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REGION II

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Licensee: Tennessee Valley Authority (TVA)

Facility: Sequoyah Nuclear Plant, Units 1 & 2

Location: Sequoyah Access Road
Hamilton County, TN 37379

Dates: July 8, 10 through 12 and August 19 through 22, 1996

Inspector: W. Miller, Jr., Reactor Inspector

Approved by: P. Fredrickson, Chief
Special Inspection Branch
Division of Reactor Safety

ENCLOSURE

EXECUTIVE SUMMARY

Sequoyah Nuclear Plant, Units 1 & 2 NRC Inspection Report 50-327/96-10, 50-328/96-10

This inspection included a review of the Sequoyah fire protection program and the action taken on previously identified inspection findings by the NRC and TVA's QA organization. The report covers a 2-week inspection period.

Plant Support

Satisfactory compensatory measures were implemented for degraded electrical raceway Thermo-Lag fire barrier materials. The Thermo-Lag upgrade project was not scheduled to be completed until late 1998. This completion date appeared to indicate that this modification project had not received a high priority when compared to the other two TVA nuclear plants. The Thermo-Lag upgrades at the other two plants have been completed. (Section F1.1)

For the areas reviewed, the control of combustible materials within the plant was inadequate. Implementation of the transient fire load permit program was also ineffective. This item is identified as an example of an apparent violation. (Section F1.2)

Most of the 1991 Fire Protection Improvement Plan items had been completed. Items not completed included engineering data on fire barrier penetration seals, construction of the new water supply system, and submittal of the Fire Protection Report. (Section F1.3)

The system engineering data on the HPFP system indicated that the available flow and pressure from the HPFP system met the requirements of the Technical Specifications (TS). However, in view of the MIC related problems, replacement of the existing fire protection river water system with a potable water supply system will result in a major fire protection program improvement. (Section F2.1)

A new Fire Protection Manager was appointed and organizational changes were made to the fire protection program in July 1996. It is too soon to determine the effectiveness of these changes. (Section F6).

Comprehensive audits and self assessments were performed of the Sequoyah fire protection program. Resolution of identified discrepancies was not accomplished in a timely manner and adequate changes were not implemented to prevent recurrence. This is identified as an example of an apparent violation. TVA made management and organizational changes to the fire protection organization in July 1996. It is too

early too determine if these changes will improve the implementation of the fire protection program. (Section F7.1)

Fire dampers were installed in various walls and floors to provide a fire rated separation from redundant safety related components. These fire dampers had been inspected by the licensee a number of times during construction, pre-operational and surveillance testing activities. However, these inspections apparently failed to identify that the dampers were not installed in accordance with the vendor's requirements until 1993. Furthermore, resolution of this issue is not scheduled for completion until 1998. The failure to promptly identify and to resolve adverse conditions associated with the fire dampers is identified as an example of an apparent violation. (Section F8.1)

Modifications to the HVAC system in May 1990 failed to receive the required fire protection and 10 CFR 50 Appendix R review. This resulted in the required CO₂ system for the computer room being inoperable and is identified as an apparent violation. (Section F8.2)

A fire hose hydrostatic test is required on the fire hose installed at the various hose stations in the plant. TVA's surveillance procedures for the reactor building fire hose stations were inadequate and did not assure that the fire hose installed in the reactor buildings had been hydrostatically tested. This is identified as an apparent violation. (Section F8.3)

TVA discovered that the fire barriers in the high radiation areas of the auxiliary building had not been included in the fire barrier surveillance inspections performed in August 1995 and March 1994 as required by the TS. This is identified as an apparent violation. (Section F8.4)

Report Details

Plant Support

F1 Control of Fire Protection Activities

F1.1 Compensatory Measures for Degraded Thermo-Lag Fire Barriers (64704)

a. Inspection Scope

The inspector reviewed the compensatory actions implemented for degraded Thermo-Lag fire barriers to determine if these measures were consistent with the requirements of the TS and the modification schedule to upgrade the fire protection features as required to eliminate the need for the compensatory measures.

b. Observations and Findings

In 1991, the NRC found that Thermo-Lag fire barrier material did not perform to the manufacturers specifications. Specifically, the installed Thermo-Lag barriers would actually provide approximately one half of the specified rating, i.e., a 1-hour fire rated barrier would provide approximately 20 to 30 minutes of protection. The NRC issued NRC Bulletin 92-01 and requested licensees with Thermo-Lag fire barriers to take the appropriate TS compensatory measures for the areas where the Thermo-Lag materials were installed. TVA implemented the TS compensatory measures for degraded fire barriers. This consisted of a roving fire watch for all plant areas where the Thermo-Lag was installed. This compensatory measure had previously been reviewed and found acceptable by the NRC.

