



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

Report Nos. 50-327/81-12 and 50-328/81-09

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

Facility Name: Sequoyah Nuclear Plant 1 and 2

Docket Nos. 50-327 and 50-328

License Nos. DPR-77 and CPPR-73

Inspection at Sequoyah site near Chattanooga, Tennessee

Inspector: *S. D. Butler*  
S. D. Butler, Resident Inspector

3/20/81  
Date Signed

Approved by: *D. R. Quick*  
D. Quick, Section Chief, RRPI Section 1A

3/25/81  
Date Signed

SUMMARY

Inspection on February 1 - March 5, 1981

Areas Inspected

This routine unannounced inspection involved 133 inspector-hours on site in the areas of Operational Safety Verification, Incident Response and Followup, Unit 2 Preoperational Testing and Completion Status and Independent Inspection Effort.

Results

Of the four areas inspected, no violations or deviations were identified in three areas; one violation was found in one area (Violation - Failure to properly maintain and verify containment integrity (327/81-12-01) (paragraph 7)).

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## DETAILS

### 1. Persons Contacted

#### Licensee Employees

J. M. Ballentine, Plant Superintendent  
C. E. Cantrell, Assistant Plant Superintendent  
W. T. Cottle, Assistant Plant Superintendent  
J. W. Doty, Maintenance Supervisor (M)  
J. M. McGriff, Assistant Plant Superintendent  
B. M. Patterson, Maintenance Supervisor (I)  
W. A. Watson, Maintenance Supervisor (E)  
D. J. Record, Operations Supervisor  
W. H. Kinsey, Results Supervisor  
R. J. Kitts, Health Physics Supervisor  
C. R. Brimer, Outage Director  
R. S. Kaplan, Supervisor, Public Safety Services  
W. M. Halley, Preoperational Test Supervisor  
D. U. McCloud, Quality Assurance Supervisor

Other licensee employees contacted included construction craftsmen, technicians, operators, shift engineers, security force members, engineers, maintenance personnel, contractor personnel, and corporate office personnel.

#### Other Organizations

Eleven NRC Region II Inspectors  
Six NRC Headquarters Personnel

### 2. Exit Interviews

The inspection scope and findings were summarized with the Plant Superintendent and/or members of his staff on February 3, 1981 and February 26, 1981. The violation was discussed with the Assistant Plant Superintendent on February 26, 1981.

### 3. Licensee Action on Previous Inspection Findings

Not inspected.

### 4. Unresolved Items

Unresolved items were not identified during this inspection.

## 5. Operational Safety Verification

The inspector toured various areas of Unit 1 on a routine basis throughout the reporting period. The following activities were reviewed/verified:

- a. Adherence to limiting conditions for operation which were directly observable from the control room panels.
- b. Control board instrumentation and recorder traces.
- c. Proper control room and shift manning.
- d. The use of approved operation procedures.
- e. Unit operator and shift engineer logs.
- f. General shift operating practices.
- g. Housekeeping practices.
- h. Fire protection measures for hot work.
- i. Posting of hold tags, caution tags and temporary alteration tags.
- j. Measures to exclude foreign materials from entry into clean systems.
- k. Personnel, package, and vehicle access control for the Unit 1 protected area.
- l. General shift security practices on post manning, vital area access control and security force response to alarms.
- m. Surveillance testing in progress.
- n. Maintenance activities in progress.

During the reporting period, the licensee experienced malfunctions of the Electric-Hydraulic Turbine Control (EHC) system for Unit 1. The malfunction appeared to be caused by electrical noise and resulted in loadswings which caused the Unit to trip. The inspector followed the licensee's troubleshooting and corrective action. The licensee had identified and corrected several sources of electrical noise which could have caused the erratic operation of the EHC system. However, the licensee was unable to verify the adequacy of their corrective action due to a forced unit outage on February 5, 1981 to correct a vibration problem with the main generator exciter shaft. The inspector will continue to follow the resolution of the EHC problem during subsequent unit operation.

On February 16, 1981, the inspector was informed of a malfunction of Unit 1 common annunciator systems which rendered them inoperable for approximately one hour. The Nuclear Regulatory Commission was properly notified per 10 CFR 50.72 and the licensee posted additional operations personnel on the control panels to monitor plant parameters and on the plant computer alarm printer which remained functional. The unit was in cold shutdown at the time of the occurrence. The problem was isolated to a Unit 2 radiation monitor which had just been energized. Subsequent investigation revealed that there had been a wiring error in the monitor that caused the alarm circuit to be energized with 120 volt alternating current and resulted in the annunciator system malfunction. This improper wiring of radiation monitors will be carried as open item 328/81-09-01 and reviewed in a subsequent inspection. The licensee is presently establishing formal procedures to deal with annunciator malfunctions and evaluating design changes to reduce the impact of system malfunctions on the overall annunciator systems.

