



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

Report Nos.: 50-327/84-35 and 50-328/84-35

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

Docket Nos.: 50-327 and 50-328

License Nos.: DPR-77 and DP-79

Inspection at: The Sequoyah Site near Soddy-Daisy, TN

Facility Name: Sequoyah 1 and 2

Inspection Conducted: November 6 - December 5, 1984

Inspectors:	<u><i>A. J. Sgnatonis</i></u>	<u>12/21/84</u>
for E. Ford		Date Signed
	<u><i>A. J. Sgnatonis</i></u>	<u>12/21/84</u>
for W. Holland		Date Signed
Approved by:	<u><i>S. Weise</i></u>	<u>12/21/84</u>
	S. Weise, Section Chief	Date Signed
	Division of Reactor Projects	

SUMMARY

Scope: This routine inspection involved 121 resident inspector-hours onsite in the areas of plant tour, technical specification compliance, operations performance, housekeeping, radiation control activities, surveillance activities, maintenance activities, quality assurance practices, site security, post-outage containment closeout, cold weather preparations, LER follow-up, modifications and independent inspection.

Results: One violation was identified - inadequate valve lineup.

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REPORT DETAILS

1. Licensee Employees Contacted

- **P. R. Wallace, Plant Manager
- *L. M. Nobles, Operations and Engineering Superintendent
- J. B. Krell, Maintenance Superintendent
- M. R. Harding, Engineering Group Supervisor
- *J. M. Anthony, Operations Group Supervisor
- *D. C. Craven, Maintenance Supervisor (E)
- D. H. Tullis, Maintenance Supervisor (M)
- *B. M. Patterson, Maintenance Supervisor (I)
- R. W. Fortenberry, Engineering Section Supervisor
- J. R. Walker, Assistant Operations Group Supervisor
- G. G. Wilson, Assistant Operations Group Supervisor
- D. E. Crawley, Health Physics Supervisor
- J. T. Crittenden, Public Safety Service Supervisor
- J. L. Hamilton, Quality Engineering Supervisor
- R. E. Alsup, Compliance Supervisor
- W. M. Halley, Preoperational Test Supervisor
- **G. B. Kirk, Compliance Engineer

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

*Attended exit interview November 16, 1984

**Attended exit interview December 11, 1984

2. Exit Interview

The inspection scope and findings were summarized with the Plant Manager and members of his staff on November 16 and December 11, 1984. A violation described in paragraph 5.b, inadequate procedures for valve lineup, was discussed in detail. The licensee acknowledged the violation and took no exception. Frequent discussions were held with the Plant Manager and his assistants concerning inspection findings. At no time during the inspection was written material provided to the licensee by the inspector.

3. Licensee Action on Previous Enforcement Matters

- a. (Closed) Violation 327/84-20-01, Failure to have adequate procedures for air compressor maintenance. The inspector reviewed TVA's response letter dated November 9, 1984, and their corrective actions. A PORC-approved maintenance instruction (MI-10.36) was established for maintenance work on the auxiliary air compressors. The inspector reviewed Maintenance Instruction MI-10.36, Auxiliary Control Air Compressor

Rebuild, Rev. 0, dated September 17, 1984, and noted that the procedure required proper removal from and return to service, use of a maintenance request, appropriate QC hold points, and post maintenance testing per Surveillance Instruction, SI-689 Auxiliary Control Air Operability Test. Corrective action appeared acceptable. This item is closed.

- b. (Closed) Violation 50-327/84-25-01 and 50-328/84-25-01, Loss of ABSCE integrity affecting ABGTS operation. The inspector reviewed TVA's response letter dated November 23, 1984, and Technical Instruction TI-77 for breaching the shield building ABSCE or control building boundaries, Rev. 2, and verified during plant tours that ABSCE doors had been appropriately labeled in accordance with the stated corrective actions. Corrective actions appeared acceptable, and this item is closed.
- c. (Closed) Violation 50-328/84-25-03, Failure to follow ISI procedure on RHR test. The inspector reviewed TVA's response letter dated November 23, 1984, and their corrective actions. Corrective action appeared acceptable, and this item is closed.
- d. (Closed) Violation 50-328/84-21-03, Failure to make 50.72 report on RHR. The inspector reviewed TVA's response letter dated November 9, 1984. Corrective actions taken appear to be adequate to prevent recurrence; this item is closed.

