

There were no safety consequences for this occurrence since plant operators monitor the vital 4KV bus voltages and the 13KV bus voltages every shift in Modes 1, 2 and 3 with minimum and maximum acceptable values specified. Channel Functional Tests of the Sustained Degraded Voltage instruments are performed on a monthly basis in Modes 1, 2 and 3 and verify operability of the instruments. Based on the above, the health and safety of the public were not affected.

**Filtration Systems**

The operation of the filtration systems has a direct impact on the off-site dose calculation. There were no consequences associated with the deficient implementation of the FHB and AB TS surveillances. The potential consequences of a design basis event, a LOCA with bypass flows in excess of 1% or a fuel handling accident without adequate negative pressure, could have resulted in 10CFR100 and GDC-19 limits being exceeded. However, using a more realistic source term value given the present extended shutdown condition of the Salem units, similar potential events would yield acceptable results even without filtration. Therefore, delaying the performance of the surveillances has no impact on the health and safety of the public.

**Containment Fan Coolers**

As demonstrated by the satisfactory results of the recalculation of the TS surveillances, the ability of the Containment Fan Cooler Units to perform their intended safety function was maintained. Therefore, the health and safety of the public was not affected.

**Containment Loose Debris Inspection**

There were no safety consequences for this occurrence. The implications of not performing a visual inspection is loose fibrous material that could become dislodged during an event and be transported to and block the Containment sump. However, housekeeping procedures, routine monitoring of work activities by job supervision and Radiation Protection technicians, and tracking of materials left in Containment provided reasonable assurance that loose material capable of being transported to the Containment sump was not present. Therefore, the health and safety of the public was not affected by this occurrence.

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

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
SALEM GENERATING STATION UNIT 1	05000272	96	05	15	11 OF 16

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

**SAFETY CONSEQUENCES AND IMPLICATIONS (Cont.)**
**Charcoal Test Canisters**

There were no safety consequences associated with the deficient implementation of these surveillances. The charcoal trays which perform the safety function and adsorption were not affected by this occurrence. There is no indication that the charcoal trays would not have performed their function. The health and safety of the public were not affected.

**Turbine-Driven AFW Pump**

The surveillance testing performed to demonstrate that TDAFW pump starts upon receipt of each actuation signal does not verify that the steam supply valve opens on receipt of each signal as required by TS 4.7.1.2.c.2. However, the logic (actuation circuitry) testing and the manual start of the TDAFW pump provides sufficient overlap testing to ensure that the TDAFW pump will perform its design functions.

Although the start of the TDAFW pump was not tested prior to Mode 3 in accordance with TS 4.0.4, the surveillance procedures performed in Modes 1 through 4 demonstrated the operability of the TDAFW pump as discussed above. Based on the above, the health and safety of the public were not impacted.

**K-621 Relay Testing**

Although the surveillance testing of the K-621 relay was not performed prior to Mode 4, the surveillance testing of the K-621 relay performed in Mode 3 demonstrated the operability of the relay. The testing of the K-621 relay was performed prior to the opening of the main steam and feedwater isolation valves and prior to the main turbine and feedwater pumps being placed into service. Although the surveillance testing of the automatic actuation logic was not performed on a staggered test basis, the testing performed would have detected any component failures and ensured the operability of the automatic actuation logic. Based on the above, the health and safety of the public were not affected.

**230 and 460 Volt Buses**

Onsite power distribution system voltage constraints are procedurally provided and defined at the 4KV level. The basis for the acceptance criteria is provided in design calculations ES-8.007(Q) and ES-15.004(Q). These calculations state that the voltages at the 230 and 460 volt busses will be acceptable to operate the loads on these buses when the 4KV bus is within its acceptable range. Although the surveillance procedures do not verify indicated voltage on the 230 and 460 volt busses, these procedures verify the proper breaker alignment for the 460/230 volt transformer breakers on the 4 KV busses and the voltage on the 4 Kv busses. Verification of the voltage on the 4 Kv and the proper alignment of 460/230 volt transformer breakers provides assurance that the proper voltage is maintained on the 230 and 460 volt busses.

**Surveillance Requirements for PIVS**

The surveillance requirements for the PIVs provide added assurance of valve integrity thereby reducing the probability of gross valve failure and consequent intersystem Loss of Coolant Accidents (LOCA). The TS value of 1 gpm of unidentified leakage is set as a threshold value and is sufficiently low to ensure early detection of additional leakage. The error as a result of not considering back pressure and standing water would not have

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

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
SALEM UNIT 1	05000272	96	-- 005	-- 15	12 OF 16

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

**SAFETY CONSEQUENCES AND IMPLICATIONS (cont'd)**

prevented gross failure of a PIV from going undetected.

