



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

Report Nos.: 50-327/92-14 and 50-328/92-14

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: May 4 through May 8, 1992

Lead Inspector: *f. s. mellen*
U. S. Mellen, RII Reactor Inspector Date Signed *5/29/92*

Inspectors: P. M. Madden, NRR, Senior Fire Protection Engineer
S. M. Shaeffer, Sequoyah Resident Inspector

Accompanying Personnel: J. T. Munday, Browns Ferry Resident Inspector

Approved by: *[Signature]*
for Richard V. Crljenjak, Chief,
Operational Programs Section Date Signed *6/1/92*

SUMMARY

Scope:

This was a special team inspection in the area of plant fire protection operability, fire protection program implementation, adequacy of fire protection system testing, and review of root causes for past fire protection system problems. The inspection focused on the recent history of LERs and other reports that concerned the fire protection program implementation and material condition of the existing system.

Results:

The licensee has demonstrated increased management awareness in the area of fire protection since May 1991. The inspection concluded with one apparent violation for a programmatic breakdown in the fire protection program that occurred for an indeterminate time before May 1991. This programmatic breakdown resulted in multiple violations of the fire protection license condition.

REPORT DETAILS

1. Persons Contacted

Licensee Employees

- *C. Baker, Fire Protection Engineer
- *R. Beecken, Plant Manager
- S. Carter, System Engineer
- *M. Cooper, Site Licensing Manager
- *T. Davis, Senior Fire Protection Specialist
- *T. Flipppo, Quality Assurance Manager
- K. Frazier, System Engineer
- J. Gates, Technical Support Manager
- *M. Heatherly, Appendix R Coordinator
- H. Hustead, Manager Fire Protection Services
- *P. Johnson, Fire Protection Training Coordinator
- C. Kent, Radiological Control Manager
- M. Lorek, Operations Superintendent
- *P. Lydon, Operations Manager
- *M. Meade, Compliance Engineer
- J. Miller, Maintenance Electrical Group Supervisor
- *W. Pruett, Monitoring Manager
- *R. Rausch, Modification Manager
- R. Rogers, Technical Support Manager
- *T. Ryan, Fire Protection Manager
- *A. Salatka, Senior Fire Protection Specialist
- *M. Salley, Engineer Specialist
- V. Shanks, Senior Fire Protection Specialist
- *J. Smith, Regulatory Licensing Manager
- P. Steward, Acting Fire Protection Supervisor
- *R. Thompson, Compliance Licensing Manager
- *P. Trudel, Nuclear Engineering Manager
- *J. Watts, Quality Assurance Specialist
- *J. Wilson, Site Vice President

NRC Employees

W. Holland, Senior Resident Inspector
P. Kellogg, Chief, Division of Reactor Projects Section 4A

*Attended exit interview.

Other licensee employees contacted included control room operators, Technical Support, and Fire Protection personnel.

The acronyms used in this report are listed in Paragraph 14.

2. High Pressure Fire Suppression Water System

The HPFP system provided the raw water for the water spray systems, preaction sprinkler systems, fire hose racks, and fire hose connections. There were several recent licensee documents that chronicled concerns or inadequacies with HPFP system. The inspectors reviewed the corrective actions for these items. The inspectors also reviewed the current HPFP system configuration.

a. Evaluation

URI 327, 328/91-08-02, Adequacy of the Backup Fire Suppression System. NRC Inspection Report 327, 328/91-08 detailed an event discovered on May 6, 1991. The licensee learned the HPFP system was inoperable based on a review of completed SI 0-SI-SFT-026-002.0, Auxiliary Building Fire Protection System Hydraulic Performance Verification. The April 2, 1991, SI performance did not meet the test acceptance criteria. Violation 327, 328/91-08-03 cited the SI performance by an unqualified test director. This is further discussed in paragraph 5. Attempting to return the HPFP system to operable status, the licensee performed the SI twice within the 24 hour period allowed by TS 3.7.11.1. The TS required backup HPFP system establishment within 24 hours if the normal HPFP system could not perform its function. Partial performance of the second test yielded unsatisfactory results, despite correct test performance and pressure adjustment within the HPFP system limitations. The licensee did not meet the TS Action Statement time requirements and erroneously concluded they had established an operable backup HPFP system although the HPFP system had not been adequately tested.

The inspectors discussed the requirements for an operable backup HPFP system with licensee management. The inspectors were initially informed management believed the TSs did not require the backup HPFP system to be the equivalent of the normal HPFP system. The licensee did not perform any hydraulic calculations to provide assurance that the degraded HPFP system would deliver the design flow and pressure. The licensee initially concluded the original HPFP system was not significantly degraded. This was based on the partial results of the second HPFP system test. The licensee could not determine an analytical value for the HPFP system's capability. The inspectors determined the licensee's initial decision to use the degraded HPFP system was not consistent with the TS requirement for establishment of a backup HPFP system. The licensee did not appropriately add external water supplies or take other actions to ensure the backup HPFP system was the equivalent of the normal HPFP system. Additionally, the licensee's conclusions of the backup HPFP system's adequacy were inappropriately based on partial results of an unsuccessful SI.

The inspectors reviewed the licensee's subsequent analysis of the degraded HPFP system condition. The licensee indicated the available flow rate and pressure did not meet the established

surveillance test acceptance criteria; however, they claimed the remaining fire suppression capability was considered adequate to enable both units to reach safe shutdown conditions. The licensee's analysis indicated the most probable fire in the Auxiliary Building would actuate a maximum of ten sprinklers in the area of highest demand and would result in a flow of 396 gallons per minute. The licensee's analysis found that this flow condition could be met based on the data collected during the flow test conducted on April 2, 1991. The licensee analysis concluded the degraded system was adequate to meet the backup criteria of TS Action Statement (b) (1) for LCO 3.7.11.1. The inspectors found the licensee's designated backup HPFP system (the degraded HPFP system) not acceptable to meet the flow requirements established in the licensing basis. By letter dated July 2, 1987, the licensee requested a change to TS 3/4.7.11, Fire Suppression Systems, to reflect changes in the flow and pressure requirements of the high pressure fire protection system pumps. On January 25, 1988, the NRC issued an SER addressing this request. The SER approval was based on the most critical fire flow demand in the reactor Auxiliary Building. The licensee determined the most limiting fire flow demand was at deluge valves 0-26-1521 and 0-26-2066. The demand required at these valves was determined to be 1170 gpm. This flow rate included a 250 gpm allowance for manual fire fighting hose streams. Therefore, from April 2, 1991, to the time the system was restored to an operable status on December 30, 1991, the licensee was operating the high pressure fire water suppression system outside the approved design basis. In addition, the licensee failed to adequately establish a backup high pressure fire water suppression system which could meet the most critical reactor Auxiliary Building fire flow demand.

The licensee's long term corrective actions to assure the adequacy of the high pressure fire protection water supply system were adequate. The redesigned system will include the elimination of HPFP system raw water supply to other systems, install two diesel fire pumps; jockey system pressure pump; and two 300,000 gallon active capacity fire protection water storage tanks. In addition, the existing fire pump design will be maintained and will provide redundant backup to the proposed diesel fire pumps.

