



**UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
REGION II**  
245 PEACHTREE CENTER AVENUE NE, SUITE 1200  
ATLANTA, GEORGIA 30303-1257

April 15, 2014

Mr. Joseph W. Shea  
Vice President, Nuclear Licensing  
Tennessee Valley Authority  
1101 Market Street, LP 3D-C  
Chattanooga, TN 37402-2801

SUBJECT: SEQUOYAH NUCLEAR PLANT, UNITS 1 AND 2 - NRC TRIENNIAL FIRE  
PROTECTION INSPECTION REPORT 05000327/2014007 AND  
05000328/2014007

Dear Mr. Shea:

On March 5, 2014, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at your Sequoyah Nuclear Plant, Units 1 and 2. The enclosed inspection report documents the inspection results, which were discussed with Mr. P. Simmons and other members of your staff on March 5, 2014. Following completion of additional post-inspection analysis of the inspection findings and review of additional information by the NRC in the Region II office, a final exit was held by telephone with Mr. M. McBrearty and other members of your staff on April 17, 2014, to provide an update on changes to the preliminary inspection findings.

The inspection examined activities conducted under your license as they related to safety and compliance with the Commission's rules and regulations and with the conditions of your license. The team reviewed selected procedures and records, observed activities, and interviewed personnel.

Five NRC-identified findings of very low safety significance (Green) were identified during this inspection. These findings were determined to involve violations of NRC requirements. However, because of the very low safety significance of these violations and because they were entered into your corrective action program, the NRC is treating these violations as non-cited violations (NCVs) consistent with Section 2.3.2 of the NRC Enforcement Policy. If you contest these NCVs, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the Nuclear Regulatory Commission, ATTN.: Document Control Desk, Washington DC 20555-0001; with copies to the Regional Administrator Region II; the Director, Office of Enforcement, United States Nuclear Regulatory Commission, Washington, DC 20555-0001; and the NRC Resident Inspector at the Sequoyah Nuclear Plant.

If you disagree with a cross-cutting aspect assignment in this report, you should provide a response within 30 days of the date of this inspection report, with the basis for your disagreement, to the Regional Administrator, RII, and the NRC Resident Inspector at the Sequoyah Nuclear Plant.

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter, its enclosure, and your response (if any) will be available electronically for public inspection in the

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter, its enclosure, and your response (if any) will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records (PARS) component of NRC's document system (ADAMS). ADAMS is accessible from the NRC Website at <http://www.nrc.gov/reading-rm/adams.html> (the Public Electronic Reading Room).

Sincerely,

**RA**

Scott M. Shaeffer, Chief  
Engineering Branch 2  
Division of Reactor Safety

Docket Nos.: 50-327, 50-328  
License Nos.: DPR-77, DPR-79

Enclosure: Inspection Reports 05000327/2014007, 05000328/2014007  
w/Attachment: Supplementary Information

cc: Distribution via ListServ

**U. S. NUCLEAR REGULATORY COMMISSION  
REGION II**

Docket Nos: 50-327, 50-328

License Nos.: DPR-77, DPR-79

Report Nos.: 05000327/2014007, 05000328/2014007

Licensee: Tennessee Valley Authority (TVA)

Facility: Sequoyah Nuclear Plant, Units 1 and 2

Location: Soddy-Daisy, TN 37379

Dates: January 27-31, 2014  
February 10-14, 2014, and March 3-5, 2014

Inspectors: J. Dymek, Reactor Inspector  
D. Jones, Senior Reactor Inspector  
D. Terry-Ward, Construction Inspector  
M. Thomas, Senior Reactor Inspector (Lead Inspector)

Approved by: Scott M. Shaeffer, Chief  
Engineering Branch 2  
Division of Reactor Safety

## SUMMARY

IR 05000327/2014007, 05000328/2014007; 01/27/2014 - 03/05/2014; Sequoyah Nuclear Plant, Units 1 and 2; Fire Protection

The report covered an announced two-week triennial fire protection inspection by a team of four regional inspectors. Five Green non-cited violations were identified. The significance of inspection findings is indicated by their color (i.e., greater than Green, or Green, White, Yellow, Red) and determined using Inspection Manual Chapter (IMC) 0609, Significance Determination Process, dated June 2, 2011. Cross-cutting aspects are determined using IMC 0310, "Aspects Within the Cross-Cutting Areas," dated December 19, 2013. All violations of NRC requirements are dispositioned in accordance with the NRC's Enforcement Policy dated July 9, 2013. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process" Rev. 4, dated December 2006.

