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

Report Nos.: 50-327/85-06 and 50-328/85-06

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

Docket Nos.: 50-327 and 50-328 License Nos.: DPR-77 and DPR-79

Facility Name: Sequoyah 1 and 2

Inspection Conducted: January 6 - February 5, 1985

Inspectors: for E. J. Ford G. J. Ignatonis 2/27/85
Date Signed

for L. J. Watson G. J. Ignatonis 2/27/85
Date Signed

Approved by: S. P. Weise, Section Chief
Division of Reactor Projects
S. P. Weise 2/27/85
Date Signed

SUMMARY

Scope: This routine, unannounced inspection entailed 147 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, independent inspection and followup of events.

Results: One violation was identified - Failure to adequately make a 10 CFR 50.72 report regarding information on a reactor protection system malfunction.

REPORT DETAILS

1. Persons Contacted

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
D. C. Craven, Supervisor Quality Engineering
B. M. Patterson, Maintenance Supervisor (I)
*R. W. Fortenberry, Engineering Section Supervisor
R. E. Alsup, Compliance Supervisor
*G. B. Kirk, Compliance Engineer
H. R. Rogers, Compliance Engineer
*R. K. Gladney, Instrument Engineer
M. E. Frye, Instrument Engineer
*L. C. Bush, Assistant Operations Supervisor

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 February 8, 1985

2. Exit Interview

The inspection scope and findings were summarized with the Plant Superintendent and members of his staff on February 8, 1985. A violation described in paragraph 12 concerning failure to adequately report, under 10 CFR 50.72(c), followup information on the failure of a reactor trip breaker was discussed. The licensee acknowledged the inspection findings. During the reporting period, frequent discussions were held with the Plant Manager and his assistants concerning inspection findings. The licensee did not identify as proprietary any of the materials provided to or reviewed by the inspectors during this inspection. At no time during this inspection was written material provided to the licensee by the inspector.

3. Licensee Action on Previous Inspecton Findings

Not inspected.

4. Unresolved Items

Unresolved items were not identified during this inspection.

5. Plant Tour (71707, 92706, 71710, 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 vibrations, pipe hanger and seismic restraint abnormal settings, various valve and breaker positions, equipment clearance tags and component status, adequacy of firefighting equipment, and instrument calibration dates. Some tours were conducted on backshifts. The inspector performed major flowpath valve lineup verifications and system status checks on Units 1 and 2 on the following systems (both trains):

(1) Containment Spray System
(2) Residual Heat Removal System
(3) Safety Injection System
(4) Turbine Driven Auxiliary Feedwater
(5) Motor Driven Auxiliary Feedwater
(6) Condensate Storage Tank (supply and recirculation flow paths)
(7) Essential Raw Cooling Water (supply to auxiliary feedwater)
(8) Upper Head Injection System
(9) Auxiliary Control Air System
(10) Auxiliary Building Gas Treatment System
(11) 6.9kV Shutdown Boards
(12) 480 VAC Shutdown, Reactor MOV, and Containment and Auxiliary Ventilation Boards
(13) 120 VAC Vital Plant Control Power System
(14) 125 VDC Vital Plant Control Power System

b. During the inspection period the inspector conducted a detailed walkdown of the Emergency Gas Treatment System (EGTS) Air Cleanup Subsystem. The two train system is utilized for both Units 1 and 2. The inspector utilized the following documents:

1. 47W610-65-1 Rev. 16, Mechanical Control Diagram Emergency Gas Treatment System (Common)

2. 47W611-65-1 Rev. 10, Mechnical Logic Diagram Emergency Gas Treatment System (Unit 1 only)

3. 47W611-65-2 Rev. 12, Mechanical Logic Diagram Emergency Gas Treatment (Unit 1 only)

4. 47W611-65-3 Rev. 3, Mechanical Logic Diagram Emergency Gas Treatment (Common)

5. 47W611-65-1 Rev. 10, Mechanical Logic Diagram Emergency Gas Treatment (Unit 2 only)

6. 47W611-65-2 Rev. 12, Mechanical Logic Diagram Emergency Gas Treatment (Unit 2 only)

7. 47W866-1 Rev. 22, Flow Diagram Heating and Ventilating Air Flow (Unit 1 only)

8. 47W866-1 Rev. 23, Flow Diagram Heating and Ventilating Air Flow (Unit 2 only)

9. System Operating Instruction SOI-65.1, "Emergency Gas Treatment System - Unit 1. "Rev. 12

10. System Operating Instruction SOI-65.2, "Emergency Gas Treatment System - Unit 2. "Rev. 7

These controlled drawings and documents were used to walkdown accessible portions of the EGTS Air Cleanup Subsystem including damper alignment, control air supply and power availability. Both trains of the EGTS Air Cleanup Subsystem were inspected.

