

LICENSEE EVENT REPORT

CONTROL BLOCK: _____ (PLEASE PRINT OR TYPE ALL REQUIRED INFORMATION)

01 | N | J | S | G | S | 2 | 2 | 0 | 0 | - | 0 | 0 | 0 | 0 | 0 | - | 0 | 0 | 3 | 4 | 1 | 1 | 1 | 1 | 4 | 5

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01 | REPORT SOURCE | L | 6 | 0 | 5 | 0 | 0 | 0 | 3 | 1 | 1 | 7 | 0 | 6 | 1 | 2 | 8 | 1 | 8 | 0 | 9 | 1 | 7 | 8 | 4 | 9

EVENT DESCRIPTION AND PROBABLE CONSEQUENCES (10)

02 | On two occasions (June 12 and 18, 1981) the Pressurizer Overpressure Protection System (POPS) was declared inoperable due to excessive leakage to the Pressurizer Relief Tank. 03 | In both cases, the appropriate Technical Specification Action Statements were entered 04 | and the Unit was operated in accordance with the action requirements. The events 05 | constituted operation in a degraded mode, permitted by a limiting condition for 06 | operation and are reportable in accordance with Technical Specification 6.9.1.9.b.

09 | SYSTEM CODE: C J 11 | CAUSE CODE: B 12 | CAUSE SUBCODE: A 13 | COMPONENT CODE: V A L V E X 14 | COMP. SUBCODE: X 15 | VALVE SUBCODE: B 16

17 | LER/RO REPORT NUMBER: 81 | EVENT YEAR: 81 | SEQUENTIAL REPORT NO.: 043 | OCCURRENCE CODE: 03 | REPORT TYPE: X | REVISION NO.: 2

ACTION TAKEN: X 18 | FUTURE ACTION: Z 19 | EFFECT ON PLANT: Z 20 | SHUTDOWN METHOD: Z 21 | HOURS: 0000 | ATTACHMENT SUBMITTED: Y 23 | NPRD-4 FORM SUB.: Y 24 | PRIME COMP. SUPPLIER: A 25 | COMPONENT MANUFACTURER: M 095 26

CAUSE DESCRIPTION AND CORRECTIVE ACTIONS (27)

10 | The occurrences involved leakage through the POPS valves and the Power Operated Relief 11 | Valves (PORV's), and were determined to be generic in nature. The PORV plugs were 12 | replaced with ones of a different design, the PORV circuitry was modified to replace 13 | the function of the POPS valves, and the POPS valves were subsequently removed from 14 | the system.

15 | FACILITY STATUS: D 28 | % POWER: 000 29 | OTHER STATUS: NA 30 | METHOD OF DISCOVERY: A 31 | DISCOVERY DESCRIPTION: Operator Observation 32

16 | ACTIVITY CONTENT: Z 33 | AMOUNT OF ACTIVITY: NA 35 | LOCATION OF RELEASE: NA 36

17 | PERSONNEL EXPOSURES: 0 37 | TYPE: Z 38 | DESCRIPTION: NA 39

18 | PERSONNEL INJURIES: 0 40 | DESCRIPTION: NA 41

19 | LOSS OF OR DAMAGE TO FACILITY TYPE: Z 42 | DESCRIPTION: NA 43

20 | PUBLICITY ISSUED: N 44 | DESCRIPTION: NA 45

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PDR ADDCK 05000311
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IE 22%

NAME OF PREPARER: J.L. Rupp PHONE: (609) 339-4309

NRC USE ONLY



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

Salem Generating Station

September 17, 1984

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

Dear Sir:

LICENSE NO. DPR-75
DOCKET NO. 50-311
REPORTABLE OCCURRENCE 81-043/03X-2
SUPPLEMENTAL REPORT

Pursuant to the requirements of Salem Generating Station
Unit No. 2 Technical Specifications, Section 6.9.1.9.b,
we are submitting supplemental Licensee Event Report for
Reportable Occurrence 81-043/03X-2.