### Cornerstone: Mitigating Systems

- Green. An NRC-identified Green non-cited violation of Sequoyah Operating License Conditions 2.C.(16) and 2.C.(13) for Units 1 and 2 respectively, was identified for the licensee's failure to ensure that fire dampers were functional, as required by the approved fire protection program (FPP), in the Auxiliary Control Room (fire area FAA-066), Vital Battery Board Room II (fire area FAA-068), and Vital Battery Board Room III (fire area FAA-087) fire area boundaries. The licensee entered this issue into the corrective action program as Problem Evaluation Reports 845913 and 848580, and implemented hourly roving fire watches in the affected fire areas.

The licensee's failure to ensure the fire dampers were functional as required by the FPP was determined to be a performance deficiency. This performance deficiency was more than minor because it affected the reactor safety mitigating systems cornerstone attribute of protection against external factors (i.e., fire) and it affected the fire protection defense in depth strategies involving the control of fires that do occur and to protect systems important to safety. The finding was screened in accordance with NRC IMC 0609, "Significance Determination Process," Attachment 4, "Initial Characterization of Findings," which determined that an IMC 0609, Appendix F, "Fire Protection Significance Determination Process," review was required as the finding involved the ability to confine a fire. The finding category of "Fire Confinement" was assigned, based upon that element of the FPP being impacted. Using IMC 0609, Appendix F, Attachment 1, "Fire Protection Significance Determination Process Worksheet," the inspectors determined that the finding was of very low safety significance (Green) at Task 1.4.3, Question C, based upon observation that a fully functional automatic sprinkler system was on either side of each affected fire barrier partition. No cross cutting was assigned to this finding because the cause of the finding was not indicative of current licensee performance. The dampers were purchased and installed in 1997. (Section 1R05.02)

- Green. An NRC-identified Green non-cited violation of Sequoyah Operating License Conditions 2.C.(16) and 2.C.(13), for Units 1 and 2 respectively, was identified for the licensee's failure to properly install an automatic pre-action fire sprinkler system in Auxiliary Control Instrument Room 2A (fire area FAA-090) in accordance with the approved FPP and applicable National Fire Protection Association (NFPA) Standard

No. 13, "Automatic Sprinkler Systems." The licensee entered this issue in the corrective action program as Problem Evaluation Report 847948.

The licensee's failure to install the sprinkler heads in accordance with the applicable NFPA Code of Record specified in the approved FPP for Sequoyah is a performance deficiency. This performance deficiency is more than minor because it is associated with the reactor safety mitigating systems cornerstone attribute of protection against external factors (i.e., fire) and it adversely affected the cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. The potential delayed actuation of the sprinkler system could affect the fire protection defense in depth strategy involving suppression of fires. The finding was screened in accordance with NRC IMC 0609, "Significance Determination Process," Attachment 4, "Initial Characterization of Findings," which determined that an IMC 0609, Appendix F, "Fire Protection Significance Determination Process," review was required as the finding involved fixed fire suppression systems. Using IMC 0609, Appendix F, Attachment 2, "Degradation Rating Guidance Specific to Various Fire Protection Program Elements," a "low" degradation rating was assigned, based on the fact that four sprinkler heads were installed in a room of 110 ft<sup>2</sup> and at least one head would be installed within 10 feet of combustibles of concern. Due to their spacing the sprinklers would be within the fire plume zone of influence for the combustibles of concern and the expected heat release rate (HRR) of postulated fires. Except as noted, the system was considered to be nominally code compliant, and therefore, met the low degradation criteria for water based suppression systems. Using IMC 0609, Appendix F, Attachment 1, "Fire Protection Significance Determination Process Worksheet," the inspectors determined that the finding was of very low safety significance (Green), at Task 1.4.2, Question A. The cause of this finding was determined to have a cross-cutting aspect of Evaluation (P.2) in the Problem Identification and Resolution cross-cutting area, because the licensee did not thoroughly evaluate the issue to ensure that resolutions addressed extent of conditions commensurate with their safety significance. (Section 1R05.03)

- Green. An NRC-identified Green non-cited violation (with two examples) of 10 CFR Part 50, Appendix B, Criterion III, Design Control, was identified for the licensee's failure to assure that design documents were controlled and appropriate quality standards for design were specified as required by site procedures. The licensee entered this issue in the corrective action program as Problem Evaluation Reports 845951, 846017, 848756, and 849220.