LER 327/91-009, Operation with Inoperable Auxiliary Building Fire Suppression System Because of Inadequate Test Performance and Review. The FPU engineering group found surveillance test results did not ensure operability of the HPFP system. After the HPFP system review, the licensee declared the HPFP system inoperable and entered the TS LCO Action Statement. The licensee adjusted HPFP system pressure and declared the backup HPFP system acceptable. NRC Inspection Report 327, 328/91-08 contains a discussion of this event. Further corrective actions ensured the refurbishment of HPFP system components. Following the test, the licensee returned the HPFP system to the original design pressure and returned the system to an operable status. LER 327/91-009, revision 1, documented the

licensee's subsequent actions. In response to this issue and other fire protection program problems the licensee began a Fire Protection Improvement Plan. Based upon this review, the licensee has adequately addressed this area.

LER 327/91-009, revision 1, documented the licensee's subsequent investigation. This investigation revealed the Auxiliary Building HPFP system was about 85 percent degraded following the April 2, 1991, SI test. The licensee used engineering judgement to account for inconsistencies introduced by their inadequate test performance. This evaluation concluded the system degradation for the most probable fire was between 20 and 30 percent. The May 1991 HPFP system test changed as-found pressure control valve conditions. The HPFP system test did not produce quantifiable HPFP system flow degradation results. If analytical results had been calculated, they would have been between the 30 and 85 percent values.

LER 327/91-020, Action Provisions of LCOs 3.7.11.2 and 3.7.11.4 Could Not Be Complied With Following Loss of Fire Suppression Water System Pressure. The failure of test performers/directors to follow approved plant test procedures caused this event. The HPFP system was in an unauthorized valve alignment. This alignment caused the depressurization of all HPFP system headers, and subsequent HPFP system inoperability. This included the system that was the backup required by TS 3.7.11.1 LCO Action Statement b.1. This backup was required because of the inability of the HPFP system to meet flow rate and pressure requirements as reported in Special Report 91-04, dated May 20, 1991, and LER 327/91-009, dated June 5, 1991. The licensee inappropriately performed steps of SI-73.4, "Fire Pump 2B-B Performance Test", out of sequence. The licensee further exacerbated the problem by failing to document the plant configuration adequately. Upon discovery of the condition, the licensee took action to restore the HPFP system to a normal configuration. An Operations Review Team was established to review and evaluate the event. This information was presented to operations personnel as "lessons learned."

LER 327/92-003, Fire Suppression Valve Positions Inside Containment Not Verified Because of a Deficient Procedure. On January 27, 1992, the licensee found that four HPFP system valves in containment did not satisfy TS Surveillance Requirement 4.7.11.2.a. The TSs required a monthly operability demonstration for the HPFP system in the reactor building reactor coolant pump area or annulus. This demonstration included verification that each valve in the flow path was in its correct position. The licensee later determined the HPFP system valves were in the required position. The root cause of the event was an inadequate review of TS Surveillance Requirement by individuals preparing the SI for the TS Surveillance Requirement. Corrective actions included revision to the SI to include checking the positions of these valves on a 31 day frequency. Other SIs were scheduled to be reviewed to identify and correct similar procedural deficiencies. The scheduled completion date is August 8, 1992. The

licensee is considering a TS change to waive the verification of valve positions for locked containment valves. This was based on the safety benefit versus accumulated exposure.

b. Conclusion

Operating License DPR-79, Section 2.C.(13)a, for Unit 2 requires that TVA shall maintain in effect all provisions of the approved fire protection plan and the NRC staff's Fire Protection Review in the Sequoyah Safety Evaluation Report and Supplements. The NRC in their Safety Evaluation Report dated January 25, 1988, approved the licensee's July 2, 1987, request to change the Critical Fire flow and pressure requirements in the Auxiliary building.

The requirement listed above was not met in that the backup HPFP supply was either unavailable or incapable of supplying the required volume of water at the required discharge pressure as required by the SER. This example is combined with the examples in Fire Barriers (FB) (Paragraph 3), Fire Watches (FW) (paragraph 4), Training (paragraph 5), and Transient Combustibles (TC) (Paragraph 6). Collectively these examples are identified as Violation 328/92-14-01.

3. Fire Barriers

As a result of the licensee's fire protection improvement program, the licensee initiated a program to ensure the long term configuration control of fire barriers. The licensee as a part of this program initiated a review of the required TS Surveillance instructions associated with the plant's fire barrier assemblies (i.e., fire doors, fire dampers, and penetration seals).

a. Fire Barrier Penetration Seals

LER 327/91-010, Failure to Conduct Visual Inspection of Expansion Joint Seals Previously Not Considered to be Fire Barriers and Discovery that Seal Material Does Not Meet Fire Barrier Requirements. The event involved licensee identification of FB seals between the Reactor Building shield walls and the Auxiliary Building that were inappropriate. The licensee entered the required TS Action Statements and posted the required FW. Corrective actions included visual inspections of FB seal integrity. Subsequent testing proved the expansion joint material was qualified as a FB. Calculation SQN-00-DO52 EPM-MHS-112391, revision 0, documented the final test results. The calculation concluded the as-constructed design was qualified as an ASTM E119 three-hour FB. Based on these results, the inspectors considered the licensee's corrective actions complete.

LER 327/91-008, Inoperable Penetration Seals That Were Not Inspected or Identified as a Result of a Deficient Procedure. On April 29, 1991, the licensee identified the visual inspection required by TS

4.7.12 had not been completed. The licensee discovered technical inadequacies in SI-233.1E, Mechanical Penetration Fire Barrier Visual Inspection, during their investigations of previously identified FB discrepancies. These included inadequate acceptance criteria. The root cause of the event was an inadequate SI. Penetration inaccessibility also contributed to the problem. NRC Inspection Report 327, 328/92-02 concluded the licensee's corrective actions were adequate.

LER 327/91-013, Inoperable Penetration Seals That Were Not Inspected or Identified as a Result of a Deficient Procedure. On June 13, 1991, the licensee identified a nonfunctional penetration seal during a walkdown associated with corrective actions to ensure the wall provided a proper fire barrier. The nonfunctional seal was located in the wall containing Door C22, separating the Unit 1 auxiliary instrument room from the corridor, above the corridor drop ceiling. The subject penetration was sealed on one side of the wall with gypsum board over the sleeve and around the conduit. This condition was not a qualified fire barrier penetration seal design. Upon discovery the licensee, in accordance with their procedures, initiated a fire barrier breach permit and took the appropriate compensatory measures required by the plant TS. The licensee determined the cause of this event was attributed to inadequate acceptance guidance provided in SI-233.1E, Fire Barrier/Mechanical and Conduit Penetration Visual Inspection. The SI stated that seals found unacceptable could remain functional provided that no air movement or light through the penetration was detected. This LER was closed by NRC Inspection Report 327, 328/92-02.

LER 327/91-016, Operations With Unqualified Penetration Seals Caused by Thermal Movements. The event involved unqualified penetration sleeve seals due to thermal movement. Piping for four Unit 1 and five Unit 2 penetrations exceeded the axial movement criteria. On July 11, 1991, the licensee discovered three penetrations on both units exceeded the limit for radial movements. By March 28, 1992, the licensee had installed new seals for Residual Heat Removal piping. The licensee projects that all plant seals will be evaluated by December 1, 1994. There was no schedule for the repair of any deficiencies detected during the evaluation of the remainder of the seals. Licensee management said the repairs would be completed before December 1994. The inspectors concluded that based on the scope of the work this schedule was reasonable.