4. Unresolved Items

Unresolved items were not identified during this inspection.

5. Plant Tour (71707/71710/92706/71711)

- a. The inspector conducted plant tours periodically during the inspection interval to verify that monitoring equipment was recording as required, equipment was properly tagged, operations personnel were aware of plant conditions, and plant housekeeping efforts were adequate. The inspector determined that appropriate radiation controls were properly established, excess equipment or material was stored properly, and combustible material was disposed of expeditiously. During tours, the inspector looked for the existence of unusual fluid leaks, excessive piping and equipment vibrations, pipe hanger and seismic restraint abnormal settings, various valve and breaker positions, equipment clearance tags and component status, and instrument calibration dates. Some tours were conducted on backshifts. The inspector performed accessible major electrical and flowpath valve lineup verifications and system status checks on the following Unit 1 systems:

- (1) Containment Spray System
- (2) Residual Heat Removal System
- (3) Safety Injection System
- (4) Centrifugal Charging System

- (5) Turbine Driven Auxiliary Feedwater
- (6) Motor Driven Auxiliary Feedwater
- (7) Component Cooling System
- (8) Auxiliary Control Air System (Units 1 and 2)
- (9) Essential Raw Cooling Water System
- (10) 120 VAC Vital Plant Control Power System (Units 1 and 2)
- (11) 120 VDC Vital Plant Control Power System (Units 1 and 2)
- (12) Condensate Storage Tank (Supply and Return)
- (13) 6900 VAC and 480 VAC Shutdown Boards

No violations or deviations were identified.

- b. On December 1, 1984, the inspector conducted a detailed walkdown of the accessible portions of the Unit 2 Cold Leg Accumulator (CLA) system. The inspector reviewed the following documents:

- System Operating Instruction, SOI 63.1A, Rev. 30 Cold Leg Injection Accumulator
- SOI 63.1, Valve Checklists 63.1A-1 thru 63.1A-6, Rev. 26
- SOI 63.1, Power Availability Checklist 63.1A-1 thru 63.1A-9, Rev. 26
- Flow Diagram, Safety Injection System, 47W811-1, Rev. 23
- Flow Diagram, Waste Disposal System, 47W830-6, Rev. 27

The inspection was conducted to confirm that procedural valve lineups and drawings matched as-built configurations, to identify potential system degradation, to verify that valves were in proper positions and locked if appropriate, and to verify that instrumentation was valved in.

The following deficiencies were identified:

- (1) Valve Checklist 63.1A-3, failed to include valve 63-36A, a root valve for level transmitter LT 63-81.
- (2) Valve Checklist 63.1A-4, failed to include valve 63-366A, a root valve for level transmitter LT 63-60.

The inspector noted that the instrument valves were properly aligned. The licensee, when informed of the procedural discrepancy on December 1, 1984 by the inspector, took immediate action to verify that both units were properly aligned and initiated action to revise their procedures. The inspector noted that had the level transmitters (one of two on two CLAs) been isolated, it could have been identified by channel comparison.

Failure to establish an adequate valve lineup for the CLA valves is a violation (327,328/84-35-01).

6. Technical Specification Compliance (71707/61726/92706)

- a. During this reporting interval, the inspector verified compliance with selected limiting conditions for operation (LCO) and reviewed results of selected surveillance tests. These verifications were accomplished by direct observation of monitoring instrumentation, valve positions, switch positions, and review of completed logs and records. The licensee's compliance with selected LCO action statements were reviewed as they happened.
- b. The inspector reviewed Section 3/4.2, Power Distribution Limits, of the Technical Specifications (TS) for Units 1 and 2 and FSAR Sections 4.3 and 4.4 to determine if Surveillance Requirements (SR) were addressed by appropriate Surveillance Instructions (SI). The inspector determined that the below listed SIs appeared to properly address the listed TS SR's:

Technical Specification SR No.	SI	Title
4.2.1.1	44	Axial Flux Difference
4.2.2.2	126	Hot Channel Factor Determination
4.2.3.2	126	Hot Channel Factor Determination
	223	Overpower Trip Bistable Adjustment for RCS Flow and R
4.2.3.3	2	Shift Log
4.2.3.4	246	Calibration Procedure for RC Flow Transmitter
4.2.3.5	155	Reactor Coolant Flow Verification
4.2.4.1	133	Quadrant Power Tilt Ratio
4.2.4.2	178	Moveable Detector Determination of QPTR
4.2.5	2	Shift Log

No violations or deviations were identified.

