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

APPROVED BY OMB NO. 3150-0104
EXPIRES 04/30/98

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.

LICENSEE EVENT REPORT (LER)

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

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
SALEM, UNIT 1	05000272	1 OF 6

TITLE (4)
DIFFERENCE BETWEEN CONTAINMENT DESIGN PARAMETERS AND ACCIDENT ANALYSIS

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
07	20	95	95	016	0	08	18	95	SALEM, UNIT 2	05000311
									FACILITY NAME	DOCKET NUMBER 05000

OPERATING MODE (9)	5
POWER LEVEL (10)	000

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11)

	20.2201(b)		20.2203(a)(2)(v)		50.73(a)(2)(i)		50.73(a)(2)(viii)
	20.2203(a)(1)		20.2203(a)(3)(i)	X	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	TELEPHONE NUMBER (Include Area Code)
E. ROSENFELD, MANAGER - NUCLEAR FUELS	(609) 339-1210

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)	MONTH	DAY	YEAR
X	YES (If yes, complete EXPECTED SUBMISSION DATE).	NO		12	15	95

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

On July 20, 1995, a disparity was identified between: the containment structure design basis as described in the Technical Specification; the Updated Final Safety Analysis Report (UFSAR) Chapter 15 accident analysis; and existing design basis for the containment structure. Technical Specifications Section 5.2.2 describes the containment as being designed for a maximum pressure of 47 psig and an air temperature of 271 degrees Fahrenheit (F). The Steam Line Break Accident (SLBA) produces peak temperatures of 348 degrees F. The Design Basis Loss of Coolant Accident (DBLOCA) produces temperatures approaching 271 degrees F and pressures approaching 47 psig. The UFSAR describes the containment as being designed for a maximum pressure of 47 psig and a liner temperature of 246 degrees F. A four hour report was made in accordance with 10 CFR 50.72.b.2.i. due to the lack of documentation that evaluates and accepts these apparent discrepancies. Preliminary analysis shows that the containment would continue to fulfill its safety function following a SLBA or DBLOCA. However, the SLBA temperature transient results in loads on portions of the containment which marginally exceed the design allowable loads. The effects of the DBLOCA may result in loads which reduce the design margin assumed in the original design basis. This is reportable in accordance with 10 CFR 50.73.a.2.ii.B as a condition outside the design basis of the plant. Investigation continues into the effects and cause and will be included in a supplemental LER. This issue will be resolved prior to transition of the plant from Mode 5 to Mode 4.

Plant and System Identification
Westinghouse - Pressurized Water Reactor

Energy Industry Identification System (EIIS) codes and component function identifier codes appear in the text as {XX/XX}.

Identification of Occurrence
A disparity was identified between; the containment design basis as described in the Technical Specification; the Updated Final Safety Analysis Report (UFSAR) Chapter 15 accident analysis for a Steam Line Break Accident (SLBA) and Design Basis Loss of Coolant Accident (DBLOCA); and the existing design calculations for the containment structure. The effects of the SLBA transient result in loads on specific portions of the containment structure which marginally exceed the allowable loads described in the UFSAR. The effects of the DBLOCA may result in loads which reduce the design margin assumed in the initial design approval. This issue is considered reportable in accordance with 10 CFR 50.73.a.2.ii.B as a condition that is outside the design basis of the plant.

Event Date: July 20, 1995

Report Date: August 18, 1995

This report was initiated by Incident Report No. 95-1176

Conditions Prior to Occurrence
Both Units were in a self-imposed extended shutdown.

Mode: 5 Reactor Power: -0-% Unit Load: -0- MWe

Description of Occurrence
On July 20, 1995, during a review of the containment liner design basis documents, a disparity was identified between: the design basis for the containment structure as described in the Technical Specification; the Updated Final Safety Analysis Report (UFSAR) Chapter 15 accident analysis for a Steam Line Break Accident (SLBA) and Design Basis Loss of Coolant Accident (DBLOCA); and the existing design calculations for the containment structure. Technical Specifications Section 5.2.2 describes the containment structure as being designed for a maximum pressure of 47 psig and an air temperature of 271 degrees Fahrenheit (F). The transient following a SLBA produces temperatures in containment which exceed 271 degrees F for approximately 160 seconds and peak at 348 degrees F. The transient following a DBLOCA produces temperatures approaching 271 degrees F and pressures approaching 47 psig. The Updated Final Safety Analysis (UFSAR) describes the containment as being designed to withstand a maximum pressure of 47 psig and an air temperature of 246 degrees F. Due to the lack of documentation that evaluates and accepts these apparent discrepancies, a four hour report was made in accordance with 10 CFR 50.72.b.2.i.. After further review it has been determined that the temperature and pressure effects associated with the SLBA are bounded by the temperature and pressure effects which governed the original design of the containment. The effects of the DBLOCA may result in

