

10CFR50.73

**Virginia Electric And Power Company  
Surry Power Station  
5570 Hog Island Road  
Surry, Virginia 23883**

November 24, 1999

U. S. Nuclear Regulatory Commission  
Attention: Document Control Desk  
Washington, D. C. 20555

Serial No.: 99-395A  
SPS: JCS  
Docket No.: 50-280  
50-281  
License No.: DPR-32  
DPR-37

Dear Sirs:

Pursuant to 10CFR50.73, Virginia Electric and Power Company hereby submits the following Licensee Event Report supplement applicable to Surry Power Station Units 1 and 2.

Report No. 50-280, 50-281/1999-004-01

This report has been reviewed by the Station Nuclear Safety and Operating Committee and will be forwarded to the Management Safety Review Committee for its review.

Very truly yours,

  
E. S. Grecheck  
Site Vice President

Enclosure

*JED*

*PDL ADDON 05000280 S*

**Commitments contained in this letter:**

- 1. Engineering and Operations personnel will receive training on this event stressing the expectations to perform appropriate operability testing prior to return to service of equipment that has been removed from service due to a related TS PT failure.**
- 2. Consideration will be given to enhancing the process for the return of equipment to service for situations like this event.**
- 3. As degraded penetration seals in the MCR envelope are identified they will continue to be repaired.**
- 4. Plant modifications will be evaluated that would eliminate the effects of non safety-related ventilation on the safety-related Main Control Room envelope.**
- 5. The adequacy of installed pressure differential indicators will be assessed.**

**cc: U. S. Nuclear Regulatory Commission  
Region II  
Atlanta Federal Center  
61 Forsyth Street, SW, Suite 23T85  
Atlanta, Georgia 30303**

**Mr. R. A. Musser  
NRC Senior Resident Inspector  
Surry Power Station**

**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 hrs. Reported lessons learned are incorporated into the licensing process and fed back to industry. Forward comments regarding burden estimate to the 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. If an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

FACILITY NAME (1)

**SURRY POWER STATION , Unit 1**

DOCKET NUMBER (2)

**05000 - 280**

PAGE (3)

**1 OF 6**

TITLE (4)

**TS Violation Due to Non-Safety Related Fans' Effect on Control Room Boundary**

| 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                 | DOCUMENT NUMBER |
| 07             | 14  | 99   | 1999           | -- 004 --         | 01              | 11              | 24  | 99   | Surry Unit 2                  | 05000-281       |
|                |     |      |                |                   |                 |                 |     |      | FACILITY NAME                 | DOCUMENT NUMBER |
|                |     |      |                |                   |                 |                 |     |      |                               | 05000-          |

| OPERATING MODE (9) | N     | THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (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)(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 |
|                    |       |                                                                                             | 20.2203(a)(2)(iv)  |  | 50.36(c)(2)       |   | 50.73(a)(2)(vii) | or in NRC Form 366A |                           |

**LICENSEE CONTACT FOR THIS LER (12)**

|      |                                            |                                      |                       |
|------|--------------------------------------------|--------------------------------------|-----------------------|
| NAME | <b>E. S. Grecheck, Site Vice President</b> | TELEPHONE NUMBER (Include Area Code) | <b>(757) 365-2001</b> |
|------|--------------------------------------------|--------------------------------------|-----------------------|

**COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)**

| CAUSE | SYSTEM | COMPONENT | MANUFACTURER | REPORTABLE TO EPIX | CAUSE | SYSTEM | COMPONENT | MANUFACTURER | REPORTABLE TO EPIX |
|-------|--------|-----------|--------------|--------------------|-------|--------|-----------|--------------|--------------------|
|       |        |           |              |                    |       |        |           |              |                    |
|       |        |           |              |                    |       |        |           |              |                    |

**SUPPLEMENTAL REPORT EXPECTED (14)**

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

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

The non-safety related Cable Vault fans were tagged out in October 1998 when it was determined that the Main Control Room (MCR) bottled air system was not capable of meeting Technical Specification (TS) requirements with the fans running. The fans were returned to service June 11, 1999, following maintenance and an Engineering evaluation. The fans were tagged out on June 23, 1999 following additional testing. On July 22, 1999, based on further evaluation it was determined that under certain conditions the bottled air system would not have met the TS differential pressure (DP) requirement during the period of time the fans had been returned to service. The Cable Vault fans have remained out of service except for testing (during which time they are administratively controlled) since this time.

While investigating the Cable Vault fan issue, a concern was identified with the DP between the MCR and the Cable Spreading Room. It was determined on July 14, 1999 that the TS required DP between the MCR and the Cable Spreading Rooms was not met with the Cable Spreading Room fans running. The doors between the Cable Spreading Rooms and the Mechanical Equipment Rooms were opened and have remained open except for testing (during which time they are administratively controlled) in order to meet the TS required DP. This event is reportable pursuant to 10CFR50.73(a)(2)(i)(B) for a condition prohibited by Technical Specifications.

