



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

APR 18 1980

Report Nos. 50-327/80-12 and 50-328/80-07

Licensee: Tennessee Valley Authority  
500A Chestnut Street  
Chattanooga, TN 37401

Facility Name: Sequoyah

Docket Nos. 50-327 and 50-328

License Nos. DPR-77 and CPPR-73

Inspection at Sequoyah Nuclear Plant near Chattanooga, Tennessee

Inspector: P. K. VanDoorn 4/15/80  
P. K. VanDoorn Date Signed

Accompanying Personnel: L. D. Zajac (Training)

Approved by: A. R. Herdt 4/17/80  
A. R. Herdt, Section Chief, RCES Branch Date Signed

SUMMARY

Inspection on March 17-20, 1980

Areas Inspected

This special, announced inspection involved 62 inspector-hours on site in the areas of preservice inspection (Unit 2) and review of actions taken to assure soundness of the pressurizer relief pipe (Unit 1).

Results

Of the two areas inspected, no items of noncompliance or deviations were identified.

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## DETAILS

### 1. Persons Contacted

#### Licensee Employees

W. F. Popp, Assistant Plant Superintendent  
\*T. B. Northern, Jr., Construction Engineer  
\*L. W. Jones, Supervisor, Mechanical & Welding Inspection Unit  
\*L. McCloud, Nuclear Power QA Supervisor  
\*J. M. Munns, Construction QA Supervisor  
P. Guthrie, Singleton Laboratory Metallurgist  
C. R. Brimer, Outage Director  
\*K. G. Galloway, Radiographer  
E. A. Merrick, ENDES Metallurgical Engineer  
W. J. Glasser, Office of Power QA Coordinator  
J. H. Fox, Power Production Metallurgist  
\*J. Lewis, Mechanical Engineer  
J. R. Haueter, Welding Engineer

Other licensee employees contacted included three construction craftsmen and four technicians.

#### NRC Resident Inspector

\*S. D. Butler

\*Attended exit interview

### 2. Exit Interview

The inspection scope and findings were summarized on March 20, 1980 with those persons indicated in Paragraph 1 above.

### 3. Licensee Action on Previous Inspection Findings

Not inspected.

### 4. Unresolved Items

Unresolved items are matters about which more information is required to determine whether they are acceptable or may involve noncompliance or deviations. One new unresolved item identified during this inspection is discussed in paragraph 5.b.

### 5. Independent Inspection Effort (Unit 2)

- a. The inspectors reviewed portions of the preservice inspection program (Surveillance Instruction No. 114) and piping angle beam ultrasonic test (UT) Procedure No. UT-1 being employed by TVA. The inspectors observed 45-degree UT inspection of weld No. RHRS-183 for conformance

to program/procedure requirements. Note: Calibration check performed after this inspection was unsuccessful and, therefore, TVA indicated that inspection of this weld would be redone.

- b. On March 20, 1980 the inspectors noticed a carbon steel pipe within the Unit 2 containment which had a series of discoloration spots due to application of a flame heat source. The flame heat had apparently been used to assist in bending the pipe. The pipe was marked as No. 47W-450-288, Ht. N37511. It was not determined during this inspection if a site requirement had been violated. Until it can be determined if this item is in noncompliance this will be unresolved Item No. 50-328/80-07-01 - Use of Flame Heat for Pipe Bending.

No items of noncompliance or deviations were identified.