TVA's schedule was to complete the necessary engineering design and modification documents required to upgrade the existing Thermo-Lag installations by late 1997 and to complete the installation of the Thermo-Lag upgrade by late 1998. The Thermo-Lag upgrades at Browns Ferry and Watts Bar have been completed. It appeared that the required Thermo-Lag upgrade program at Sequoyah had not received as high a priority as the upgrade programs at the other two TVA plants.

During this inspection, the inspector reviewed the compensatory program in place for the degraded fire barriers. These measures included a roving fire watch. The fire watch patrols were being performed in accordance with Procedure FPI-0180, Revision 0, Compensatory Fire Watch Responsibilities and Control. This procedure divided the plant into 16 fire watch zones. Each zone was inspected by a fire watch at intervals of 60 minutes with a 15 minute tolerance. Fire watch patrols were also provided for other degraded fire

protection features such as inoperable suppression systems and degraded fire dampers.

The fire watch patrols were performed by the labor shop and consisted of two employees per shift working 12 hour shifts. Their duties included walking down each identified zone requiring a fire watch due to inoperable or degraded fire protection system or features and to report any identified fire. The inspector reviewed randomly selected fire watch data sheets and noted that the fire watch patrols were being performed within the specified times for the zones requiring the fire watch patrols. A question involving storage of fire watch patrol records was addressed by the licensee prior to the exit.

c. Conclusions

Satisfactory compensatory measures had been implemented for the degraded electrical raceway Thermo-Lag fire barrier materials. In addition, the Thermo-Lag upgrade project was not scheduled to be completed until late 1998. The scheduled completion date indicated that this modification project had not received a high priority when compared to the other two TVA nuclear plants. The Thermo-Lag upgrades at the other two plants had been completed.

F1.2 Control of Combustibles

a. Inspection Scope

The inspector reviewed the implementation of the licensee fire protection program for the control of combustible materials in the plant.

b. Observations and Findings

Procedure SSP-12.15, Revision 14 (Effective March 29, 1996), Fire Protection Plan, Appendix E, Control of Combustibles, is the procedure used to control the transient fire loads in the plant. Appendix E Section 1.0 states that the control of transient fire loads is essential to TVA's defense-in-depth fire protection philosophy to ensure that controls are adequate for fire prevention, control, and suppression. This Appendix was not to be used for occupancy changes or introduction of transient combustibles for periods greater than six months. Transient fire load permits for greater than 6 months or storage resulting in occupancy classification changes were to be processed in compliance with SSP-9.3, Plant Modifications and Design Change Controls or SSP-12.4, Temporary Alterations Control Program. Appendix E, Section 4.J.3 required permits for high fire loads to be approved by the site Fire Protection Engineer.

The inspector toured the plant during the week of July 8-12 to observe the implementation of SSP-12.25, Appendix E for the control of transient combustibles. Two plant areas were identified which did not conform to the requirements of Appendix E. These were:

Auxiliary Building-Elevation 690: Protective Clothing Storage

Transient Fire Load Permit TFL-95-0254 was issued on November 14, 1995, with an expiration date of December 31, 1995, for the storage of radiation worker protective clothing on Elevation 690 of the auxiliary building between column lines A-4 and A-6. This permit listed the storage of combustibles as 1100 pounds of protective clothing and 400 pounds of rubber and plastic (boots, gloves, etc.) which were classified as having a high fire load. This storage area was located in a portion of the building that is equipped with automatic sprinkler protection; however, there were a number of safety related electrical raceways located directly above the storage area. Some of these raceways contained safe shutdown related cables and were enclosed with Thermo-Lag fire barriers.

When the inspector questioned the location of this combustible storage area and the expired transient fire load permit, the licensee informed the inspector that this material had been in this location for several years. The inspector concluded that this storage location did not conform to the requirements of SSP-12.25, Appendix E in that this material had been stored in this location for greater than 6-months, the transient fire load permit had expired, and engineering had not performed an appropriate occupancy change, design change or temporary alteration control to address this issue.

Auxiliary Building Elevation 669: Former Spare Room

The former spare room on elevation 669 of the auxiliary building was used for the storage of metal scaffolding, flammable liquids, and numerous miscellaneous items. The general housekeeping in this area during the week of July 8-12 was not good; however, workers were in the process of cleaning up this room. During the week of August 19 the housekeeping was found acceptable. This room was not provided with a fire detection or suppression system and was not suitable for use as a combustible storage area.

The inspector reviewed the transient fire load permits for this area and noted that the following permits were either issued for longer than six months, did not receive approval by the Site Fire Protection Engineer, or had not received an engineering analysis to justify the change in occupancy: Permit TFL-95-0033 (high fire load), issued February 5, 1995 and extended to December 31, 1996; Permits TLC-96-0003 (no fire load indicated) issued January 1, 1996 with

expiration date of December 31, 1996; Permit TFL-96-004 (medium fire load), issued January 1, 1996 with expiration date of December 31, 1996; and Permit TFL-96-0005 (no fire load indicated) issued January 1, 1996 with expiration date of December 31, 1996.