**LICENSEE EVENT REPORT (LER)  
TEXT CONTINUATION**

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

**1.0 DESCRIPTION OF THE EVENT**

Technical Specifications (TSs) require that a bottled dry air bank [IEEE: LH-GBM] be available under accident conditions to maintain the Main Control Room (MCR) at a positive differential pressure (0.05 inches of water) with respect to adjoining areas of the auxiliary, turbine, and service buildings for one hour. The capability to pressurize the MCR boundary during a design basis accident is required to be demonstrated once per eighteen months by using a flow rate of air equivalent to or less than the flow rate delivered by the bottled air supply. Installed instrumentation only measures the DP between the MCR envelope and the Turbine Building. There is no installed instrumentation to measure the DP between the MCR and other adjoining areas. Station procedure 0-OPT-VS-005, "Control Room Leakage Test," provides instructions to verify compliance with TSs by using a supply fan [IEEE: MF-FAN] to pressurize the MCR envelope with a volume of air less than the volume stored in the bottled air supply. The supply fan with a restrictive orifice used during the test supplies approximately 300 cubic feet per minute (cfm) to the MCR envelope. The expected bottle capacity is approximately 500 cfm per train. The station has two bottled air supply trains installed.

During the October 1998 performance of 0-OPT-VS-005, the differential pressure requirement could not be maintained with the non-safety related service building Cable Vault fans [IEEE: MF-FAN] running. It was determined that there was a system imbalance between the exhaust and supply flow rates. The Cable Vault fans were tagged out and the test was completed with results that met the acceptance criteria of the procedure. The Cable Vault fans remained tagged out until June 11, 1999.

Between October 1998 and June 1999, door seals and penetration seals were repaired and the Cable Vault fans were flow balanced. Testing was performed in April and June 1999 to determine the impact of the Cable Vault fans on the MCR envelope. Based on Engineering's review of the April and June test results it was determined through analysis of the data that the Cable Vault fans could be returned to service. The fans were returned to service on June 11, 1999.

On June 23, 1999, during the performance of periodic test 0-OPT-VS-005, one of the four MCR envelope pressure indicators [IEEE: NA-PI] was below the minimum TS required positive pressure differential of 0.05 inches of water. An eight-hour limiting condition of operation (LCO) clock to hot shut down was entered for both units on June 23, 1999 at 0314 hours. The Unit 1 and Unit 2 Cable Vault fans were again tagged out and the Control Room Leakage test, 0-OPT-VS-005, was repeated. The acceptance criteria for 0-OPT-VS-005 was verified to be satisfactory in this condition and the eight-hour LCO was exited at 0456 hours.

It was determined on July 22, 1999, that the air flow rate from one train of the bottled air system was too low to be able to meet the TS differential pressure requirement of 0.05

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inches of water during the period from June 11 to June 23, 1999. Specifically, the required DP could not be maintained with the Cable Vault fans running using this train of air bottles. The DP could be maintained with the redundant train of air bottles with the Cable Vault fans running, since the actual air flow rate from this train was higher. Since the DP requirement could not be met by each individual train of air bottles, this is reportable pursuant to 10CFR50.73(a)(2)(i)(B) for a condition prohibited by Technical Specifications.

While investigating the influence of the Cable Vault ventilation on the MCR envelope, local pressure readings were taken in the Cable Spreading Rooms with a portable non calibrated barometer since no instrumentation is installed to monitor differential pressure in this area. It appeared that the Unit 1 and 2 Cable Spreading Rooms were at a higher pressure than inside the MCR envelope. On June 29, 1999, as a conservative measure, the doors between the Cable Spreading Rooms and adjacent Mechanical Equipment Rooms (MER) 1 and 2 were opened to reduce the higher pressures while further evaluation was being performed.

On July 14, 1999, after additional evaluation of the Cable Spreading Room ventilation flow balance conditions, Engineering concluded that the Unit 1 and Unit 2 Cable Spreading Room ventilation systems [IEEE: MF-AHU] were pressurizing their respective spaces to the extent that the control room bottled air system would not have been able to maintain the minimum positive differential pressure of 0.05 inches of water across the MCR boundary during a design basis accident with the Cable Spreading Room fans running. This condition was assumed to exist from the time maintenance was performed on the Unit 1 and Unit 2 Cable Spreading Room fans during December 1998 until the higher pressures were reduced by opening the doors in the Cable Spreading Rooms on June 29, 1999. Therefore, this is reportable pursuant to 10CFR50.73(a)(2)(i)(B) for a condition prohibited by Technical Specifications.

During these events, Unit 1 and Unit 2 were in various modes of operation from refueling shutdown to 100% reactor power due to normal operation, refueling outages, and maintenance activities.