Description of Occurrence (Continued)

loads which reduce the design margin calculated for the original design case. Preliminary analysis, as discussed below, has shown that the containment would continue to fulfill its safety function following a SLBA and a DBLOCA.

This issue is reportable under 10 CFR 50.73 because the effects of the SLBA and DBLOCA transients may result in loads on portions of the containment structure which exceed the described design basis in the UFSAR.

Specifically, an evaluation of the Salem Unit 1 Containment Spray supports, (calculation 6S1-1710-001 and engineering judgment), revealed that limited areas of the containment liner would marginally exceed yield stress following a SLBA. This would occur at the liner locations where the Containment Spray support steel penetrates the liner and attaches to embedments in the containment structure. Evaluations conclude that the minor deformation (conservatively estimated to be 0.152 inches) which might occur would not prevent the containment structure or the Containment Spray system from performing their safety function.

A review of the original design basis calculations for the containment liner indicates that the DBLOCA conditions may infringe upon the design margin calculated for in the original design case. The original design demonstrated a 1.5 design margin for the load conditions associated with a liner temperature of 246 degrees F and a containment pressure of 47 psig. Review of these calculations supports an assessment that containment integrity would be maintained at the Technical Specification design values of 47 psig. with an air temperature of 271 degrees F. (also considered upper limits for the DBLOCA), however, the 1.5 design margin may not be maintained.

Analysis of Occurrence

Updated Final Safety Analysis Report (UFSAR) Section 3.1.2 states that PSE&G conforms to the intent of the AEC's General Design Criteria for Nuclear Power Plants dated July 7, 1971, with minor exceptions. Criteria 10 of this document states that the containment shall be designed to sustain the initial effects of gross equipment failures, such as a large coolant boundary break, without loss of integrity. The containment must be able to maintain its functional capability under any accident condition.

UFSAR, Section 6.2.1.1 provides the containment functional description and design basis. It describes that the containment completely encloses the reactor coolant system and ensures that post-accident leakage is limited. The containment structure also provides biological shielding for normal and accident conditions.

UFSAR Section 3.8.3 provides the structural design basis requirements for the containment structure. This section addresses containment response to various load combinations including Design Basis Loss Of Coolant Accident (DBLOCA) pressures and temperatures. These analyses indicate peak loading at a pressure of 47 psig and a liner temperature of 246 degrees F.

Analysis of Occurrence (Continued)

SLBA Impact on Containment and Liner - The SLBA analysis predicts a peak containment temperature value of 348 degrees F. Although the SLBA peak temperature is higher than that resulting from the Design Basis LOCA, the corresponding pressure for the SLBA is only 35 psig compared to a pressure of 47 psig for the Design Basis LOCA. Initial preliminary structural analysis shows that the Design Basis LOCA combination of pressure and temperature result in more severe loading for the containment and liner and therefore, bounds the temperature and pressure scenario associated with a main steam line break accident. Detailed structural analysis is continuing. The final results will be provided in the supplement to this LER.

SLBA Impact on Containment Spray Piping Supports - The containment spray piping supports are attached directly to the containment structure through the containment liner. Initial evaluations of the Salem Unit 1 Containment Spray supports, (calculation 6S1-1710-001), revealed that the containment liner at the support steel embedments into the containment structure marginally exceeds yield stress during the short duration SLBA temperature transient. However, evaluations conclude that the deformation which might occur would not prevent the containment structure or the Containment Spray system from performing its safety function. Detailed analysis is continuing and the final results will be provided in the supplement to this LER.