Previous TVA audits of the fire protection program identified problems with the control of combustibles and transient fire loads in the plant and in the spare room on elevation 669.

Technical Specification 6.8.1.f requires that written procedures shall be established, implemented and maintained covering fire protection program implementation.

Procedure SSP-12-15, Fire Protection Plan, Appendix E, Sections 1.0 and 4.0.B, C and F state that any transient fire load request for permits greater than 6 months, or determined to be occupancy classification changes, shall be processed by the originator in compliance with SSP-9.3, Plant Modifications and Design Change Controls or SSP-12.4, Temporary Alterations Control Program. Appendix E, Section 4.0.J.3, 4 and 5 requires the approval of the Site Fire Protection Engineer prior to the introduction of any "High Fire Load" into any safety related area of the plant.

For the two areas on elevations 669 and 690 of the auxiliary building, the requirements for control of transient fire loads were not met. The failure to promptly identify and resolve adverse conditions, specifically the storage of combustible materials within the plant, is identified as an example of Apparent Violation 50-327, 328/96-10-01, Inadequate Identification and Resolution of Fire Protection Deficiencies.

During the week of August 19-22, 1996, the inspector noted that all of the combustible materials in these two areas had been removed. The radiation worker clothing had been relocated to the cask decon collection tank room on elevation 669 of the auxiliary building and a transient storage permit had been issued for these materials. TVA was reviewing the location of combustible storage in this area and other plant areas and had a schedule to identify all permanent combustible storage areas and complete the required engineering analysis for these areas by November 1996.

c. Conclusions

For the areas reviewed, the control of combustible materials within the plant and the implementation of the transient fire load permit program were inadequate and ineffective. This item had previously been identified in TVA audits and is identified as an example of an apparent violation for failure to

take appropriate corrective action. TVA had initiated corrective action to resolve this issue.

F1.3 Fire Protection Improvement Plan

a. Inspection Scope

The inspector reviewed the status of corrective action on the 1991 TVA Fire Protection Improvement Plan for the Sequoyah plant.

b. Observations and Findings

In late 1990, TVA identified a number of fire protection discrepancies at Sequoyah. A fire protection improvement team was formed to evaluate these issues and make appropriate corrective action recommendations for management review. Following several TVA management meetings, a working meeting was held between TVA and the NRC on August 19, 1991, to discuss TVA's identified program weaknesses and proposed corrective actions. The commitments from this meeting were summarized in a TVA letter to the NRC dated October 4, 1991. These commitments consisted of 65 items identified as the 1991 Sequoyah Fire Protection Improvement Plan. These items were originally scheduled to be completed by December 1, 1994. Periodic status reports were submitted to the NRC. The final completion date was changed to August 30, 1996, in the periodic status report of December 1, 1995.

The inspector reviewed the completion status of these improvement items and noted that as of August 22, 1996, most of the items had been completed. Portions of the evaluations for some items had been completed but the final resolution had not been completed. Examples of these items include:

1. Fire barrier penetration seals: Inspections of all of the fire barrier electrical and mechanical penetration seals had been completed and preparation was in progress to stipulate on the engineering documents and drawings that each fire barrier penetration was bounded by a tested configuration. Resolution of design documentation problems remained for approximately 1500 penetrations from the original scope of approximately 24,500 penetrations. Completion of this item is scheduled for late 1997.
2. Upgrades to the HPFP system: The design change packages to replace the existing raw water fire protection water system with a potable water supply system have been completed and the construction of these upgrades were scheduled to be completed by late 1997.

3. Fire Protection Report: The fire protection report, including revisions to the Fire Hazards Analysis, were in progress and were scheduled to be completed by August 30, 1996. A copy of this report will be sent to the NRC for review. In addition, TVA will request an amendment to the operating license to remove the fire protection requirements from the TS. This request will be sent to the NRC in late 1996.

The Fire Protection Report will place all of the TVA Sequoyah fire protection commitments in a single document. The report will also include the operability and surveillance requirements of the fire protection systems and features.

c. Conclusions

The inspector's review indicated that most of the Fire Protection Improvement Plan items had been completed. Examples of the items not yet completed were fire barrier penetration seal engineering data, construction of the new water supply system, and submittal of the Fire Protection Report.

The improvement plan resulted in a number of enhancements to the fire protection program, such as:

- Development of the Fire Protection Report to include all fire protection commitments and requirements in a single document.
- Preparation of an up to date Fire Hazards Analysis to describe the hazards and fire protection features in each plant area.
- Development of an engineering document to provide design requirements and fire test data for each fire barrier electrical and penetration seal. This had been a long-standing issue at Sequoyah.
- Generated appropriate design change modification packages for the installation of the fire pumps and water storage tanks using potable water to replace the existing river water fire pumps.
- Provided a number of general enhancements of the site's fire protection procedures and program. Three examples of significant enhancements include the provision of fire protection training to the engineering staff, development of hydraulic data for the fire protection water system to aid in the analysis of degraded fire protection piping systems, and the issuance of revised Pre-fire Plans.

