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EVENT DESCRIPTION AND PROBABLE CONSEQUENCES (10)CAUSE DESCRIPTION AND CORRECTIVE ACTIONS (27)

PHONE (804) 357-3184

ATTACHMENT 1  
SURRY POWER STATION, UNIT NO. 2  
DOCKET NO: 50-281  
REPORT NO: 33-032/03T-0  
EVENT DATE: 08-11-83

TITLE OF THE EVENT: STEAM GENERATOR J-TUBES DEGRADATION

1. Description of the Event

With Unit 2 at refueling shutdown, inspection of the feeding in "A" steam generator revealed holes in 7 J-tubes. The diameter of the holes range from 1/8 inch to 1 inch. Westinghouse Technical Bulletin 82-07, dated December 28, 1982, initiated a program of inspection and replacement of J-tubes as a result of previous J-tube thinning observed in both domestic and European plants. This is being reported per T.S.-6.6.2.a.(9).

2. Probable Consequences and Status or Redundant Equipment

In the original steam generator design, the steam generator feeding sprayed water through holes in the bottom of the ring. This arrangement allowed water to drain from the feeding when feeding stopped and the water level was below the feeding. With the feeding drained, a potential for water hammer existed when feeding was resumed. The feeding holes are now located on the top of the feeding limiting the potential for water hammer. To direct feedwater downward, J-tubes were installed on the top of the feeding. The holes observed in the Surry J-tubes at this outage did not affect this design function.

Had the erosion-corrosion process been allowed to continue at Surry 2, the most probable consequence would have been the creation of a loose part which could have entered the downcomer region of the steam generator. The Surry steam generator design incorporates a downcomer resistance plate below the feeding which restricts the downcomer opening to 1-1/2 inches. Existing data would indicate that wall perforations are most likely to occur at the J-tube feeding-weld interface, thus resulting in a loose part approximately the size of a complete J-tube. Since the J-tubes are constructed of 2-1/2 inch diameter schedule 80 pipe, the resistance ring would preclude a J-tube from coming in contact with the tube bundle.

If a piece of J-tube small enough to get through the downcomer resistance ring were produced, its presence would be made immediately known by the loose parts monitor. For these reasons, the health and safety of the public were in no way affected.

3. Cause

Based on the Westinghouse evaluation, J-tube wall thinning is believed to be related to an erosion-corrosion phenomenon based on similar experience at other plants. Westinghouse is preparing a program with Utility Owners Group to investigate the cause of J-tube wall thinning and confirmation of remedial actions.

4. Immediate Corrective Action

All J-tubes in Surry Unit 2 steam generators were inspected. The inspection yielded the following results:

- Generator A: 7 tubes with holes, plus 9 tubes with < 50% nominal wall thickness.
- Generator B: 0 tubes with holes, 7 tubes with < 50% nominal wall thickness.
- Generator C: 1 tube with holes, plus 4 tubes with < 50% nominal wall thickness.

5. Subsequent Corrective Action

The existing J-tubes are made of carbon steel. All unit 2 J-tubes are being replaced with inconel J-tubes which provides a higher resistance to erosion.

6. Action Taken to Prevent Recurrence

Westinghouse is conducting an on-going investigation into the phenomenon of J-tube erosion. The results of this investigation will determine if further actions will be required.

7. Generic Implications

This problem has been experienced at other plants. Unit 1 has operated for less than 18 months since the steam generators were replaced, therefore the unit 1 J-tubes will be inspected during the next refueling outage.

# Vepco

USNRC REGION II  
ATLANTA, GEORGIA

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AUG 25 1983

VIRGINIA ELECTRIC AND POWER COMPANY  
Surry Power Station  
P. O. Box 315  
Surry, Virginia 23883

Serial No: 83-059

Docket No: 50-281

License No: DPR-37

Mr. James P. O'Reilly  
Regional Administrator  
Suite 2900  
101 Marietta Street, NW  
Atlanta, Georgia 30303

Dear Mr. O'Reilly

Pursuant to Surry Power Station Technical Specifications, the Virginia Electric and Power Company hereby submits the following Licensee Event Report for Surry Unit 2.

Report Number

83-032/03T-0

Applicable Technical Specification

T. S. 6.6.2.a(9)

This report has been reviewed by the Station Nuclear Safety and Operating Committee and will be reviewed by Safety Evaluation and Control.

Very truly yours,

*J. L. Wilson*  
J. L. Wilson  
Station Manager

Enclosure

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