

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1) Salem Generating Station - Unit 1	DOCKET NUMBER (2) 0 5 0 0 0 2 7 2	PAGE (3) 1 OF 0 5
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TITLE (4)
Both Trains of High Head SI Declared Inoperable - T. S. 3.0.5 entered

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 NAMES		
0 5	2 5	8 7	8 7	0 0 6	0 0 0	0 5	2 4	8 7	DOCKET NUMBER(S) 0 5 0 0 0		

OPERATING MODE (9) 1	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more of the following) (11)									
POWER LEVEL (10) 1 0 0	20.402(b)	20.406(c)	50.73(a)(2)(iv)	73.71(b)						
	20.406(a)(1)(i)	50.36(c)(1)	50.73(a)(2)(v)	73.71(c)						
	20.406(a)(1)(ii)	50.36(c)(2)	50.73(a)(2)(vii)	OTHER (Specify in Abstract below and in Text, NRC Form 366A)						
	20.406(a)(1)(iii)	X 50.73(a)(2)(i)	50.73(a)(2)(viii)(A)							
	20.406(a)(1)(iv)	50.73(a)(2)(ii)	50.73(a)(2)(viii)(B)							
	20.406(a)(1)(v)	50.73(a)(2)(iii)	50.73(a)(2)(x)							

LICENSEE CONTACT FOR THIS LER (12)		TELEPHONE NUMBER	
NAME	AREA CODE		
M. J. Pollack - LER Coordinator	6 1 0 9	3 1 3 9 1 - 1 4 0 1 2 2	

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		
X	B	Q 1 B	9 D G O	8 1 0	YES						

SUPPLEMENTAL REPORT EXPECTED (14)			EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR
<input type="checkbox"/> YES (If yes, complete EXPECTED SUBMISSION DATE) <input checked="" type="checkbox"/> NO						

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

On May 25, 1987 at 1607 hours, it was observed that the spring charging motor, for No. 11 Centrifugal Charging Pump (CCP) {BQ} 4KV breaker (GE Magne Blast Type AM-4.16-350-2N, S/N 0224A6261-011), was not attached to the breaker framework. The pump was subsequently declared inoperable. Prior to discovery of the No. 11 CCP breaker condition, the No. 12 CCP emergency power supply (1C Diesel Generator {EK}) had been made unavailable as a result of a design change in progress. Since none of the Technical Specification 3.5.2 Action Statements can be met when both Centrifugal Charging Pumps are declared inoperable (one of which is declared inoperable due to an inoperable emergency power supply) Technical Specification 3.0.5 was entered. All vital and non-vital 4KV breakers have undergone a visual examination to determine if any of the four (4) 1/4 inch bolts have loosened. No additional loose bolts were found. As a result of preliminary investigations of this event (NPRDS, Nuclear Network, ... etc.), PSE&G is aware of other spring charging motor mounting bolt problems at other plants. Investigation of INPO SER 14-87 "Breaker Failure Due to Loose Mounting Bolts" is being conducted. The breaker manufacturer has been contacted and is reviewing this occurrence.

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PLANT AND SYSTEM IDENTIFICATION:

Westinghouse - Pressurized Water Reactor

Energy Industry Identification System (EIIIS) codes are identified in the text as {xx}

IDENTIFICATION OF OCCURRENCE:

Both trains of High Head Safety Injection declared inoperable - Technical Specification 3.0.5 entered

Event Date: 5/25/87

Report Date: 6/24/87

This report was initiated by Incident Report No. 87-203

CONDITIONS PRIOR TO OCCURRENCE:

Mode 1 Reactor Power 100% - Unit Load 1152 MWe

DESCRIPTION OF OCCURRENCE:

On May 25, 1987 at 1607 hours, it was observed that the spring charging motor, for No. 11 Centrifugal Charging Pump {BQ} (CCP) 4KV breaker (GE Magne Blast Type AM-4.16-350-2N, S/N 0224A6261-011), was not attached to the breaker framework. The pump was subsequently declared inoperable. The breaker was observed to be in the open position and the closing springs were charged. Prior to discovery of the No. 11 CCP breaker condition, the No. 12 CCP emergency power supply (1C Diesel Generator {EK}) had been made unavailable as a result of a design change in progress.

Technical Specification 3.5.2 states:

Two independent ECCS subsystems shall be OPERABLE with each subsystem comprised of:

- a. One OPERABLE centrifugal charging pump,
- b. One OPERABLE safety injection pump,
- c. One OPERABLE residual heat removal heat exchanger,
- d. One OPERABLE residual heat removal pump, and
- e. An OPERABLE flow path capable of taking suction from the refueling water storage tank on a safety injection signal and transferring suction to the containment sump during the recirculation phase of operation."

Since none of the Technical Specification 3.5.2 Action Statements can be met when both Centrifugal Charging Pumps are declared inoperable (one of which is declared inoperable solely due to an inoperable emergency power supply) Technical Specification 3.0.5 was entered.

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DESCRIPTION OF OCCURRENCE: (cont'd)

Technical Specification 3.0.5 states:

"When a system, subsystem, train, component or device is determined to be inoperable solely because its emergency power source is inoperable, or solely because its normal power source is inoperable it may be considered OPERABLE for the purpose of satisfying the requirements of its applicable limiting Condition for Operation, provided: (1) its corresponding normal or emergency power source is OPERABLE; and (2) all of its redundant system(s), subsystem(s), train(s), component(s) and device(s) are OPERABLE, or likewise satisfy the requirements of this specification. Unless both conditions (1) and (2) are satisfied within 2 hours, action shall be initiated to place the unit in a MODE in which the applicable Limiting Condition for Operation does not apply by placing it, as applicable, in:

1. At least HOT STANDBY within the next 6 hours,
2. At least HOT SHUTDOWN within the following 6 hours, and
3. At least COLD SHUTDOWN within the subsequent 24 hours.