F2 Status of Fire Protection Facilities and Equipment (64704)

F2.1 Status of High Pressure Fire Protection System

a. Inspection Scope

The inspector reviewed the reliability status of the high pressure fire protection (HPFP) system.

b. Observation and Findings

The inspector reviewed two recent reports prepared by the system engineer responsible for the HPFP system.

HPFP SYSTEM STATUS REPORT

The 1996 third quarter status report for HPFP system indicated the HPFP system status was "Yellow" or in need of improvement, due to:

- Microbiological Induced Corrosion (MIC) problems in the HPFP system. Three small pin hole size MIC related leaks were identified during the third quarter. There were a total of 15 small leaks in the system. Correction was not scheduled until late 1997. These repairs were to be made after construction of the new fire protection water system has been completed.
- HPFP pumps operated most of the quarter to support chemistry water processing, chlorination and system flushing. Continuing operation of the fire pumps resulted in cavitation downstream of the fire pumps which deteriorated the interior wall of the pipe. Recent ultrasonic examinations revealed that a section of this piping needed to be replaced. This section of piping was scheduled to be replaced in September 1996 by Work Request C326772.
- Electric motor for HPFP Pump 2A-A was replaced by an electric motor that was reworked by an unapproved vendor. This pump was considered available but not operable until the appropriate evaluation was completed and the pump passed the TS operability test. After the Third Quarter report was issued, the motor rework was approved, the pump passed the surveillance test and was considered operable.

SPECIAL SYSTEM ENGINEER'S REPORT ON HPFP SYSTEM STATUS

The HPFP System Engineer's August 22, 1996, Special Report on HPFP System Status provided information on the history of the HPFP system, hydraulic flow data, results of pump tests, MIC leaks, new HPFP system, and current system status.

A new HPFP water supply system, consisting of two fire pumps and two 300,000 gallon tanks, was scheduled to be constructed in 1997. This system will separate the fire protection water system from the raw service water system.

The existing HPFP system was previously perceived by TVA to have performance problems. However, a TVA evaluation concluded that these problems were due to testing methodology and instrumentation inaccuracies. Approximately 15 MIC related piping system leaks existed in the system. These were small pin hole leaks and the number of new leaks were occurring at a rate of about one new leak per two months (six per year). Major new leaks were being repaired but repairs to small pin hole leaks had been deferred until the construction of the new fire protection water system. This schedule would result in the system being taken out of service only once for repair or replacement of the piping and valves with the MIC leaks in the auxiliary building. These leaks did not appear to affect the operability of the system. TVA's evaluation and monitoring of this system concluded that there was not a concern for the structural integrity of the HPFP piping system.

TVA's report indicated that the existing HPFP water system meets the fire protection design requirements. Flow test data for the plant's automatic sprinkler systems, performed in January 1993, December 1993, December 1994 and December 1995, exceeded the design requirements. Flow tests for the exterior yard mains, performed in 1993, 1994 and 1995, indicated satisfactory volumes of water were available to meet the fire protection demands for the safety related areas of the plant. These tests also indicated that the flow capacity of the system remained constant, i.e., no significant reduction in available flow.

The annual surveillance flow tests performed on the four HPFP pumps during 1992 through 1996 indicated that these pumps met the requirements of the TS.

c. Conclusions

Based on review of the system engineer's data on the HPFP system and other report data, the inspector concluded that the available flow and pressure from the HPFP system met the requirements of the TS. However, in view of the

MIC related problems, replacing the existing fire protection river water system with a potable water supply system will be a major fire protection program improvement.

F6 Fire Protection Organization and Administration (64704)

A new Fire Protection Manager was appointed in July 1996. Organizational and responsibility changes were also made in July 1996. The Fire Protection Manager previously reported to the Operations Manager via an Operations Supervisor and Operations Support Superintendent. Currently, the Fire Protection Manager reports directly to the Operations Manager.

Additional organizational and staffing changes have been proposed.

CURRENT

Fire Protection Manager
Fire Protection Supervisor
Fire Protection Engineer
Fire Marshall
Fire Brigade (5 Shifts)
Foreman (Brigade Leader)
Two Fire Operators/Fire Brigade
Two AUO Fire Brigade Members
(Assigned to Operations)

Total assigned: 21

PROPOSED

Fire Protection Manager
Fire Protection Engineer
Fire Marshall
Fire System Engineer
Fire Brigade (5 Shifts)
Foreman (Brigade Leader)
Four Fire Operators

Total proposed: 30

TVA's schedule was to complete the staffing for the proposed organization by late 1996.

The inspector concluded that the changes to the fire protection organization and staffing were positive improvements.

