UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II
101 MARIETTA ST., N.W., SUITE 3100
ATLANTA, GEORGIA 30303

Report Nos. 50-338/82-28 and 50-339/82-28

Licensee: Virginia Electric and Power Company
Richmond, VA 23261

Facility Name: North Anna

Docket Nos. 50-338 and 50-339

License Nos. NPF-4 and NPF-7

Inspection at North Anna site near Mineral, VA

Inspector: John W. York — 9/2/82
J. W. York — Date Signed

Approved by: J. J. Blake — 9/2/82
J. J. Blake, Section Chief — Date Signed
Engineering Inspection Branch
Division of Engineering and Technical Programs

SUMMARY

Inspection on August 16-19, 1982

Areas Inspected

This special unannounced inspection involved 22 inspector-hours on site in the areas of thermal sleeve removal, flow splitter removal, reactor coolant loop stop valve guides, cap screw fractures in reactor coolant pump diffuser adapter, and broken control rod guide tube support pins.

Results

In the areas inspected, no violations or deviations were identified.

REPORT DETAILS

1. Persons Contacted

Licensee Employees

R. Cartwright, Station Manager
W. Harrell, Assistant Station Manager
*D. Benson, Superintendent of Operations
*M. Fellows, Staff Assistant to Station Manager
*A. Hogg, Jr., Manager Quality Assurance
*J. Hanson, Jr., Superintendent of Technical Service
*J. Smith, Supervisor, Performance and Test Engineering
*F. Miller, Supervisor Quality Control
*H. Miller, Director of Nuclear Operations Maintenance Support
*J. McAvoy, Senior Staff Engineer
Q. Parker, Engineering Supervisor, Project

Other licensee employees contacted included technicians and office personnel.

NRC Resident Inspector

*D. Johnson
M. Shymlock

*Attended exit interview

2. Exit Interview

The inspection scope and findings were summarized on August 19, 1982, with those persons indicated in paragraph 1 above. The licensee was informed of the inspection findings listed below. The licensee acknowledged the inspection findings with no dissenting comments.

Inspector Followup Item, 338/82-28-01, Failure analysis of reactor coolant loop stop valve guide, paragraph 5.c.

Inspector Followup Item, 338/82-28-02, Failure analysis of cap screws in reactor coolant pump diffuser adapter, paragraph 5.d.

Inspector Followup Item, 338/82-28-03, Failure analysis of control rod guide tube support pins, paragraph 5.e.

3. Licensee Action on Previous Enforcement Matters

Not inspected.

4. Unresolved Items

Unresolved items were not identified during this inspection.

5. Licensee Event Reports (92700)

Currently both Units 1 and 2 at the North Anna site are in an outage. The scheduled return to power dates are August 22 for Unit 2 and early October for Unit 1.

The inspector reviewed the following activities that were being planned or were underway for this outage: (a) thermal sleeve removal, (b) flow splitter removal, (c) reactor coolant loop stop valve guides, (d) cap screw fractures in reactor coolant pump diffuser adapter, and (e) broken control rod guide tube support pins.

a. Removal of Thermal Sleeves - Units 1 and 2

IE Information Notice No. 82-30, "Loss of Thermal Sleeves in Reactor Coolant System Piping at Certain Westinghouse PWR Power Plants," states that Westinghouse has recommended that a nondestructive examination be performed to assess thermal sleeve conditions of affected systems at the next extended plant outage. As a result of this recommendation, the licensee radiographed eleven nozzles in both Unit Nos. 1 and 2 to determine the condition of the thermal sleeves. The results of the radiography for Unit 2 indicated that the following four thermal sleeves had cracked welds or that the sleeve had moved:

- 3 inch diameter charging nozzle in loop B
- 12 inch diameter accumulator discharge nozzle in loop B
- 6 inch diameter safety injection nozzle in loop C
- 12 inch diameter accumulator discharge nozzle in loop C

The last of the four, thermal sleeve removal and repair for Unit 2 (the 12 inch diameter accumulator discharge nozzle for loop C) was completed during this inspection.

For Unit 1, the radiographic inspection indicated that one thermal sleeve had cracked welds and that the thermal sleeve in a 6 inch diameter safety injection nozzle in loop A was not evident on the radiographs. The licensee did not locate the thermal sleeve from the 6 inch line in the reactor vessel and now plans to put a video camera into the pipe to try to locate the part. The licensee stated that plans are still being formulated for thermal sleeve removal for Unit 1.

Within the areas inspected, no violations or deviations were identified.

b. Removal of Flow Splitter - Unit 1

During plant pre-start up at Unit 2 a crack was found in the reactor coolant pump suction elbow flow splitter on one of the loops. The licensee decided to remove the flow splitter from this elbow on all three loops and committed to inspecting and monitoring the flow splitters in Unit 1. As a result of this monitoring program on Unit 1, one side of the flow splitter in the A loop was found to have ultrasonic testing (UT) indications that have increased in length by 15.5 inches from the October 1981 inspection to the June 1982, inspection. There were UT indications of varying degrees along approximately 64 percent of the length of the weld-plate interface.