Sincerely yours,

A handwritten signature in dark ink, appearing to read "J. M. Zupko, Jr.", with a circled "X" at the end of the signature.

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

JR:k11

CC: Distribution

Report Number: 81-043/03X-2

Occurrence Dates: 06/12/81
06/18/81

Report Date: 09/17/84

Facility: Salem Generating Station Unit 2
Public Service Electric & Gas Company
Hancock's Bridge, New Jersey 08038

IDENTIFICATION OF OCCURRENCE:

Reactor Coolant System - Pressurizer Overpressure Protection System - Inoperable

This report was initiated by Incident Reports 81-190 and 81-199

CONDITIONS PRIOR TO OCCURRENCE:

06/12/81 - Mode 4 - Rx Power 000 % - Unit Load 0000 MWe
06/18/81 - Mode 5 - Rx Power 000 % - Unit Load 0000 MWe

DESCRIPTION OF OCCURRENCE:

On June 12, 1981, during the cooldown of the Unit for maintenance, the Pressurizer Overpressure Protection System (POPS) was not armed when Reactor Coolant System (RCS) temperature decreased to 312°F. Previously, POPS Valves 2PR47 and 2PR48 and Power Operated Relief Valves (PORV) 2PR1 and 2PR2 were isolated by closing Block Valves 2PR6 and 2PR7, due to excessive leakage to the Pressurizer Relief Tank (PRT). Technical Specification Action Statement 3.4.10.3.b was entered at 0437 hours, due to both POPS channels being isolated and inoperable. The RCS was depressurized and a vent path to the PRT, from the RCS, was established within the eight (8) hours required by the Action Statement. The POPS valves and the PORV's were inspected, restroked and functionally checked during the maintenance outage. Technical Specification Action Statement 3.4.10.3.b was terminated at 1500 hours, June 14, 1981, when both POPS channels were returned to service.

In preparation for returning the Unit to service, following Pressurizer steam bubble formation, PORV 2PR1 and/or POPS Valve 2PR47 were again identified as leaking through to the PRT. At 1830 hours, June 18, 1981, Technical Specification Action Statement 3.4.10.3.a was entered, POPS Channel 1 was declared inoperable and Block Valve 2PR6 was closed to isolate the leakage. At 1035 hours, June 21, 1981, RCS temperature was increased to greater than 312°F, and Action Statement 3.4.10.3.a was terminated. As the RCS heatup continued, leakage to the PRT developed through PORV 2PR2. Block Valve 2PR7 was then closed to isolate the leakage. At 1235 hours, when the Unit entered Mode 3, Technical Specification Action Statement 3.4.5.a was entered, due to isolation of both PORV's (2PR1 and 2PR2).

DESCRIPTION OF OCCURRENCE: (cont'd)

Due to the fact that seat leakage of the PORV type valves was a recognized generic problem, and engineering investigation of the POPS valve problems was required, the decision was made to complete startup testing and commence Cycle 1 operation with the relief lines isolated. Technical Specification Action Statement 3.4.10.3.b was again entered on July 9, 1981, when the RCS temperature was decreased below 312°F during a short maintenance shutdown (see LER 81-059/03X-1).

Startup testing was completed, and power operation commenced in October, 1981; Technical Specification Action Statement 3.4.5.a was re-entered during that startup, due to isolation of the relief lines. The Unit was then operated at power until the scheduled refueling shutdown in January, 1983. The problem reappeared during that shutdown when the POPS channels were again required, but still inoperable, due to the isolation of the relief lines (see LER 83-005/03X-1).

APPARENT CAUSE OF OCCURRENCE:

PORV 2PR2 and POPS Valve 2PR47 were previously identified to be leaking through, and were therefore isolated by closing Block Valves 2PR6 and 2PR7. When RCS temperature decreased to 312°F, both POPS Channels 1 and 2 were declared inoperable since they were isolated. Problems with leakage past the other PORV and POPS valve were also involved in the later occurrences.