7. Plant Operations Review (71706/61726/62703)

- a. The inspector periodically during the inspection interval reviewed shift logs and operations records, including data sheets, instrument traces, and records of equipment malfunctions. This review included control room logs, auxiliary logs, operating orders, standing orders, jumper logs and equipment tagout records. The inspector routinely observed operator alertness and demeanor during plant tours. During abnormal events, operator performance and response actions were observed and evaluated. The inspector conducted random off-hours

inspections during the reporting interval to assure that operations and security remained at an acceptable level. Shift turnovers were observed to verify that they were conducted in accordance with approved licensee procedures.

- b. On December 1, 1984, the inspector observed ongoing work on the reactor coolant drain tank pump 2B. The activity was discussed with the craft personnel performing the work and a QA inspector providing QA coverage for the electrical activities. The inspector noted that required tools were available, applicable portions of required procedures were present and utilized, personnel seemed knowledgeable, and the work was properly authorized. The inspector noted the work was in a high radiation zone in addition to being a contaminated area. The work area had proper radiological posting, and protective clothing requirements were met. The inspector independently measured the radiation field at various points in and around the work area and determined it was as posted. The following documents were reviewed:
- Maintenance Request, MR-A-294489, dated 11/5/84
 - Modifications and Additions Instruction, M&AI-12 Interconnecting Cable Termination and Insulation Inspection, Rev. 7

No violations or deviations were identified.

8. Physical Protection (71707)

The inspector verified by observation and interview during the reporting interval that measures taken to assure to physical protection of the facility met current requirements. Areas inspected included the organization of the security force, the establishment and maintenance of gates, doors and isolation zones in the proper condition, that access control and badging was proper, that search practices were appropriate, and that escorting and communications procedures were followed. No violations or deviations were identified.

9. Unit 2 Containment Closeout (71711)

On December 1, 1984, following the refueling outage for cycle 2, the inspectors performed a preliminary close out inspection of Unit 2 lower containment. Areas inspected included inside the crane wall, the raceway, the containment fan rooms, and the cold leg accumulator rooms. This closeout inspection emphasized post-outage housekeeping and debris removal. The FSAR safety analysis assumes a predetermined water flow to the containment sump. Debris in containment has the potential to clog the sump screens during an accident condition and obstruct the assumed flow. The inspectors checked the containment floor, upper and lower reactor coolant pump platforms, upper and lower steam generator platforms, all ledges and flat surfaces associated

with HVAC ductwork, ice condenser inlet doors, reactor vessel enclosure and other potential debris areas. Containment sump screens and covers were in place and all areas were free of debris with the exception of several yellow-poly bags which were being utilized by maintenance personnel. It was noted by the inspector that the licensee has not yet performed their final close-out inspection and this material is allowable until that time. The inspectors noted that some containment floor drains (not part of the safety-related sump system) were partially obstructed by small items of debris, and the licensee corrected the condition.

The inspectors noted the refueling cavity drain plugs had been removed and the vortex eliminators were in place. These items are necessary to provide an upper containment spray water pathway to lower containment. This inspection will be concluded after the licensee completes their final close-out inspection and enters mode 4. The inspectors assessed the overall state of cleanliness as very good for those areas inspected thus far.

No violations or deviations were identified.

10. Cold Weather Preparations (71714)

During this reporting period the inspector reviewed the licensee's program of protective measures for extreme cold weather. General Operating Instruction, GOI-6, Apparatus Operation (Rev. 26), contains a subsection GOI-6H, Freeze Protection (Rev. 22) which provides a freeze protection checklist to identify equipment and/or areas needing freeze protection, identifies the means of protection, and provides surveillance requirements to ensure operability during the months needed. After initial checkout on November 1, the checklist is completed once per week until March 15. The inspector held discussions with the Shift Engineer and Operations Supervisor regarding the means of scheduling and implementation of the surveillances. During tours the inspector verified the presence and operability of heat tracing and protective insulation. The inspector verified that the plant's daily schedule for shift priority work items included a requirement for the Operations staff to perform the freeze protection checklist. To date, no instances of freezing sense lines have occurred, and no violations or deviations were identified.

