UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II
101 MARIETTA STREET, N.W.
ATLANTA, GEORGIA 30323

Report Nos.: 50-327/84-29 and 50-328/84-29

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: October 6 - November 5, 1984

Inspector: S Weise for 12/10/84
E. J. Ford Date Signed

Approved by: S Weise 12/10/84
S. Weise, Section Chief Date Signed
Division of Reactor Projects

SUMMARY

Scope: This routine, announced inspection involved 128 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, refueling activities, modifications, independent inspection and follow-up of events.

Results: One violation was identified - failure to establish adequate procedure for surveillance testing.

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 Supervisor
*R. C. Bircheli, Plant QA Staff
*R. L. Moore, QA Evaluator
*J. Blankenship, Information Officer
*S. West, Electrical 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.

Other Organizations

*W. E. Holland, Resident Inspector, Watts Bar

*Attended exit interview, November 2
+Attended exit interview, November 15

2. Exit Interviews

The inspection scope and findings were summarized with the Plant Superintendent and members of his staff on November 2 and 15, 1984. A violation described in paragraph 12, inadequate procedure for surveillance testing of diesel generators, was discussed in detail. The licensee acknowledged the violation and took no exception. At no time during the inspecton period did the inspectors provide written material to the licensee.

3. Licensee Action on Previous Enforcement Matters

Not inspected.

4. Unresolved Items

Unresolved items were not identified during this inspection.

5. Plant Tour (71707, 92706, 71710)

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 fire fighting equipment, and instrument calibration dates. Some tours were conducted on backshifts. The inspectors performed major flow path valve lineup verifications and system status checks on the following systems:

(1) Safety Injection System - including cold leg injection path open and hot leg injection path closed

(2) Condensate Storage Tank - supply and recirculation flow return paths for Unit 1

(3) Motor Driven and Turbine Driven Auxiliary Feedwater Systems

(4) Containment Spray System

(5) Containment Purge Air Exhaust Monitors

(6) Residual Heat Removal System

(7) Auxiliary Control Air System

(8) 120 VAC Vital Plant Control Power System

(9) 125 VDC Vital Plant Control Power System

(10) 480 VAC Shutdown Boards (Unit 1)

(11) 6900 VAC Shutdown Boards (Unit 1)

b. During a review for correct electrical power line-ups to the Turbine Driven Auxiliary Feedwater System (TDAFW), the inspector noted that three of the four steam supply valves to the TDAFW turbine were powered from the same electrical train. The inspector brought this apparent conflict of the train separation criteria of 10 CFR 50, Appendix A to the licensee's attention. Licensee personnel asserted that no conflict existed and that the valves were properly powered per design

requirements. The inspector independently examined functions and possible failure modes of the involved valves using the following documents:

- Flow Diagram Auxiliary Feedwater drawing no. 47W 803-2, Revision 25

- Logic Diagram, Main and Reheat Steam drawing no. 47 W 611-1-1, Revision 13

- Logic Diagram, Auxiliary Feedwater System drawing no. 47 W611-3-4, Revision 9

Based on the above information, valve FCV 1-15 (normally open) provides a steam supply from steam generator (SG) one. This flow path is in parallel with valve FCV 1-16 (normally closed) which provides steam from SG four. Valves 1-15 and 1-16 are powered from Train A. These parallel lines then feed a common steam supply line which has two normally open valves in service, FCV 1-17 and FCV 1-18. Valve 1-17 is powered by train A and valve 1-18 is powered by train B; thus a loss of train A or train B electrical power would not affect their ability to isolate a downstream (turbine side) steam line break. A steam supply transfer (SST) signal will automatically close valve 1-15 and open 1-16 upon an upstream line break on SG loop one, thus giving the ability to isolate the break and still supply steam to the turbine. Both steam supply lines (loop 1 and loop 4) are protected from reverse steam flow by check valves downstream of the isolation valves (valves 1-15 and 1-16). These check valves provide additional protection against both SG's feeding a line break on either steam supply loop. Additionally, SG's one and two are fed by motor driven auxiliary feedwater pump (MDAFW) - A, SG's three and four are fed by MDAFW - B. All four SG's are also fed by the turbine driven auxiliary feedwater pump which derives its preferred steam supply from SG one and its backup or alternate steam supply from SG four.