As noted, seat leakage problems with the Copes-Vulcan D100-160 relief valves have been experienced by a number of power plants, and have been identified as generic in nature. The failures involve the galling of the valve internals due to the use of similar materials. The POPS valve problems evidently were the result of binding of valve internals due to insufficient clearances.

ANALYSIS OF OCCURRENCE:

The operability of the POPS, or an RCS vent, ensures that the RCS will be protected from pressure transients when one or more of the RCS cold legs are less than or equal to 312°F. Either POPS valve has adequate relieving capacity to protect the RCS from overpressurization, when the transient is limited to either the start of an idle reactor coolant pump (with the secondary water temperature of the steam generator less than or equal to 50°F above the RCS cold leg temperature) or the start of a safety injection pump and its injection into a water solid RCS.

The PORV's and pressurizer bubble function to relieve RCS pressure during all design transients, up to and including the design step load decreases with the steam dumps. Operation of the PORV's minimize the undesirable opening of the Pressurizer Code Safety Valves (2PR3, 2PR4 and 2PR5). Each PORV has a remotely operated block valve to provide positive shutoff capability, should a relief valve become inoperable.

ANALYSIS OF OCCURRENCE: (cont'd)

Action Statement 3.4.10.3.a requires:

With one POPS inoperable, restore the inoperable POPS to operable status within seven (7) days or depressurize and vent the RCS through a 3.14 square inch vent(s) within the next eight (8) hours.

Action Statement 3.4.10.3.b requires:

With both POPS inoperable, depressurize and vent the RCS through a 3.14 square inch vent(s) within eight (8) hours.

Action Statement 3.4.5.a requires:

With one or more PORV's inoperable, within one (1) hour either restore the PORV's to operable status or close and remove power from the associated block valves; otherwise, be in at least hot standby within the next six (6) hours and in cold shutdown within the following thirty (30) hours.

As noted, in each case, the appropriate action was taken to either restore a POPS channel to operability, establish an RCS vent path or isolate a pressurizer relief valve. The events therefore involved no undue risk to the health or safety of the public. The occurrences constituted operation in a degraded mode permitted by a limiting condition for operation, and were therefore reportable in accordance with Technical Specification 6.9.1.9.b.

CORRECTIVE ACTION:

Acting upon the recommendations of the manufacturer and the EPRI, the PORV plugs were replaced during the 1983 refueling outage. The valve plugs were replaced with ones manufactured of stellite faced 316 stainless steel. Similar type plugs had been previously installed in Salem Unit 1 valves; the valves have since performed satisfactorily. No further leakage problems were noted with Unit 2 valves (see LER 81-017/03X-1).

Design Change Request 2EC-1599 was issued to modify the POPS valves to increase their reliability; the work was completed during the first refueling outage.

Due to the history of recurrent problems with the system, an engineering review of the POPS problems was performed. Based on the results of the review, a recommendation was made to redesign the PORV (2PR1 and 2PR2) control circuitry to allow these valves to function as POPS valves (similar to the control scheme in Unit 1). As noted, previous problems with seat leakage in the PORV type valves had been addressed and apparently corrected, leading to consideration of this alternative. Design Change Request 2SC-1245 was issued in September, 1983, to implement the change. The modifications were completed in early 1984, and 2PR47 and 2PR48 were scheduled for removal during the next outage of sufficient duration.

CORRECTIVE ACTION: (cont'd)

On July 25, 1984, a subsequent problem was encountered with 2PR47 lifting and failing to reseat. The incident (documented in LER 84-018-00) resulted in a reactor trip and safety injection. Due to that occurrence, both 2PR47 and 2PR48 were removed from the system.

FAILURE DATA:

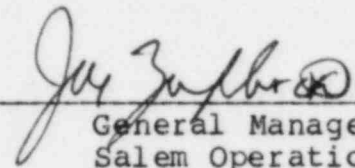
POPS Valves

Marotta Scientific Controls
Relief Valve
Model MV-225C

PORV Valves

Copes-Vulcan, Inc.
Relief Valve
Type D100-160

Prepared By J. L. Rupp



General Manager-
Salem Operations

SORC Meeting No. 84-123