The licensee has removed the flow splitter plate in loop C using an underwater plasma cutting torch operating on a track. The plate was cut three times along the elbows horizontal direction. The plate was then removed through the disassembled reactor coolant pump. A protrusion of approximately 3 to 3½ inches remained on each side of the elbow after cutting. During this inspection, a milling machine was being set up to mill underwater approximately 1½" from these protrusions. An ultrasonic test will then be performed from the outside diameter of the elbow to assure that all of the defects have been removed. The inspector examined some of the cutting equipment and the setup for the milling operation.

The licensee has decided to remove the flow splitter in loop A and had begun to disassemble the reactor coolant pump on this loop. Using crack growth rate calculations, this loop would limit the operation of Unit 1 to approximately 100 days. The licensee will also remove the flow splitter in loop B if it does not become a critical path item.

Within the areas inspected, no violations or deviations were identified.

c. Reactor Coolant Loop Stop Valve Guides - Unit 1

On July 16, 1982, during disassembly of the cold leg reactor coolant loop stop valve (MOV-1591) on loop A, the licensee discovered that a valve guide was missing. A search inside the reactor vessel with a video camera revealed the two broken parts of the valve guide. One of the parts was approximately 6-inches long and was located at an incore instrumentation guide. The other part was approximately 33-inches long and located on the secondary core support. The inspector reviewed the tapes showing the location of the two parts.

The valve guide is a channel shaped item made from AISI 410 stainless steel with dimensions of 39 inches by 4 inches by 2.5 inches and weighing approximately 58 pounds. The licensee stated that part of the guide length must be removed before the guide can fall into the flow stream, and that a large force is required to break the guide into two

or more pieces. It is postulated that a pin on the bottom of the guide that engages a hole at the bottom of the slot in the body failed and caused the guide to skew. With a skewed valve guide the valve would not completely close or seat and could break the valve guide during the attempted closing. It was documented that this valve was not able to close during a previous outage. This valve guide was replaced and all other valves have been properly cycled. These two pieces of the valve guide will be removed from the reactor vessel. To remove these parts both the upper and lower internals will be removed from the reactor vessel. Westinghouse will perform a fracture analysis on the guide tube. Until the fracture analysis is reviewed by Region II, this will be Inspector Followup Item 338/82-28-01, Failure Analysis of Reactor Coolant Loop Stop Valve Guide.

Within the areas inspected, no violations or deviations were identified.

d. Cap Screw Failures in Reactor Coolant Pump

Diffuser Adapter - Unit 1

During the disassembly of the reactor coolant pump (Model 93A), on loop C, of Unit 1, (for the flow splitter removal operation) 7 out of 12 cap screws holding the diffuser adapter were found to have failed. The failed screws were all from one side of the pump. These screws are one of the following types of stainless steel 302, 304, 305, or 385. The Equipment Specification allows either of the four alloys to be used.

Westinghouse informed the licensee that eight Model 93A with operating experience ranging from one to ten years had been examined after power operation and that no failure of bolting had been noted. Westinghouse also stated that in the unlikely event in which the diffuser adapter bolts should fail and the adapter fall off completely, there would be no loose parts problem in that all of the bolts would be trapped and not get into the flow stream.

The licensee has sent several of these screws to Westinghouse for failure analysis. The licensee has also sent some of these screws to Babcock and Wilcox for an independent failure analysis. Until these failure analyses are reviewed by Region II, this will be Inspector Followup Item 338/82-28-02, Failure Analysis of Cap Screws in Reactor Coolant Pump Diffuser Adapter.

Within the areas inspected, no violations or deviations were identified.

e. Coolant Rod Guide Tube Support Pin Failure - Unit 1

During May 1982, North Anna 1 had a pin failure. The lock nut of a support pin was found in steam generator A and a smaller piece of the support pin was found in steam generator C. Approximately 75 percent of the tube ends sustained some degree of damage. The following options were considered for solving this guide tube pin problem.

- Install a new set of upper internals
- Install new guide tubes
- Replace only the pins

The licensee decided on the option of installing a complete new set of guide tubes.

During this inspection, the task of removing all the guide tubes from the upper internals was completed. As the guide tubes were removed, a video camera was used to determine the approximate condition of the support pins. Of the 56 guide tubes 22 had lower removal torque values, indicating a partially or completely cracked pin. The preliminary results were as follows:

- 17 guide tubes - Pins were missing the lower portion of one pin (shoulder and leaf portion)

- 3 guide tubes - Pins were missing the lower portion of two pins (shoulder and leaf portion)

- 2 guide tubes - One entire pin and nut was missing.

The 17 pins plus the 3 pins had varying degrees of cracking as indicated by varying amounts of brightness on the pin fracture faces. Westinghouse will receive several of these pins (both upper and lower areas) for failure analysis. Until this failure analysis is reviewed by Region II, this will be Inspector Followup Item 338/82-28-03, Failure Analysis of Control Rod Guide Tube Support Pins.

Within the areas inspected, no violations or deviations were identified.