11. Licensee Event Report (LER) Followup (92700)

- a. The inspector reviewed the following LER's to verify that the report details met requirements, identified the cause of the event, described appropriate corrective actions, adequately assessed the event, and addressed any generic implications. Corrective action and appropriate licensee review of the below events were verified. When licensee identified violations were noted, they were reviewed in accordance with the enforcement policy. The following LERs are closed.

<u>LER</u>	<u>EVENT</u>
327/84-08	Auxiliary Building Isolation
327/84-09	Containment Isolation
327/84-28	Auxiliary Building Isolation
327/84-53	Auxiliary Building Boundary Door Breached
327/84-55	Auxiliary Building Boundary Door Breached
328/83-144	Power Range Neutron Flux Channel Out of Calibration
328/83-146	Pressurizer Level Channels Out of Calibration
328/83-148	Condenser Vacuum Exhaust Flow Monitor Failed High
328/84-07	Undervoltage Timing Relay Failure

- b. Several LER's have been issued in 1984 under the new reporting criteria involving auxiliary building ventilation isolations (ABI), containment building ventilation isolations (CVI) and the control room ventilation isolations (CRI) due to spurious radiation monitor spiking related to electromagnetic interference, movement of contaminated equipment near radiation monitors, and similar miscellaneous causes. The following actions have been taken by the licensee to reduce the number of spurious isolations: modification to the discriminator circuitry of scintillation type detectors per work package WP-11129, modification to incorporate a time delay in the trip circuitry on all radiation monitors associated with isolation functions per work packages WP-10895 and WP-11266, relocation of instrument grounds, installation of rubber mounts on switches for vibration reduction, and procedure SQA 133 revision to require blocking the monitor when contaminated material is being moved past it. The licensee is presently reviewing the set-points of some of the monitors to determine if a Technical Specification change is appropriate to allow a greater margin between the trip point and the background reading. The number of events have decreased significantly since the above-mentioned corrective actions were implemented. The following LERs are considered closed:

327/84-58 327/84-39, 327/84-37
 327/84-29, 327/84-21, 327/84-16, 327/84-15, 327/84-14
 327/84-12 and 328/84-11

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

12. Modifications (37700)

On November 14, 1984, the inspector witnessed a portion of the post-modification testing (PMT) of the 2B-B motor driven auxiliary feedwater pump. The purpose of this PMT is to verify that the recently installed cavitating venturies function as designed and satisfy those system requirements previously met using pressure control valves (PCV). The PCVs were replaced due to repeated maintenance problems with their electro-hydraulic operators. Engineering Change Notice, ECN L5842, replaced PCV-3-122 and PCV-3-132 (on A and B pump discharge lines) with cavitating venturies. To prevent pump run-out, the venturies cavitate at the throat and limit flow to 600 gpm at 1048 psia.

The inspector reviewed the contents of Work Plan 11243, including PMT-53, Rev. 0, Auxiliary Feedwater System Cavitating Venturi Modification, to verify that the modification was reviewed and approved in accordance with Technical Specifications and conformed to licensee modification procedures. Selected portions were reviewed to insure that an unreviewed safety question determination had been made.

The inspector discussed the on-going PMT with test engineers at the work site and observed the start up of the pump and data collection. The pump successfully passed required flow rates but the discharge section containing the cavitating venturi had excessive vertical vibration and will be retested after shimming. This portion of the test will be rerun as plant conditions allow. The inspector will monitor testing progress until the pump meets all acceptance criteria. This is an inspector follow item (IFI 328/84-35-02).

13. Refueling Evolutions - Damaged Rod Control Cluster Assembly (RCCA) During Fuel Assembly Transfer.

During refueling activities on October 25, 1984, an RCCA installed in a fuel assembly was damaged during transfer back to the refueling cavity of Unit 2. The damage occurred when the assembly was being raised by the transfer system upender. The RCCA neck struck the refueling tube flange and bent approximately sixty degrees from its normal position. The inspector conducted a review to determine the cause of the event. Based on document reviews and discussions with licensee personnel, the inspector found that the fuel assembly transfer system for Unit 2 had been modified prior to refueling to remove underwater air motors and limit switches and replace them with more reliable, above-water, electric motors and counter controls. The modified fuel assembly transfer system was verified as fully operable prior to fuel movement; however, during refueling operations, difficulties were encountered which caused operators to periodically bypass the fuel transfer cart interlock functions.