LER 327/91-012, Inadvertent Breach of the Main Control Room and Cable Spreading Room Fire Barrier and Pressurization Boundary During the Unit 2 Cycle 4 Refueling Outage Because of Inappropriate Personnel Actions. The event involved licensee identification of the breach during a periodic surveillance inspection. After identification of the breach, the licensee took proper actions to correct the problem. An incident investigation determined the breach occurred during an electrical modification during the Unit 1 Cycle 4 refueling outage. The licensee concluded the breach

occurred because of inappropriate personnel actions. The technicians drilled into the incorrect cabinet during modification installation and did not properly repair/seal the inappropriate cabinet hole. This event was an example of lack of knowledge of fire protection and breach requirements at the technician level. The inspectors monitored licensee corrective actions and determined they were adequate to prevent recurrence.

LER 327/91-018, Operation With Fire Barriers That Did Not Comply With Underwriter's Laboratories Configurations Resulting From Deterioration of Material, Inappropriate Personnel Actions, or Initial Installation Inadequacies. This event identified nine nonfunctional FBs, including seven walls and two doors. The duration and cause of these conditions could not conclusively be determined, but three conditions appear to have resulted from inappropriate personnel action. For example, the licensee discovered an ice making machine drain line routed through a three inch hole in a FB using a cloth rag as a seal. The remaining nonfunctional FBs resulted from deterioration of the material or initial installation not conforming to compartmentation requirements. The licensee repaired all eight nonfunctional FBs. The licensee inspected and repaired the remaining masonry walls. The inspection identified many masonry walls that required cosmetic repair and six that were breaches. General Employee Training improved plant personnel awareness of compartmentation requirements and the importance of reporting damage to the SUS.

(Special Report 92-03) On February 27, 1992, the licensee identified fire barrier penetration 4A-2T821 was nonfunctional for a period greater than seven days. The licensee upon discovery took the appropriate compensatory actions as required by the TS and the fire barrier breach was repaired on the same day of discovery.

The inspectors, on May 6, 1992, during a plant walkdown noted a minor discrepancy with a boot type penetration seal installed in the fire barrier wall located in the Auxiliary Building on elevation 714', along column line A8 between column lines Q and R. This discrepancy consisted of an improperly installed banding strap which attaches the fire resistive boot assembly to the pipe penetrating the fire barrier. The licensee noted the problem and has initiated Work Request C0134051 to correct the problem. The corrective actions to restore the seal to an "as-design" configuration were completed on May 8, 1992.

The licensee's penetration seal re-evaluation program will follow the guidance identified in NRC Information Notice (IN) 88-04. The licensee's fire barrier penetration seal re-evaluation program will be conducted in two phases. The first phase will establish the walkdown procedure and the data necessary to document the "as-built" conditions of the penetration seals. During this phase the licensee will develop a procedure for conducting engineering evaluations to determine fire resistive equivalency of unique "as-built" fire

barrier penetration seal configurations. During this phase the licensee will verify that typical penetration design details are adequately supported by the appropriate fire test documentation. From the engineering information developed during this phase the licensee will develop the design basis for their typical fire barrier penetration seal configurations used at the Sequoyah facility. In addition, the licensee will document how each typical seal design is traceable to an acceptable fire test. During the second phase the licensee will perform a walkdown and inspection of all fire rated penetration seal configurations in the plant. From the walkdown data, the licensee will document the "as-built" conditions of each seal configuration. The "as-built" data will be compared to the Sequoyah qualified typical penetration seal design detail and appropriately documented. This comparison should link "as-built" to the qualified typical penetrations. For those fire barrier penetration seals not supported by the qualified typical penetration details the appropriate engineering evaluation will be performed or the penetration will be reworked and a tested configuration will be installed.

Based on the review of the licensee's proposed fire barrier re-evaluation program, the inspectors determined these actions were appropriate for the establishment of the design basis for each seal and will ensure long term configuration control over plant fire barrier penetration seals. In addition, this type of program will ensure long term compliance with NRC fire protection requirements, ensure that prompt operability evaluations are made, and ensure the appropriate compensatory measures are instituted when breaches in fire barriers penetration seals are made.

Although improvements were evident the inspectors noted the program remained fragmented. The licensee identified several weaknesses associated with the implementation of fire wall designs, and the operability of fire doors and dampers. The inspectors inquired if the licensee intends to develop a total fire barrier program which addresses the design basis for the entire barrier including the design and installation of the passive fire resistive devices (i.e., fire barrier penetration seals, fire doors and dampers) installed in the barrier. The licensee indicated that this approach would assist in assuring that configuration control is properly maintained and they would consider the implementation of such a program.

b. Fire Barrier Walls

(Special Report 91-06) During a May 31, 1991, walkdown the licensee identified a series of discrepancies associated with the fire barrier walls separating the Unit 1 and 2 auxiliary instrument rooms. The licensee identified the casing bead required by the design drawing was not installed on the vertical edge of the gypsum wall board above the opening. In addition, a bed of joint compound was not applied at the interface between the suspended ceiling and the vertical wall board. Sections of the wall board on the inside

face of the wall located under the access platform were missing. The licensee also identified that portions of the gypsum wall board were missing behind the kick plate on the platform. This design configuration is considered to be indeterminate with respect to the fire resistive rating of the wall assembly. The licensee upon identifying the noted design discrepancies initiated the appropriate compensatory measures and established a roving FW for this plant area.

(Special Report 90-11) On May 31, 1990, as a result of the licensee's fire protection program improvement efforts, additional discrepancies associated with fire walls were identified. The licensee identified the wall panels above fire doors C53 and C23 were not acceptable fire resistive configurations. The licensee also identified the fire barrier wall on elevation 714' of the Auxiliary Building, at column line A8 between columns Q and R, is restrained and does not allow for thermal expansion. In addition, the licensee has identified the fire barrier walls surrounding fire doors C57 and C63 are constructed of wood fiber and gypsum sand mixture. The fire resistance of this wall configuration is indeterminate. The licensee, upon identifying these conditions, took the appropriate corrective actions and modifications to correct these fire barrier deficiencies.

The above Special reports are considered examples where the licensee failed to establish and maintain a functional fire barrier and are violations of the Unit 2 license DPR-79, condition 2.C.(13).a.

c. Fire Doors

(Special Report 91-02) On March 8, 1991, the licensee identified Auxiliary Building fire door A44 as inoperable. The grout above the door frame was observed to be cracked and loose. The licensee initiated a work request to repair the door. In addition, the appropriate compensatory measures in accordance with the TSs were initiated. Scheduling problems associated with the work request and the implementation of the request resulted in the door being inoperable for greater than the LCO seven day period.

(Special Report 92-01) On February 6, 1992, the licensee determined that fire door A-111, an oversized fire door connecting the radioactive waste packaging area on elevation 706' of the Auxiliary Building to the railroad bay was nonfunctional and could not perform its design function as a fire door. The door was determined to be inoperable as a result of physical damage resulting from the carts which transport radioactive waste to the packaging area. The licensee upon discovery took the appropriate compensatory measures and established a roving FW for this area. Currently, this door remains inoperable due to the unavailability of a new fire door. The door has been ordered and is expected to be delivered and installed by October 1, 1992.