6. Review of Actions Concerning Soundness of Pressurizer Relief Line (Unit 1)

- a. In May 1979, the Unit 1 pressurizer relief line (6-inch stainless steel pipe) was deformed during hot functional testing of the reactor coolant system. Deformation was corrected by use of a weld draw bead technique. (Previous documentation is provided in RII Report Nos. 50-327/79-36, 50-327/79-72 and 50-327/80-02). By NRC letter, TVA has been granted relief from post weld re-hydro testing of the pressurizer relief line based on TVA's contention that full penetration had not been achieved during realignment welding. This inspection was conducted to further verify that full penetration was not achieved.
- b. Based on a March 13 meeting between TVA and NRC, Office of Nuclear Reactor Regulation (NRR), TVA performed in place metallographic analysis of the weld heat affected zones (HAZ) of the two groove welds which had been utilized by TVA to affect the line repair. Six HAZ areas were polished utilizing portable field polishing equipment. These areas were electrolytically etched using 10% oxalic acid solution similar to Method A of ASTM A262. This is a standard method to determine whether carbide precipitation (called sensitization) has taken place at the material grain boundaries. The areas were observed at magnifications up to 400X using a portable field metallurgical microscope. The inspectors observed this field metallurgical work in its entirety, including observation of the areas through the microscope. Only slight intermittent ditching was noted in only several grains of hundreds of grains observed under the microscope. The material was therefore considered to be nonsensitized. The lack of a band of sensitization prevented determination of the HAZ width. Also noted was a very small grain size in comparison with grain size of a mockup which had been previously welded by TVA to gather data for this repair. It is generally considered that smaller grain size imparts improved resistance to intergranular carbide precipitation. The inspector requested that the portable polishing equipment be utilized on the TVA mockup which contained a known degree of sensitization in order to show that the equipment was capable of providing an adequate metallurgical polish. TVA verbally reported to the inspector that the carbide

precipitation was easily detected on the mockup after using the portable polishing equipment. A report of the above metallurgical results will be forwarded to NRC:NRR by TVA with a copy to NRC:IE:RII.

- c. In order to determine the remaining wall thickness which was present when field welding was performed, the inspector reviewed weld documentation, interviewed the welder and steam fitter (grinder) who performed the field work (Note: TVA indicated verbally that the welder performing the field weld also welded the mockup using the same welding procedure), and observed ultrasonic inspection (UT) of the pipe material for wall thickness determination. Weld documentation required a limit of 1/2-inch grinding depth, however, actual field depth was not recorded using a calibrated measuring device. UT of the pipe showed the material to be greater than 3/4-inch thick except one small area which had a minimum wall thickness of 0.695-inch (minimum allowable pipe wall is 0.629).

Craft personnel indicated verbally that, due to the methods of controlling grinding depth in the field, the groove depth could have been as deep as 9/16-inch. A 9/16-inch (0.562-inch) depth would have resulted in a minimum remaining wall thickness of 0.133-inch in a small area. The welder indicated that he was extremely careful via welding technique and utilization of low amperage, not to penetrate the pipe wall during welding.

- d. The inspector reviewed pipe base material (6-inch schedule 160 AISI Type 316 stainless steel) certification including chemistry and heat treatment records. These records were satisfactory.
- e. The inspectors reviewed radiographic (RT) film for the field welds. Radiography had been performed prior to flush grinding of the field welds in accordance with the applicable code at Sequoyah which is the ANSI Standard B31.7, 1969 Edition plus addenda through 1970. For this RT the above Code required a No. 12 penetrometer with 2T sensitivity or alternately a No. 10 or smaller penetrometer with ability to detect a 0.010-inch slot. The No. 10 penetrometer technique had been chosen. The inspectors considered the technique used by TVA to be less sensitive than the alternate technique. Based on this and the fact that improved sensitivity would also be realized due to the welds having been flush ground since original RT, the inspectors requested TVA to RT the field welds using a No. 12 penetrometer and obtain 2T sensitivity. The inspectors also requested that sections of No. 5, 7 and 10 penetrameters be placed on the pipe during the RT for additional information. This RT was accomplished and the resultant RT film was reviewed independently by each of the two NRC inspectors. The 2T sensitivity level had been obtained and the additional sections of penetrameters were visible. No weld melt-thru areas or defects were noted.

- f. Based on the results of the above inspections and previous data submitted to NRC by TVA it is the inspector's evaluation that full penetration (i.e., melting of the internal surface during welding) was not achieved during the welding performed to realign the Sequoyah Unit 1 pressurizer relief line.

No items of noncompliance or deviations were identified.