The licensee's failure to assure that design documents were controlled and appropriate quality standards for design were specified in accordance with design control procedures was a performance deficiency. The performance deficiency was more than minor because if left uncorrected it could lead to installation of breakers that may not meet the critical characteristics needed to perform their safety function. The finding was screened in accordance with NRC IMC 0609, "Significance Determination Process," Appendix A, "The Significance Determination Process for Findings At-Power." Using IMC 0609, Appendix A, Exhibit 2, "Mitigating Systems Screening Questions," the finding was determined to have very low safety significance (Green) because it did not represent an actual loss of safety function. No cross-cutting aspect was identified, since the issue was determined to not reflect current licensee performance. (Section 1R05.06)

- Green. An NRC-identified Green non-cited violation of Sequoyah Operating License Conditions 2.C.(16) and 2.C.(13), for Units 1 and 2 respectively, was identified for the licensee's failure to maintain necessary materials and procedures for cold shutdown repairs, as required by the approved fire protection program. The licensee entered this issue into the corrective action program as Problem Evaluation Reports 845931, 847420, 847428, 847449, and 847462.

The licensee's failure to provide adequate guidance for all repairs listed in the Appendix R casualty procedure and failure to maintain the required repair parts for the same procedure was a performance deficiency. The performance deficiency was more than minor because it was associated with the procedure quality attribute of the Mitigating Systems Cornerstone and it adversely affected the cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events (fire) to prevent undesirable consequences. Inadequate procedural guidance and the lack of required materials could adversely affect the licensee's capability to achieve and maintain cold shutdown conditions. The finding was screened in accordance with NRC IMC 0609, "Significance Determination Process," Attachment 4, "Initial Characterization of Findings," which determined that an IMC 0609, Appendix F, "Fire Protection Significance Determination Process," review was required as the finding affected fire protection defense-in-depth strategies involving post-fire safe shutdown. Using IMC 0609, Appendix F, Attachment 1, "Fire Protection Significance Determination Process Worksheet," the inspectors determined that the finding was of very low safety significance (Green) at Task 1.3.1, because it was determined that the reactor was able to reach and maintain a hot safe shutdown condition. The cause of this finding was determined to have a cross-cutting aspect of Teamwork (H4) in the Human Performance cross-cutting area because the licensee failed to assure that individuals and work groups communicated and coordinated their activities within and across organizational boundaries to ensure nuclear safety was maintained. Specifically, the coordination between operation's department procedure writers, maintenance department procedure writers, and fire operations department personnel was inadequate to ensure the adequacy of cold shutdown repair procedures and the availability of required materials. (Section 1R05.09)

- Green. An NRC-identified Green non-cited violation of Sequoyah Operating License Conditions 2.C.(16) and 2.C.(13), for Units 1 and 2 respectively, was identified for the licensee's failure to perform the required reviews when adding fire watches to the fire protection program. The licensee entered the issue into their corrective action program as Problem Evaluation Report 845593.

The licensee's failure to perform the required evaluation and review prior to revising the fire hazards analysis was a performance deficiency. The performance deficiency was more than minor because it was associated with the procedure quality attribute of the Mitigating Systems Cornerstone and it adversely affected the cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events (fire) to prevent undesirable consequences. Specifically, the sole use of fire watches as a mitigation measure for the unavailability of the credited pressurizer power operated relief valve would adversely affect the capability to achieve and maintain safe shutdown during a fire event. The finding was screened in accordance with NRC IMC 0609, "Significance Determination Process," Attachment 4, "Initial Characterization of Findings," which determined that an IMC 0609, Appendix F, "Fire Protection Significance Determination Process," review was required as the finding affected fire protection

defense-in-depth strategies involving post-fire SSD. Using IMC 0609, Appendix F, Attachment 1, "Fire Protection Significance Determination Process Worksheet," the issue screened as having very low safety significance (Green) at Task 1.5.3 because the change in core damage frequency (delta CDF) was less than  $1\text{E-}6$  (i.e., delta CDF calculated to be  $6.6\text{E-}7$ ). The cause of this finding was determined to have a cross-cutting aspect of Evaluation (P.2) in the Problem Identification and Resolution cross-cutting area, because the licensee did not thoroughly evaluate the issue to ensure that resolutions addressed causes commensurate with their safety significance. Specifically, the establishment of effective corrective actions was adversely affected by the failure to perform an evaluation prior to revising the fire hazards analysis. (Section 1R05.11)