The inspector reviewed possible valve position and electric power configurations and examined the results of each assuming an upstream line break on loop one followed by a failure of train A or train B electrical power. The inspector concluded from the review that powering valves 1-15 and 1-16 from A train is not a conflict of train separability and is the proper configuration.

c. Spent Fuel Pit Cooling System (SFPCS). Section 9.1.3, of the Sequoyah FSAR states that the SFPCS is designed to remove the decay heat generated by stored spent fuel assemblies. During the inspection period, the inspector conducted a walkdown of the SFPCS utilizing the following documents:

- Logic Diagram, Spent Fuel Pit Cooling System, drawing no. 47 W 611-78-1, Revision 6

- Flow Diagram, Fuel Pool Cooling and Cleaning System, drawing no. 47 W 855-1, Revision 14

- System Operating Instruction, SOI 78.1A, Revision 15

- SOI 78.1A, Valve checklist 78.1A-1 (applicable portions)

The inspection was conducted to confirm that 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 calibrated, valved-in, and functioning.

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

6. Technical Specification Compliance (71707, 61726, 62703)

a. During this reporting interval, the inspector verified compliance with selected limiting conditions for operation (LCO) and observed 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. During the inspection period, the inspector observed portions of the following surveillances:

(1) Unit 1 reactor coolant pump (RCP) seal return instrument testing. Documents reviewed included:

- SI 208, Periodic Calibration of Chemical and Volume Control System (Refueling Cycle)

- Instrument Maintenance Instruction IMI-62, Appendix B, RCP # 3 High Range Return Flow, Loop No. F-62-37

- Instrument Maintenance Instruction IMI-134 Configuration Control Sheet

The following test equipment in use was verified as properly calibrated:

- Fluke 8600A Digital Voltmeter, TVA calibration number 493418, due 10-30-84

- Ramp Generator, TVA calibration number 493247, due 2-1-85

(2) Unit 2 steam generator pressure channel testing. Documents reviewed included:

- Instrument Maintenance Instruction IMI-99, Reactor Protection System (CC 9.14 Offline Channel Calibration of Loop 4 Generator Steam Pressure. Channel IV (P-546) (P-1-30) Units 1 & 2) Rev. 3, October 17, 1934

- Appendix A curves for Ramp response for PY 546B and Step response for PY 526B

The following test equipment in use was verified as properly calibrated:

- HP 7100 Strip Chart Recorder, Calibration No. 491313, due 2-1-85
- Fluke 8600A Digital Voltmeters (2) calibration nos. 493422 (due 11-21-84) and 493421 (due 11-20-84)
- Ramp Generator, TVA 493246, due 2-28-85

(3) Unit 2 rod control insertion limit calibration. Documents reviewed included:

- SI-616, Periodic Calibration of Rod Control Instrumentation (Refueling Cycle) Rev. 1
- IMI-85-RIL, Control Bank Rod Insertion Limit and P/A Converter Channels Units 1 and 2, Rev. 1 (Appendix A controlled testing for loops z85-5063 and z85-5072, Appendix B controlled configuration changes and independent verification)

Test equipment in use was verified as not being overdue for calibration.

For all the above testing, the inspector verified that testing was being performed in accordance with the procedure in use at the work site, that communications were adequate, that the tested components met the acceptance criteria, and that lead lifting and restoration was verified. The inspector determined that instrument mechanic personnel were knowledgeable through technical discussions of the circuitry involved and the nature and purpose of the test.

No violations or deviations were identified.

7. Plant Operations Review (71707, 61726, 62703)

a. The inspector periodically 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 in accordance with approved licensee procedures. During this reporting period Unit 1 operated in Mode one and Unit 2 continued its cycle 2 refueling modification outage which began September 28, 1984.

b. On October 31, 1984, a phase A isolation signal was received during performance of Surveillance Instruction (SI)-6 on Unit 2. The portion of this instruction which checks the containment vent isolation feature requires that the phase A reset button be depressed to prevent phase A isolation equipment from operating. In a discussion with the Shift Technical Advisor, it appeared that the push button operated properly, but the phase A isolation did occur. Potential Reportable Occurrence (PRO)-2-84-207 was issued as a result. The licensee notified the NRC as required. The inspector reviewed the procedure in use for technical adequacy utilizing the following documents:

- SI-6, Containment Building Ventilation Isolation, Rev. 16 dated September 10, 1984.

- Unit 2 Technical Specifications 3.6.1.8 and 3.7.8.