This specification is not applicable in MODES 5 or 6."

Technical Specification 3.0.5 was exited at 1618 hours the same day after a spare breaker was installed and No. 11 CCP was declared operable.

APPARENT CAUSE OF OCCURRENCE:

The No. 11 CCP 4KV breaker was removed from the switchgear cubicle and inspected. The four (4) 1/4" bolts with lockwashers had loosened from the spring charging motor housing and the motor was hanging from its wires. Subsequent examination revealed three (3) motor mounting bolts were 5/8" long and one (1) bolt was 3/4" long. The 5/8" bolts were used in one (1) inboard and two (2) outboard motor housing tapped holes. The other inboard tapped hole, which used the 3/4" bolt, was found deformed at the upper part of the hole with the threads badly stripped.

This breaker was removed from service on January 16, 1986 after 897 total operations and was overhauled in February 1986 (by contractor) as part of preventive maintenance (every five (5) years) and subsequently inspected and tested by PSE&G Maintenance Department personnel prior to returning it to service on February 23, 1986. When the breaker was taken out of service due to the loose bolts, the breaker had undergone 224 additional operations since its last five year overhaul.

Cycling (closed and open) does subject the breaker's spring charging motor to vibration. By design, the motor is suspended from the motor support bracket with four (4) 1/4" x 20 bolts (5/8" long) with lockwashers while the motor support bracket is held to the breaker frame with seven (7) 3/4 inch bolts, washers and lockwashers.

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ANALYSIS OF OCCURRENCE:

The breaker would have been able to close and open one time for a Safety Injection (SI) occurrence. If, however, a blackout occurred after the SI, the breaker may not have been able to reclose. If the spring charging motor could not charge the springs, a ratchet wrench could be used to manually charge the closing springs. While the breaker is closing, the breaker's opening springs are compressed so the breaker can be tripped open when required. Therefore, No. 11 CCP was correctly identified as inoperable since it could not meet its required ECCS function(s) under all analyzed conditions. With No. 12 CCP emergency power supply disconnected, Technical Specification 3.5.2 Action Statements could not be met because it requires two (2) operable ECCS pumps (CCP's) for high head injection (where one pump is 100% redundant of the other). Therefore, Technical Specification 3.0.5 was entered. No. 11 CCP was declared operable again eleven (11) minutes after discovery of the breaker condition and a spare breaker installed. This was well within the time frame allowed (2 hours) by Technical Specification 3.0.5 which otherwise would have required initiation of a Unit shutdown.

During a large break LOCA, core cooling and reactivity control would be provided by intermediate SI flow (SI Pumps) and low head flow (RHR Pumps) both of which take suction off of the Refueling Water Storage Tank. During a small break LOCA high head injection is mandatory in order to provide level control in the Reactor Coolant System. During a main steam line break or feedwater line break, high head injection is required to overcome RCS pressure in order to put RWST water (containing 2000 ppm boron) and BIT water (containing 20,000 ppm boron) which help prevent the core from returning to criticality which would occur otherwise due to the large drop in moderator temperature (positive reactivity insertion due to the moderator temperature coefficient). Mitigation of the loss of high head injection is addressed procedurally in station Emergency Operating Procedures (EOPs).

The CCP's are used as backup pumps to the Positive Displacement Charging Pump during routine plant operations. Either CCP is capable of supplying the required Reactor Coolant System charging flow and Reactor Coolant Pump seal injection flow. At the time of this events discovery, the PDP was in service.

CORRECTIVE ACTION:

All vital and non-vital 4KV breakers have been visually examined to determine if any of the four (4) 1/4 inch bolts have loosened. No additional loose bolts were found.

Every 18 months, the breaker is routinely inspected and tested per Maintenance procedure M3D "4KV and 13KV Magne-Blast Circuit Breaker Inspection and Test". Section 9.17 of the procedure specifically

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CORRECTIVE ACTION: (cont'd)

states "check all nuts, washers, bolts, cotter pins and terminal connections for tightness". In addition, once per shift, the 4KV cubicles are checked by an operator to determine breaker status and cubicle condition.

As a result of preliminary investigations of this event (NPRDS, Nuclear Network, ... etc.) PSE&G is aware of other spring charging motor mounting bolt problems at other plants. Investigation of INPO SER 14-87 "Breaker Failure Due to Loose Mounting Bolts" is being conducted.

The breaker manufacturer has been contacted and is reviewing this occurrence.



General Manager -
Salem Operations

MJP:pc

SORC Mtg. 87-047



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

Salem Generating Station

June 24, 1987

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

Dear Sir:

SALEM GENERATING STATION
LICENSE NO. DPR-70
DOCKET NO. 50-272
UNIT NO. 1
LICENSEE EVENT REPORT 87-006-00

This Licensee Event Report is being submitted pursuant to the requirements of 10CFR 50.73(a)(2)(v)(A). This report is required within thirty (30) days of discovery.

Sincerely yours,

A handwritten signature in cursive script that reads "J. M. Zupko, Jr." with a circled "R" at the end.

J. M. Zupko, Jr.
General Manager-
Salem Operations

MJP:pc

Distribution

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The Energy People