## REPORT DETAILS

### 1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, Barrier Integrity

#### 1R05 Fire Protection

This report documents the results of a triennial fire protection inspection (TFPI) at the Sequoyah Nuclear Plant (SQN) Units 1 and 2. The inspection was conducted in accordance with NRC Inspection Procedure (IP) 71111.05T, "Fire Protection (Triennial)," issued January 31, 2013. The objective of the inspection was to review a minimum sample of 3 risk-significant fire areas (FAs) to verify implementation of the SQN fire protection program (FPP). An additional objective was to review site specific implementation of a minimum of one mitigating strategy from Section B.5.b of NRC Order EA-02-026, "Order for Interim Safeguards and Security Compensatory Measures" (commonly referred to as B.5.b), as well as the storage, maintenance, and testing of B.5.b mitigating equipment. The FAs chosen for review were selected based on available risk information as analyzed onsite by a senior reactor analyst from Region II, data obtained in plant walk downs regarding potential ignition sources, location and characteristics of combustibles, and location of equipment needed to achieve and maintain safe shutdown (SSD) of the reactor. Other considerations for selecting the FAs were the relative complexity of the post-fire SSD procedure, information contained in FPP documents, and results of prior NRC TFPIs. In selecting the B.5.b mitigating strategy sample, the inspectors reviewed licensee submittal letters, safety evaluation reports, licensee commitments, B.5.b implementing procedures, and previous NRC inspection reports. Section 71111.05-05 of the IP specifies a minimum sample size of three FAs and one B.5.b mitigating strategy for addressing large fires and explosions. This inspection fulfilled the requirements of the IP by selecting four FAs and one B.5.b mitigating strategy. The FAs chosen were:

- Fire Area FAC-017/Room C12, Unit 1 Main Control Room
- Fire Area FAA-067/Rooms A02 and A09, Unit 1 6.9kV Shutdown Board Room A and Personnel and Equipment Access Room
- Fire Area FAA-069/Room A04, Unit 1 125V DC Vital Battery Board Room I
- Fire Area FAA-073/Room A08, Unit 1 480V Shutdown Board Room 1A2-A

For each FA selected, the inspectors evaluated the licensee's FPP against the applicable NRC requirements and licensee design and licensing basis documents. The B.5.b mitigating strategy selected was to manually depressurize the steam generators and use the portable pump. Specific licensing and design basis documents reviewed by the inspectors are listed in the Attachment.

#### .01 Protection of Safe Shutdown Capabilities

##### a. Inspection Scope

For the selected FAs, the inspectors performed physical walkdowns to observe: (1) the material condition of fire protection systems and equipment; (2) the storage of permanent and transient combustibles; (3) the proximity of fire hazards to cables relied



upon for SSD; (4) the potential environmental impacts, if any, on credited operator manual actions (OMAs) to the areas adjacent to the FA, and (5) the licensee's implementation of procedures and processes for limiting fire hazards, housekeeping practices, and compensatory measures for inoperable or degraded fire protection systems and credited fire barriers.

#### Methodology

For the selected FAs, the inspectors evaluated the potential for the effect from the fire event on credited actions specified by licensee procedures. The inspectors reviewed calculation SQS40127, "Equipment Required for Safe Shutdown per 10CFR50 Appendix R," Rev. 51 and conduit and cable tray routing information by FA, as well as, conducted field walkdowns of the cable routing to confirm that at least one train of redundant cables routed in the FA was adequately protected from fire damage or the licensee's analysis determined that the fire damage would not prohibit safe plant shutdown. The inspectors reviewed the SQN fire hazards analysis (FHA) for the selected FAs and compared it to the abnormal operating procedures (AOPs) to verify that cables and equipment credited to provide reactivity control, reactor coolant makeup, reactor heat removal, process monitoring and support functions for post-fire SSD in the safe shutdown analysis (SSA) and applicable procedures were adequately protected from fire damage in accordance with the requirements of the site's fire protection report.

#### Operational Implementation

The inspectors reviewed the SQN Fire Protection Report (FPR) and the SSA, and applicable references to other AOPs to verify that the shutdown methodology properly identified the systems and components necessary to achieve and maintain post-fire SSD. The inspectors performed walkdowns of the procedural actions based upon the FAs selected to assess the implementation of the SSD strategy and human factors attributes associated with them. The inspectors reviewed licensee records, which specified the shift staffing from randomly selected dates, to ensure the proper staffing levels existed to implement actions specified by licensee procedures. The inspectors reviewed licensee-training material to ensure licensed and non-licensed operators were being trained based upon the current plant configuration.

#### b. Findings

No findings were identified.

### .02 Passive Fire Protection

#### a. Inspection Scope

The inspectors walked down the selected FAs to evaluate the adequacy of the fire resistance of barrier enclosure reinforced concrete and block walls, ceilings, floors, and electrical raceway fire barrier systems. This evaluation also included fire barrier penetration seals, fire doors, fire dampers, and the Thermo-Lag electrical raceway fire barrier systems (ERFBS) to ensure that at least one train of SSD equipment would be maintained free of fire damage. Construction detail drawings were reviewed as necessary. Where applicable, the inspectors observed the installed barrier assemblies and compared the as-built configurations to the approved construction details,

supporting fire endurance test data, licensing basis commitments, and standard industry practices.

b. Findings

Introduction: The inspectors identified a Green non-cited violation (NCV) of Sequoyah Operating License Conditions 2.C.(16) and 2.C.(13) for Units 1 and 2 respectively, for failure to ensure that fire dampers were functional (as required by the approved FPP) in the Auxiliary Control Room (fire area FAA-066), Vital Battery Board Room II (fire area FAA-068), and Vital Battery Board Room III (fire area FAA-087) fire area boundaries.

