VIRGINIA ELECTRIC AND POWER COMPANY
RICHMOND, VIRGINIA 23261

November 26, 1975

Regulatory File Cy.

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Mr. Norman C. Moseley, Director
Office of Inspection and Enforcement
U.S. Nuclear Regulatory Commission
Region II - Suite 818
230 Peachtree Street, Northwest
Atlanta, Georgia 30303

Serial No. 792
PO&M/JTB:nkw

Docket No. 50-280
License No. DPR-32

Dear Mr. Moseley:

The Virginia Electric and Power Company hereby submits forty (40) copies of Special Report No. SR-S1-75-06 describing a recent event which occurred at the Surry Power Station, Unit No. 1.

The substance of this report has been reviewed by both the Station Nuclear Safety and Operating Committee and the System Nuclear Safety and Operating Committee. In addition, the Safety Review Committee of the Westinghouse Electric Corporation has reviewed the matter.

Very truly yours,

C. M. Stallings

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

Enclosure

cc: Mr. Robert W. Reid
39 copies SR-S1-75-06

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SPECIAL REPORT

SR-S1-75-06

STEAM GENERATOR TUBE PULLING ACTIVITIES

NOVEMBER 25, 1975

DOCKET NO. 50-281

LICENSE NO. DPR-32

SURRY POWER STATION

VIRGINIA ELECTRIC AND POWER COMPANY

I. INTRODUCTION

As a part of an investigative program to assist in analyzing generic steam generator tube concerns, a tube was to be cut and removed from the "A" steam generator of Unit No. 1 at the Surry Power Station. During the activities associated with the tube removal on October 21, 1975, equipment failure allowed a steam generator tube to be pulled without being cut prior to pulling. The purpose of this report is to summarize the occurrence and the corrective actions associated therewith.

II. SUMMARY OF OCCURRENCE

A tube sample was being removed from "A" steam generator on October 21, 1975 by representatives of the Westinghouse Electric Corporation. The tube pulling operation consists of the following basic steps:

1. Counterbore the tube end to remove the tube to tube sheet weld.
2. Core drill the tube to relieve the rolled portion.
3. Expand the tube into the sixth support plate.
4. Cut the tube with the I.D. fly cutter just below the sixth support plate.
5. Cut threads into the tube I.D. with tap.
6. Install threaded pulling bar into tube.
7. Extract tube with hydraulic jacking equipment.

Upon completion of the above operations for tube R20C74, it was discovered that the tube was severly distorted and stretched. It appeared that the tube had not been cut, but had been pulled apart.

Subsequent investigation of the incident confirmed that the tube had not been cut, but was pulled apart by the hydraulic jacking mechanism. A

review of the work log indicates the aforementioned steps had been completed. However, it was determined that step number 4, cutting the tube, was not satisfactorily completed.

Following the incident it was determined that one of the extension links which connected the cutting head to the drive assembly had broken. This failure resulted in the rotation of only that portion of the cutter assembly below the broken link. Since the fly cutter is at the top of the assembly, it is postulated that rotation did not occur and the tube was not cut. The Westinghouse representative operating the cutter was not aware of the condition, since the cut is made primarily by "feel" and the extended length of the assembly (about 26 feet) resulted in less sensitivity. The operator assumed the tube had been cut and the operation continued and the tube was extracted with the hydraulic jacking equipment. Sufficient force was applied by the jacking equipment to pull the tube apart.

As a result of the occurrence, an investigation was conducted to determine the cause and consequences of the event. The results of the investigation and corrective actions are summarized below:

1. Tube cutting activities
    a. there was no damage to cutter heads
    b. the linkage was broken on cutter assembly
    c. inspection of the tube indicated it had not been cut
    d. the tube cutting procedure as written was followed.
2. It is believed that the tube parted approximately nine (9) inches above the seventh (top) support plate. The location of the break cannot be measured with precision due to the plastic deformation of the removed segment.
3. The most probable site for damage resulting from the high pulling force would be tube R19C74 which is directly below the broken

tube. An eddy current probe was inserted through the outlet (cold leg) of this tube and pushed through the U-bend around to the straight hot leg. No abnormal signals were observed in tube R19C74. In addition, all the other tubes in column 74 below row 20, as well as columns 73 and 75, were eddy current inspected to the fullest extent possible. There was some interference with the eddy current probe associated with "denting" deformation at support plates on some of these tubes. It is concluded that the load imposed on tube R19C74 during the pulling of tube R20C74 (above it in the U-bend section) did not result in significant deformation. It is considered that the tubes below R19C74 were relatively unaffected if any contact did occur.

4. Tube R19C74 was plugged as a precautionary measure.
5. The remaining portion of tube R20C74 was plugged as well as the tube hole in the tube sheet from which the tube was removed. Tubes surrounding R20C74 were also plugged. Westinghouse advises that the broken end of R20C74 cannot contact other tubes which form a part of the reactor coolant pressure boundary during subsequent operation.
6. The load imparted to the tube sheet during pulling operations was analyzed. The recorded maximum pulling force of 14,115 pounds had no adverse effect on the integrity of the tube sheet or divider plate since the resulting deflections are negligible.
7. To preclude the recurrence of a similar event, the tube pulling procedure has been revised to require that an eddy current inspection be conducted on the tube to be removed to confirm it has been cut.

III. CONCLUSION

Tube R20C74 was pulled apart in the removal operation as a result of an undetected malfunction of the internal tube cutter which failed in a manner which gave the operator a false indication of having cut completely through the tube wall.

The inadvertant pulling of uncut tube R20C74 did not affect the structural integrity of the reactor coolant system pressure boundary in steam generator "A". The plugging of the tubes surrounding R20C74 provides additional assurance that the integrity of the pressure boundary will be maintained. The loss of primary flow area in the tube bundle does not affect the operation of the safety injection system, nor will it interfere with normal operation.

The health and safety of the general public was not affected by the occurrence described herein.