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

Report No. 50-327/80-42

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

Facility Name: Sequoyah Plant Unit 1

Docket No. 50-327

License No. DPR-77

Inspection at: Sequoyah site near Chattanooga, Tennessee

Inspector: S. D. Butler — Date Signed: 1-9-81

Approved by: H. C. Dance, Section Chief, RONS Branch — Date Signed: 1-9-81

SUMMARY

Inspection on October 1 - November 3, 1980

Areas Inspected
This routine inspection involved 112 inspector-hours on site in the areas of operational safety verification, power ascension test witnessing, verification of license conditions, licensee event report review, independent inspection effort, and followup on plant incidents.

Results

Of the six areas inspected, no violations or deviations were identified.

DETAILS

1. Persons Contacted

Licensee Employees

J. M. Ballentine, Plant Superintendent
C. E. Cantrell, Assistant Plant Superintendent
W. F. Popp, Assistant Plant Superintendent
J. M. Bynum, Assistant to Plant Superintendent
J. W. Doty, Maintenance Supervisor (M)
J. M. McGriff, 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. O. McCloud, Quality Assurance Supervisor
W. T. Cottle, Compliance Supervisor

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

Other Organizations

Two Region II inspectors
PAR Systems Incorporated Representative

2. Exit Interviews

The inspection scope and findings were summarized with the Plant Superintendent and members of his staff on October 16, 1980 and November 7, 1980. Licensee representatives acknowledged their understanding of the findings.

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 operating 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 and startup testing in progress.
n. Maintenance activities in progress.

On September 30, 1980 while observing routine operations in the main control room, the inspector found several system drawings which were not controlled in accordance with Administrative Instruction AI-25, Drawing Control after Unit Licensing. Apparently the drawings had been used by operators for doing valve lineups prior to plant startup. The inspector determined that although the drawings were not properly controlled per the licensee's procedure, they were current and correct. In addition the operators were using properly controlled valve lineup sheets as their primary documentation for doing the valve lineups. The inspector discussed this matter with plant management who took prompt action to remove the drawings from the plant and reinstructed personnel of the importance of using properly controlled drawings for work or operation of safety-related systems. The licensee also took steps to insure that operations personnel had additional copies of properly controlled drawings for future use and began a program of making the document control center more accesible to plant personnel to provide controlled drawings as needed. The inspector considers this to be an isolated occurrence and had no further questions.

On October 2, 1980 while reviewing logs in the main control room, the inspector noted in the shift operational advisor's (SOA) log that at 0525 hours during steam dump testing the reactor coolant system had been cooled down below 541 degrees F while the reactor was critical. This is contrary to Technical Specification 3.1.1.4. There was not a similar entry in any of the other logs. The inspector reviewed the chart recorders for reactor coolant system average temperature (TAVE), hot leg (TH) and cold leg (Tc) temperatures and determined that system temperature had in fact gone below 541 degrees F at about the time in question. However, it could also be determined from the temperature recorders that system temperature returned to greater than 541 degrees F in less than fifteen minutes from the beginning of the transient.

This is in compliance with the action statement for the technical specification. The inspector brought his findings to the attention of plant management, questioning why this occurrence was not properly noted in the operators logs. Further inquiry found that the operators were aware of the transient but due to some confusion failed to properly log the information. The inspector cautioned those involved of the need for accurate logging of plant information because if this occurrence had gone unreported it would have resulted in noncompliance with Technical Specification reporting requirements. The licensee agreed to discuss this matter with personnel involved. The inspector had no further questions on this matter.

On two occassions during the startup test program the licensee expressed their intentions of operating the plant at a power level slightly above test plateau power or defering certain test which were described in the final safety analysis report (FSAR) as being performed at a specific point in the test program prior to proceeding. The inspector felt this was contrary to license condition 2.c.(3) which requires the licensee to conduct their test program in accordance with Section 14 of the FSAR. The FSAR describes certain tests to be performed at specific power levels prior to proceeding to the next power level. The inspector contacted the office of Nuclear Reactor Regulation (NRR) through the Region II management to get a clarification on this matter. It was concluded that it was the intention that testing was to be performed in the sequence described in the FSAR unless prior Nuclear Regulatory Commission approval was obtained. The licensee was informed of this determination and subsequently requested and received NRR approval to defer certain tests until a later stage of their power ascension test program.