Description: During an inspection of the selected fire areas the inspectors noted that several fire dampers in adjoining fire areas to the 6.9Kv Shutdown Board Room A (FAA-067) were installed with their fusible links oriented downward, approximately 18-inches from the floor. This configuration would not allow the fire dampers to close due to an abnormal rise in temperature within the room of fire origin. They were installed in the Auxiliary Control Room, (FAA-066), Vital Battery Board Room II, (FAA-068) and Vital Battery Board Room III, (FAA-087). The below listed fire dampers were noted to have been installed with fusible links oriented downward.

- 1XFD-313-914, FAA-066 Aux. Control Rm. to FAA-067 6.9Kv Shutdown Bd. Rm. A
- 2XFD-313-914, FAA-066 Aux. Control Rm. to FAA-081 6.9Kv Shutdown Bd. Rm. B
- 1XFD-313-918, FAA-066 Aux. Control Rm. to FAA-088 Aux. Control Inst. Rm. 1A
- 2XFD-313-918, FAA-066 Aux. Control Rm. to FAA-090 Aux. Control Inst. Rm. 2A
- 1XFD-313-919, FAA-066 Aux. Control Rm. to FAA-089 Aux. Control Inst. Rm. 1B
- 2XFD-313-914, FAA-066 Aux. Control Rm. to FAA-091 Aux. Control Inst. Rm. 2B
- 1XFD-313-908, FAA-068 Vital Batt Bd Rm II to FAA-067 6.9Kv Shutdown Bd. Rm. A
- 2XFD-313-908, FAA-087 Vital Batt Bd Rm III to FAA-081 6.9Kv Shutdown Bd. Rm. B

Because the dampers were installed with their fusible links oriented downward and only 18-inches from the floor, the hot gases from a fire that would be necessary to melt the fusible link would never reach the fusible link before venting at the top of the damper into the adjacent fire area. Air from the adjacent fire area would be drawn across the bottom of the damper and into the fire room of origin, thus cooling the link itself and preventing it from ever reaching a temperature high enough (165°F) to melt the link and release the damper into a shut position. Failure of these dampers to operate would allow smoke and heat to migrate beyond the fire room of origin and affect multiple adjacent fire zones. The inspectors modeled postulated fires of various sizes for the Auxiliary Control Room using computer programs. The fire modeling provided further confirmation that outside air required for combustion would be drawn across the bottom of the damper and hot fire gases would exit across the top of the damper in a mass balance fire mechanism. The inspectors also compared the installation and orientation characteristics of the fire dampers against the installation requirements and characteristics of similar heat actuated devices such as heat detectors, fusible link sprinkler heads and fusible link actuated fire doors. All of these devices were installed to be in the fire's hot gas layer in order to sense the fire and actuate as required. Based upon this information the inspectors concluded that the dampers' fusible link would not have melted as required and thus the dampers were not functional. Part II of the FPR (Fire Protection Plan, Section 14.6, Operating Requirements - Fire Barrier Penetrations, Feature Operating Requirement (FOR) 3.7.12) states that "All fire barrier penetrations (including cable

penetration barriers, fire doors and fire dampers) in fire zone boundaries protecting safety related areas shall be functional.” The licensee entered this issue in the corrective action program (CAP) as Problem Evaluation Reports (PERs) 845913 and 848580, and implemented hourly roving fire watches in the affected FAs.

Analysis: The licensee’s failure to ensure the fire dampers were functional as required by the FPR was determined to be a performance deficiency. This performance deficiency was more than minor because it affected the reactor safety mitigating systems cornerstone attribute of protection against external factors (i.e., fire) and it affected the fire protection defense in depth strategies involving the control of fires that do occur and to protect systems important to safety. Failure of these dampers to operate could allow smoke and heat to migrate beyond the Auxiliary Control Room or Vital Battery Board Rooms II & III and affect multiple adjacent fire zones. The finding was screened in accordance with NRC IMC 0609, “Significance Determination Process,” dated June 2, 2011; Attachment 4, “Initial Characterization of Findings,” dated June 19, 2012, which determined that, an IMC 0609, Appendix F, “Fire Protection Significance Determination Process,” dated September 20, 2013, review was required as the finding involved the ability to confine a fire. The finding category of “Fire Confinement” was assigned, based upon that element of the fire protection program being impacted. Using IMC 0609, Appendix F, Attachment 1, “Fire Protection Significance Determination Process Worksheet,” dated September 20, 2013, the inspectors determined that the finding was of very low safety significance (Green), based upon observation that a fully functional automatic sprinkler system was on either side of each affected fire barrier partition (Task 1.4.3, Question C). No cross cutting was assigned to this finding because the cause of the finding was not indicative of current licensee performance. The dampers were purchased and installed in 1997.