**BF22 Steam Generator Feed Stop-Check Valve Testing**

The testing on the subject valves was being performed in accordance with standards and guidance in Section XI of the ASME Boiler and Pressure Vessel Code but not in accordance with the operability requirements of the Technical Specifications prior to mode changes. The motor operators were being tested under the guidance of the GL 89-10 program. The containment isolation feature of the subject valves is backed-up by the BF19 and BF40 feed regulating valves formerly credited as the feedwater containment isolation valves for GDC 57 criteria prior to LCR 91-04 of August 30, 1993.

**Control Rod Drop**

There were no safety consequences associated with this event. The control rod drop was always performed and completed in accordance with the TS surveillance requirements. Entries into Mode 2 (Start-up) and Mode 1 (Power Operations) were always performed with fully operable control rod drop times. timing

**High Steam Flow Interrupt Relay Testing**

The High Steam Flow Interrupt circuitry is a redundant feature that provides a backup to the Reactor Trip Turbine Trip by ensuring that the Main Steam Isolation Valves close following a reactor trip. No credit is taken for the High Steam Flow Interrupt circuitry in any of the safety analyses. In addition, redundant steam flow channels are provided in each steam line to generate the High Steam Flow signal. The High Steam Flow signal provides input to the High Steam Flow SIS actuation and the High Steam Flow Main Steam Line isolation. Because of this redundancy, a single failure of these contacts would not cause nor prevent actuation of either of these features. Based on the above, there was no impact to the health and safety of the public.

**Steam Generator Blowdown Flow Instrument Testing**

There were no safety consequences associated with this occurrence. The Steam Generator Blowdown Flow Instrument provides steam generator blowdown flow indication only. Protection from an unmonitored release of radioactive effluents is provided by automatic termination of flow that is actuated by the Steam Generator Blowdown Line Radiation Monitor. Should a Steam Generator Blowdown Flow channel become inoperable, TS allows effluent release as long as flow rate is estimated every four hours during the release using pump performance curves. Based on the above, there was no impact to the health and safety of the public.

**Overpower Delta T Channel Calibration Testing**

There were no safety consequences for this occurrence. Operability testing on Unit 2 subsequent to the discovery of the inadequate channel calibration verified that the Overpower Delta T channels were operable. Inputs for this reactor trip come from four channels (one per Reactor Coolant loop) and require a coincidence of two-out-of-four signals. A failure of one of the four channels would not have caused or prevented a reactor trip.

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

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
SALEM UNIT 1	05000272	96	-- 005	-- 15	13 OF 16

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

**SAFETY CONSEQUENCES AND IMPLICATIONS (cont'd)**

Vital Bus Degraded Voltage Undervoltage Trip Contact Channel Functional Testing

There were no safety consequences for this occurrence. Operability testing on Unit 2 subsequent to the discovery of the inadequate functional test verified that the Degraded Voltage Undervoltage Trip Contacts were operable. The Degraded Voltage Undervoltage Trip function (95.1% undervoltage) provides second level undervoltage protection for the vital buses with primary undervoltage protection provided by the Loss of Voltage relay (70% undervoltage). In the event that the output from the power source to the vital bus drops to a level above the setpoint of the first level undervoltage protection, but below the setpoint of the second level undervoltage protection, a failure of one of the three 95.1% undervoltage relays would not prevent actuation of the Degraded Voltage Undervoltage Trip Contacts.

125 VDC and 28VDC Battery Testing

Although the testing of the 125 VDC and 28 VDC batteries were not being performed in accordance with TS surveillance requirements 4.8.2.3.2.b and 4.8.2.5.2.b.2, the use of representative battery cells for electrolyte temperature to correct for specific gravity was consistent with IEEE Standard 450-1987. Since the battery cell specific gravity was being corrected for the average electrolyte temperature based on a representative set of battery cells, the batteries were determined to still be capable of performing their design basis function. Subsequently, satisfactory testing of the Unit 2 125 VDC and 28 VDC batteries was performed using individual cell electrolyte temperatures. Based on the above, the health and safety of the public were not impacted.

Feedwater System Isolation Functional Testing

There are no safety consequences associated with this event. Unit 1 has been shutdown since early 1995. During the Unit 2 re-start testing program and the recent Unit 2 trip (LER 272/97-16) the functionality of the rest of the circuitry was demonstrated. The SGFP trip valves closed as required when demanded.