On November 1, 1980 the inspector observed the conduct of a portion of Instrument Maintenance Instruction IMI-99 involving a channel of the reactor protection system. The initial readings taken for the as found equipment indicated out of tolerance values for the protection system bistables. Apparently the air conditioning for the auxiliary instrument rooms had been secured for several days for some duct modification and room temperature was above normal. The instrument mechanics had determined that the air conditioning had been restarted just prior to commencing the surveillance test. Subsequent checks of the bistable trip setpoints indicated that they were drifting back into required tolerances as the instrument room was brought back into its normal temperature range. The matter was discussed with the instrument foreman. It was determined that the shift engineer was properly notified of the problem and that the plant engineering staff was also aware of the problem. The inspector discussed the problem with the plant manager to determine what steps were being taken to prevent reccurence of this problem. The inspector was informed that the instrument supervisor was going to take steps to insure that temperature in the auxiliary instrument room was monitored and kept within necessary limits to prevent instrument drift. Subsequent discussion indicated that arrangements were being made with the

operations department to control temperature in the auxiliary instrument room and details of the licensee's corrective action will be submitted in the licensee event report concerning the occurrence.

During the initial stages of power ascension testing, the licensee determined that their steam flow transmitters were not spanned properly to operate over the full range of differential pressure across the steam flow venturi. The transmitters could not be respanned locally so the licensee decided to make temporary circuit modifications to allow use of the transmitters up to 50% power until new transmitters could be obtained from the vendor. The inspector reviewed the design change request for making the temporary circuit modifications. The high steamflow safety injection setpoint generating circuits had to be adjusted to generate the proper setpoint based on the output signal produced by the modified steamflow circuitry. The inspector reviewed the calculations for newly generated high steam flow safety injection trip setpoints and found them conservative in comparison to technical specification requirements.

No violations or deviations were identified.

6. Power Ascension Test Witnessing

On October 5, 1980 the inspector witnessed portions of the licensee's radiation survey at 10% reactor power. The inspector verified the proper revision of S/U 1.0, Operational Baseline Data, was in use and adequate data sheets of the proper revision were available. It was verified that radiation instruments being used for the survey were properly calibrated and response checked before and after the survey, as required by procedure. The inspector accompanied a team of two health physics technicians inside containment to witness the actual performance of their portion of the survey and to take independent radiation measurements for comparison. No unexpected radiation levels were noted during the survey. The inspector reviewed the completed data sheets of other survey teams for completeness and to determine if any out of tolerance levels had been noted. The inspector will continue to follow the performance of S/U 1.0 during the power ascension test program as surveys are performed at higher power levels.

No violations or deviations were identified.

7. Verification of Licensee Conditions

The inspector verified that prior to going above 5% reactor power, the licensee subjected all auxiliary feedwater pumps to an endurance test as required by license condition 2.c.(22).E. Each pump was run continuously for 48 hours and started and run for one hour after being allowed to cool to ambient conditions. During the testing of the turbine driven pump, it was discovered that the speed controller was adversely affected by heat from the pump turbine. The controller was moved from its original location adjacent to the the turbine steam

supply, additional insulation was added to steam and drain lines and a faulty ventilation damper was repaired. The pump was retested with room temperature at the maximum design limit and it was proven to operate satisfactorily. The inspector reviewed the report of the auxiliary feedwater pump endurance tests to be submitted to the Nuclear Regulatory Commission and had no further questions on this matter. The following open items were reviewed by the inspector and considered satisfactorily resolved.