The inspector reviewed the modification of the system to determine if the requirements of 10 CFR 50.59 were satisfied. The inspection included reviews of Engineering Change Notice (ECN) L5867 and Work Plans (WP) 10994, 10341, 10664, and 11041 which accomplished the licensee and vendor portions of the modification work. The inspector also reviewed Post-Maintenance Test

(PMT) -48 to determine if adequate post-modification testing was conducted. Based on these reviews, the inspector concluded that all work and testing appeared to have been accomplished in a satisfactory manner. The inspector evaluated the unreviewed safety question determination (USQD) provided by the licensee as part of ECN L5867. The modification consisted of a replacement of the underwater air motor with an above-water electric motor, and a replacement of the underwater limit switches with a control system which counts partial revolutions of the electric motor. Additionally, a motor torque limiting system was installed to stop the electric motor when a specific torque setpoint is reached. This torque setpoint is meant to actuate when the cart assembly reaches its full limit of travel, but will also actuate should an obstruction be encountered. The counter system also provides an indicating light to signal that the cart has reached its full limit of travel. Once the full limit of travel is reached, the counter provides the necessary electrical circuitry to allow upender operation. This counter interlock can be bypassed to allow upender operation when the counter system is inoperable. The inspector's review of the USQD indicated that the new modification did not constitute an unreviewed safety question.

The inspector then conducted an inspection into the operability of the fuel transfer system during the event, including a review of fuel handling procedures. The inspector reviewed fuel handling instruction (FHI) - 3A, Rev. 10, Functional Demonstration of Upender and Fuel Transfer Device, and determined that documentation indicated that all required equipment was operational prior to the start of refueling evolutions. The inspector also reviewed FHI-7 - Rev. 16, Refueling Operation, and interviewed the Senior Reactor Operator (SRO) in charge of the refueling operation at the time the event occurred. The procedure, FHI-7, Step III.I.3 requires that operators verify that the conveyor moves toward the reactor side and stops at the full travel limit and that the conveyor at reactor side red lamp is illuminated. Based on the documented testing of FHI-3A, the counter permissive should ensure that the RCCA/Fuel Assembly clears the transfer tube flange by approximately one inch. The inspector questioned the fuel transfer system operators as to whether the counter was bypassed during the event, and they indicated that the counter was not bypassed during the event. The SRO also stated that the counter had been bypassed during some previous fuel transfer operations due to problems with the fuel transfer cart stopping prior to satisfying its full travel limit interlock. The operators indicated that binoculars were being used to verify that the transfer cart had reached its full travel during periods when the counter system was inoperable.

Based on the above statements, the inspector concluded that the counter/interlock for the fuel cart and upender did not operate as designed to prevent upender operation. The licensee had not resolved the root cause of this deficiency at the time of the inspection, but was involved in reviewing the system problems with the equipment vendor. This will remain an inspector followup item (IFI 328/84-35-03) until the cause of this fuel transfer system failure is determined and corrected. During the post-event

checkout of the transfer system by the mechanical maintenance refueling group, licensee personnel determined that the upender T bar and the fuel assembly basket slot posed an interference fit which, at times, would trip the motor on torque prior to the transfer cart assembly reaching full travel. This condition, in conjunction with a failure of the counter limit permissive or placing the reactor side upender limit permissive in bypass, would allow for upender operation without the transfer cart assembly reaching its full limit of travel.

During the review of FHI-7, the inspector questioned the meaning of Precaution H of the procedure which allows interlocks on the fuel handling system to be bypassed only with the approval of and under the direct supervision of the Fuel Handling SRO. Licensee management indicated that this applied to non-Technical Specification interlocks, except in emergencies, and required additional site management input. Based on these discussions and the RCCA damage event, the licensee will review FHI-7 and make revisions as appropriate to provide:

- clarification on which interlocks cannot be bypassed without the formal administrative controls of Technical Specification 6.8.
- proceduralized requirements on the actions to be taken when interlocks are bypassed.
- requirements for additional fuel transfer system checks when transferring fuel elements containing an RCCA, since these elements have significantly less clearance with the tube flange during upender operation.

This will remain an inspector followup item until FHI-7 is reviewed and revised (50-328/84-35-04).

The refueling was completed by installing an underwater camera to verify that the transfer cart reached its full limit of travel during each transfer of fuel.

No violations or deviations were identified.