**2.0 SIGNIFICANT SAFETY CONSEQUENCES AND IMPLICATIONS**

The MCR envelope is designed to be maintained at a positive differential pressure using bottled air during the period following design basis accidents when containment pressure would be greater than atmospheric pressure and a release could occur. Positive differential pressure would limit contamination and personnel dose in the MCR during this period of potential containment leakage.

The local pressure measurements taken on June 29, 1999 indicated that if a leak occurred between the MCR and the Cable Spreading Rooms, contaminants in the Cable Spreading Room could enter the MCR. The Cable Spreading Room ventilation system is

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designed to be a closed system in the recirculation mode. Therefore, the space effectively serves as a buffer between the MCR and the containment. Observations made during system walkdowns of the area did not indicate that there were leaks between the Cable Spreading Room and the MCR.

There would still have been a positive pressure differential (DP) between the MCR and adjoining areas (except for the Cable Spreading Room) with the Cable Vault fans running although the magnitude of the DP would have been less than the required 0.05 inches of water.

Additionally, with a loss of off-site power accident, the fans in the adjoining areas would not be running and minimum DP requirements would have been achieved. During the time that the TS requirements could not be met, the station was never in a condition where the bottled air system was needed and the air bottle train with the higher air flow rate was always available.

**3.0 CAUSE**

The causes, as determined by a root cause evaluation (RCE), involved several factors. Factors relating to the Cable Vault fans were equipment condition and design configuration. These factors were the cause of the initial PT failure. Equipment condition refers to the MCR envelope penetration degradation and design configuration refers to the imbalance of the cable vault fan flow that produced a negative pressure in the Unit 1 Cable Vault, increasing MCR envelope leakage. In addition, the Cable Vault fans should not have been returned to service without performing a satisfactory periodic test (PT) for the MCR envelope since they were secured as the result of a previously failed test. The process in place for the return to service of the equipment did not adequately specify and track return to service requirements for this situation.

The cause of the failure to maintain the required DP between the MCR and the Cable Spreading Rooms was determined to be design configuration and analysis. The original plant design did not adequately consider the possible effects of non-safety related (NSR) ventilation on the safety-related MCR envelope. Changes to non safety-related ventilation system configuration can cause a flow unbalance resulting in a positive pressure in adjacent areas relative to the MCR. Additionally, the design location of the pressure differential indicators (PDIs) does not allow for monitoring differential pressure in all areas adjacent to the MCR.

**4.0 IMMEDIATE CORRECTIVE ACTION(S)**

On June 23, 1999, when it was determined that the Cable Vault fans were the problem, the fans were tagged out. Appropriate limiting conditions for operation were entered and exited as required.

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On June 29, 1999, the Cable Spreading Room doors were opened to reduce pressure in the rooms.

**5.0 ADDITIONAL CORRECTIVE ACTIONS**

Accessible MCR pressure boundary penetrations were inspected for leaks. Minor leaks were found and repaired with no appreciable improvement on the Control Room leakage test results. Door seals were inspected and determined not to be the cause of the unsatisfactory test data. Floor drains were verified not to be leaking.

Ventilation systems in the areas adjoining the MCR were balanced and DP tests were performed in order to achieve and verify the TS required DPs. Until the root cause evaluation is completed and additional corrective actions are identified and implemented, the following conservative actions have been taken. The Unit 1 and Unit 2 Cable Vault fans have been tagged out to prevent operation of the fans and the doors between the Cable Spreading Rooms and adjacent MER 1 and 2 have been opened to reduce pressure in the areas. This configuration will be maintained except during testing when administrative controls are in place.

**6.0 ACTIONS TO PREVENT RECURRENCE**

Administrative controls were put in place immediately following the event. These controls were to tag out the Cable Vault Ventilation System and open the doors to the Cable Spreading Room. Leaks were identified and repaired in the MCR envelope and ventilation systems were balanced. These actions will ensure continued compliance with TS requirements and will also prevent recurrence of the event. Additional corrective actions for this event identified through an RCE will be implemented in two phases.

First, Engineering and Operations personnel will receive training on this event stressing the expectations to perform appropriate operability testing prior to return to service of equipment that has been removed from service due to a related TS PT failure. In addition, consideration will be given to enhancing the process for the return of equipment to service for situations like this event. Also, as degraded penetration seals in the MCR envelope are identified they will continue to be repaired.

The second phase of the corrective actions will involve an evaluation of plant modifications that would eliminate the effects of the NSR ventilation fans on the SR MCR envelope during accident conditions. The adequacy of installed pressure differential indicators will be assessed after the evaluation of the modifications.

**7.0 SIMILAR EVENTS**

None

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**8.0 MANUFACTURER/MODEL NUMBER**

N/A

**9.0 ADDITIONAL INFORMATION**

None