(Closed) Open item 40-327/80-36-02 Unauthorized use of hydrogen ignitors prior to approval by NRC. The inspector verified that the licensee is taking appropriate measures to prevent unauthorized use of the hydrogen ignitor system by danger tagging the power supply breaker in the off position until NRC approval for use is received. This item is closed.

(Closed) Open item 50-327/80-36-03 Changes to control room labeling. The inspector verified that the labeling changes recommended by the Office of Nuclear Reactor Regulation were made to the unit 1 control panel in order to parallel component descriptions used in Emergency Operating Instructions. This item is closed.

(Closed) Open item 50-327/80-36-04 Control room background noise. Subsequent to issuance of Supplement #2 of the Safety Evaluation Report, the inspector verified that the licensee had taken necessary steps to reduce control room background noise to less than 65 decibels. This item is closed.

The following items were required for completion at Sequoyah either as license conditions or as required by NUREG 0660, NRC Action Plan, developed as a result of the TMI-2 Accident. The inspector verified

each requirement was satisfied prior to the applicable milestone or required completion date:

No.	NUREG	Subject
1.	I.C.7	NSSS Vendor review of procedures (license condition)
2.	I.G.1	Training during low power testing (license Condition)
3.	II.D.3	Relief valve and safety valve position indication (license condition)
4.	II.E.1.2	Auxiliary feedwater automatic initiation and flow indication (control grade) (license condition)
5.	II.F.2	Saturation meter (license condition)
6.	II.G.1	Emergency power for pressurizer equipment (license condition)
7.	II.B.4	Degraded core training (license condition)
8.	II.E.1.1	Auxiliary feedwater reliability (license condition)
9.	II.E.3.1	Emergency power for pressurizer heaters (license condition)

10. II.E.4.2 Containment isolation reliability
11. III.D.1.1 Primary coolant sources outside containment (reduced leakage program)

No violations or deviations were identified.

8. Licensee Event Report (LER) Review

During the reporting period, LER's were reviewed on a routine basis as they were received from the licensee. Each LER was reviewed to determine that:

a. The report accurately described the event
b. The reported cause was accurate and the LER form reflected the proper cause code
c. The report satisfied the technical specification reporting requirement with respect to information provided and timing of submittal
d. Corrective action appeared appropriate to correct the cause of the event
e. Corrective action has been or is being taken
f. Generic implications if identified were incorporated in corrective action
g. Corrective action taken or to be taken was adequate, particularly to prevent recurrence
h. The event did not involve continued operation in violation of regulatory requirements or license conditions

On October 5, 1980 during power operation a leak was discovered in the seal water injection line to number three reactor coolant pump. The Nuclear Regulatory Commission was notified per 10 CFR 50.72 and section 6.9.1.12 of their technical specifications. Details of the occurrence were submitted in licensee event report SQRO-50-327/80-156. The inspector verified that the plant was placed in cold shutdown as required by technical specification 3.4.6.2. Subsequently the inspector monitored the licensee's corrective action which included repair and retesting of the damaged line, nondestructive testing of similar lines on other reactor coolant pumps, review of pipe support analyses for this line and similar lines on other reactor coolant pumps and installation of additional supports on the line to prevent recurrence. The inspector questioned the need for additional supports when the original analysis was determined to be correct. The licensee contended that the analysis did not take into account the operationally induced vibrations from the pump and that the additional supports would prevent future pipe fatigue cracking from pump vibration without voiding the seismic support of the line. The other lines reviewed were not found to need additional support. Testing of other lines revealed no similar problems.