- Logic diagram, Emergency Gas Treatment, drawing no. 47W611-65-2, Rev. 13

- Logic diagram, Containment Isolation (CI), drawing no. 47W611-88-1, Rev. 16

- Solid state protection system schematic diagram (108 2H 70) (sheet 20 of 29) SNP Revision 2, dated 5/8/80

Based on the above review and technical discussions with instrumentation engineers, the inspector had the following findings:

- the procedure was properly followed

- the procedure was adequate to accomplish its purpose, i.e. test the containment ventilation isolation feature

- due to the circuitry involved and testing method, when depressing the reset button and actuating the handswitch, a partial or complete phase A isolation can occur.

- the procedure made reference in two separate sections (paragraph 1.0 "Scope" and paragraph 2.0 "Precautions") to the fact that a phase A isolation will occur

- the procedure incorrectly stated in a note following step 3.4 that manually initiating containment vent isolation while holding the phase A reset pushbutton would prevent a phase A isolation.

The actuation occurs due to the fact that the phase A isolation cannot be prevented by holding the reset button. Holding the reset button only prevents latching the slave relays, which are energized from the master relay (K502) when the CI phase A actuation hand switch is manipulated.

The licensee revised the test procedure to require lifting leads so as to positively prevent any phase A actuation signal from being

transmitted to the affected safety equipment. This revised procedure was reviewed by the inspector. As revised, the procedure does not appear to affect phase A signals automatically generated by the appropriate safety circuitry or manual circuitry. The inspector noted that independent verification is required for the lead lifting and restoration activities.

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. Refueling Activities - Unit 2 (60705, 60710, 93702)

a. Refueling Preparations

The inspectors reviewed the licensee fuel handling instructions (FHI) to verify that approved procedures were available covering the receipt, inspection and storage of new fuel. Procedures reviewed included:

- FHI-1A for receiving new fuel on site
- FHI-1B for removing fuel from shipping containers, inspecting new fuel assemblies and new fuel inserts, and placing fuel in fuel storage racks
- FHI-1C for handling of empty new fuel shipping containers
- FHI-1D for onsite manual loading of rod cluster control assemblies into new fuel assemblies
- FHI-1E for site loading of new fuel assemblies into shipping containers for return to manufacturing facility

The above procedures are divisions of the general procedure, FHI-1 "Receiving, Returning, Inspecting, and Storing New Fuel and Inserts", Rev 27, dated May 14, 1984.

The inspectors reviewed Unit 2 Technical Specifications (TS) as revised through Amendment 27, dated August 23, 1984, extracted Mode 6 (refueling) requirements from TS sections 1 through 10 and compared them against the licensee's signoff sheets in Fuel Handling Instruction FHI-6, Preparation for Refueling, Rev. 19, dated April 10, 1984. The licensee's list of requirements in FHI-6 appeared to cover the

applicable TS requirements for entering Mode 6. Also reviewed were procedures FHI-7, Refueling Operation, Rev 16, dated October 5, 1984, which contained precautions, prerequisites and instructions for reactor core loading. The inspector reviewed Restart Test Instruction RTI-2 Core Reloading, Rev 5, dated April 23, 1984, which is used in conjunction with FHI-6 and FHI-7. The instructions reviewed appeared to be adequate for the conduct of refueling operations.

The licensee submitted reload plans to NRR in a letter dated September 18, 1984, for the Unit 2, cycle 3 reload core, including Sequoyah Nuclear Plant Unit 2 Reload Safety Evaluation for cycle 3 operation. The licensee evaluated this reload pursuant to 10 CFR 50.59 and made a determination that no unreviewed safety questions exist.

b. Defueling Activities

On October 19, 1984, the inspectors conducted an inspection of activities for the second refueling on Unit 2 at SNP. The inspection involved observation of defueling activities being conducted in containment, on the auxiliary building refueling deck, and in the control room. The inspectors observed transfer of fuel assemblies from the reactor vessel to the spent fuel pool. During the evolutions the inspectors verified that all fuel handling operations were being performed in accordance with Technical Specifications and approved procedures. The inspectors also verified that containment integrity was being maintained and that the licensee was maintaining good housekeeping in the fuel handling areas. The inspectors discussed the defueling evolutions in progress with the refueling senior reactor operator and refueling personnel involved in the evolutions. Staffing during refueling appeared to meet requirements.