The above Special Reports are considered examples where the licensee failed to establish and maintain a functional fire barriers and are violations of the Unit 2 license DPR-79, condition 2.C.(13).a.

d. Backup HPFP system

On May 4, 1992, a portion of the underground HPFP system main piping was repaired. A pressure fit joint in a section of underground HPFP piping feeding fire hydrants 0-26-883 and 0-26-884 failed. The post indicator isolation valve which isolates the line feeding the affected hydrants had to be replaced because of residual leakage. To replace this valve and make the necessary joint repairs, the licensee had to isolate a 14-inch feed to the underground HPFP system main/raw water loop around the power block and the feed to the condensate circulation water, cooling tower makeup, and HPFP system pump intake structure. The inspectors reviewed the licensee's actions to establish compensatory fire suppression measures for the intake structure and the backup measures to supplement the HPFP system with an on-site fire engine. The actions taken to establish HPFP water to the intake structure's standpipe and hose stations consisted of routing three supply lines from fire hydrant 0-26-2052 to the intake structure's internal standpipe system. In addition, the licensee routed a preconnected manual fire attack line from this hydrant to the entrance of the intake structure. The inspectors reviewed this alternate fire water supply configuration to the intake structure and found it adequate with respect to supplying water for manual fire fighting purposes.

Since the underground HPFP system was in a degraded mode, the licensee established a backup HPFP supply using the site fire engine. The inspectors after reviewing this pumping configuration had concerns about the suction lift associated with this pump drafting operation. On May 6, 1992, the licensee demonstrated the fire engine could develop sufficient lift and pump at a capacity in excess of 1,000 gpm at 135 psi. The inspectors reviewed this compensatory alternative fire water supply configuration and based on the level of system degradation, found this configuration adequate with regard to providing improved pressure and flow to fire protection systems supplied by the underground system.

e. Raceway Fire Barriers

The inspectors reviewed the adequacy of the raceway fire barriers installed at the Sequoyah facility. The raceway fire barriers used, were a 1-hour Thermo-Lag 330-1 system. The licensee's raceway fire barrier systems are installed on conduit and junction boxes. There are no cable tray assemblies at the Sequoyah facility protected by fire barrier enclosures. The inspectors, during their walkdown of these barriers, noted the high quality of craft workmanship associated with the various barrier installation configurations. The inspectors did note that some of the Thermo-Lag material was leaching as a result of water damage. The root cause of this damage

is attributed to overhead cooling water piping (e.g., service water, component cooling water) condensation formation. This results in water dripping off the overhead piping onto the Thermo-Lag material. The licensee indicated they would investigate how to protect the raceway fire barrier assemblies against water damage resulting from condensation. In addition, the inspectors noted that several box type Thermo-Lag configurations were used to enclose conduit banks.

It appeared that these assemblies used a Unistrut frame with the Thermo-Lag panels mechanically fastened to the frame. The inspectors noted that the fire resistive characteristics of this type of panel configuration has not been qualified by large scale fire test.

In order to establish the design basis associated with the Thermo-Lag fire barrier assemblies, the inspectors requested the qualification fire tests, installation procedures, raceway fire barrier design details, and the QC installation witness and hold point documentation. The licensee indicated that they do not have the necessary qualification fire test documentation to demonstrate the fire resistive characteristics of the "as-built" raceway fire barrier configurations. The licensee's raceway fire barrier applications were developed from the installation details documented in the Thermal Science, Incorporated (TSI/vendor) installation manual (TSI Technical Note 20684, Thermo-Lag 330 Fire Barrier System Installation Procedures Manual Power Generating Plant Applications, Revision V, November 1985). For special Thermo-Lag 330 applications (e.g., conduit banks enclosed by pre-formed panels). The licensee requested vendor assistance with certain design details. The licensee requested the vendor to review and comment on their Thermo-Lag panel enclosure design sketch. This sketch detailed a 1-hour fire resistive enclosure design utilizing Thermo-Lag panels bolted to a Unistrut frame. The maximum free spans of the Thermo-Lag panels for this configuration is 8 feet. The panel joints are mechanically joined by 1/4 inch bolt and fender washer configuration. The vendor reviewed the licensee's design sketch and in a letter dated May 7, 1986, indicated that this assembly was within the scope of their approved one hour and three hour test program. The vendor, in their correspondence with the licensee, did not provide qualification testing which would substantiate the fire resistive characteristics of this assembly.

During the installation of the Thermo-Lag raceway fire barrier assemblies the licensee did apply limited scope QC to these assemblies. The QC inspections verified the following: no voids or spaces existed at the joints; all steel/metal penetrating the Thermo-Lag enclosure was protected per the 18-inch rule; banding of the Thermo-Lag material was on 12-inch centers; all fillet joints have a 1/2 inch minimum cover bead applied; and all fasteners, other than banding, were covered with 1/2 inch mastic in all directions over the fasteners.

The adequacy of the Thermo-Lag 330-1 raceway fire barrier systems installed at Sequoyah is considered to be indeterminate. The inspectors could not verify the design basis for these systems and could not link them to qualified fire tested configurations. In addition, the ampacity derating factors used for cabling enclosed by Thermo-Lag 330-1 may be in question. Currently, these issues are being evaluated by NUMARC and the NRC and the implementation of the resolution of these issues by the licensee will be reviewed during a subsequent NRC inspection.

f. Fire Dampers

The inspectors, on May 6, 1992, during a walkdown of selected plant areas, noted that fire damper 1-XFD-31C-904 located in shutdown board room 1B1 was not operable. The inspectors observed that one of the coil springs required to close the damper was broken. At the time of discovery, the licensee's staff notified the control room and verified that the area was covered by a FW. The licensee promptly noted the problem and initiated Work Request C052219. The corrective actions to restore the fire damper to an "as-design" configuration were taken on May 8, 1992.

g. Fire Retardant Cable Coatings

In a letter to the NRC dated January 24, 1977, the licensee committed to coat all cables in the control building cable spreading room, auxiliary control room, and reactor building annulus with a fire retardant coating. In addition, the licensee committed to provide fire retardant cable coatings at all divisional interactions. By letter dated September 1, 1978, the NRC requested additional information concerning these commitments. The licensee, in response to the NRC concerns, committed in a March 15, 1979, letter to coat all exposed surfaces of cables installed in areas outside of primary containment with a flame retardant coating. The licensee has applied the coating; however, they do not periodically inspect or maintain the fire retardant cable coatings. The inspectors during their plant walkdowns noted several cases where this material was damaged or missing on previously coated cables.

Missing or damaged fire retardant coating is considered another example where the licensee failed to establish and maintain the fire protection program in accordance with the Unit 2 license DPR-79, condition 2.C.(13).a.

h. Conclusion

Operating License DPR-79, Section 2.C.(13)a, for Unit 2, requires that TVA shall maintain in effect all provisions of the approved FPPs and the NRC staff's Fire Protection Review in the Sequoyah Safety Evaluation Report and Supplements. The approved FPPs delineated in Sequoyah Fire Protection Safety Evaluation Report, dated February 1980 required passive fire protection through fire

cell design. The licensee used fire resistive assemblies, such as fire doors, fire dampers, and building construction to confine fire hazards within a fire cell.

The fire resistive assemblies; such as, fire doors, fire dampers, and building construction used to confine fire hazards within a fire cell; were incapable of performing their intended functions. These examples are combined with the examples in HPFP System (paragraph 2), FW (paragraph 4), Training (paragraph 5), and TCs (Paragraph 6). Collectively these examples are identified as Violation 328/92-14-01.