On October 15, 1980 the licensee reported that both trains of their emergency gas treatment system was inoperable. This was reported to

the Nuclear Regulatory in accordance with 10 CFR 50.72 and technical specification 6.9.1.12. The details of the occurrance were reported in licensee event report SQRO-50-327/80158. Inspector followup of the event revealed that while the plant was in mode 4 (hot shutdown) a construction electrician, working in the main control room lifting leads for Unit 2 work in accordance with a work release, inadvertently lifted Unit 1 leads to flow control valves 65-80 and 65-82 instead of the Unit 2 valves of the same numbers. These valves modulate emergency gas treatment system return flow to the shield building vent enabling the system to maintain the reactor building annulus at a negative pressure during an accident. Disabling these valves rendered the system inoperable. Discussions with the electrician and his foreman indicated that the electrician properly followed his normal procedure for lifting leads. However the Unit 1 and 2 cables were on the same drawing with identical numbers except the prefix 1 and 2 and the terminals were in very close proximity in the control room panel. When the electrician referenced the drawing and noted the terminal numbers to lift the required cable leads he mistakenly used the Unit 1 cable terminal numbers instead of the Unit 2 cable terminal numbers. The cause of the problem was identified and corrected by licensee personnel prior to completion of the actions required by technical specifications. The inspector discussed this matter with plant management. Due to the circumstances involving a high probability of personnel error involved with work of this type and the additional problem of similar numbering of cables for Units 1 and 2 equipment and close proximity of the cables in the control room panels, the inspector emphasized that special consideration needed to be given for additional measures to prevent recurrence. The licensee has subsequently instituted a program which requires second party verification when construction personnel remove or replace wiring on equipment or panels under control of division of Nuclear Power or interface with Unit 1 systems.

No violations or deviations were identified.

9. 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 testing and operations effort.

On October 12, 1980 the licensee identified an inward displacement of approximately five inches on the end wall of the "C" section of the main turbine condenser. The plant was cooled down to permit isolation of the main steam system and inspection inside the condenser. Inspection revealed that three vertical stiffner welds had failed allowing inward displacement of the condenser shell. The condenser end wall was returned to near its original position and rewelded. In addition reinforcing plates were welded across the affected joints as

well as across the corresponding joints of all vertical stiffners on both end walls of the condenser.

On October 16, 1980 the inspector reviewed the licensee's change over to the new Essential Raw Cooling Water (ERCW) pumping station. Revised operating procedures were reviewed to ensure proper guidance was available for operating the new station as well as providing adequate pumping capacity at the old ERCW station in accordance with a licensee commitment. Providing the old pumps as backup is required until resolution of NRR's questions concerning the effect of barge impact and settlement of the discharge conduit at the new station. The inspector noted that security had not been fully implemented at the new pumping station even though the station was being considered operational. The inspector questioned the Security Supervisor on this matter and determined that he had not been notified that the new pumping station was to be placed in service as well as the old station. A Region II security specialist was consulted concerning this matter and he did not consider it a violation since the old pumping station was being adequately protected and was available for use. The inspector subsequently verified that full security measures had been properly implemented at the new ERCW pumping station.

On October 20-22, 1980 the inspector attended the bi-monthly resident inspectors meeting at the Region II office. Topics of the meeting included a briefing on the new Nuclear Regulatory Commission enforcement policy which has been published in the Federal Register for public comment.

On October 23, 1980 the inspector attended a Region II Systematic Appraisal of Licensee Performance meeting with licensee management at their Chattanooga, Tennessee corporate office.

On October 17, 1980 the licensee discovered a broken seat in the number four main turbine governor valve. Subsequent inspection of the number one governor valve seat indicated cracking in the valve seat similar to number four. The valve seats are installed by shrinkling the valve seat into place and then fixing it with four equally spaced pins which are driven into place after heating the valve seat. The damage to the valve seats was in the areas of the pins and was attributed to heating the seat for pin installation and probably accelerated by prolonged low power operation. At low power, governor valves one and four are throttled close to their seat causing the seats to be subjected to high pressure drop and turbulent steam flow. The seats of all four governor valves were replaced. A new style seat which is less susceptible to this type of failure was obtained from the vendor for governor valves two and three. Due to lack of availability, old style seats were used in governor valves one and four but heating was not used to install the four fixing pins. The licensee did not consider this to be a problem since valves one and four are not throttled at higher power levels and not using heat to install the fixing pins will reduce the likelihood of seat breakage.