F7 Quality Assurance in Fire Protection Activities

F7.1 Nuclear Assurance and Licensing Fire Protection Audits (64704)

a. Inspection Scope

The inspector reviewed the results of the licensee's QA audits of the fire protection program and the corrective actions initiated in response to the audit findings and recommendations.

b. Observations and Findings

During an inspection in February 1996, as documented in NRC Inspection Report 50-327, 328/96-02, the inspector noted that although comprehensive audits of the plant's fire protection program were being performed, the corrective actions on identified findings were not being completed in a timely manner, as follows:

NOTE: The inspection status evaluation for each item is contained in the bracketed "[]" sentence at the end of each issue.

1992 Audit:

- * Inadequate emergency lighting installation and an inadequate preventive maintenance program for installed lighting units. [The installation of new lighting units had been completed with the field testing and preventive maintenance procedure revisions in progress.] (SQFIR920077209)

1994 Audit:

- * No restoration program for approximately 1500 degraded fire barrier penetration seals. [Engineering design data input was scheduled for early 1997. As of this inspection, no date had been proposed for completion of required modifications.] (SQ940019PER, SQ940466PER, and SQ961363PER)
- * Inadequate procedures for the evaluation and control of transient combustibles. [Procedures had been revised but had not been effectively implemented. The issue associated with the storage of combustible materials in the plant was scheduled for resolution by November 1996.]
- * Inadequate design control over fire barrier penetration seals. [Resolution of this issue is scheduled for late 1997.] (SQ940019PER, SQ940466PER, and SQ961363PER)

1995 Audit:

- * Changes were being made to the plant without following the design change process, i.e. inadequate controls over plant changes which affect the fire protection program. [This issue was scheduled to be resolved by 1997.] (SEQ950428)

- Controls were not in effect to retain the operability of the structural steel fireproofing supporting the floor above the cable spreading room. [TVA planed to maintain this fireproofing material on the structural steel supporting the control room flooring. Repairs to the damaged or missing fire proofing materials were in process during this inspection.] (SQ960468PER)
- * Testing of the backup cable spreading room fire suppression system for the cable spreading room had not been performed since 1982. [TVA plans to install a blind flange in this system and remove it from service. The design change package was scheduled to be issued September 15, 1996. No schedule date was provided for completion of this plant change.] (SQ950382PER and SQ960468PER)
- Errors were noted in the Fire Hazards Analysis. [These errors were scheduled to be corrected by August 1996.] (SQ950368PER)

1996 Audit:

TVA's audit No. SSA9604 of the Sequoyah Fire Protection Program dated May 10, 1996, found the program not fully adequate due to continuing implementation problems and recurring program deficiencies. TVA's corrective actions on previous audit findings had not been effective in resolving long-standing problems. The audit report stated that immediate management attention and improvement were required. The audit findings, adverse conditions and recommendations included:

Findings

- Design requirements for inspection of fire barriers were not translated into plant surveillance instructions and conflicts were identified with visual inspection criteria. [This item was scheduled to be completed by November 29, 1996.] (SQ960886PER and SQ960888PER)
- Two implementation problems were identified related to the failure to perform visual inspections of fire barrier penetrations as required by the TS. [This item was scheduled to be resolved by September 1, 1996.] (SQ960796PER and SQ960854PER)
- Tracking, prioritization and resolution of long-term fire protection problems and previous audit findings had not been fully effective. Lessons learned from other nuclear utilities, including TVA plants, were not adequately evaluated to prevent similar issues at Sequoyah. The timeliness of corrective actions on previous audit findings was

inadequate. These included: correction of Appendix R emergency lighting issues; continuous use of TS compensatory actions due to impairments to fire doors and fire barrier penetration seals; fragmented organizational structure with no overall responsible manager of the fire protection program; and Fire Hazards Analysis and UFSAR discrepancies and errors. [Resolution of these issues were being discussed by TVA and no completion date had been scheduled.] (SQ960928PER)

Outstanding Audit Adverse Conditions

- A number of fire doors separating safety related redundant divisions were not alarmed as required by the fire protection commitments. [Correction of this issue was scheduled to be resolved by November 29, 1996.] (SQ960783PER)
- Some Appendix R emergency lighting units have batteries that exceed the 10 year expected life and 8 year preventive maintenance replacement schedule. Most Appendix R lighting units were installed in 1985. [The initial 8 year change out was in process during this inspection.] (SQ960955PER)
- Records were not available to provide documented evidence that the fire brigade members had received training on protective clothing. [Resolution of this item was in process.] (SQ960885PER)
- Several minor fire protection related discrepancies were noted in UFSAR Section 8. [Resolution of this item was in process.] (SQ960887PER)
- The original Fire Hazards Analysis used as the basis for the fire protection system design is referenced in the UFSAR but was not retrievable from the Technical Information Center. [This item had been completed and was in the closure review process.] (SQ960782PER)

Audit Recommendations

- Consider increasing visibility of fire protection impairments and other fire protection issues with a weekly presentation to the plan of the day committee as was being done at the other TVA nuclear plants.
- Consider improving the public address system so that it can be heard in all plant areas, such as 500kv switchyard and elevation 669 of the control building.