No violations or deviations were identified.

6. Technical Specification Compliance (71707)

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.

7. Plant Operations Review (71707)

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. 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 the 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. Licensee Event Report (LER) and Special Report Followup (92700)

The inspector reviewed the following LER's and Special Reports to verify that the report details met licensee requirements, identified the cause of the event, described appropriate corrective actions, adequately assessed the event, and addressed any generic implication. 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 inspector had no further comments.

LER	EVENT
327/83048	Main Steam Safety Relief Valve did not meet Setpoint Criteria
327/83055	Inoperability of One Bank of Movable Control Assemblies
327/83067	Inoperability of Bus 1B Start
327/83079	Possible Failure of Masonry Walls During a Tornado
327/83120	Open Ice Condenser Doors
327/83169	Inoperability of Steam Generator Blowdown Flow Rate Monitor
327/83173	Inoperability of One Diesel Generator
327/83174	Inoperability of Engineered Safety Feature Function for Steam Line Pressure
327/83178	One Waste Gas Decay Tank having High Oxygen Concentration
328/83050	Inoperability of One Moveable Control Assembly
328/83087	Axial Flux Difference Outside limits

328/83089	Inoperability of one Steam Generator Pressure Channel for Remote Shutdown Instrumentation
328/83099 (Rev. 0 and Rev. 1)	Main Steam Safety Relief Valves did not Meet Setpoint criteria
328/83109	Failure to meet 18-month Surveillance Requirements on Fuses for Overcurrent Protective Devices on Containment Penetration Conductors
328/83118	Failure to Perform 72-hour Surveillance Requirement on Valve Lineups Preventing Uncontrolled Boron Dilution
327/83191	Inoperability of One Rod Position Indicator
Special Report 83-04 (Docket 327)	Penetration Fire Barrier not Functional in Excess of Seven Days

10. Observation of Emergency Plan Drill (82301)

On January 30, 1985 the inspector observed an Emergency Plan drill. The objectives of the drill scenario were:

1. To staff the Technical Support Center (TSC), Operational Support Center (OSC), Chattanooga Emergency Control Center (CEOC), Knoxville Emergency Center (KEC) and Muscle Shoals Emergency Center (MSEC);

2. Check and test communications and information flow pathways;

3. Input message and parameters at TSC and practice information flow to CECC, MSEC and KEC; and

4. Practice TSC to OSC briefing and talkthrough (OSC portion simulated).

The scenario included a steam generator tube leak followed by a loss-of-offsite power. The scenario was correctly diagnosed and the drill objectives were met. The drill was part of the preparation for the 1985 Emergency Exercise.

No deviations or violations were identified.

11. Independent Inspection Effort (92706)

The inspector routinely attended the morning staff meetings during the reporting period. These meetings provide a daily status report on operational and maintenance activities in progress as well as discussion of significant problems or incidents associated with the plant.

12. Event Follow-up on Reactor Trip Breaker A (71707, 61726, 62703 and 93702)

The Unit 2 reactor automatically tripped from train B protection system while at 96% power on January 13, 1985, due to a low-low level on steam generator #2. The initiating event was the failure of a level control valve (2-LCV-6-106A) associated with the #3 heater drain tank which resulted in an upset on the secondary system. The operators were attempting to stabilize the plant when the reactor trip occured. Within approximately 5-8 seconds after trip initiation the reactor operator observed the indicating lights for reactor trip breakers (RT) A and B. RT-B indicated open, but RT-A did not. The operator immediately initiated manual breaker opening for RT-A using the hand switch on control panel (2-M-4). This action was in accordance with the steps to verify reactor trip as required by Emergency Instruction E-0, "Reactor Trip or Safety Injection" (Revision 0).

The inspector discussed this event with plant operations personnel, reviewed applicable logs and emergency instructions, (E-0 and ES-0.1) and reviewed the reactor trip report required by Administrative Instruction AI-18, "Plant Reporting Requirements" (Revision 38). No discrepancies or inappropriate actions were noted.

