



UNITED STATES
 NUCLEAR REGULATORY COMMISSION
 REGION II
 101 MARIETTA STREET, N.W., SUITE 2900
 ATLANTA, GEORGIA 30323-0199

Report Nos.: 50-327/94-05 and 50-328/94-05

Licensee: Tennessee Valley Authority
 6N 38A Lookout Place
 1101 Market Street
 Chattanooga, TN 37402-2801

Docket Nos.: 50-327 and 50-328

License Nos.: DPR-77 and DPR-79

Facility Name: Sequoyah Units 1 and 2

Inspection Conducted: January 24 through February 4, 1994

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| Inspectors: | <u>S. E. Sparks</u> | <u>2/17/94</u> |
| | S. E. Sparks, Project Engineer | Date Signed |
| | <u>M. T. Widmann</u> | <u>2/22/94</u> |
| | M. T. Widmann, Reactor Engineer | Date Signed |
| | <u>S. E. Sparks for</u> | <u>2/17/94</u> |
| | G. Schnebli, Resident Inspector | Date Signed |
| Approved by: | <u>Paul J. Kellogg</u> | <u>2/22/94</u> |
| | Paul J. Kellogg, Chief, Section 4A | Date Signed |
| | Division of Reactor Projects | |

SUMMARY

Scope:

This routine announced inspection was conducted on site in the area of Unit 1 restart. Specifically, areas of review included Appendix 12 of the Sequoyah Nuclear Plant Restart Plan, the disposition of work orders (WO) and work requests (WR) in accordance with Unit 1 restart criteria, post maintenance testing reviews, review of lessons learned from the Unit 2 restart, and activities associated with the use of Unit 1 components during the Unit 2 restart. In addition, a review of licensee event report (LER) 50-327/93-29 and violation 50-327,328/93-42-03 was conducted during the inspection period.

Results:

In the area of Operations, the inspectors concluded:

- The licensee was implementing Appendix 12 of the Sequoyah Restart Plan, dated January 25, 1994, in a conservative manner in the area of Unit 1 WO/WRs. Outage management and the system engineers were knowledgeable

of the restart criteria, and their application of the restart criteria to WO/WRs was conservative (paragraph 2.b).

- System engineer's knowledge of current system status was good, and in some cases, quite comprehensive (paragraph 2.b).
- The licensee's review of lessons learned from the Unit 2 restart effort was comprehensive and their efforts thorough to date (paragraph 2.e).

Two examples were identified by the inspectors in which Appendix 12 of the revised Sequoyah Restart Plan was inconsistent with plant procedures. The inspectors concluded these issues to be attributed to a combination of the licensee transitioning to normal plant procedures in conjunction with a lack of attention to detail and communication between outage management and site licensing. The inspectors concluded that these two issues did not have a negative effect regarding the disposition of appropriate WO/WRs during the Unit 1 outage (paragraph 2.a).

REPORT DETAILS

1. Persons Contacted

Licensee Employees

- * R. Fenech, Site Vice President
- * D. Keuter, Vice President, Nuclear Readiness
- K. Powers, Plant Manager
- J. Baumstark, Operations Manager
- * M. Burzynski, Nuclear Engineering Manager
- * M. Cooper, Maintenance Program Manager
- * D. Driscoll, Site Quality Assurance Manager
- * J. Gates, Outage Manager
- C. Kent, Chemistry and Radiological Control Manager
- R. Shell, Site Licensing Manager
- J. Smith, Regulatory Licensing Manager
- * R. Thompson, Compliance Licensing Manager
- * J. Ward, Engineering and Modifications Manager
- * N. Welch, Operations Superintendent
- * W. Lagergren, Outage Manager
- * H. Rogers, Technical Support Program Manager
- * L. Poage, Site Audit and Assessment Manager
- M. Frye, Technical Support
- J. Traffanstedt, Planning and Scheduling Supervisor
- C. Turner, Mechanical Maintenance
- M. Campbell, System Engineer
- D. Mroz, System Engineer
- H. Koehler, System Engineer
- E. Craig, System Engineer

NRC Employees

- * W. Holland, Senior Resident Inspector
- * S. Sparks, Project Engineer
- * M. Widmann, Reactor Engineer
- * G. Schnebli, Resident Inspector, Browns Ferry

- * Attended exit interview.