4. Fire Watches

a. Evaluation

LER 327/91-014, Fire Watch Patrols Were Not Performed Because of Radiological Conditions and a Failure of Administrative Controls. This event involved the licensee's failure to have FWs in the Auxiliary Building and Additional Equipment Building as required by TS LCO 3.7.12. The licensee did not perform FW rounds due to an airborne radiological condition and a failure of administrative FW requirement controls. Licensee corrective actions included returning area fire detectors to service and strengthening of administrative controls to improve accountability and ownership of FWs. The inspectors reviewed the licensee's corrective actions including revision to selected parts of SSP 12.15, Fire Protection Plan, revision 0. The inspectors considered the licensee corrective action adequate.

URI 327, 328/90-32-01, FW Program Deficiencies Including Log Discrepancies and Stationary FWs Less than Fully Alert. This URI addressed two concerns with the FW program. The first example involved an on-duty FW that was less than fully attentive. The second example involved an hourly FW making at least one log entry for the previous hour and at least one entry for the next hour. The inspectors reviewed SSP 12.15, Appendix J, Control of Compensatory and Hot Work Fire Watches and Section Instruction Letter FDSIL-010, Fire Watches, revision 7. The inspectors determined that adequate instruction existed to preclude recurrent events.

LER 327/91-015, Fire Watch Patrol Was Not Performed Because of Inadequate Shift Turnover. Inadequate shift turnover resulted in a missed FW. Recent FW turnover process changes had not been adequately explained to all appropriate FPU personnel. To prevent recurrence the licensee reviewed the turnover process with all FWs and modified PI O-PI-FPU-000-299.0, Operations Fire Protection Foreman Shift Relief and Status Check Sheets. This procedure modification included a FW tracking sheet that was part of the turnover process. Additionally, the procedure provided the requirements for the FW relief or turnover of the FPU Foreman position. It followed the LER commitment and provided guidance for

the turnover of other FPU personnel. The inspectors concurred with the licensee's corrective actions. The licensee documented a similar occurrence in LER 327/91-014. The inspectors concluded the licensee had not yet had sufficient time for the corrective action to be implemented and prevent LER 327/91-015 from occurring. However, subsequent corrective actions have been effective.

IIS 91-053 dated May 30, 1991, documented that FWs were not established while panel 609 zones 112 and 113 were out of service. This was due to miscommunication between two different organizations that supervised FWs. The corrective actions taken for LER 327/91-014 should resolve these problems.

b. Observations

During a plant tour, the inspectors noted several FW discrepancies which were contrary to FPU managements expectations for the FW program. The inspectors observed a FW enter an area designated on the route sheet, sign the log, and exit the area without inspecting the area. The inspectors also observed that FWs were not carrying their route books. The route books contained the normal route, special inspection areas, and an updated TC load sheet. The inspectors reviewed the area log and noted the FW had not occurred within required time. This was observed on logs in other areas. The inspectors reviewed the log sheets for an upcoming FW and discovered that the route sheets had already been annotated as complete. These route sheets are not the official record to indicate accomplishment of the FW. The official records, located in each room, were being signed appropriately. Rather, the route sheets are an aid to the FW to assure the proper route is taken and were not being used as intended. The discrepancies were also contrary to FPU managements expectations for the FW program. The inspectors discussed these concerns with licensee management. The licensee was investigating these problems and stated they would develop a corrective action plan when the investigation was complete. The inspector pointed out that the FW program was compensatory action for both the TS and a license condition. The FPU management stated they would ensure that the persons performing the FWs understood their importance.

c. Conclusion

Operating License DPR-79, Section 2.C.(13)a, for Unit 2, requires that TVA shall maintain in effect all provisions of the approved fire protection plan and the NRC staff's Fire Protection Review in the Sequoyah Safety Evaluation Report and Supplements. The approved FPPs delineated in Sequoyah Fire Protection Safety Evaluation Report, dated February 1980, established the administrative controls for FWs.

The FWs and the FW program did not provide adequate compensatory measures for TS or license condition requiring Fire Watches. These

examples are combined with the examples in HPFP System (paragraph 2), Fire Barriers (Paragraph 3), Training (paragraph 5), and Transient Combustibles (Paragraph 6). Collectively these examples are identified as Violation 328/92-14-01.

5. Training

a. Fire Brigade

The inspectors reviewed the fire brigade eligibility requirements and the administrative methods used to track eligibility. The required training hours for fire brigade members exceed the minimum requirements for the positions for a one year period. The FPU fire brigade qualification tracking program was adequate. The system was well executed and provided sufficient lead time to schedule fire brigade training.

b. Fire Watch Training

The inspectors included review of Fire Protection Training Procedure FPT-213, revision 3. The procedure detailed the curriculum for FW training. The revised procedure was comprehensive and provided a good blend of general fire protection/prevention information and site specific fire protection information. The inspectors and FW supervisors discussed techniques used to provide management's expectations of FWs and their role in fulfilling compensatory measures. The inspectors noted the licensee had increased efforts to monitor the performance of the FWs in the field. The additional interaction between FPU supervision and FWs has improved the FW program. Review of FW round sheets, revealed they identified FB breaches, alarmed panels, and TC loads. The inspectors also reviewed FDSIL 010, revision 7, which contained other guidance for the FWs. Although not a formal part of the FW training program, it provided detailed information in a context beneficial to those not familiar with the responsibilities of a fire watch. The inspectors concluded that improved FW training should provide a good threshold for identifying potential fire hazards.

c. Test Director Training

Previous problems were identified with unqualified test directors performing fire protection system testing. Due to these problems, the inspectors reviewed the training and qualifications of fire protection system test directors. The Fire Protection Unit now provides qualification card for each potential test director. To become qualified on a specific test, the individual must assure their immediate supervision of their acceptable knowledge of the test. In addition, the requirements must be met as detailed in SSP-8.1, Conduct of Testing. The qualifications of the individuals on specific test basis was an improvement.

d. Evaluation

LER 328/91-002, Failure to Comply with TS Action Statement and Establish the Appropriate Compensatory Measures. This event involved the operation of Unit 2 in a condition prohibited by TS 3.3.3.8. The TS required the establishment of a FW within an hour upon entering the LCO. The licensee removed fire protection panel 0-L-630 from service to support maintenance activities on February 11, 1991. When the panel was removed, the licensee entered TS 3.3.3.8 LCO Action Statement but did not establish a FW because they expected a short duration project. Operations later stopped the work due to an unexpected start of all four HPFP pumps. The licensee then exited the TS LCO Action Statement. The licensee later determined they exited the LCO prematurely. This was due to communications problems between operations and maintenance personnel. The licensee later determined the work in progress did not start the fire pump. Following several alarm trouble investigations and other problems with incorrect operability determinations the appropriate PMT was successfully completed. The licensee then declared the panel operable. The FW was not established for about six hours. The licensee identified multiple causes for the event that included inadequate procedures, poor communications, inadequate training, and failure to follow procedures. The licensee also identified weaknesses in the administrative controls for removing HPFP equipment from service. The inspectors determined the corrective actions were adequate. The licensee improved PHYSI-13, Fire, by more clearly defining the process and responsibilities of the Fire Operations Supervisor. This also included the establishment of the SOS as the individual responsible for authorization of fire protection related work documents. Before this revision, the procedure specified the Fire Operations Supervisor would/could authorize the removal of TS fire protection equipment from service. Notification of the SOS did not assure SOS cognizance and control over the fire protection system.