Component Cooling Water Heat Exchanger Service Water Flow Control Valve Testing

There are no safety consequences for this occurrence. Operability testing on Unit 2 subsequent to the discovery of the inadequate ESF time response testing of the 21 (22) Component Cooling Water (CCW) heat exchangers' Service Water inlet flow control valves (21SW122) and 22SW122) verified that the valves were operable. Whether the valve actuation air is supplied by the air controller (3-way solenoid energized) or directly by the air header (loss of power to the 3-way solenoid), solenoid valve response time is about the same (less than 1 second). The CCW heat exchangers are required to be operable in Modes 1-4.

**CORRECTIVE ACTIONS**

1. A Technical Specification Surveillance Improvement Project (TSSIP) has been initiated for Salem Units 1 and 2. The scope and content of the TSSIP program was described previously in LER 311/95-008-00. The TSSIP review is expected to be completed by December 31, 1997.
2. Channel Checks of Tavg instruments will be incorporated into the operating logs for Modes 1 through 4 prior to each Unit restart.

LICENSEE EVENT REPORT (LER)  
TEXT CONTINUATION

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
SALEM UNIT 1	05000272	96	-- 005	-- 15	14 OF 16

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

CORRECTIVE ACTIONS (cont.)

3. Channel Checks of the Sustained Degraded Voltage instruments will be incorporated into the operating logs for Modes 1 through 4 prior to each Unit restart.
4. The appropriate procedures were reviewed and the FHB testing procedure was revised to incorporate additional guidance to ensure adequate bypass flow and negative pressure testing.
5. An in-depth review of the Technical Specifications regarding ventilation system testing was performed by Radiation Protection personnel with no additional deficiencies identified.
6. The total bypass flow and negative pressure testing for the Units 1 and 2 FHB will be demonstrated acceptable prior to fuel movement, as appropriate.
7. The total bypass flow for the Units 1 and 2 AB ventilation systems will be demonstrated acceptable prior to the respective Unit entering Mode 4.
8. The CFCU time responses for Units 1 and 2 were recalculated using the appropriate inputs from containment pressure high, with satisfactory results.
9. A station implementing procedure for Salem Units 1 and 2 will be revised and/or developed to assure compliance with Technical Specification 4.5.2.c.2 prior to establishing Containment Integrity for Salem Unit 2.
10. The Charcoal trays and test canisters are being replaced in the Auxiliary Building Ventilation, Control Area Ventilation and the Fuel Handling Ventilation systems. Both the trays and canisters are being sent to a vendor for replacement. This will be completed by Mode 6 for the Control Area and Fuel Handling Ventilation systems, and Mode 4 for the Auxiliary Building Ventilation system.
11. A consultant with experience in nuclear ventilation systems design and testing is in the process of conducting a review to verify that ventilation systems testing is in compliance with the Technical Specifications Surveillance and UFSAR requirements.
12. Ventilation procedures will be revised by Mode 6 for the Control Area and Fuel Handling Ventilation systems, and Mode 4 for the Auxiliary Building Ventilation system.
13. As stated in LER 272/96-016-00, mode transition procedural controls are being evaluated and improved as necessary to ensure that the higher Mode acceptance criteria are used to verify the acceptability of making a Mode transition. This review will be completed prior to Mode 6.
14. A License Change Request to include an exemption to the provisions of Specification 4.0.4 in Technical Specification 4.7.1.2.c.2 will be submitted by October 30, 1996.
15. Procedure changes will be implemented or new procedures will be developed prior to each respective unit's entry into Mode 3 to ensure that the TDAFW pumps are tested in accordance with TS 4.7.1.2.c.2.

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

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
SALEM UNIT 1	05000272	96	-- 005 --	15	15 OF 16