Other licensee employees contacted included control room operators, shift technical advisors, shift supervisors and other plant personnel.

2. Operational Safety Verification (71707)

a. Review of Appendix 12 of the Sequoyah Restart Plan

The licensee submitted Appendix 12 to the Sequoyah Restart Plan on January 25, 1994. Appendix 12 describes the process the licensee will implement during the restart of Unit 1. The inspectors

reviewed Appendix 12 as it relates to the disposition of WO/WRs, and reviewed the restart criteria. The inspectors noted that the restart criteria in Appendix 12 were consistent with the criteria the licensee used during the restart of Unit 2, except for the deletion of one criterion associated with the conduct of work during a dual unit outage (Unit 2 had resumed power operation in October 1993). The inspectors concluded the Unit 1 restart criteria of Appendix 12 was acceptable.

Appendix 12 stated that the licensee is transitioning to normal plant procedures and processes, and indicated that Site Standard Practice (SSP) SSP-7.2, OUTAGE MANAGEMENT, Rev. 6, was to be used in conjunction with the restart criteria to determine if WO/WRs were to be completed prior to restart of Unit 1. The inspectors questioned several system engineers and outage management regarding their knowledge of the restart criteria. Although the restart criteria had not been included in any plant procedure (only in Appendix 12), discussions with several system engineers revealed that they were cognizant of the restart criteria, due in part to the heightened sensitivity of the Unit 2 restart process.

As stated above, during the review of SSP-7.2, the inspectors noted that the procedure contained no criteria similar to the restart criteria used for Unit 1 and Unit 2 restart. The restart criteria provides guidance to system engineers and outage management regarding evaluation and disposition of restart items during future refueling or extended forced outages. The inspectors questioned the licensee regarding how the proper sensitivity to the disposition of WO/WRs would be maintained (consistent with that used during the current process of restarting Unit 1 and the Unit 2 restart) among system engineers, operators, and outage management after the licensee has made a full transition to normal plant processes. Licensee management agreed that the need existed for maintaining this sensitivity, and was considering various options to ensure that appropriate items and deficiencies would be considered for upcoming refueling and forced outages as part of normal plant procedures and processes. As a result of the concerns identified with regards to SSP-7.2, the licensee revised SSP-7.2 to incorporate restart evaluation criteria for use by outage management and system engineers in determining restart dispositions.

The inspectors' review of Appendix 12 and SSP-7.2 identified the following issues:

- Appendix 12 states that SSP-7.2 would be used to add or delete WO/WRs to the outage. A review of SSP-7.2 revealed that WO/WRs would be added/deleted using Appendix I. During the inspector's review of Unit 1 WO/WRs, it was noted that outage management routinely added items to the outage by specifying the appropriate outage priority, after which the WR would be routed to work planning. The WR would then be

planned for completion during the outage (planned WRs are identified as WOs). Thus, the licensee would add WR/WO to the outage without the use of Attachment I of SSP-7.2. The inspectors discussed this apparent inconsistency with plant management. The inspectors concluded that this issue could be attributed to a combination of the licensee transitioning to normal plant procedures in conjunction with a lack of attention to detail and communication between outage management and site licensing. The inspectors also concluded that this issue did not have a negative effect regarding the disposition of appropriate WO/WRs during the outage, in that all WO/WRs reviewed were added to the Unit 1 outage as necessary. As a result of the inconsistency identified, the licensee has revised the plant procedure to remove the requirement that additions to outage scope be performed through the Appendix I process. The inspectors consider the licensee's actions to be appropriate.