- Ensure management expectations are fully understood concerning the evaluation and incorporation of the existing commitments into the fire protection report.
- Evaluate long term non-conformance issues for unresolved safety question determination.

TVA had assigned a Problem Event Report number to address the concerns for resolving fire protection related issues. Corrective action on most of the May 1996 audit items were in the initial implementation stages. It was too early to evaluate the effectiveness of this corrective action.

The Sequoyah TS for Units 1 and 2, Section 6.8.1.f, requires that written procedures shall be established, implemented and maintained covering the fire protection program implementation.

TVA's Nuclear Quality Assurance Plan (NAQP), TVA-NQA-PL89-A provides a complete description of the quality assurance program for operation of the Sequoyah Nuclear Plant. NAQP TVA-NQA-PL89-A, Section 5.0 identifies the programs and features to which the NAQP applies. Section 5.0.B.6 lists fire protection as one of these programs.

NAQP, TVA-NQA-PL89-A, Section 10.2.2.B, Corrective Action for Adverse Conditions, states: TVA nuclear organizations and onsite non-TVA nuclear service organizations performing quality-related activities at nuclear facilities shall promptly identify and resolve adverse conditions.

The failure to promptly identify and resolve adverse conditions identified during quality assurance audits of the fire protection program, specifically six specific findings from the audits of October 9, 1992, August 1, 1994, and July 14, 1995, is identified as an example of Apparent Violation 50-327, 328/96-10-01, Inadequate Identification and Resolution of Fire Protection Deficiencies. **Note that the six specific findings are annotated by an "" in the report text.**

c. Conclusions

Comprehensive audits and self assessments of the Sequoyah fire protection program were performed. However, resolution of identified discrepancies was not accomplished in a timely manner and adequate changes were not implemented to prevent recurrence. This was identified as a violation.

TVA initiated fire protection program management and organizational responsibility changes in July 1996. It was too soon to determine the effectiveness of these changes.

F8 Miscellaneous Fire Protection Issues

F8.1 (Closed) LER 327/93-027, Degraded Fire Dampers as a Result of a Failure to Install the Dampers in accordance with Design Drawings.

TVA identified approximately 326 fire dampers which failed to meet the vendor's design and installation requirements. These fire dampers had been in a degraded condition since initial licensing. The principal discrepancy was the installation of the dampers in concrete walls and floor penetrations without the required clearance to permit thermal expansion in the event of fire.

TVA performed detailed evaluations and determined that the installation of 318 dampers was adequate and no additional modifications were required. This decision was based on the installation location of the dampers, low combustible loading in the areas on each side of the fire barrier where the damper was installed, and the fire detection and suppression systems provided. A total of 8 fire dampers were required to be modified to meet the design requirements. This work is scheduled to be completed in FY 1998. A roving fire watch was provided for all of these degraded fire dampers as required by TS Section 3.7.12.

The inspector reviewed the locations of the eight fire dampers to be replaced and noted that six of these dampers were located in the walls separating the auxiliary control room from the four auxiliary control instrument rooms. One damper was in the wall separating 125v battery room II from 6.9kv board room A and the remaining damper to be replaced was in the wall separating 125v battery room III from 6.9kv board room B. These dampers were to be replaced to assure separation from the two redundant safe shutdown trains.

The inspector reviewed the following calculations and found that these calculations were satisfactory:

- | | | |
|---|----------------------------|--|
| - | SQN-26-DO53 EPM-VTI-101994 | 86-10 Evaluation of Diesel Generator Building Fire Dampers |
| - | SQN-26-DO53 EPM-VTI-113094 | 86-10 Evaluation of Control Building Fire Dampers |
| - | SQN-26-DO53 EPM-VTI-120894 | 86-10 Evaluation of Auxiliary Building Fire Dampers |
| - | SQN-26-DO53 EPM-VTI-082895 | 86-10 Evaluation of Remaining Fire Dampers |

DCN S-11786-A

86-10 Evaluation of Seven Fire Dampers

NRC Inspection Report 50-327, 328/94-09, Paragraph 7.a, contains additional information on this LER and an assessment of TVA corrective action.

TVA's evaluation determined that the root cause of this event was construction personnel not following design drawings during the initial installation of the fire dampers.

The corrective actions included establishing fire watches in the safety related areas where the fire dampers were installed and performing engineering evaluations to determine which dampers were required to be replaced.