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

**CORRECTIVE ACTIONS (cont'd)**

16. Integrated Operating Procedure and Surveillance Test Procedure changes will be implemented prior to the respective Unit's entry into Mode 4 to ensure that relay K-621 is tested in accordance with TS 4.3.2.1.1, Table 4.3-2, Item 1.b prior to entering Mode 4.
17. The procedures for BF22 valve tests and surveillances have been revised for Salem Unit 2 and valve testing will be completed prior to Unit 2 entry into Mode 4. The motor operators of the 21-24BF22 valves have been added to the IST program.
18. The unit 1 Technical Specification 3.1.3.3 "Control Rod drop" applicability will be changed to be applicable in Modes 1 and 2. This change will make Salem Unit 1 consistent with Salem Unit 2 and the Westinghouse Standard Technical Specifications. This license change request will be issued by the first quarter of 1998.
19. The procedure for the Hot Rod Drop Time Measurement surveillance test for Salem Unit 2 was revised to verify the operability of the High Steam Flow Reference Interrupt relay contacts. This procedure was performed satisfactorily on Unit 2 on August 16, 1997 (WO 970814257). A similar procedural revision will be implemented for Salem Unit 1 and will be performed as a part of the next Unit 1 startup.
20. The procedures for BF22 valve tests and surveillances have been revised for Salem Unit 2 and valve testing will be completed prior to Unit 2 entry into Mode 4. The motor operators of the 21-24BF22 valves have been added to the IST program.
21. The unit 1 Technical Specification 3.1.3.3 "Control Rod Drop" applicability will be changed to be applicable in Modes 1 and 2. This change will make Salem Unit 1 consistent with Salem Unit 2 and the Westinghouse Standard Technical Specifications. This license change request will be issued by the first quarter of 1998.
22. The procedure for the Hot Rod Drop Time Measurement surveillance test for Salem Unit 2 was revised to verify the operability of the High Steam Flow Reference Interrupt relay contacts. This procedure was performed satisfactorily on Unit 2 on August 16, 1997 (WO 970814257). A similar procedural revision will be implemented for Salem Unit 1 and will be performed as a part of the next Unit 1 startup.
23. The Unit 1 and Unit 2 Steam Generator Blowdown Flow Instrument Loop Channel Calibration procedures were revised to satisfy the TS surveillance requirement to encompass the entire instrument channel. This procedure was satisfactorily performed on Unit 2 (#21 S/G WO 970818187, 8/25/97; #22 S/G WO 970819099, 8/22/97; #23 S/G WO 970819101, 8/21/97; #24 S/G WO 970819103, 9/1/97). The Steam Generator Blowdown Flow Instrument Loop Channel Calibration procedure will be performed on Salem Unit 1 by September 30, 1997.
24. The Unit 1 and Unit 2 procedures for channel calibration of the Overpower Delta T Protection channels were revised to provide the proper channel overlap. Corrective Maintenance Action Request 00971029378 was performed on 10/29/97 on Unit 2 to verify continuity from the signal summatoms to the Tavgy dynamic compensator lead/lag controller. Channel calibration of the Reactor Coolant Loop Delta - Tavgy Protection channels on Unit 1 will be performed prior to entry into Mode 2 (under WO 00950926043, WO 00951008053, WO 00951002038, and WO 00951001032).

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

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)
SALEM UNIT 1	05000272	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	16 OF 16
		96	-- 005	-- 15	

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

**CORRECTIVE ACTIONS (cont'd)**

25. The ESFAS Instrumentation monthly channel functional testing procedures for Unit 2 were revised to verify operability of the Sustained Degraded Voltage relay and contacts. These procedures were successfully performed under WO 00971031429 on 11/1/97. Procedural revisions (WO 00971031440) and verification of operability (WO 00950609045) of the channels on Unit 1 will be completed prior to entry into Mode 3.
26. Quarterly surveillance test procedures SC.MD-ST.125-0003(Q) and SC.MD-ST.28D-0003(Q) were revised to include the measurement of each battery cell electrolyte temperature to perform specific gravity corrections.
27. The Unit 2 125 VDC and 28 VDC were satisfactorily tested using individual battery cell electrolyte temperatures. The Unit 1 125 VDC and 28 VDC batteries will be tested using the revised procedures prior to declaring these batteries operable.
28. The Technical Specification surveillance test procedures will be revised to fully test the Steam Generator Feed pump trip valve circuitry prior to the performance of the next scheduled TS required surveillance testing. (CR 00971121173)
29. Service Water System Modification Validation Test TS2-SE-SU.SW-0003 (Q) Rev. 4 addressed the 22 Service Water Header (22SW122) and data to support analysis of 22SW122 valve time response was obtained as a result. On 12/18/97, Salem Operations Department procedure S2.OP-ST.SW-0008(Q) was revised to provide the proper methodology for testing valves 21SW122 and 22SW122. This procedure was then performed satisfactorily on 12/18/97 for 21SW122 under WO00980123026. Full compliance with T.S. 4.3.2.1.3 was demonstrated on that date.
30. Salem Operations Department Procedure S1.OP-ST.SW-0008(Q), Service Water Valves (Aux Bldg) Modes 1-6 will be revised to provide the proper methodology for testing valves 11SW122, 12SW376, and 12SW380 and will be performed to verify operability of those valves prior to the entry of Unit 1 into Mode 4. (PIR 00971218169)