- Appendix 12 states that SSP-7.2 is to be used to add or delete WO/WRs to the outage. A review of SSP-7.2 revealed that the Outage Manager and Outage Director must concur on the deletion of WO/WRs. System engineer concurrence should also be obtained. However, Appendix 12 states that only the Outage Manager could add or delete WO/WRs, with appropriate system engineer concurrence. This apparent inconsistency was brought to the attention of plant management. Plant management stated that this issue would be resolved by revising Appendix 12 of the Sequoyah Restart Plan. Based on the WO/WRs reviewed, the inspectors concluded that the above inconsistency did not result in a decrease in the level of review of each WO/WR to be deleted from the scope of the outage. The inspectors concluded that the licensee's actions were appropriate.

b. Review of Unit 1 WOs/WRs

This inspection entailed a review of the licensee's implementation of Appendix 12 of the Sequoyah Restart Plan with regards to WO/WRs. The inspection consisted of a detailed review of approximately 117 WO/WRs to determine if the licensee was applying the Appendix 12 restart criteria in a conservative manner. The majority of the WO/WRs reviewed had been initiated between October 1, 1993 and January 24, 1994. The inspectors focused on post restart items that were at one time dispositioned as Unit 1 restart items, and since had been deferred by outage management as work items not required to be completed prior to restart of Unit 1. In addition, the inspectors' review encompassed WO/WRs that were dispositioned initially as work for post Unit 1 restart to determine if the initial decision to not include the work item for restart was consistent with the restart criteria. WO/WRs for the following systems were reviewed:

1. System 03 - Auxiliary Feedwater System
2. System 06 - Heater Drains/Vents
3. System 30 - Ventilation System
4. System 61 - Ice Condenser System
5. System 62 - Boric Acid Evaporators and Demins
6. System 67 - Essential Raw Cooling Water System
7. System 70 - Component Cooling System
8. System 234 - Heat Tracing
9. System 247 - Lighting System
10. Various Main Control Room Deficiencies

Review of computer printouts for items to be deferred until post restart of Unit 1 were discussed with several system engineers based on system safety significance and relative number of work items deferred. Items that were identified as potentially impacting safe operation of a system were reviewed individually and discussed in detail. Through interviews with the system engineers, the inspectors determined that engineer knowledge of system current status (i.e. problems, equipment broken, work completed) was good, and in some cases, quite comprehensive. Knowledge of work items deferred and the associated reason for deferral was also good, as was system engineer familiarity with the review process for deferring an item from the outage.

The inspectors reviewed and discussed an issue with the licensee associated with a main feedwater pump that could potentially affect plant reliability. The issue, once included in the Unit 1 outage as restart work but since deferred, involved the raw cooling water system for lube oil coolers for the Unit 1 main feedwater pump 'A'. The internals of the raw cooling water system pipe were examined by the system engineer and outage management personnel and determined to be approximately two-thirds (2/3) blocked. According to the system engineer and an outage manager, the supply pipe was oversized in the original design, and although the flow would be restricted due to the build-up of solids in the pipe, the flow control valve still had available operating range to open further to maintain adequate flow to the coolers. The system engineer also stated that the flow control valve position over the previous operating cycle needed to maintain adequate flow had not significantly changed. Thus, the system engineer and licensee outage management concluded that in the current condition, adequate flow would be maintained such that the main feedwater pump lube oil would not overheat.

The inspectors discussed with the licensee the potential effects for a loss or degradation of lube oil cooling. Loss of lube oil cooling could result in an overheating condition of the main feedwater pump lube oil if the flow was inadequate to effectively cool the lube oil in the main feedwater pump. The resulting loss of the main feedwater pump could cause a transient of the unit. Licensee outage management emphasized to the inspectors that their review of the issue concluded the condition, while degraded, would

not have an adverse affect on plant equipment throughout the upcoming Unit 1 operating cycle. The licensee stated that pipe replacement would occur during the Unit 1 cycle 7 refueling outage.

