



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

Nuclear Business Unit

MAR 02 1998

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

LER 311/98-002-00
SALEM GENERATING STATION - UNIT 2
FACILITY OPERATING LICENSE NO. DPR-75
DOCKET NO. 50-311

Gentlemen:

This Licensee Event Report entitled "23 Overtemperature Delta Temperature Found Inoperable" is being submitted pursuant to the requirements of the Code of Federal Regulations 10CFR50.73(a)(2)(i)(B).

Sincerely,

A. C. Bakken III
General Manager -
Salem Operations

Attachment

BJT

C Distribution
LER File 3.7

9803060428 980302
PDR ADOCK 05000311
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: 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.

FACILITY NAME (1)

SALEM GENERATING STATION UNIT 2

DOCKET NUMBER (2)

05000311

PAGE (3)

1 OF 5

TITLE (4)

23 Overtemperature Delta Temperature Channel Found Inoperable

| 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 | 29 | 98 | 98 | -- 002 | -- 00 | 03 | 02 | 98 | FACILITY NAME | DOCKET NUMBER |
| OPERATING MODE (9) | | 1 | THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR 5: (Check one or more) (11) | | | | | | | |
| POWER LEVEL (10) | | 100 | 20.2201(b) | | 20.2203(a)(2)(v) | | X | | 50.73(a)(2)(i) | 50.73(a)(2)(viii) |
| | | | 20.2203(a)(1) | | 20.2203(a)(3)(i) | | | | 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)(iii) | | 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

Brian J. Thomas, Licensing Engineer

TELEPHONE NUMBER (Include Area Code)

609-339-2022

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)

| | | | | | | |
|---|---|----|-------------------------------------|-------|-----|------|
| YES (If yes, complete EXPECTED SUBMISSION DATE). | X | NO | EXPECTED SUBMISSION DATE (15) | MONTH | DAY | YEAR |
|---|---|----|-------------------------------------|-------|-----|------|

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

On January 29, 1998, during performance of the quarterly Functional Surveillance test on the 23 Reactor Coolant $\Delta T/T$ -Avg. loop, the lead/lag module settings associated with Overtemperature Delta Temperature (OT ΔT) reactor trip function were found in an off-normal position. The lead was in the off position and lag was in position 1, the required positions are 2.8 for lead and 4 for lag (corresponding to the Technical Specification time constants of 30 seconds for lead and 4 seconds for lag). With the lead in the off position there is no lead (i.e., no anticipatory trip). The as-found settings were not in compliance with the time constant requirements specified in Technical Specification (TS) Table 2.2-1, item 7, OT ΔT , Note 1 which states that the lead time constant is to be set at 30 seconds and lag time constant is to be set at 4 seconds.

Although the exact cause of this event could not be determined, the apparent cause of this event is being attributed to human error. This event will be reviewed with the appropriate maintenance personnel.

This event is being reported in accordance with 10 CFR 50.73(a)(2)(i)(B), any condition prohibited by the plant's Technical Specifications.

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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

Reactor Control and Protection System (RCP) {JC/-}*.

* Energy Industry Identification System (EIIIS) codes and component function identifier codes appear as {SS/CCC}.

CONDITIONS PRIOR TO OCCURRENCE

At the time of occurrence, Salem Unit 2 was in Mode 1 at 100% Power.

DESCRIPTION OF OCCURRENCE

On January 29, 1998, during performance of the quarterly Functional Surveillance test on the 23 Reactor Coolant $\Delta T/T$ -Avg. loop, the lead/lag module settings associated with Overtemperature Delta Temperature (OT ΔT) reactor trip function were found in an off-normal position. The lead was in the off position and lag was in position 1, the required positions are 2.8 for lead and 4 for lag (corresponding to the Technical Specification time constants of 30 seconds for lead and 4 seconds for lag). With the lead in the off position there is no lead (i.e., no anticipatory trip). The as-found settings were not in compliance with the time constant requirements specified in Technical Specification (TS) Table 2.2-1, item 7, OT ΔT , Note 1 which states that the lead time constant is to be set at 30 seconds and lag time constant is to be set at 4 seconds.

When the off-normal switch positions were identified, testing was stopped, and troubleshooting was performed under procedure SH.MD-AP.ZZ-0002(Q) to restore the switches to their proper position. Following restoration of the switches, the functional test was completed and the 23 $\Delta T/T$ -Avg channel was returned to operable status.