Enforcement: Sequoyah Operating License Condition 2.C(16) and 2.C(13) for Units 1 and 2 respectively, state in part that the licensee shall implement and maintain in effect all provisions of the approved fire protection program referenced in the SQN Updated Final Safety Analysis Report (UFSAR) as approved in NRC Safety Evaluation Reports (SERs) contained in NUREG-0011, Supplements 1,2 and 5 NUREG-1232 Volume 2: NRC letters dated May 29 and October 6, 1986, and the Safety Evaluation (SE) issued on August 12, 1997. UFSAR Section 9.5.1.1 states in part that fire protection systems and fire protection features are described in the SQN FPR and the FPR should be referred to for a detailed description of the FPP. The FPR Part II, Section 14.6, Operating Requirements-Fire Barrier Penetrations Feature Operating Requirements (FOR) 3.7.12 states; “All fire barrier penetrations (including cable penetration barriers, fire doors and fire dampers) in fire zone boundaries protecting safety related areas shall be functional.”

Contrary to the above, since 1997, the licensee did not implement all provisions of the approved fire protection program, in that, due to their orientation, dampers installed in the Auxiliary Control Room (FAA-066), Vital Battery Board Room II (FAA-068), and Vital Battery Board Room III (FAA-087) were not functional. Because the finding was of very low safety significance (Green) and was entered into the licensee’s corrective action program (CAP) as problem evaluation reports (PERs) 845913 and 848580, this finding is being treated as a NCV consistent with Section 2.3.2 of the NRC Enforcement policy. This finding is identified as NCV 05000327, 328/2014007-01, Improper Orientation of Fire Dampers in Auxiliary Building.

.03 Active Fire Protection

a. Inspection Scope

The inspectors reviewed the redundancy of fire protection water sources and fire pumps to confirm that they were installed in accordance with the National Fire Protection Association (NFPA) codes of record to satisfy the applicable separation, design requirements, and licensing basis requirements of the SQN FPP. Current fire protection system health reports were reviewed and discussed with personnel knowledgeable in the operation and maintenance of these systems. The inspectors performed in-plant observations of the material condition and operational lineup for the operation of the fire water pumps and fire protection water supply distribution piping which included manual fire hose and standpipe systems for the selected FAs. Using operating and valve cycle/alignment procedures as well as engineering drawings, the inspectors examined the fire pumps and accessible portions of the fire main piping system to verify the operational status and the alignment of system valves; and to verify the consistency of as-built configurations with engineering drawings. The inspectors also examined portions of the licensee's SSA and select electrical circuit routing drawings outlining the fire water pumps' power and pressure start capability to verify that the fire water system would be available to support fire brigade response activities during power block fire events.

The inspectors compared the fire detection and fire suppression systems for the selected FAs to the applicable NFPA Standard(s) by reviewing design documents and observing their as-installed configurations during in-plant walkdowns. The inspectors reviewed selected fire protection vendor equipment specifications, drawings, and engineering calculations to determine whether the fire detection and suppression methods were appropriate for the types of fire hazards that existed in the selected FAs. During plant walkdowns, the inspectors observed the placement of the fire hose stations, fire extinguishers, fire hose nozzle types, and fire hose lengths, as designated in the firefighting pre-plan strategies, to verify that they were accessible and that adequate reach and coverage was provided. The inspectors reviewed completed periodic surveillance testing and maintenance program procedures for the fire detection and suppression systems and compared them to the operability, testing, and compensatory measures. This review was to assess whether the test program was sufficient to validate proper operation of the fire detection and suppression systems in accordance with their design requirements.