The inspectors also discussed the work involved with replacing approximately 200 feet of the supply and return piping to the lube oil coolers. Licensee management stated that the replacement would encompass 1700 welds and take up to 3 weeks to complete (both shop and field work). Licensee outage management also expressed concerns to the inspectors relative to the affect on Unit 1 schedule if pipe replacement were performed.

The inspectors concluded that the above issue satisfied the restart criteria in that plant reliability could be affected. The inspector's discussions with the system engineer and outage management revealed that they were fully cognizant of the technical issue, history of operating characteristics, and risks associated with effects on plant reliability. Licensee outage management evaluated the risks associated with various options, and concluded that this work item could be removed from the Unit 1 refueling outage. In accordance with the Restart Plan, this item was also reviewed by MRRRC, who concurred in the removal of this item from the Unit 1 refueling outage.

The inspectors review of approximately 117 WO/WRs during the inspection identified the above issue as having the highest potential to adversely affect Unit 1 operations. However, other individual issues, or the aggregate effect of conditions such as the one discussed above, could also have an adverse affect on Unit 1 safety and/or reliability. As discussed in Paragraph 3 of this Inspection Report, the licensee's progress in reducing backlogs was identified by Nuclear Assessment as "needing improvement." The inspectors noted that additional inspection in this area would be conducted to confirm that WO/WRs deferred from the outage prior to Unit 1 restart continue to be consistent with the restart criteria and are thoroughly evaluated by licensee management.

The inspectors concluded that the licensee was implementing Appendix 12 of the Sequoyah Restart Plan, dated January 25, 1994, in a conservative manner in the area of Unit 1 WO/WRs. Outage management and the system engineers were knowledgeable of the restart criteria, and their application of the restart criteria to WO/WRs was conservative.

c. Review of PMs

The inspectors reviewed the licensee's Preventive Maintenance (PM) program with particular emphasis on those PMs that had been deferred or cancelled during the refueling outage and would not be accomplished prior to the projected startup of Unit 1. The inspectors reviewed the licensee's procedure that governs the PM

program, SSP-6.3, PREVENTIVE MAINTENANCE, Revision 10, dated December 22, 1993, and considered the procedure was adequate and covered all aspects of a good PM program. The inspectors requested and were provided with a list of all Unit 1 refueling outage PMs that were scheduled to be performed during the outage and also a list of those that were rescheduled or cancelled. Approximately 1120 PMs had initially been scheduled and at the time of this inspection 732 were completed, 114 were complete but awaiting completion of the PMT, 184 still needed to be worked, 26 had been cancelled, and 64 had been rescheduled. The inspector reviewed all cancelled and rescheduled PMs. Of the 26 PMs that were cancelled, 16 of them were assigned another PM number or included as part of another procedure. Six were cancelled as the PMs were invalid or were for equipment that was obsolete and being replaced. The remaining four were either included in error or rescheduled in the Unit 1 cycle 7 refueling outage.

Of the 64 PMs that were rescheduled, 53 were actually performed under another work document. For example, a PM may require changing oil in a pump, however during the outage the pump was overhauled which included changing the oil. Therefore, the PM requirement was satisfied and the PM was rescheduled to its next required performance. The inspector considered that these PMs were not really rescheduled as they had been performed. This issue was discussed with licensee personnel responsible for the program and they agreed. In addition, the licensee stated that in the future they would identify PMs in this category under a different, more appropriate title than that of rescheduled. The remaining rescheduled PMs were reviewed by the inspector and the reason for each was discussed with the licensee. The inspector also reviewed Appendix L of SSP-6.3 for each PM that was cancelled or rescheduled. This appendix is required to be completed to provide technical justification for rescheduling or cancelling PMs. The inspector considered the justification for these PMs was adequate.

d. Lessons Learned from Unit 2 Restart Effort

Discussions were conducted with the Outage Manager and his staff concerning lessons learned from the Unit 2 restart effort and how they were applied to the preparation for the Unit 1 restart. Also included in these discussions was the use of components from Unit 1 to support Unit 2 restart and the licensee's program that ensured adequate replacement of the item on Unit 1.