In addition, the inspectors evaluated fire protection operator aids. This review showed that twenty-eight panel aids were inadequate, inappropriate, or confusing. The licensee either corrected or removed the aids. Improvements in this area included the issuance of training procedure PPT201.004, TSs and Technical Training on Fire Protection Equipment. The FPU, modification group, and the electrical maintenance group were provided training on the TSs associated with HPFP. Additional training was provided on the requirements for declaring equipment operable, and PHYSI-13, Appendix C. The inspectors considered the corrective actions for the LER complete.

LER 327/91-024, Inoperable Fire Detector Circuit Supervision Due to Inadequate Understanding and Review. The event involved the discovery of a fire detection alarm that masked all subsequent trouble alarms on the detection panel. The detector supervisory circuitry was functionally inoperable, because of a continuously

energized alarm circuit. The possibility existed that a trouble condition could occur between SIs that would result in an unidentified inoperable detector. Immediate corrective actions included disablement of the alarm conditions. Additionally, the operators received training to evaluate inoperable suspect alarm conditions more conservatively. The licensee's root cause evaluation concluded the event resulted from a lack of fire detection system features knowledge and an insensitivity for operation with existing alarm conditions. Long term corrective actions included detection system operating instruction revisions to provide guidance for operation with masking alarms. The licensee also revised the system logic diagrams and developed integrated detection system operational training. Licensee actions included efforts to reduce the number of continuously energized fire protection annunciators. The inspectors concluded the corrective actions were adequate to address the root cause of the issue.

VIO 327,328/91-08-03, Failure to Follow Procedure With Two Examples, Inadequate TS Surveillance Cycle Time Review and Failure of Supervisor to Assure Test Director Qualifications When Performing TS Required Surveillances. The first example was Inadequate TS Surveillance Cycle time review. This resulted from the responsible FPU foreman rotating off-shift before forwarding the completed SI to the Technical Support Group for review. Following receipt of the SI by the Technical Support Group competing priorities caused more delays. The licensee restructured the plan of the day meeting to include increased emphasis on SI performance and review cycle completion. The second example was the failure of a supervisor to assure test director qualifications for a TS required surveillance. This was identified by the licensee and resulted from poor communication between the FPU management and FPU Foremen. The FPU Foreman was not knowledgeable of program changes and subsequently failed to ensure the qualifications of the test director. This test director performed O-SI-SFT-026.002.0. As corrective action the licensee provided additional training to ensure the test directors understand their responsibilities and management's expectations. A fire protection improvement task force addressed various issues including organization responsibilities, training, procedures, trend analysis and hardware condition. The licensee implemented the Fire Protection Improvement Plan to resolve the issues. The task force established an interim FPU organization that will remain in place until the completion of the fire protection improvement plan.

e. Conclusion

Operating License DPR-79, Section 2.C.(13)a, for Unit 2, requires that TVA shall maintain in effect all provisions of the approved fire protection plan and the NRC staff's Fire Protection Review in the Sequoyah Safety Evaluation Report and Supplements. The approved FPPs delineated in Sequoyah Fire Protection Safety Evaluation

report, dated February 1980, as amended by TVA letter to Mr. Rubenstein, established the requirements for the fire protection program. This program delineated the training requirements.

The fire protection training program did not provide assurance the fire protection program would be adequately implemented. These examples are combined with the examples in HPFP system (paragraph 2), Fire Barriers (Paragraph 3), Fire Watches (paragraph 4), and Transient Combustibles (Paragraph 6). Collectively these examples are identified as Violation 328/92-14-01.

6. Transient Combustible Loads

The inspectors reviewed several previous events related to problems with the control of TC loads in safety-related areas. The events included two NRC identified violations which indicated a lack of concern or awareness of TC load control requirements. There were several other licensee identified problems with related root causes. Corrective actions for the events were initially effective. The inspectors observed TC load requirements were understood at the FW, maintenance foreman, and operator level. Enhanced GET-10 was another example of management effort to improve TC load awareness. Due to increased management involvement, the licensee has better control of TC loads in the safety-related areas.

a. Evaluation

Violation 327,328/90-34-01, Failure to Control Transient Fire Loads in Safety-related Areas. This violation, identified on October 11, 1990, involved an NRC identification of a large quantity of wood without a fire rating left unattended in the Auxiliary Building from October 1 through 11, 1990. The wood was an empty shipping crate and associated wooden supports for a replacement Residual Heat Removal pump motor. The licensee's event investigation concluded an electrical maintenance supervisor violated the TC loading requirements by allowing the TC load to remain in the Auxiliary Building for ten days without the appropriate TC load permit. FPU personnel twice identified the problem; however, their efforts to correct the situation were unsuccessful. The licensee's corrective actions for the event included disciplinary action and TC load training for maintenance personnel. During review of the corrective actions, the inspectors noted that roving fire watches did not identify the transient fire load in the area as a problem. This was a weakness in the FW program. Review of the current training of FWs indicated that this specific problem was being corrected. A review of specific training aspects of the fire watches is discussed in paragraph 5. The corrective actions for the violation were adequate.

Violation 327,328/91-22-01, Failure to Maintain Adequate Controls of Transient Fire Loads in a Safety-related Area. The NRC identified this event on September 18, 1991. It involved several TC loads

associated with the refurbishment of the P-B ERCW pump. These included untreated wooden crates and loading pallets. The licensee brought TC loads into the safety-related area without a required PHYSI-13 transient fire load permit and a required FW. The inspectors observed the fire detection system had been deactivated to allow material staging. The licensee's event review concluded the cause of the violation was a failure to follow established procedures. Immediate corrective actions included obtaining the appropriate transient fire load permit and establishing a dedicated FW. The inspectors reviewed changes to SSP-12.7, Housekeeping/Temporary Equipment Controls, revision 5, which added inspection criteria to the Appendix A Housekeeping Checklist. These additions required the inspection of safety-related areas for compliance with the TC load permit program. Other corrective actions included posting signs at safety-related building entrances to remind personnel that TC load permits might be required when moving TCs. This was an isolated event; however, the event showed a lack of attention to detail regarding line supervision awareness of transient fire load controls. The inspectors concluded the corrective actions were adequate.

FIR 92-012205, dated January 29, 1992, transient fire loads without approved permits were identified in the plant by QA and FPU personnel. This was promptly corrected.

II-S-91-049, dated May 23, 1991, seven thousand pounds of lumber in the relay room without a TC load permit. This was promptly corrected.

II-S-91-088, dated August 15, 1991, twelve hundred pounds of scaffolding located above the Unit 2 Upper Head Injection Accumulator did not have a transient fire load permit. This situation was promptly corrected.

b. Conclusion

Operating License DPR-79, Section 2.C.(13)a, for Unit 2, required that TVA maintain in effect all provisions of the approved fire protection plan and the NRC staff's Fire Protection Review in the Sequoyah Safety Evaluation Report and Supplements. The approved FPPs delineated in Sequoyah Fire Protection Safety Evaluation Report, dated February 1980, established the requirements for control of transient combustibles.

The licensee demonstrated a disregard for the control of transient combustibles through the middle of 1991. Their understanding of the requirements for control of TCs has improved since then. These items are combined with the items in HPFP System (paragraph 2), Fire Barriers (Paragraph 3), Fire Watches (paragraph 4), and Training (paragraph 5). Collectively these items are identified as Violation 328/92-14-01.