SLBA Impact on the Equipment Qualification (EQ) Program - The peak SLBA temperatures as described in UFSAR Chapter 15 Accident Analysis have been considered as part of the EQ program analysis. Therefore, the effects of the elevated SLBA temperatures on the equipment analyzed under the EQ program have been evaluated to be acceptable.

SLBA Impact on Containment Hatches - The containment equipment hatch and personnel hatch have seals made of silicone rubber gaskets which are rated for service up to 300 degrees F. Initial assessments (based on Hope Creek EQ Report (MEQ-1), Salem Environmental Design Criteria (S-C-ZZ-SDC-1419 and engineering judgment) of these seals for temperatures up to 350 degrees F conclude that the seals will continue to perform their safety function. Detailed evaluation and qualification of the seals for the SLBA elevated temperatures is ongoing and will be documented in the supplement to this LER.

SLBA Impact on Floor Framing/Miscellaneous Steel - Initial reviews of floor framing at elevation 100 ft. and elevation 130 ft. and miscellaneous steel below elevation 100 ft. indicate that sufficient attention to detail was provided in the original design to allow for further thermal growth with minimal impact. Slotted holes and pinned connections were used extensively. Further investigation into the temperature effects on these component is continuing and the final results will be provided in the supplement to this LER.

SLBA Impact on Other Steel Structures - Other internal steel structures which consist of miscellaneous access platforms and supports for major equipment have been initially reviewed. The design of these components indicates that most have sufficient built-in flexibility to preclude significant effects from thermal loads. However, several of these structures appear to be highly constrained, and thermal loads could create significant stresses. These structures are currently being evaluated and the final results will be provided in the supplement to this LER.

Analysis of Occurrence (Continued)

LOCA Analysis- UFSAR Section 3.8 documents the acceptability of the Containment design. The containment design calculations demonstrated the containment would not exceed design allowables with a containment pressure of 47 psig and a liner temperature of 246 degrees F. The calculations go on to demonstrate that a 1.5 times design margin is built into the design. This is done by demonstrating that the containment would not exceed design allowables with a containment pressure of 70.5 psig (1.5 times 47 psig.) with a corresponding saturation temperature of 306 degrees F. Therefore, containment integrity would be maintained at the Technical Specification design values of 47 psig. with an air temperature of 271 degrees F.

Initial review of the design documentation indicates that the original design assumed a differential temperature between the air temperature of 271 degrees F and the 246 degrees F temperature of the liner. In the absence of any substantial documentation justifying this temperature difference, it is assumed that the containment liner will most likely reach temperatures very close to the peak accident temperature (containment structure heat transfer models support this determination). Further review of design documentation is required to determine the extent to which the 1.5 design factor may be impacted by the 271 degrees F containment air temperature.

Apparent Cause of Occurrence

The apparent cause of this occurrence is still underway and will be provided in the supplement to this LER. Causal factors may include a programmatic breakdown in configuration control.

Prior Similar Occurrence

Investigation into other prior similar occurrences will be conducted as part of the root cause determination and will be reported in the supplement to this LER.

Safety Significance

This issue is considered reportable in accordance with 10 CFR 50.73.a.2.ii.B as a condition that is outside the design basis of the plant. While the plants continue operating at or below mode 5, there are no industrial safety or nuclear safety issues associated with this issue. The temperature and pressure effects associated with a SLBA or a DBLOCA would not be possible while the plant is maintained shutdown with Reactor Coolant temperatures at or below 200 degrees F. The analysis completed at this time indicates that the containment temperatures and pressures predicted following a SLBA or DBLOCA would not have rendered the containment structure incapable of performing its intended safety function. However, final analysis is continuing and the plants will not transition from mode 5 to mode 4 until this issue is resolved.

Corrective Actions

Corrective actions, as necessary, will be developed after completion of a root cause determination and analysis into the impact of this issue on plant equipment and design bases.

A letter has been issued to all of Nuclear Engineering identifying the temperature transient associated with the SLBA. All groups were requested to identify and analyze any components not previously evaluated for the effects of the elevated temperatures associated with the SLBA.

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

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

Corrective Actions (Continued)

The results of these and other analyses is continuing, and the plants will not transition from mode 5 to mode 4 until this issue is resolved. Additional corrective actions identified will be reported in the supplement to this LER.