Aspects of fire brigade readiness were reviewed, including but not limited to, the fire brigade's personal protective equipment, self-contained breathing apparatuses, portable communications equipment, and other fire brigade equipment to determine accessibility, material condition, and operational readiness of equipment. During plant walkdowns, the inspectors compared firefighting pre-plan strategies to existing plant layout and equipment configurations and to fire response AOIs for the selected FAs. This was done to verify that firefighting pre-fire plan strategies and drawings were consistent with the fire protection features and potential fire conditions within the area. The inspectors also verify that appropriate information was provided to fire brigade members to facilitate suppression of an exposure fire that could impact the SSD strategy. An operating shift of the fire brigade was randomly selected to confirm that all members were currently qualified with regard to their medical and fire brigade training records. Current mutual aid agreements with local outside fire departments were also reviewed.

b. Findings

Introduction: The inspectors identified a Green NCV of Operating License Conditions 2.C (16) and 2.C (13), for Units 1 and 2 respectively, for failure to properly install an automatic pre-action fire sprinkler system in Auxiliary Control Instrument Room 2A (FAA-090) in accordance with the approved FPP and applicable National Fire Protection Association (NFPA) Standard No. 13, "Automatic Sprinkler Systems."

Discussion: During an inspection of the selected FAs, the inspectors noted that the automatic suppression system (Pre-action sprinkler system) in auxiliary building elevation 734.0', Auxiliary Control Instrument Room 2A, (FAA-090) was not installed in accordance with NFPA 13. The sprinklers were located greater than the maximum allowed 12-inch vertical distance from the ceiling, thus delaying their expected response time after fire ignition. The Code of record, NFPA 13, 1975 edition, Section 4-3.1 required that ceiling level sprinklers be installed within 12-inches of smooth ceiling construction. The sprinkler heads in FAA-090 were installed approximately 60-inches below the ceiling which was outside their laboratory tested configuration and NFPA 13 installation requirements. This would lead to a slower sprinkler response time after fire ignition for heads installed under the projected ceiling jet and outside the fire plume. The inspectors noted that previous licensee corrective actions to relocate sprinkler heads to address sprinkler non-conformance in the auxiliary building were performed as part of Design Change Notice (DCN) 22408. PER 147467 required reviews of sprinkler drawings and in-plant walkdowns to confirm if similar conditions existed in any other safety-related areas. The sprinkler non-conformance in Auxiliary Control Instrument Room 2A was not identified during the previous licensee reviews. The licensee most recently addressed this issue in October 2013.

Analysis: The licensee's failure to install the sprinkler heads in accordance with the applicable NFPA Code of Record specified in the approved FPP is a performance deficiency. This performance deficiency is more than minor because it is associated with the reactor safety mitigating systems cornerstone attribute of protection against external factors (i.e., fire) and it adversely affected the cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. The potential delayed actuation of the sprinkler system could affect the fire protection defense in depth strategy involving suppression of fires. The finding was screened in accordance with NRC IMC 0609, "Significance Determination Process," dated June 2, 2011; Attachment 4, "Initial Characterization of Findings," dated June 19, 2012, which determined that an IMC 0609, Appendix F, "Fire Protection Significance Determination Process," dated September 20, 2013, review was required as the finding involved fixed fire suppression systems. The nature of the degradation of the water based suppression system was related to the response time of the sprinkler system. The installed configuration of these heads would result in a delay in their expected response time after fire ignition. Using IMC 0609, Appendix F, Attachment 2, "Degradation Rating Guidance Specific to Various Fire Protection Program Elements," dated February 28, 2005, a "low" degradation rating was assigned. This was based upon the fact that four sprinkler heads were installed in a room of 110 ft<sup>2</sup> and at least one head would be installed within 10 feet of combustibles of concern. Due to their spacing the sprinklers would be within the fire plume zone of influence for the combustibles of concern and the expected heat release rate (HRR) of postulated fires. Except as noted, the system was considered to be nominally code compliant, and therefore, met the low degradation criteria for water based suppression systems. Using

IMC 0609, Appendix F, Attachment 1, "Fire Protection Significance Determination Process Worksheet," dated September 20, 2013, the inspectors determined that the finding was of very low safety significance (Green), at Task 1.4.2, Question A. The cause of this finding was determined to have a cross-cutting aspect of Evaluation (P.2) in the Problem Identification and Resolution cross-cutting area, because the licensee did not thoroughly evaluate the issue to ensure that resolutions addressed extent of conditions commensurate with their safety significance.

Enforcement: Sequoyah Operating License Conditions 2.C (16) and 2.C (13) for Units 1 and 2 respectively, state in part that the licensee shall implement and maintain in effect all provisions of the approved FPP referenced in the SQN UFSAR as approved in NRC SERs contained in NUREG-0011, Supplements 1, 2, and 5, NUREG-1232, Vol. 2, NRC letters dated May 29 and October 6, 1986, and the SE issued August 12, 1997. SQN UFSAR Section 9.5.1.1, states that fire protection systems and fire protection features are described in the SQN FPR and the FPR should be referred to for a detailed description of the FPP. Part IV, Section 3.3 of the FPR states that NFPA 13-1975, Automatic Sprinkler Systems, was the code used to evaluate the adequacy of sprinkler systems. NFPA 13, Section 4-3.1 requires that ceiling level sprinklers be installed within 12-inches of smooth ceiling construction.

