



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

Nuclear Business Unit

DEC 05 1996

LR-N96392

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

LER 272/96-031-00
SALEM GENERATING STATION - UNIT 1
FACILITY OPERATING LICENSE NO. DPR-70
DOCKET NO. 50-272

Gentlemen:

This Licensee Event Report entitled "Plant In Unanalyzed Condition due to Qualification of Magnacraft-Struthers Dunn Series B255 Relays" 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. 96-172

DVH

C Distribution
LER File 3.7

1/1
1022

9612090379 961205
PDR ADDCK 05000272
S PDR

The power is in your hands.

LICENSEE EVENT REPORT (LER)

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

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS MANDATORY INFORMATION COLLECTION REQUEST: 60.0 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-8 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) SALEM GENERATING STATION UNIT 1		DOCKET NUMBER (2) 05000272	PAGE (3) 1 OF 4
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TITLE (4)
Plant In Unanalyzed Condition due to Qualification of Magnacraft-Struthers Dunn Series B255 Relays

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
11	05	96	96	- 031	- 00	12	05	96	Salem Unit 2	05000311
									FACILITY NAME	DOCKET NUMBER

OPERATING MODE (9) N	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11)										
POWER LEVEL (10) 000	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 Dennis V. Hassler, LER Coordinator	TELEPHONE NUMBER (Include Area Code) 609-339-1989
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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
B	Various	83	S440	N					

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)

On November 5, 1996, Farwell and Hendricks, Inc. informed PSE&G that one of two verification relays failed a latching qualification evaluation. The relay failed by becoming unlatched above 5G broadband acceleration. The verification relays were used to assess the similarity of Magnacraft-Struthers Dunn series B255 relays purchased recently to the relay previously utilized during the model's seismic qualification. Subsequent evaluation by PSE&G determined that the affected relays are seismically qualified for their applications at Salem Station. However, based on a Farwell and Hendricks 10CFR21 report on these relays, PSE&G concluded that there was doubt of the capability of the Magnacraft-Struthers Dunn series B255 latching relays to perform their design function.

The cause for the latching failures of the relays is the change in the relay design which resulted in a reduction of the latching force. Magnacraft-Struthers Dunn modified the relay frame design after September 1992 to more securely mount the reset coil to the relay frame. Corrective actions include replacement of the affected relays.

This event is reportable in accordance with 10 CFR 73(a)(2)(ii); any condition that resulted in the plant being in an unanalyzed condition.

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TEXT CONTINUATION**

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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

Various plant systems *

* Energy Industry Identification System (EIIS) codes and component function identifier codes appear as (SS/CCC)

CONDITIONS PRIOR TO OCCURRENCE

At the time of identification, Salem Units 1 and 2 were shutdown and defueled.

DESCRIPTION OF OCCURRENCE

On November 5, 1996, Farwell and Hendricks, Inc. informed PSE&G that one of two verification relays failed a latching qualification evaluation. The relay failed by becoming unlatched above 5G broadband acceleration. The verification relays were used to assess the similarity of Magnacraft-Struthers Dunn series B255 relays {-/83} purchased recently to the relay previously utilized during the model's seismic qualification. Based upon this notification, the NRC was notified in accordance with the requirements of 10CFR50.72 of the plant being in an unanalyzed condition.

The Magnacraft-Struthers Dunn B255 series relay is a two coil latching relay with six contact pairs. The relays are produced as "commercial grade" components and are dedicated for PSE&G's use by Farwell and Hendricks, Inc.

On Friday, November 1, 1996, Farwell and Hendricks provided PSE&G with a copy of their 10CFR21 notification documenting a potential defect within Magnacraft-Struthers Dunn series B255 latching relays which result in their unlatching without the energization of their reset coil. This notification resulted from latching failures experienced at Salem Station. Based on the November 1 and 5, 1996 notifications by Farwell and Hendricks to PSE&G, PSE&G concluded that there was doubt of the capability of the Magnacraft-Struthers Dunn series B255 latching relays to perform their design function. Subsequent evaluation by PSE&G determined that the Magnacraft-Struthers Dunn B255 series relays are seismically qualified for their applications at Salem Station. Following the latching relay failures, Farwell & Hendricks performed additional testing regarding the latching fragility. PSE&G reviewed the results of the latching fragility testing and concluded that the maximum anticipated accelerations were enveloped by the latching fragility level. To improve the relay latching force, the Manacraft-Struthers Dunn relay was modified with a new reset spring and reset coil. The modified relays have been seismically tested and qualified by Farwell and Hendricks.

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DESCRIPTION OF OCCURRENCE (cont'd)

Following installation of relays into a valve control circuit early in 1996, a relay spuriously unlatched without an operator initiated demand signal. In this application the change in relay state resulted in the valve swapping from AUTO to the MANUAL mode of control. The affected relay was removed from the circuit and replaced. Further problems with the latching relays led to increased investigation into the problems identified in this LER.

CAUSE OF OCCURRENCE

The cause for the latching failures of the relays is a change in the relay design which resulted in marginal latching force. Magnacraft-Struthers Dunn modified the relay frame design after September 1992. In the course of making this change, the elongation of the reset spring was reduced, lowering the force applied at the latch.

PRIOR SIMILAR OCCURRENCES

In the past two years, one LER (311/95-004-01) addressed relays. This LER specifically addressed Magnacraft-Struthers Dunn relays as a cause of the event. One of the corrective actions in the LER was an inspection of the Bailey Relay Cabinets (which contain Magnacraft-Struthers Dunn relays) for visible problems with the relays. This corrective action led to 100% visual inspection and the replacement of affected Magnacraft-Struthers Dunn relays.

SAFETY CONSEQUENCES AND IMPLICATIONS

There were no safety consequences associated with this occurrence. The affected relays are used within the control circuits for both safety related and non-safety related components throughout the Salem facility. The failure of these relays could affect the ability of the component to perform their intended function. The failures that have occurred have been on relays used within 28 VDC and 125 VDC control circuits. The 28 VDC control circuits are, typically, the interface between the operator's control board pushbuttons and the final actuation of the controlled device. 28 VDC latching relays are typically utilized to establish and maintain conditions such as AUTO or MANUAL operating mode, last position demand for breakers, Interlock State, and Alarm Acknowledgment State. 125 VDC latching relays are typically utilized to communicate breaker position within control circuits and indications. To date, 13 relay failures have been identified for relays installed in the plant. In the event of a loss of equipment function as result of relay failures, operators would enter the necessary operating procedures (alarm response, abnormal, EOPs, etc.) to respond to the loss of the equipment function.

The health and safety of the public were not affected by this issue.

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

CORRECTIVE ACTIONS

1. The affected population of the Magnacraft-Struthers Dunn B255 latching relays required for Modes 6 and 5 system operability will be replaced prior to returning the affected components to operable status.
2. The remaining affected population of Magnacraft-Struthers Dunn B255 latching relays will be replaced or re-evaluated prior to Salem Unit 2 entering Mode 4.
3. The affected Magnacraft-Struthers Dunn B255 latching relays will be replaced in Salem Unit 1 prior to returning the systems to operable status.