On February 27, 1981, the Nuclear Regulatory Commission was notified of a design deficiency identified during Unit 2 preoperational testing at Sequoyah. Various control circuits are designed with indicating fuses which when blown, will energize an alarm relay and annunciator in the control room indicating that the fuse has blown. However, the circuits were designed such that the alarm circuit could also energize the control loop and cause the affected component to actuate. Unit 1 was evaluated and it was determined that the deficiency also existed for the operating unit. A temporary modification was performed on the affected circuits removing the alarm relay to preclude this problem until a permanent modification can be completed. This will be carried as open items 327/81-12-02 and 328/81-09-02 until permanent modifications are completed on the affected control loops for both units.

During the reporting period the inspector followed the periodic ice weighing surveillance required for the Unit 1 ice condenser. The initial weighing of ice baskets revealed the need to add ice to various locations in the ice condenser. Subsequent reweighing has indicated a few minor deficiencies in ice weight. However, based on a technical specification change received from the Office of Nuclear Reactor Regulation on March 4, 1981, reducing the required ice mass, the licensee has satisfied the requirements for ice mass in the Unit 1 ice condenser. The request for the technical specification change was based on a reanalysis of the minimum required ice mass previously performed by the designer of the ice condenser.

No violations or deviations were identified.

#### 6. Incident Response and Followup

On February 11, 1981, the inspector was notified by the licensee that the Unit 1 containment had been inadvertently sprayed with approximately 105,000 gallons of water due to an error in valve manipulation on the backup Residual Heat Removal spray system. The inspector traveled to the plant

site immediately following the event. The licensee had already established communications with the Nuclear Regulatory Commission Incident Response Center and Region II management personnel. The cause of the inadvertent spray had been corrected and assessment of the event was in progress. The inspector discussed the incident with plant management and operations personnel on duty at the time. The plant was verified to be in a stable condition. The inspector entered the Unit 1 containment with members of the plant staff to further assess plant conditions. Subsequent to the incident, the inspector participated in inspections by Region II inspectors and management personnel to determine the exact details of the incident and the underlying causes. Details of these inspections and the resultant findings are in report 50-327/81-07.

As a result of Region II findings, a Confirmation of Action letter was issued on February 23, 1981, which outlined the licensee's required actions prior to restart of Unit 1. The licensee met with Region II management on February 27, 1981 in Atlanta, Georgia to discuss their response to the items required to be addressed in the Confirmation of Action letter.

Subsequent to finalization of the licensee's corrective actions, the inspector reviewed them for adequacy and implementation. The following documents were reviewed and discussed with plant staff:

- a. Administrative Instruction AI-2 "Authorities and Responsibilities for Safe Operation and Shutdown"
- b. Administrative Instruction AI-30 "Nuclear Plant Method of Operation"
- c. OSLT-14 "Non-Licensed Operator Breakin Training (Interim)"
- d. OSLA-58 "Maintaining Cognizance of Operational Status"
- e. OSLA-99 "Assistant Unit Operator (AUO) Duty Locations and Responsibilities"
- f. OSLA-98 "Discipline of Operations"

In addition, the inspector attended several training sessions with operations personnel covering the above subjects. The operating staff has reviewed the qualifications and experience of all non-licensed operators and compiled a list to ensure that only qualified personnel are assigned to duty stations until the entire non-licensed staff can receive the necessary on-the-job training and certification. Other related matters discussed with plant management were: revised operating staff structure to aid in better controlling plant activities; improved maintenance program for in-plant phone systems and the purchase of additional hand-held radios for use by operations personnel; improved methods for control of plant status; and a general upgrading of control room professionalism and work environment. The

inspector discussed these matters with various members of the operating staff to gain their impressions and will continue to observe for implementation during plant operation. The inspector relayed his findings to Region II management.

The inspector has reviewed copies of Special Maintenance Instructions SMI-1-317-20 and SMI-1-317-21 which cover decontamination, cleanup and checkout of the Unit 1 containment, electrical equipment and instrumentation. The recovery effort was also discussed with the Outage Director and Instrument Supervisor. No major equipment damage was apparent during the recovery. The inspector's review revealed several pump motors in the containment raceway that were not covered by the recovery procedures. They were subsequently checked by the licensee.

#### 7. Unit 2 Preoperational Testing and Completion Status

During the reporting period the inspector reviewed the licensee's preparations for performing the Unit 2 Containment Integrated Leak Rate Test (CILRT). The test procedure TVA-2 was reviewed and discussed with various test personnel. The inspector reviewed the valve lineups for approximately fifteen penetrations and compared them to system drawings to determine if 10 CFR 50, Appendix J, requirements were being met. The inspector determined that penetration X-76 for the service air system would not be vented to the containment atmosphere during the CILRT as required by 10 CFR 50, Appendix J, paragraph III.A.1.(d). This was brought to the attention of the licensee and a change was implemented to properly vent the system. The inspector physically checked valve positions during preliminary valve alignments and found several discrepancies. Test personnel were informed of these discrepancies and a complete reverification of valve position was performed prior to signoff in the official procedure. The actual CILRT was witnessed by a Region II containment testing specialist and is covered in report 50-328/81-05.