The investigation of the event did not determine the cause of the switches being found in the off-normal position. The investigation included interviews with personnel that worked or performed tests in the 23 $\Delta T/T$ -Avg Channel in the last three months. The investigation included a detailed review of the associated work order packages. The following conclusions were reached as a result of the investigation:

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

DESCRIPTION OF OCCURRENCE (cont'd)

- The last date the functional test procedure was performed for this channel was November 6, 1997. This test was completed satisfactorily and the lead and lag settings were restored to the correct position. The traces of the lead/lag module output contained in the work order package provide verification that the switches were returned to their correct position.
- All personnel who performed functional surveillance test on any Tave channel during this period and all personnel who performed tasks within channel III cabinets during this period were interviewed. None of the interviews uncovered any indication of performance outside plant expectations. Extensive human factors engineering has been incorporated into the placement of the cabinets such as an alarm in the control room to notify operators of entry into a cabinet, all cabinets are labeled, all the modules are labeled, and the floors are painted different colors for each unit. Human factors engineering was also addressed in the preparation of the procedures such as are color coding the procedures by unit, requiring independent verification of the proper placement of these switches, and a performing a trace to further verify that the channel is properly restored. A review of technician work practices was also conducted, specific qualifications are required before a technician can perform the surveillance, and an independent verifier is present during the performance of the procedure. The area in which the cabinets are located is a vital (controlled) plant area.
- Since the lead and lag dials require some effort to position them, drifting of the switches from their normal positions or bumping the switches out of their normal positions was not considered probable.
- Tampering was evaluated immediately upon discovery and ruled out due to the following reasons: (1) The cabinet door is alarmed which would notify the control room operators whenever the cabinet is entered. (2) The module lead/lag and time bias were aligned to the exact position required by step 5.4.5 of the procedure. (3) This mispositioning of these switches does not have an adverse affect on the reactor protection system's ability to safely shutdown the reactor.

Based on the above no conclusive evidence could be identified to indicate when the switches were mis-positioned.

Since the lead/lag switch positions for 23 $\Delta T/T$ -Avg were found in a position contrary to the settings provided in the TS Table 2.2-1, this event is reportable in accordance with 10CFR50.73 (a)(2)(i)(B), any condition prohibited by the plant's Technical Specifications.

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CAUSE OF OCCURRENCE

Although there was no conclusive evidence of the cause, the most likely scenario was that a technician initiated a $\Delta T/T$ -Avg. functional test in the cabinet for RCP channel III instead of the intended cabinet. The error was then undetected by the completion of the surveillance. Therefore, actions were not taken at that time to restore the proper configuration of lead/lag module.

PRIOR SIMILAR OCCURRENCES

A review of LERs issued in the past two years did not identify any prior similar occurrences.

SAFETY CONSEQUENCES AND IMPLICATIONS

For the three UFSAR Chapter 15 accident scenarios for which OT ΔT is the primary Reactor Trip signal, the most limiting accident analysis is the Rod Withdrawal At Power accident (UFSAR Section 15.2.2). Even in this analysis, any positive reactivity insertion rate over 3 pcm/sec, would cause a High Flux Trip. A rate below 3 pcm/sec produces a relatively slow rise in core average temperature (20 °F over 480 seconds) such that the lead function (when set at the proper value) would provide no anticipatory trip. Instead, the reactor trip would be the result of the actual real-time temperature changes.

The time response of a Unit 1 $\Delta T/T$ -Avg channel was performed with the lead/lag switches in the as found abnormal configuration. The result of this testing demonstrated that the output of the lead/lag module showed no appreciable difference in response to a simulated 10% process step change. Therefore, no discernible impact would be noted in the overall channel time response.

Therefore, the health and safety of the public were not affected.

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CORRECTIVE ACTIONS

1. The lead and lag switches were restored to their correct positions and the functional testing of the 23 $\Delta T/T$ -Avg loop was completed satisfactorily on January 30, 1998.
2. This event will be reviewed with the controls technicians from both Salem and Hope Creek stations by March 15, 1998.
3. Immediately after the condition was identified all of the Tavg channels for both Units were checked to verify that the lead/lag modules were properly aligned. No mis-alignments were identified.
4. Additional testing was performed to determine the safety significance of having the lead/lag module in the as-found setting. The response of the lead/lag module indicated that the total channel time response would not have been affected. There was no discernible difference in the output of the lead/lag module when comparing the normal (switch setting) and as-found (switch setting) traces for a step change input.