NRC Form 366
(9-83)

U.S. NUCLEAR REGULATORY COMMISSION
APPROVED OMB NO. 3150-0104
EXPIRES: 8/31/85

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
Salem Generating Station - Unit 2	0 5 0 0 0 3 1 1	1 OF 0 5

TITLE (4)
Reactor Coolant System-RTD Bypass Line - 22RC17 & 23RC24 Valve Failures

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	DOCKET NUMBER(S)
0 1	1 2	8 4	8 4	0 0 1	0 0	0 2	0 9	8 4		0 5 0 0 0
										0 5 0 0 0

OPERATING MODE (9)	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more of the following) (11)			
5	20.402(b)	20.405(c)	50.73(a)(2)(iv)	73.71(b)
POWER LEVEL (10)	20.405(a)(1)(i)	50.36(c)(1)	50.73(a)(2)(v)	73.71(c)
0 0 0	20.405(a)(1)(ii)	50.36(c)(2)	50.73(a)(2)(vii)	X OTHER (Specify in Abstract below and in Text, NRC Form 366A)
	20.405(a)(1)(iii)	50.73(a)(2)(i)	50.73(a)(2)(viii)(A)	
	20.405(a)(1)(iv)	50.73(a)(2)(ii)	50.73(a)(2)(viii)(B)	
	20.405(a)(1)(v)	50.73(a)(2)(iii)	50.73(a)(2)(x)	

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER
J. L. Rupp	AREA CODE 6 0 9 3 3 9 - 4 3 0 9

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	A B	1 S V	R 3 4 4	Y							

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 fifteen single-space typewritten lines) (16)

In January 1983, Salem Unit 1 experienced a low flow condition in No. 14 Reactor Coolant Loop Resistance Temperature Detector Bypass Line. The event was attributed to blockage caused by corrosion products, and the event was documented in LER No. 83-007/03L. As a result of that LER, the USNRC issued IE Information Notice No. 83-65, describing this occurrence, and recommending that all utilities periodically verify the RTD bypass line low flow alarm setpoints. As a result of the IE notice, Salem received a message from another utility, informing us that a similar problem (which they had experienced) was caused by a separation of the stem and disc on an RTD bypass line valve. Although no additional RTD bypass lines low flow conditions have been experienced, it was decided to radiograph all bypass line valves in both units at the next available opportunity. On January 12 and 13, 1984, radiography results of the Reactor Coolant System Resistance Temperature Detector Bypass Line valves (in Unit 2) indicated that the stems were detached from the disks on 22RC17 and 23RC24. It should be noted that this failure can occur undetected. This problem appears to be generic in nature, and this report is being submitted to notify the Commission and other facilities of this type of problem.

IE22

PLANT AND SYSTEM IDENTIFICATION:

Westinghouse - Pressurized Water Reactor

Energy Industry Identification System (EIIS) codes are indentified in the text as [XX].

IDENTIFICATION OF OCCURRENCE:

Reactor Coolant System [AB] - Resistance Temperature Detector (RTD) Bypass Line - 22RC17 and 23RC24 Valve Failures

When Discovered: 01/12/84
01/13/84

Report Date: 02/09/84

This report was initiated by Incident Reports 84-011 and 84-012

CONDITIONS PRIOR TO OCCURRENCE:

Mode 5 - Rx Power 000 % - Unit Load 0000 MWe

DESCRIPTION OF OCCURRENCE:

On January 29, 1983, during routine shutdown operation, a low flow alarm was received in the Unit 1 control room from the No. 14 Reactor Coolant Loop RTD Bypass Line. Investigation of the problem, by alternately isolating the hot-leg and cold-leg sides of the flowpath, indicated that the hot-leg flowpath was obstructed. The No. 14 Reactor Coolant Average Temperature Channel was therefore declared inoperable and a limiting condition for operation was entered, retroactive to the time of discovery. All bistables associated with the channel were immediately placed in the tripped condition. The redundant loop Tave channels remained operable throughout the occurrence. In an attempt to dislodge the obstruction from the hot-leg bypass loop, its isolation valve was cycled, and bypass flow was restored to normal. No other problems with the channels were evident, and the occurrence was assumed to involve an isolated instance of corrosion products restricting flow in the bypass line.

Unit 1 Licensee Event Report (LER) 83-007/03L documented the above listed occurrence. As a result of that LER, the NRC issued IE Information Notice No. 83-65 (dated October 7, 1983) to all Westinghouse nuclear power reactor facilities holding an operating license (OL) or a construction permit (CP). This information notice recommended calibration of the flow sensors on a refueling outage basis and verification of the alarm setpoint on a monthly basis, to assure the operability of this monitoring function, since no previous surveillance requirements existed.

DESCRIPTION OF OCCURRENCE: (cont'd)

As a result of that information notice, Salem received a notice (dated October 19, 1983) from another utility, via the Site Westinghouse Representative, informing us of a similar problem which they had experienced with reduced flow through the RTD bypass loops. The message explained that their problem was caused by a stem-to-disk separation of a bypass line isolation valve. The valve disk had fallen, resulting in restriction of the flow. Given the right conditions, the valve disk could lift and flow would be reestablished; this type of failure could easily be mistaken for an obstruction caused by crud.