TS 3.7.12 requires all fire barrier penetrations (including fire dampers) to be functional at all times in fire zone boundaries protecting safety related areas. Fire dampers were installed in the various walls and floors to provide a fire rated separation from redundant safety related components. The fire dampers at Sequoyah had been inspected by the licensee a number of times during construction and pre-operational and surveillance testing activities. These inspections failed to identify that the dampers were not installed in accordance with the vendor's requirements. The failure to promptly identify and the resolve adverse conditions associated with the fire dampers is identified as another example of Violation 50-327, 328/96-10-01, Inadequate Program for Identification and Resolution of Fire Protection Deficiencies.

This LER is closed. The corrective action will be reviewed as part of the resolution for this violation.

F8.2 (Closed) LER 327/95-018, Inoperability of the Carbon Dioxide System for the Computer Room Resulting from an Inadequate Design Change.

On December 18, 1995, during a review of plant HVAC systems, TVA identified that HVAC ducts passing through the computer room on elevation 685 of the control building had been provided with new outlets. These outlets were not equipped with dampers to close upon actuation of the computer room CO₂ system. This resulted in the CO₂ system being inoperable since the supply and exhaust air flow from these openings would exhaust the CO₂ from the room if the fire protection extinguishing system activated. The system was removed from service on December 18, 1995 and the room added to the roving fire watch detail. Current plans are to install the appropriate dampers in 1997.

The modifications to the HVAC system were performed in May 1990. The NRC inspector noted that surveillance functional and operability testing had been performed on the computer room CO₂ system in April 1991, August 1992, June 1994 and December 1995. These tests did not identify that the system did not meet the design requirements.

TVA identified the root cause of this event to be personnel error by the designers during the design phase. The designers failed to recognize that the HVAC system changes affected the isolation of the computer room and had an adverse effect on the fire suppression system for this room. Also, the design change failed to receive the required fire protection and 10 CFR 50 Appendix R reviews.

TS 3.7.11.3 requires the CO₂ system for the computer room to be operable whenever the equipment protected by the system is required to be operable. The failure to maintain the CO₂ for the computer system operable is identified as Apparent Violation 50-327, 328/96-10-02, Inoperable CO₂ System.

This LER is closed. The corrective action will be reviewed as part of the resolution for this violation.

F8.3. (Closed) LER 327/96-002, Surveillance Requirements Associated with Fire Protection Hose Station Were Not Performed as Required by Technical Specifications.

On February 15, 1996, TVA discovered that the surveillance requirements for the fire hose inside containment was not hydrostatically tested as specified by TS Section 4.7.11.4. On November 10, 1990, the surveillance instructions contained in Procedures 1/2-SI-FPU-026-191.R, Fire Hose Inspection, for the fire hose stations inside containment were revised by removing the requirement to verify that fire hose installed inside containment had been hydrostatically tested within three years of the conclusion of a fuel cycle. The fire hose inside containment was replaced with new fire hose every three years during a refueling outage. Subsequent investigation by TVA found that the fire hose for 9 of the 24 hose stations for the Unit 1 annulus had not been tested within three years. The fire hose on these 9 stations was replaced with new fire hose on February 29, 1996. The fire hose in the Unit 1 lower containment had been replaced with new hose in September 21, 1995 which had been tested by the manufacturer in January 1995.

The fire hose for the Unit 2 annulus was replaced May 7, 1996, by a fire hose which had been tested on May 6, 1996. The fire hose for the Unit 2 lower containment was replaced April 30, 1996, with new fire hose which had been

hydrostatically tested on April 30, 1996. TVA's corrective action of replacing this hose with properly tested hose was satisfactory.

TVA determined that the root cause of this event was an improper procedure revision and inadequate procedure review of procedures 1/2-SI-FPU- 026-191.R during the performance of the revision. Specifically, the procedures did not require that the date of the hydrostatic test of the replacement fire hose be verified prior to installation. This permitted fire hoses to be installed which did not meet the test requirements of the TS.

TS Section 4.7.11.4.c.2 requires that each of the fire hose stations shown in Table 3.7-5 shall be demonstrated operable at least once per 3 years by conducting a hose hydrostatic test at a pressure of 150 psig or at least 50 psig above maximum fire main operating pressure, whichever is greater. The hose stations installed in the Reactor Buildings are listed in Table 3.7-5.

Between November 10, 1990 and February 15, 1996, TVA's surveillance instructions for Procedures 1/2-SI-FPU-026-191.R for the reactor building fire hose stations were inadequate in that these procedures did not assure that the fire hose for these locations would be hydrostatically tested as required by TS Section 4.7.11.4.c.2. This issue, is identified as Apparent Violation 50-327, 328/96-10-03, Inadequate Surveillance Procedures for the Fire Hose Stations inside the Reactor Buildings.

F8.4. (Closed) LER 327/96-03, Failure to Perform Surveillance Requirements for Penetration Fire Barrier Inspections as required by the TS.

On March 25, 1996, TVA discovered that the fire barriers in the high radiation areas of the auxiliary building had not been included in the fire barrier surveillance inspections performed in August 1995 and March 1994.