The licensee initiated an investigation into the causes of the failures and took corrective actions prior to returning the unit to service. The inspector reviewed the event and licensee action.

a. Diagnosis of Fault Origin

The licensee performed diagnostic troubleshooting to isolate the malfunction, by performing an automatic reactor trip test (IMI-99.-FT-19) on Train A of the Solid State Protection System (SSPS). The objective of this test is to verify that the reactor trip breaker will open when a trip signal simulating pressure trip is applied to a train of SSPS. During this test the pressurizer high pressure trip signal is generated by automatic test circuitry, and the undervoltage (UV) coil voltage is observed for a drop to approximately zero volts from the normal 43 ± 4 volts across the coil. Failure of this voltage change to occur indicated to the licensee that the fault was located in the train A SSPS cabinet rather than the reactor trip breaker. Further maintenance work on Train A was authorized by a Maintenance Request (MR) and the train was removed from service utilizing appropriate procedures. During this process the UV card A515 was removed, replaced, and the proper card output verified by test signal injection. The old card was reinstated and rechecked verifying its inoperability. Having established card A515 as faulty, the new card was again inserted and its proper operation reverified. The inspector discussed the above with various licensee personnel and reviewed the following documentation:

- Maintenance Request, MR A-298460

- Instrument Maintenance Instruction, IMI-99 FT-19 "Functional Test of Reactor Trip Breakers "(automatic)" Rev. 10

- Instrument Maintenance Instruction IMI-134 "Configuration Control of Instrument Maintenance Activities, Units 1 and 2" Rev. 2.

- Technical Instruction, TI-52 "Special Instruction for Removing the SSPS from Service and Returning it to Service, Units 1 and 2" Rev. 10

No discrepancies were noted.

b. Post Maintenance Testing of Train A

After testing the new A515 card in the SSPS rack, reactor trip breaker A was closed and verified to open automatically. Additional measures taken by the licensee and performed under procedure MI-10.9 included an inspection of the trip breaker mechanism trip bar for binding, alignment and free movement of all parts, clean and smooth contacts, and correct lubrication. A final comprehensive test was performed which measured the response time of the reactor trip breaker from the logic to the breaker. Recorded test results showed a response time of 0.08 seconds. The maximum time allowable is 0.2 seconds.

The inspector reviewed applicable portions of the following documents:

- Maintenance Request, MR A-300157

- Maintenance Instruction, MI-10.9 "Removal, Inspection, Lubrication, and Replacement of Control Rod Drive MG set, Reactor Trip, and Reactor Trip Bypass Circuit Breakers - 6 months, Units 1 and 2" Rev. 8.

- Surveillance Instruction, SI-227.1 "Response Time Testing Reactor Protection System TRip Functions, Units 1 and 2" Rev. 2.

c. UV Output Card Troubleshooting

The resident inspector and a regional specialist witnessed the instrument mechanics' (IMs) troubleshooting of the UV output card in the instrument shop and discussed the troubleshooting techniques with the IM's and the cognizant instrument engineer. The faulty component was isolated to an output transistor, with an emitter to collector short which prevented deenergization of the UV coil. The (Q3) transistor was replaced, the board was then placed in a logic test box which exercised the logic matrix to verify the repair was effective and the card was certified ready for later service. The inspector noted the test equipment in use was within the calibration due date.

The UV output card was identified as W 6058 D45G01, WSN 0101 and the drawing in use was "UV Output Board, Solid State Protection System, dwg. 6058D90, Rev. E". The inspector reviewed the following controlling documentation which authorized the work and provided troubleshooting instructions:

MRA 300806 (Maintenance Request Form)

- Instrument Maintenance Instruction IMI-134 "Configuration Control of Instrument Maintenance Activities, Units 1 and 2" Rev. 2

- Special Maintenance Instruction SMI-0-99-1 "SSPS Circuit Card Test" Rev. 1

The inspector concluded that the faulty component had been identified, the board appropriately tested and the work activities correctly controlled.

d. Notification of NRC

On January 12, 1985, at 4:48 a.m. CST, the NRC operations center was notified of a reactor trip on Unit 2 which occurred at 3:29 a.m., CST. The notification of the operations center for this event is required by 10 CFR 50.72. The licensee informed the operations center duty officer of the event within the required time frame, but did not indicate that one of the two series trip breakers (RT-A) had failed to properly actuate and required manual initiation. This was apparently due to a lack of sufficient information on the part of the reporting individual. Knowledge of the malfunction was known in the control room prior to the phone call as evidenced by the Unit 2 Assistant Shift engineer's (ASE) log entries and the control room operator's actions.

The inspector performed a follow-up inquiry and determined by interviews with cognizant personnel that sufficient information was possessed by individuals performing the reporting function to enable them to correct the initial report within a reasonable time after the report. Licensee personnel evaluated the need for further reporting and concluded that it was not necessary. Failure to correct the initial report and provide significant information concerning the partial failure of the Reactor Protection System, is a violation (328/85-06-01).

The resident inspector was notified of the reactor trip by the licensee shortly after the notification to the NRC duty officer, and was later apprised of the trip breaker malfunction.