Although the occurrence in January 1983 was the only one of its kind ever experienced at either of the Salem units, it was decided to radiograph all RTD bypass line valves in all reactor coolant loops of both units during their next refueling outages. When the present maintenance shutdown of Unit 2 was extended, the decision was made to radiograph the valves associated with that unit at that time, rather than wait for the next refueling outage.

Five valves in each of the four bypass lines (for a total of twenty valves) were radiographed. On January 12, 1984, radiography results of No. 22 Reactor Coolant Loop RTD Bypass Line valves revealed that the disk was separated from the stem on 22RC17. On January 13, 1984, a similar failure was discovered on 23RC24, located in No. 23 Reactor Coolant Loop RTD Bypass Line. All other bypass line valves were satisfactory.

ANALYSIS OF OCCURRENCE:

The reactor coolant loop temperature instruments are utilized in the Reactor Protection System [JC]. Operability of the temperature instruments is required to provide the overall reliability, redundancy, and diversity available in the facility design for the mitigation of accidents. The Reactor Coolant System [AB] hot-leg and cold-leg RTDs are located in reactor coolant bypass loops. A bypass loop from upstream of the steam generator to the reactor coolant pump inlet is used for the hot-leg RTD, and a bypass loop from downstream of the reactor coolant pump to the pump inlet is used for the cold-leg RTD.

The bypass loop flowrate affects the overall time response of the temperature signals provided for reactor protection. These response times are considered in performing FSAR accident analyses and are included in plant Technical Specification surveillance requirements. Westinghouse Functional Specification CE-CPA-978 requires a bypass flowrate of fifty to three-hundred gallons per minute (50-300 GPM). Flowrate within this band will ensure the required time response for thermal overpower and overtemperature protection. The Salem Generating Station design enables a normal flowrate of three-hundred (300) GPM. The RTD bypass loops have low flow alarms whose setpoint

ANALYSIS OF OCCURRENCE: (cont'd)

is ninety percent (90%) of the normal flow. This setpoint corresponds to a flowrate of two-hundred and seventy (270) GPM, and is well above the minimum required flowrate of fifty (50) GPM.

Unit 2 has never received this alarm during plant operation, which indicated that the bypass line flow has held these valve disks in the open position. As previously stated, the unit is shutdown. To verify proper operation, the flow sensor calibration was checked, the reactor coolant pumps were started, and flow measurements verified flow to be greater than two-hundred and ninety (290) GPM in the bypass lines containing the defective valves. This indicates that the disks are, in fact, lifting off of their seat. The low flow alarm setpoints were checked. They were satisfactory, and the alarms functioned properly, which confirms that flow in these bypass lines has always been greater than two-hundred and seventy (270) GPM.

Unit 1 RTD bypass flow sensors were also calibrated. Flow measurements greater than two-hundred and seventy (270) GPM was confirmed. The low flow alarm setpoints were also verified to be functioning properly.

A safety evaluation was performed. The physical dimensions of these detached disks precludes the possibility of them being dislodged from the inlet or outlet ports of the valves. Because of the valve design, the stems cannot be physically backed out of the valves by overtravel. They also cannot be forced out by the system pressure; this has been confirmed by the vendor. Flow in the bypass lines has been confirmed to be greater than two-hundred and seventy (270) GPM. The low flow alarms have been verified to be set at 270 GPM and functioning properly; they will alert operators in the control rooms if flow decreases below this value. Corrective action will be taken if the alarm is received. Because only one valve in each loop is affected, the RTDs may be isolated (if necessary) at any time. Flow direction through these valves has been verified to be in the direction that tends to lift the valve disks off of their seats. There are no unreviewed safety questions or problems associated with Unit 2 startup because of these valve failures. There are also no safety problems with continued operation of Unit 1, even if similar failures should occur. This occurrence involves no undue risk to the health or safety of the public. This problem appears to be generic in nature, and this report is being submitted to notify the Commission and other facilities to the possibility of similar undetected failures.

FAILURE DATA:

Rockwell-International
Globe Valve 1500 S
2 Inch, Stainless Steel
Type 3624 F316
Mark No. FA-17

FAILURE DATA: (cont'd)

Although the problem has been identified in 2" valves, other size valves of a similar design may also be subject to this type of failure. The separation of the stem from the disk is apparently caused by the force exerted on this joint when the valve is backseated.

CORRECTIVE ACTION:

The Station has identified all two inch (2") valves of this type. Installation has been verified to be such that the system flow (for valves which are in the normally open position) is in the direction which will tend to lift the disk off of the seat, if such a failure should occur. Corrective action will be taken upon receipt of a low flow alarm. The Station is working on plans to replace these valves with ones of a different design. As an added precaution, the handwheels of 22RC17 and 23RC24 have been removed, to prevent further operation and overtravel of the stems. Operators have been advised to use caution while backseating these type of valves.

Prepared By J. L. Rupp

General Manager-
Salem Operations

SORC Meeting 84-016

PSE&G

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

Salem Generating Station

February 9, 1984

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

Dear Sir:

SALEM GENERATING STATION
LICENSE NO. DPR-75
DOCKET NO. 50-311
UNIT NO. 2
LICENSEE EVENT REPORT 84-001-00

This Licensee Event Report is being submitted to notify the Commission and other facilities of a possible undetected generic problem associated with Reactor Coolant Loop RTD Bypass Line valves.

Sincerely yours,

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

JR:kll

CC: Distribution

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