PSEG

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

Nuclear Business Unit

FEB 02 1996

LR-N96020

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

Gentlemen:

LER 272/96-001
SALEM GENERATING STATION - UNIT 1
FACILITY OPERATING LICENSE NO. DPR-70
DOCKET NO. 50-272

This License Event Report entitled "Insufficient Thermal Overload Relay Heater Margin" is being submitted pursuant to the requirements of the Code of Federal Regulations 10CFR50.73(a)(2)(ii).

Sincerely,

Clay Warren
General Manager -
Salem Operations

Attachment

SORC Mtg. 96-013

KBH/tcp

C Distribution
LER File 3.7

JE22

Attachment A

The following item represents commitments that Public Service Electric & Gas (PSE&G) made to the Nuclear Regulatory Commission (NRC) relative to this LER (272/96-001-00). The commitment is as follows:

1. Modifications required to replace undersized TOL's will be completed prior to the respective start-up of Salem Units 1 and 2.

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 Generating Station - Unit 1	05000272	1 OF 3

TITLE (4)
Insufficient Thermal Overload Relay Heater Margin

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
01	03	96	96	001	00	02	02	96	Salem Generating Station - Unit 2	05000311
									FACILITY NAME	DOCKET NUMBER 05000

OPERATING MODE (9)	*	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11)			
POWER LEVEL (10)	0	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)
Dennis V. Hassler - LER Coordinator	609-339-1989

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
YES (If yes, complete EXPECTED SUBMISSION DATE).	X	NO				

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

In January 1996 a calculation was issued to perform sizing determinations for selected rotating equipment Thermal Overload Heaters (TOLs) on 230V and 460V safety related electrical buses, taking into consideration installed ambient temperatures and degraded voltage conditions. The results of this calculation showed that 36 electrical loads had undersized TOLs that could cause spurious tripping of their respective loads. The original sizing of TOLs at the Salem Nuclear Generating Station was performed by selecting the heater from the vendor catalog using vendor recommended selection criteria. Installed ambient temperatures and degraded voltages were not fully considered in the early 1970's when the plant was designed. Engineering has issued updated TOL design criteria as well as calculations for sizing TOLs for all safety related rotating loads and motor operated valves. In addition modifications to replace undersized TOLs will be completed prior to the respective startups of Salem Units 1 and 2.

This issue is reportable under 10CFR50.73(a)(2)(ii) "...the nuclear power plant being outside the design basis of the plant."

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

PLANT AND SYSTEM IDENTIFICATION

Westinghouse - Pressurized Water Reactor

230 V Motor Control Center (MCC) {ED/--}*
460 V Motor Control Center (MCC) {ED/--}*

* Energy Industry Identification System (EIIS) codes and component functions are identified in the text as {SS/CC}.

CONDITIONS PRIOR TO OCCURRENCE

At the time of the above occurrence, both Salem units were in a self-imposed extended shutdown.

Unit 1: Defueled - 0% power

Unit 2: Defueled - 0% power

There were no structures, components, or systems that were inoperable at the start of the event that contributed to the event.

DESCRIPTION OF OCCURRENCE

Following the October 1994 Service Water System Operational Inspection a corrective action was implemented for engineering to develop a calculation verifying Thermal Overload Heater (TOL) sizing. In April 1995 calculation ES-18.007, Rev. 0, "Rotating Equipment Thermal Overload Sizing Calculation," was issued for Service Water Motor Control Center TOLs. No reportable conditions were found as a result of this calculation. In January 1996, Rev. 1 of the calculation was issued. The results of this calculation showed that under installed ambient temperature conditions accompanied by degraded voltage, 36 electrical loads had undersized TOLs that did not meet the required overload trip margin specified in Technical Standard, ND.DE-TS.ZZ-2012(Q), Rev. 0, Dated 7/13/94. This deficiency could cause spurious tripping of their respective loads.

PRIOR SIMILAR OCCURRENCES

During the previous two years there were two LERs that attributed their root cause to design deficiencies and were similar in nature to this LER. LER 272/94-011-00 evaluated a design deficiency in the Salem Unit 1 circulating water bus Under Voltage (UV) protection and LER 311/94-008-00 evaluated a design deficiency in the Salem Unit 2 Feedwater control system at low reactor power levels.

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

CAUSE OF THE OCCURRENCE

Original sizing of TOLs at the Salem Nuclear Generating Station was performed by selecting the heater from the vendor catalog without detailed consideration and documentation of specific design and environmental conditions. The TOLs were sized to Field Directive S-C-E155-EFD-0169 issued by PSE&G's Engineering and Construction Department. The directive did not account for the TOLs' installed ambient temperature conditions and degraded voltage. The root cause of this event was inadequate design of the TOLs in 1970's.

SAFETY SIGNIFICANCE

The safety significance of this event was low. Applying current design criteria for TOLs, engineering has determined spurious tripping of the evaluated loads could occur during a degraded voltage condition. However, the condition of degraded voltage, a design basis accident, and multiple combinations of loads which may experience a spurious TOL trip, all occurring concurrently was judged to be of low probability and therefore was not evaluated. A review of previous reportable events involving a degraded voltage condition revealed two occurrences at the Salem station. The first occurrence was reported in LER 91-024-00 and involved a degraded voltage condition as a result of a lightning strike. The LER concluded that the health and safety of the public was not affected by this event. The second occurrence was reported in LER 86-007 and involved a degraded voltage condition as a result of vital busses being overloaded by startup currents produced by safeguards equipment. A review of this LER has determined that the health and safety of the public was not affected. Based on no other reportable incidents of degraded voltage conditions, the undersized TOLs described in this LER did not affect the health and safety of the public.

CORRECTIVE ACTIONS

1. Nuclear Electrical Engineering has issued Technical Standard ND.DE-TS.ZZ-2012(Q) for the design and sizing of motor starters, circuit breakers and thermal overload relay heaters. This supersedes PSE&G Field Directive S-C-E155-EFD-0169.

2. Electrical engineering has issued calculation ES-18.007 for the sizing of thermal overload heaters for all safety related rotating loads.

3. Electrical engineering has issued calculation ES-18.006 for the sizing of thermal overload heaters for all safety related motor operated valves.

4. Modifications required to replace undersized TOLs will be completed prior to the respective startup of Salem Units 1 and 2.