7. QA Audits

a. Evaluation

The inspectors reviewed the annual, biennial, and triennial QA audits to determine audit depth and the ability to identify programmatic problems. The following licensee QA audits were reviewed:

Audit No. SQA89915, Fire Protection and Loss Prevention (annual/triennial), audit conducted August 2 - 11, 1989;

Audit No. SQA90016, Fire Protection - Annual and Biennial, audit conducted August 20-21, 1990; and

Audit No. SQA91106, Fire Protection Program - Annual, audit conducted August 12-23, 1991.

Based on the inspectors review of these audits, the depth of the triennial audit was not sufficient to identify potential programmatic problems. The licensee used a fire protection engineer from their insurance carrier as the outside consultant. The scope of the audit was more centered on loss prevention. It did not focus on programmatic aspects and the design basis of the fire protection/safe shutdown features. The inspectors considered this audit weak in QA problem identification associated with fire protection program configuration control. In addition, this audit was weak in assessing the plant fire protection equipment and program implementation. The audit was of the depth necessary to verify continued compliance with NRC requirements, FSAR commitments, NRC Fire Protection Program Safety Evaluation Reports and plant specific license conditions. The inspectors in reviewing all three audits found minimal QA investigations into verifying compliance with Appendix R, Sections III.G, III.J, III.L, and III.O.

b. Conclusion

In accordance with plant TS 6.5.2.8.h and 6.5.2.8.i the licensee is performing the required fire protection QA audits. In reviewing these audits, against the guidance provided in Generic Letter 82-21, Technical Specifications for Fire Protection Audits, the inspectors concluded the licensee was not performing an in depth assessment of the fire protection program implementation against the fire protection licensing and design basis. Therefore, the licensee's ability to identify potential programmatic problems associated with the design, installation, and long term configuration control of plant fire protection features has been limited. In addition, these audits have not focused on long term compliance with the applicable requirements of Appendix R.

8. HPFP System Maintenance and Trending

a. Fire Protection Maintenance Backlog

The inspectors reviewed the WR backlog for the HPFP System. NRC Inspection Report 327, 328/91-08 identified HPFP system deficiencies that were not resolved promptly. These equipment deficiencies contributed to the general system degradation and delayed system restoration. System WR trending was also not effective. Untimely HPFP system preventative maintenance resulted in HPFP strainer mechanisms that were in poor material condition. Priorities set on WRs from 1988 showed that low priority was given to maintaining good physical HPFP system condition. Inoperable and leaking HPFP system pressure control valves were other examples of ineffectual maintenance.

The inspectors reviewed the current HPFP system WR backlog that included 101 line items. The licensee identified most of the WRs following the May 1991 system degradation. The identification of these events was further evidence of the licensee's burgeoning improvement process. The inspectors reviewed the latter items in detail with the appropriate system engineer. The priorities of the remaining items were consistent with other safety-related system work backlog. The inspectors noted that tracking and trending of HPFP system WRs was not effective. System engineers had limited involvement due to time constraints. The inspectors also reviewed closed WRs for each month since May 1991. The number of system 26 WRs completed during this period was about 200. Other fire protection related systems exhibited similar proactive WR completions. The inspectors concluded that with the major problem identification phase behind them, timeliness of work on fire protection related WRs should continue to improve.

b. System Trending

The inspectors reviewed the information available prior to the HPFP system failure of May 6, to determine if the licensee adequately addressed all precursor information. The licensee uses SI 0-SI-SFT-026-002.0, Auxiliary Building Fire Protection System Hydraulic Performance Verification, to implement the surveillance requirement of TS 4.7.11.1.f. The TS required a triennial system flow test. Although this was a triennial test, the licensee performed this test annually, to satisfy insurance commitments. Portions of the SI were intended to be used for trending. However, the licensee gathered the data, but they failed to trend the data or make any other meaningful comparisons of the test results. The lack of system performance trending contributed to the uncorrected system degradation.

c. Evaluation

LER 327/91-022, Smoke Detectors in Duct Work of Clean Air Systems Inoperable Because of Misoriented Covers. This event involved the misorientation of smoke detector covers and missing sensitivity test jack lids. Either of these conditions would result in a reduction of air flow through the detector and subsequent reduction in its sensitivity. The detectors were replacements for the original installation. The licensee concluded the root cause of this event was an inadequate work plan review. This resulted in inadequate procedures and training concerning new detectors. Another factor was the inattention to detail by the periodic test performers during detector cover reinstallation. The inspectors reviewed the revision of SIs 234.2, .5, .6, and .7, TS Fire Detectors, which included new detector, testing, and training requirements. The inspectors verified appropriate fire detector information was contained in the vendor manual. The inspectors verified detector inspection/repair completion for the detectors not previously inspected.

d. Conclusion

Based on an evaluation of the WR number and types issued on the HPFP since May 1991, there was a definite peak in identified discrepancies about December 1991. This peak corresponds to the peaks in PERs, and IIRs. Based upon this and discussions with FPJ personnel, the inspectors concluded the bulk of the maintenance work was completed. In addition, the licensee's ability to effectively trend the HPFP system should improve.

9. Licensee Event Report Review (92700)

In addition to the LERs discussed above, the inspectors reviewed reporting for the following fire protection related LERs to evaluate initial adequacy of the corrective actions. The inspector's review included follow-up on implementation of corrective action and/or review of licensee documentation. The inspectors verified all required corrective action(s) were either complete or identified in the licensee's program for tracking of outstanding actions.

- a. (Closed) LER 327/91-009, Operation with Inoperable Auxiliary Building Fire Suppression System Because of Inadequate Test Performance and Review. Based on the discussion in paragraph 2 this LER is closed.
- b. (Closed) LER 327/91-010, Failure to Conduct Visual Inspection of Expansion Joint Seals Previously not Considered to be Fire Barriers and Discovery that Seal Material Does Not Meet Fire Barrier Requirements. Based on the discussion in paragraph 3 this LER is closed.
- c. (Closed) LER 327/91-012, Inadvertent Breach of the Main Control Room and Cable Spreading Room Fire Barrier and Pressurization Boundary

During the Unit 2 Cycle 4 Refueling Outage Because of Inappropriate Personnel Actions. Based on the discussion in paragraph 3 this LER is closed.

- d. (Closed) LER 327/91-014, Fire Watch Patrols Were Not Performed Because of Radiological Conditions and a Failure of Administrative Controls. Based on the discussion in paragraph 4 this LER is closed.
- e. (Closed) LER 327/91-015, Fire Watch Patrol was Not Performed Because of Inadequate Shift Turnover. Based on the discussion in paragraph 4 this LER is closed.
- f. (Closed) LER 327/91-016, Operations With Unqualified Penetration Seals Caused by Thermal Movements. Based on the discussion in paragraph 3 this LER is closed.
- g. (Closed) LER 327/91-018, Operation with Fire Barriers That Did Not Comply With Underwriters Laboratories Configurations Resulting from Deterioration of Material, Inappropriate Personnel Actions, or Initial Installation Inadequacies. Based on the discussion in paragraph 3 this LER is closed.
- h. (Closed) LER 327/91-020, Action Provisions of LCOs 3.7.11.2 and 3.7.11.4 Could Not be Complied With Following the Loss of Fire Suppression Water System Pressure. Based on the discussion in paragraph 2 this LER is closed.
- i. (Closed) LER 327/91-022, Smoke Detectors in Duct Work of Clean Air Systems Inoperable Because of Misoriented Covers. Based on the discussion in paragraph 8 this LER is closed.
- j. (Closed) LER 327/91-024, Inoperable Fire Detector Circuit Supervision Due to Inadequate Understanding and Review. Based on the discussion in paragraph 5 this LER is closed.
- k. (Closed) LER 328/91-002, Failure to Comply with TS Action Statement and Establish the Appropriate Compensatory Measures. Based on the discussion in paragraph 5 this LER is closed.
- l. (Closed) LER 327/92-003, Fire Suppression Valve Positions Inside Containment Not Verified Because of a Deficient Procedure. Based on the discussion in paragraph 2 this LER is closed. violations were identified.