The root cause of this event was personnel error. The surveillance performer and reviewer incorrectly believed that fire barrier inspections were not required if access to a plant area was restricted by radiological conditions such as high radiation.

All of these fire barriers were inspected and requirements were discussed with the appropriate personnel. This corrective action was satisfactory.

TS 3.7.12 Section 3.7.12 requires all fire barrier penetrations to be functional at all times in fire zone boundaries protecting safety related areas. TS 4.7.12 requires each fire barrier penetration to be verified to be functional at least once per 18 months. The failure to verify that all of the fire barrier

penetrations were functional is identified as Apparent Violation 50-327, 328/96-10-04, Failure to Perform Fire Barrier Penetration Seal Inspections.

- F8.5 (Closed) Violation: 50-327, 328/96-02-07, Inadequate Storage and Maintenance of Fire Pumps and Components in Long Term Storage.

TVA responded to this violation by letter dated May 22, 1996. The inspector reviewed the corrective action and verified that this action was appropriate and satisfactorily implemented.

Management Meetings

X1 Exit Meeting Summary

The inspectors presented the inspection results to members of licensee management at the conclusion of the inspection on August 22, 1996. The licensee acknowledged the findings presented.

The inspectors asked the licensee whether any materials would be considered proprietary. No proprietary information was identified.

PARTIAL LIST OF PERSONS CONTACTED

Licenses

- *Adney, R., Site Vice President
- *Baron, R., General Manager Nuclear Assurance and Licensing
- *Casey, J., Fire Protection Manager
- *Edwards, W., Engineering Task Manager
- *Fecht, M., Nuclear Assurance & Licensing Manager
- *Flippo, T., Site Support Manager
- *Heatherly, I., Nuclear Engineering-Mechanical/Nuclear
- *Jutice, W. Nuclear Engineering Safety Analysis Supervisor
- *Kent, C., Radcon/Chemistry Manager
- *Lagergren, B., Acting Operations Manager
- *Meade, K., Compliance Manager
- *Rupert, J., Engineering and Support Services Manager
- *Salley, M., Corporate Engineer, Fire Protection
- Shell, R., Site Licensing Manager
- *Smith, J., Regulatory Licensing Manager
- *Summy, J., Assistant Plant Manager
- *Zerinque, O., Senior Vice President, Nuclear Operations

*Attended exit interview

INSPECTION PROCEDURES USED

- IP 64704: Fire Protection Program
- IP 92901: Followup-Plant Operations
- IP 92904: Followup-Plant Support

ITEMS OPENED AND CLOSED

Opened

<u>Type</u>	<u>Item Number</u>	<u>Status</u>	<u>Description and References</u>
EEI	50-327, 328/96-10-01	OPEN	Inadequate Identification and Resolution of Fire Protection Deficiencies. (Sections F1.2, F7.1, and F8.1)
EEI	50-327, 328/96-10-02	OPEN	Inoperable CO ₂ System. (Section F8.2)

EEI	50-327, 328/96-10-03	OPEN	Inadequate Surveillance Procedures for Fire Hose Stations Inside Reactor Buildings. (Section F8.3)
EEI	50-327, 328/96-10-04	OPEN	Failure to Perform Surveillance Inspections of Fire Barrier Penetration Seals. (Section F8.4)

Closed

<u>Type</u>	<u>Item Number</u>	<u>Status</u>	<u>Description and References</u>
LER	327/93-027	CLOSED	Degraded Fire Dampers as a Result of a Failure to Install the Dampers in accordance with Design Drawings. (Section F8.1)
LER	327/95-018	CLOSED	Inoperability of the Carbon Dioxide System for the Computer Room Resulting from an Inadequate Design Change. (Section F8.2)
LER	327/96-002	CLOSED	Surveillance Requirements Associated with Fire Protection Hose Stations Were Not Performed as Required by Technical Specifications. (Section F8.3)
LER	327/96-003	CLOSED	Failure to Perform Surveillance Requirements for Penetration Fire Barrier Inspections as required by the TS. (Section F8.4)
VIO	50-327, 328/96-02-07	CLOSED	Inadequate Storage and Maintenance of Fire Pumps and Components in Long Term Storage. (Section F8.5)

LIST OF ACRONYMS USED

CFR	-	Code of Federal Regulations
EEI	-	Escalated Enforcement Item
kV	-	Kilo-Volt
LER	-	License Event Report
NQAP	-	Nuclear Quality Assurance Plan
NRC	-	Nuclear Regulatory Commission
PER	-	Problem Evaluation Report
PSIG	-	Pounds per Square Inch Gage
SI	-	Surveillance Instruction
SSP	-	Site Standard Practices
TS	-	Technical Specification
TVA	-	Tennessee Valley Authority
UFSAR	-	Updated Final Safety Analysis Report
URI	-	Unresolved Item
VIO	-	Violation
WO	-	Work Order
WR	-	Work Request