

VIRGINIA ELECTRIC AND POWER COMPANY  
RICHMOND, VIRGINIA 23261

April 6, 1978

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Mr. James P. O'Reilly, Director  
Office of Inspection and Enforcement  
U. S. Nuclear Regulatory Commission  
Region II - Suite 818  
230 Peachtree Street, Northwest  
Atlanta, Georgia 30303

Serial No. PO&M/DLB:das  
Docket No. 50-281  
License No. DPA-37

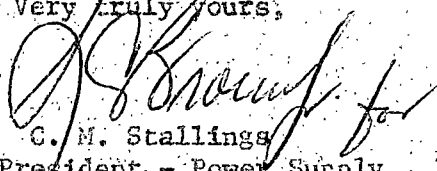
Dear Mr. O'Reilly:

Pursuant to Surry Power Station Technical Specification 6.6.2.a(4), the Virginia Electric and Power Company hereby submits the following Licensee Event Report for Surry Unit No. 2.

LER-78-012/01T-0

This report has been reviewed by the Station Nuclear Safety and Operating Committee and will be placed on the agenda for the next meeting of the System Nuclear Safety and Operating Committee.

Very truly yours,



C. M. Stallings  
Vice President - Power Supply  
and Production Operations

Enclosure (3 copies)

cc: Dr. Ernest Volgenau, Director (40 copies)  
Office of Inspection and Enforcement

Mr. William G. McDonald, Director (3 copies) ✓  
Office of Management Information  
and Program Control

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## Dilution of Reactor Boron Concentration

### 1. Description of the Event

At about 1545, 3-24-78, the Shift Supervisor was advised that Unit 2 Reactor boron concentration was 1259 ppm, a reduction of 113 ppm since the previous day's sample of 1372 ppm. At the time the unit was in cold shutdown, with loops drained and reactor being cooled by the Residual Heat Removal System. This reduction in boron concentration corresponded to an unplanned reactivity addition of more than 0.5%. Since containment integrity was not set, this event is contrary to Technical Specification 3.8.A.5 and is also reportable in accordance with Technical Specification 6.6.2.a(4).

### 2. Probable Consequences of the Event

The health and safety of the general public were not affected by this event since the reactor was at all times greater than 4% shutdown. The event was identified by routine surveillance practices intended in part to detect problems of this nature.

### 3. Cause of the Event

A filter capacitor in the internal power supply of Flow Controller FC-2-114 failed open. This permitted an AC signal to be introduced into the Flow Transmitter loop. The effect of this AC injection was to cause the controller to command the Primary Grade (PG) flow control valve to go full open and deliver about 150 gpm of PG water instead of 100 gpm as demanded by the setpoint control. A secondary effect of the AC injection was to prevent the Dual Comparator YC-2-114 output relays from deenergizing and causing flow deviation alarms. Without the alarms, the operators were not alerted to the excess water flow condition.

Upon identification of the event, a sample of the blender output was taken and analyzed at 1042 ppm. (It should be noted that had the event proceeded undetected for an extended period of time, the reactor would never have been less than about 2.3% shutdown. The required shutdown margin is 1%.)

From a review of logs and process computer alarm printouts, it was judged that the dilution occurred in the period 1600/3-23 to 0540/3-24.

### 4. Immediate Corrective Action

Initial attempts at troubleshooting the PG flow control system were inconclusive but a measure of blend control was achieved by adjusting the water and boric acid setpoints. Detailed troubleshooting identified the faulty controller and it was replaced. Subsequent operation was normal.

### 5. Scheduled Corrective Action

Vendor is being asked to make a design study to determine if hardware changes can be made which would prevent a similar occurrence.

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6. Action Taken to Prevent Recurrence

Current operator observation techniques and existing surveillance programs will suffice to counter a recurrence.

7. Generic Implications

This event is not considered to have generic implication. The failure of the electronic element that caused this event is considered to be a random age failure.