The inspectors were provided with a list of 77 items that were issues/problems identified during Unit 2 restart activities. This list was compiled by the individual system engineers and a review of Problem Evaluation Reports (PERs) generated during this evolution. The licensee discussed each line item with the inspectors and how each item had been addressed or would be addressed during the Unit 1 return to service. The inspectors

considered the licensee's list to be comprehensive and their efforts thorough in this area. In addition, the inspectors reviewed the NRC control room log maintain by NRC inspectors monitoring the Unit 2 restart. A list of 43 issues/problems was generated from the review. The licensee's list was then compared to the NRC list. This comparison showed that the majority of the items were common to both lists. The items on the NRC list that were not identified on the licensee's list were then discussed with the Outage Manager to ensure these issues were also addressed. Discussions with the Outage Manager indicated that all issues had been or would be addressed.

The licensee's program for restoring components back into Unit 1 that were previously removed to support Unit 2 restart was also reviewed by the inspectors and discussed with the licensee. The procedure that controls materials borrowed from installed plant equipment is SSP-6.22, MAINTENANCE MANAGEMENT SYSTEM PLANNING WORK ORDERS, Revision 17, dated December 15, 1993. Section 3.7.3 of this procedure requires that a purchase request be prepared for the material to be borrowed or moved and submitted to Materials and Procurement for review and evaluation. This will ensure the borrowed part is acceptable for use in the desired location and commence the process for procuring a suitable replacement part. This section also requires that two work packages be generated, one for removal and one for installation. Thus, ensuring PMT requirements are specified for the borrowed parts application and the reinstallation of the replacement part. The inspectors reviewed the work packages, design change notices and PMT requirements for three issues that occurred during the Unit 2 restart effort requiring use of Unit 1 components (containment spray annubar, control rod step counters, and flow control valve 1-FCV-62-54). This review was mainly in the process of returning or replacing the borrowed parts back into Unit 1. No deficiencies were identified.

e. Review of PMTs

In addition, the inspector performed a limited review of the licensee's PMT process. Their PMT program is controlled by SSP-6.31, MAINTENANCE MANAGEMENT SYSTEM PRE-OR POST-MAINTENANCE TESTING, Revision 2, dated September 16, 1993. The inspectors reviewed this document and twenty work packages for maintenance performed and associated PMT requirements on the safety injection system. The work packages were reviewed to ensure only the individuals authorized by Attachment 1 of SSP-6.31 reviewed and approved PMT requirements, and that the PMT requirements met the guidelines of Attachment 2, PMT Component Matrixes. No deficiencies were identified. However, the inspectors informed the licensee that due to the limited review in this area (only 20 mechanical maintenance PMTs for the safety injection system were reviewed) additional inspection effort may be required.

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

3. Evaluation of Licensee Self-Assessment Capability (40500)

During the inspection period, selected reviews were conducted of the licensee's ongoing self-assessment programs to evaluate the effectiveness of these programs. Specifically, the inspectors reviewed recent assessments conducted by Nuclear Assurance (NA). The NA assessment results for the week of January 24 indicated that the area of Balance of Plant was and had been acceptable since late December. In the operations department, configuration control was identified as needing improvement due to the identification of FLAS 5 fuses installed backwards. The mis-installation of FLAS 5 fuses was identified as a repeat occurrence. The two other areas of the operations department (strengthened operations management and conduct of operations) was identified as acceptable.

The Backlogs area was identified as needing improvement due to the continuation of Unit 1 restart curves (backlog curves) exceeding planned levels. Twenty-one areas remain above the projected Unit 1 workoff levels as of the issuance of the NA assessment. The area of personnel organization and culture was also identified as needing improvement.