No violations or deviations were identified in this area.

c. Refueling

The inspectors witnessed various refueling evolutions during reloading of fuel assemblies from the spent fuel pool to the reactor vessel for Unit 2. These evolutions included transfer of several fuel assemblies from the spent fuel pool to the transfer cart, verification of the proper fuel assembly by visual observation of identification number, proper operation and control of transfer equipment used during fuel movement and transfer of several fuel assemblies from the transfer cart to the reactor vessel core area in the reactor building. The inspectors interviewed licensee personnel performing the fuel assembly handling evolutions to insure that the personnel were properly trained and were following approved procedures. The inspectors also verified that adequate housekeeping, radiological, and accountability controls were established and implemented.

During refueling activities, the licensee reported an event in which a fuel assembly with a rod control cluster assembly (RCCA) installed was damaged during transfer to the refueling cavity. Damage to the RCCA

occurred when the assembly was being raised from a horizontal to a vertical position after transfer through the transfer tube. The neck of the RCCA hit the transfer tube flange, and the RCCA assembly was bent. This problem is further addressed in inspection report numbers 50-327/84-32 and 50-328/84-32. The licensee implemented a temporary corrective measure which involved installation of a television monitor and underwater camera to provide better visual determination that the fuel transfer cart was against its stop prior to commencing the fuel assembly raising evolution. The inspectors verified that temporary corrective action measures were in place and being used during subsequent transfer evolutions. Fuel reload for Unit 2 was completed on October 31, 1984.

No violations or deviations were identified during this inspection.

10. Modifications (37700)

On November 2, 1984, the inspectors observed modification work in progress on the 125 VDC Vital Battery Board IV for the installation of a fifth vital battery. The purpose of the modification was to install a fifth vital battery charger and all necessary switching circuitry to allow the fifth vital battery to be used as a spare for any one of the existing vital batteries. This modification was initiated by design change request SQ-DCR-1092 and authorized by engineering change notice ECN L5599. The inspectors reviewed the implementing work plan package (WP 11260) at the work site to verify that the modification was reviewed and approved in accordance with Technical Specifications and conformed to licensee modification procedure controls. Selected portions of these documents were reviewed to ensure that an unreviewed safety question determination had been made and that any special requirements had been taken into account. The following special requirements were considered:

- seismic requirements
- fire protection
- auxiliary building secondary containment enclosure (ABSCE) impact
- post maintenance testing

The inspector observed that modification implementation with respect to operating Technical Specification (TS) requirements and the need for TS changes prior to putting the battery into service had been considered. The inspector discussed ongoing activities with the electricians performing the work and accompanied the cognizant electrician foremen to observe and inspect another battery board in a more advanced stage of installation.

No violations or deviations were identified.

11. Event Follow-up (93702 / 71707 / 61726)

On October 19, the licensee notified the NRC that all four diesel generators auto-started inadvertently due to personnel error during a circuit breaker

surveillance. The inspector followup on this event consisted of discussions with the Unit 2 Assistant Shift Engineer (ASE) to ascertain operations involvement and observation of the breaker tested (breaker 213) and affected fuse assemblies powered by the breaker. The inspector noted that control power to diesel generator (DG) 2A-A was supplied through one of these fuses. Upon loss of control power all four DGs auto-start due to the action of the common emergency start signal. The ASE stated that due to his involvement in other tasks he had an auxiliary unit operator (AUO) assist an electrician conducting the test. The AUO opened breaker number 213, located on 125 VDC Vital Battery Board III, failing to recognize that by doing so he was removing power to the fuse assemblies.

Surveillance Instruction SI-258.2, Inspection of Molded Case and Lower Voltage Circuit Breakers, Rev. 4 contains step-by-step general instructions and a separate data sheet for each element under test. Step 6.1 requires Shift Engineer approval to test the breaker and then directs that the breaker be removed from the board. Subsequent to Step 6.1, a caution note requires that, for vital battery board III breaker 213, MI 10.3 be used to spare out the breaker to maintain power to the fuse column. Step 6.1 through 6.6 on data sheet 10 (for breaker 213) provide signoffs for receiving SE or ASE approval for removal of the breaker, providing input test current, recording appropriate data and notifying ASE of test completion. At the bottom of the page is a cautionary note similar to the note in the instructions. These cautionary notes are necessary information which must be provided to test personnel prior to the performance of the applicable steps. The procedure was inadequate in that it failed to provide necessary information in an appropriate sequence to preclude inadvertent start of the DG's and power loss to other equipment. Failure to establish an adequate procedure is a violation (327, 328/84-29-01). The inspector also noted that the involved test personnel were not sufficiently familiar with the procedure to prevent this event.