No violations were identified.

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

- a. (Closed) URI 327, 328/90-32-01, Fire Watch program deficiencies including log discrepancies and stationary Fire Watch less than

fully alert. Based on the discussion in paragraph 4 this URI is closed.

- b. (Closed) VIO 327, 328/90-34-01, Failure to Control Transient Fire Loads in Safety-related Areas. Based on the discussion in paragraph 6 this VIO is closed.
- c. (Closed) URI 327, 328/91-08-02, Adequacy of the Backup Fire Suppression System. Based on the discussion in paragraph 2 this URI is closed.
- d. (Closed) VIO 327, 328/91-08-03, Failure to Follow Procedures With Two Examples - Inadequate TS Surveillance Cycle Time Review and Failure of Supervisor to Assure Test Director Qualifications for TS Surveillance. Based on the discussion in paragraph 5 this VIO is closed.
- e. (Closed) URI 327, 328/91-08-04, Inadequate Corrective Action Resulted in Fire Protection System Becoming Inoperable. Based on the discussion in paragraph 12 this URI is closed.
- f. (Closed) VIO 327, 328/91-22-01, Failure to Maintain Adequate Controls of Transient Fire Loads in a Safety-related Area. Based on the discussion in paragraph 6 this VIO is closed.

No violations were identified.

11. Root Cause

While there were many individual root causes for each area inspected, the rudimentary root cause for the fire protection deficiencies detailed in this report is inappropriate management attention. Inappropriate attention directly precipitated the inadequate material conditions and fostered the attitudes that led to many personnel errors. Management's attention has been more appropriately focused on the fire protection program since May 1991. The more clearly focused attention is directly responsible for the identification of many fire protection discrepancies. Many of these deficiencies existed since the original design and construction of the fire protection system.

12. Conclusions

Licensee management did not have positive control over the fire protection system as recently as May 1991. Prior to May 1991 many problems existed with the fire protection equipment and the management of the fire protection resources. These problems developed into a fire protection programmatic breakdown that had existed for an indeterminate time, but became apparent in May 1991. This was coincident with an extensive fire protection system failure. Since then, the licensee's attitude towards fire protection and the fire protection system has clearly changed. Their altered posture has demonstrated a more proactive approach that is identifying and correcting deficiencies.

Notwithstanding the corrective actions since May 1991, the conditions observed on and before May 1991 and the items identified by the licensee and the NRC since that time were indicative of a programmatic breakdown in fire protection program in May 1991 and for an indeterminate time prior to that date. Operating License DPR-79, Section 2.C.(13)a, for Unit 2, requires that TVA shall maintain in effect all provisions of the approved fire protection plan and the NRC staff's Fire Protection Review in the Sequoyah Safety Evaluation Report and Supplements. The approved fire protection plans, commitments, or Safety Evaluation Report delineate the requirements for Fire Suppression Water System (paragraph 2), Fire Barriers (Paragraph 3), Fire Watches (paragraph 4), Training (paragraph 5), and Transient Combustibles (Paragraph 6). Each referenced report paragraph contains a listing of violations of individual aspects of Section 2.C.(13)a of the Operating License. Collectively these items are identified as Violation 328/92-14-01.

13. Exit Interview

The inspection scope and results were summarized on May 8, 1992, with those individuals identified in paragraph 1. The inspectors described the areas inspected and discussed in detail the inspection findings listed below. The licensee did not identify as proprietary any of the material provided to or reviewed by the inspectors during this inspection. There was some clarifying discussion; however, dissenting comments were not received from the licensee.

<u>Item Number</u>	<u>Status</u>	<u>Described and Reference</u>
LER 327/91-009	Closed	Operation with Inoperable Auxiliary Building Fire Suppression System Because of Inadequate Test Performance and Review.
LER 327/91-010	Closed	Failure to Conduct Visual Inspection of Expansion Joint Seals Previously not Considered to be Fire Barriers and Discovery that Seal Material Does Not Meet Fire Barrier Requirements.
LER 327/91-012	Closed	Inadvertent Breach of the Main Control Room and Cable Spreading Room Fire Barrier and Pressurization Boundary During the Unit 2 Cycle 4 Refueling Outage Because of Inappropriate Personnel Actions.
LER 327/91-014	Closed	Fire Watch Patrols Were Not Performed Because of Radiological Conditions and a Failure of Administrative Controls.
LER 327/91-015	Closed	Fire Watch Patrol was Not Performed Because of Inadequate Shift Turnover.

LER 327/91-016	Closed	Operations With Unqualified Penetration Seals Caused by Thermal Movements.
LER 327/91-018	Closed	Operation with Fire Barriers That Did Not Comply With Underwriters Laboratories Configurations Resulting from Deterioration of Material, Inappropriate Personnel Actions, or Initial Installation Inadequacies.
LER 327/91-020	Closed	Action Provisions of LCOs 3.7.11.2 and 3.7.11.4 Could Not be Complied With Following the Loss of Fire Suppression Water System Pressure.
LER 327/91-022	Closed	Smoke Detectors in Duct Work of Clean Air Systems Inoperable Because of Misoriented Covers.
LER 327/91-024	Closed	Inoperable Fire Detector Circuit Supervision Due to Inadequate Understanding and Review.
LER 328/91-002	Closed	Failure to comply with TS Action Statement and establish the appropriate compensatory measures.
LER 327/92-0J3	Closed	Fire Suppression Valve Positions Inside Containment Not Verified Because of a Deficient Procedure.
URI 327,328/ 90-32-01	Closed	Fire Watch program deficiencies including log discrepancies and stationary Fire Watch less than fully alert.
VIO 327,328/ 90-34-01	Closed	Failure to control transient fire loads in safety-related areas.
URI 327,328/ 91-08-02	Closed	Adequacy of the backup fire suppression system.
VIO 327,328/ 91-08-03	Closed	Failure to follow procedures with two examples - Inadequate TS surveillance cycle time review and failure of supervisor to assure test director qualifications for TS surveillance.
URI 327,328/ 91-08-04	Closed	Inadequate corrective action resulted in fire protection system becoming inoperable.

VIO 327,328/
91-22-01

Closed

Failure to maintain adequate controls of transient fire loads in a safety-related area.

14. Acronyms

CFR	-	Code of Federal Regulations
FPU	-	Fire Protection Unit
FB	-	Fire Barrier
FW	-	Fire Watch
GET	-	General Employee Training
HPFP	-	High Pressure Fire Protection
LCO	-	Limiting Condition for Operation
LER	-	Licensee Event Report
NRC	-	Nuclear Regulatory Commission
NRR	-	Nuclear Reactor Regulation
PER	-	Problem Evaluation Report
PSIG	-	Pounds per Square Inch
SI	-	Surveillance Instruction
TC	-	Transient Combustibles
TS	-	Technical Specification
TVA	-	Tennessee Valley Authority
URI	-	Unresolved Item
VIO	-	Violation
WR	-	Work Request