The inspectors concluded the licensee's assessments to date to be adequate. The licensee's planned assessments prior to Unit 1 restart will be reviewed in future NRC inspections.

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

4. Licensee Event Report Review (92700)

The inspectors reviewed the LER listed below to ascertain whether NRC reporting requirements were being met and to evaluate initial adequacy of the corrective actions. The inspector's review also included followup on implementation of corrective action and/or review of licensee documentation that all required corrective action(s) were either complete or identified in the licensee's program for tracking of outstanding actions.

(Open) LER 327/93-29, Inoperable Check Valves in the Component Cooling System as a Result of a Build-up of Corrosion Products Between Valve Components. This issue involved the determination on November 16, 1993, that both units were outside their design basis as a result of eight inoperable check valves in the Unit 1 component cooling system piping upstream of the reactor coolant pump thermal barrier heat exchangers. The Unit 1 condition was discovered by radiographic inspections of the check valves while Unit 1 was in Mode 5, and identified that seven of eight check valves were stuck in the open position. The eighth check valve was determined to be assembled incorrectly. At the time of the discovery, Unit 2 was operating at 100% power. A shutdown of Unit 2 was initiated because of the high probability that a similar condition existed on Unit 2. The licensee determined that seven of eight Unit 2

check valves were stuck in the open position. The cause of the condition was oxide wedging between valve components (piston and bonnet).

Licensee corrective actions for Unit 1 included the completion of field work to replace the carbon steel valve bonnets on all eight Unit 1 check valves with stainless steel valve bonnets. The inspectors concluded the licensee's actions regarding this issue to be satisfactory for Unit 1 restart. A Unit 2 action plan will be developed and implemented to ensure check valve operability before restart from the Unit 2 cycle 6 refueling outage. This LER will remain open pending the licensee's completion of other activities and additional NRC inspection associated with this issue.

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

5. Action on Previous Inspection Findings (92701, 92702)

(Closed) VIO 50-327,328/93-42-03, Post Maintenance Testing

This violation was associated with three examples in Sequoyah's PMT program. Specifically, these examples included inappropriate close out of work documents, inadequate review of post maintenance testing, and Technical Specification Component Condition Records closed out without the associated PMT paperwork appropriately dispositioned.

The licensee responded to the notice of violation in a memorandum dated December 9, 1993. During the inspection the inspector reviewed and verified the corrective actions taken by the licensee for completeness and adequacy to address the violation.

The inspector reviewed PER #SQ930557PER, which addressed standardization of work order planning to incorporate PMT instructions as a routine planning function. As a result of the PER, SSP-6.22, MAINTENANCE MANAGEMENT SYSTEM PLANNING WORK ORDERS, was revised to include guidance for planners on examples of how to specify PMTs in the work order packages. The inspector verified this revision was complete.

In addition, SSP-7.53, WORK APPROVAL AND CLOSURE, was revised to clarify the sequence and logic flow for sign-offs of work packages, including a separate sign-off "Ready for PMT", and for "Work Complete." The separation of the sign-offs will resolve future packages being closed out premature to the PMT being completed. The Surveillance Instruction (SI) 0-SI-SXV-000-006.0, TESTING OF CATEGORY "A" AND "B" VALVES AFTER WORK ACTIVITIES, UPON RELEASE FROM A HOLD ORDER, OR WHEN TRANSFERRED FROM OTHER DOCUMENTS, was also revised to incorporate the recommendations of #SQ930557 PER. The inspector reviewed and verified the corrective actions delineated by the licensee in the December 9, 1993 response, and find the actions adequate.

Within the areas inspected, no violations were identified.

6. Exit Interview

The inspection scope and results were summarized on January 28 and February 4, 1994, with those individuals identified by an asterisk in paragraph 1 above. The inspectors described the areas inspected and discussed in detail the inspection findings. Proprietary information is not contained in this report. Dissenting comments were not received from the licensee.

Strengths and weaknesses summarized in the results paragraph were discussed in detail.