On October 24, 1980 the inspector reviewed the installation and testing of high density spent fuel racks by the licensee. The inspector reviewed work plan 8861 documentation provided by the licensee and the vendor, PAR System Incorporated, including the following: the licensee procurement documents, vendor shipping, handling, storage and installation procedures, unreviewed safety question determination for installation, quality assurance documentation for rack construction and post installation tack test procedure. The inspector noted that there were several outstanding nonconformance reports concerning lack of fuel cell verticality and damage to certain fuel cells during unpackaging at the site. The inspector determined that the use of the nonconforming cells for fuel storage was going to be adminstratively controlled by the licensee until resolution was obtained from their engineering organization. Subsequent to the review, the inspector advised a member of the Office of Nuclear Material Safety and Safeguards that he had no objection to an amendment to the licensee's 10 CFR 70 license to store Unit 2 fuel in the high density racks. The Unit 1 10 CFR 50 license already permitted storage of Unit 1 fuel in the racks.

On October 24, 1980 the inspector was informed that, while setpoint testing of Unit 2 pressurizer safety valves, one valve had an erratic lift setpoint. Investigation by the licensee determined that the valve had a broken spring. Analysis of the broken spring was performed by the licensee and it was determined that the break was due to a fabrication flaw. The springs from the other two Unit 2 safety valves as well as the replacement spring for the valve found to have the broken spring were subjected to nondestructive testing and no similar flaws were found. Discussion with the valve manufacturer revealed that this was the first known spring failure found in over three hundred valves of similar design produced by the manufacturer. The inspector questioned the licensee as to the possibility of a similar failure of a Unit 1 pressurizer safety valve. They had come to the conclusion that due to the low historical occurrence of the spring failure in the valves of this type they did not believe it was justified to suspect the Unit 1 valves. The inspector appraised Region II personnel of the situation and there were not further questions.

No violations or deviations were identified.

10. Followup on Plant Incidents

During the reporting period the licensee has experienced numerous reactor trips due to equipment malfunctions. In each instance the inspector reviewed the circumstance concerning each occurrence to verify proper reporting to the Nuclear Regulatory Commission, proper use of procedures subsequent to the trips for plant recovery, proper operation of all equipment and systems involved, and proper plant and operator response. In addition, the cause of equipment malfunction was determined and the inspector followed the licensee's corrective action to ensure it was adequate to prevent reoccurrence of the malfunction.

No violations or deviation were identified.

11. Miscellaneous Followup

In response to a question concerning the use of potable water (not Grade A) for flushing and hydrostatically testing stainless steel piping systems at Sequoyah Unit 1, the inspector reviewed the following:

a. Construction coordination Plan 63-1 "Cleaning of Safety Injection System"
b. Construction Test Procedure 63-1 "Cleaning of the Refueling Water Storage Tank and fill and discharge piping"
c. Construction Coordination Plan 62-1 "Cleaning of Chemical and Volume Control System"
d. Construction Coordination Plan 74-1 "Cleaning of Residual Heat Removal System"
e. Sequoyah Inspection Instruction No. 48 "Cleanliness Inspection of Fluid Handling Systems"
f. G-39 "Cleanliness during Fabrication of Fluid Handling Components"
g. Sequoyah Inspection Instruction No. 41 "Hydro test of Piping Systems"

In each case the procedures very clearly specified the use of grade A water including the limits required. In addition the inspector looked at various Quality Control Cards prepared in accordance with item #a and #g which showed Quality Control inspector certification of water quality used for cleaning and testing of the systems mentioned above. In no case was any discrepancy noted involving water quality which would substantiate the allegation. The inspector discussed the matter with a construction test engineer who was involved in a great deal of the Unit 1 testing during the time frame in question. He stated that he knew of no instances where potable water had been used when grade "A" water was required. He also stated that a temporary deionized water plant and the permanent deionized water plant were in operation at the time to provide adequate grade A water. The inspector informed Region II of these findings.

No items of noncompliance or deviations were identified.