During drawing reviews for the Unit 2 CILRT the inspector noted a discrepancy in drawing 47W846-2 for the service air system which affected Unit 1 containment penetration isolation. Valve 1-33-704, the inside containment isolation valve for Unit 1, was shown to be normally open. 10 CFR 50, Appendix A, Criterion 56, requires systems of this type to be isolated by locked shut manual isolation valves inside and outside containment if they are not automatically isolated during an accident. Unit 1 procedures were reviewed to determine if valve 1-33-704 was included for containment integrity valve alignment or periodic alignment checks as required by Technical Specification 3.6.1.1. It was not, but valve 1-33-740, the outside isolation valve, was included. The inspector notified licensee personnel of this finding. Licensee personnel took immediate steps to include valve 1-33-740 in their containment integrity valve alignment. The unit was in cold shutdown, which does not require containment integrity. Subsequent investigation revealed that a design change, implemented prior to Unit 1 licensing, has changed valve 1-33-740 from a check valve to a manual isolation valve. A drawing change showed the change to a manual valve but failed to indicate that the valve should be shut during normal operation.

The requirement was overlooked by plant operating personnel when the drawing was reviewed for containment integrity valve alignment. According to personnel questioned the valve remained normally open. In addition to adding valve 1-33-704 to containment integrity procedures the licensee is reviewing other containment penetrations to ensure a similar problem does not exist. Failure to properly establish and periodically verify containment integrity is a violation of Technical Specification 3.6.1.1 and is covered in the attached Notice of Violation (327/81-12-01).

During the reporting period, the inspector began a review of the inspection status of the remaining open items to be resolved, and testing to be completed prior to licensing for the Unit 2. This review will be documented in a letter from Region II to Nuclear Regulatory Commission Headquarters. This review will be an ongoing process as Unit 2 nears its scheduled completion date and the status letter will be periodically updated to reflect changes in status.

No other violations or deviations were identified.

#### 8. Independent Inspection Effort

The inspector routinely attended the morning scheduling and staff meetings during the reporting period. These meetings provide a daily status report on the operational and testing activities in progress as well as a discussion of significant problems or incidents associated with the start-up and operational testing and operations effort.

On February 2, 1981, an NRC inspector from the the Nuclear Regulatory Commission, Office of Nuclear Material Safety and Safeguards, was onsite to tour the low level waste storage facility presently under construction at Sequoyah. The inspector also attended a public meeting held in Chattanooga, Tennessee concerning the storage of low level waste at the plant site.

On January 29, 1981, the licensee notified the Nuclear Regulatory Commission in writing of a potential problem with cooling flow reduction to safety related components due to internal corrosion of the carbon steel piping of the Essential Raw Cooling Water (ERCW) system. The licensee has experienced this problem at some of its other plants and presently has a program to study the effect of the corrosion. In order to monitor the problem at Sequoyah and prevent its adverse impact on the operating unit, on April 15, 1981, the licensee committed to institute a program at Sequoyah to periodically monitor flow to safety related equipment and visually inspect selected locations in the ERCW system for unusual buildup of corrosion products. The inspector attended discussions with plant staff on the installation of spool pieces at various locations in the ERCW system and viewed photographs of the pipe sections cut open for installation of spool pieces. There did not appear to be any significant constriction shown on the photographs. A Region II metallurgist was briefed on the licensee's proposed program and will be kept informed. The inspector will continue to follow the licensee's corrosion monitoring program as it is implemented.

The inspector reviewed the licensee plans to make various modifications to its Class 1E electrical distribution system to mitigate a potential low voltage situation which could arise in the event of a loss of offsite power. The modifications consist of the installation of a degraded voltage relay in the 6900 volt shutdown boards. The modifications will enhance sensitivity by causing transfer of the boards to their alternate supply breaker or the diesel generator with a smaller reduction in system voltage. Secondly the loads supplied from the 480 volt shutdown boards would be split with part of the loads supplied normally from the backup transformers to reduce voltage drop across each transformer and finally, current limiting reactors would be removed from the 480 volt shutdown boards to again limit voltage drop to the supplied loads. The licensee completed the modifications during a recent outage with exception of the load split of the 480 volt shutdown boards. This modification is still under review since it is believed that it could cause an unacceptable loss of operating flexibility.

On February 10, 1981, members from the Nuclear Regulatory Commission Incident Response Center and Telecommunications Section toured the plant site to review incident response facilities and communications systems at Sequoyah.

On February 25, 1981, two members of the Office of Policy Evaluation were onsite to review the design and layout of the licensee's hydrogen ignitor system installed to prevent the buildup of hydrogen in the containment following an accident.

On February 27, 1981, the inspector attended meetings in the Region II office with licensee personnel. The meetings involved a general familiarization with licensee corporate structure for Region II personnel and an enforcement meeting with licensee management concerning the recent inadvertent spray of the Unit 1 containment.

No violations or deviations were identified.