Contrary to the above, the licensee failed to implement all provisions of the approved fire protection program in that, sprinklers in the Auxiliary Control Instrument Room 2A, (FAA-090) were not installed in accordance with NFPA 13-1975, "Automatic Sprinkler Systems," and the ceiling level sprinklers were not installed within 12-inches of smooth ceiling construction. This condition has existed since original plant licensing. Because the finding was of very low safety significance (Green) and was entered into the licensee's CAP as PER 847948, this finding is being treated as a NCV consistent with Section 2.3.2 of the NRC Enforcement policy. This finding is identified as NCV 05000327, 328/2014007-02, Auxiliary Control Instrument Room 2A Sprinklers Not in Compliance with NFPA 13-1975.

#### .04 Protection from Damage from Fire Suppression Activities

##### a. Inspection Scope

The inspectors evaluated whether water-based manual firefighting activities could adversely affect equipment credited for SSD, inhibit access to alternate shutdown equipment, or adversely affect local OMAs required for SSD in the selected FAs. The inspectors reviewed available documentation related to flooding analysis for the rupture and inadvertent operation of fire suppression systems, fire protection activities, and potential flooding through unsealed concrete floor cracks for this assessment. The inspectors also performed independent calculations of inter-area migration of water under fire doors to validate feasibility of selected OMAs in adjacent plant areas.

Firefighting pre-plan strategies; fire brigade training procedures; fire damper locations; heating, ventilation and air conditioning drawings; and fire response procedures were reviewed to verify that inter-area migration of heat and smoke via the ventilation system was addressed such that OMAs would not be inhibited by smoke migration from one area to adjacent plant areas used to accomplish SSD.

##### b. Findings

No findings were identified.

.05 Alternative Shutdown Capability

a. Inspection Scope

Methodology

The licensee credited an alternative shutdown capability for a postulated fire in fire area FAC-017, Main Control Room (MCR). The inspectors reviewed UFSAR Section 9.5.1, the SQN FPR, and corresponding AOPs to ensure that appropriate controls provided reasonable assurance that alternative shutdown equipment remained operable, available, and accessible when required. In cases where local OMAs were credited in lieu of cable protection of SSD components, the inspectors performed a walk-through of the procedures to determine if the operators could reasonably be expected to perform the alternative safe shutdown procedure actions and that equipment labeling was consistent with the alternate safe shutdown procedures. The inspectors reviewed applicable process and instrumentation diagrams to gain an understanding of credited equipment's flow path and function. The inspectors reviewed applicable licensee calculations to ensure the alternative shutdown methodology properly identified systems and components to achieve and maintain SSD for the FAs selected for review.

Additionally, the team reviewed electrical schematics and one line diagrams to ensure that the transfer of SSD control functions to the alternate shutdown facility included sufficient instrumentation to safely shutdown the reactor. This review also included verification that shutdown from outside the MCR could be performed both with and without the availability of offsite power.

Operational Implementation

The inspectors reviewed procedure AOP-N.01, "Plant Fire", to verify the adequacy of this procedure to mitigate a fire in fire area FAC-017. The inspectors reviewed selected training materials for licensed and non-licensed operators to verify that training reinforced the shutdown methodology that is utilized in the FPP and AOPs for fires. The inspectors also reviewed shift manning and training records to verify that personnel required for SSD using alternative shutdown systems and procedures were trained and available onsite, exclusive of those assigned as fire brigade members. The inspectors performed a walk-through of procedure steps with operations personnel to assess the implementation and human factors adequacy of the procedures and shutdown strategy to evaluate the ambient conditions, difficulty, and operator familiarization associated with each OMA. The inspectors reviewed the systems and components credited for use during this shutdown method to verify that they would remain free from fire damage. The inspectors reviewed selected operator actions to verify that the operators could reasonably be expected to perform the specific actions within the time required to maintain plant parameters within specified limits.

b. Findings

No findings were identified.

.06 Circuit Analysis

a. Inspection Scope

The inspectors reviewed SQN FPR, system flow diagrams, and the SQN post-fire SSA to verify that the licensee had identified required and associated circuits that may impact post-fire SSD for the selected FAs. On a sample basis, the inspectors verified that the cables of equipment specified in the SSA essential equipment list required for achieving and maintaining shutdown conditions, in the event of a fire in the selected FAs, had been properly identified. In addition, the inspectors reviewed cable routing information for credited equipment/components to verify that the cables had either been adequately protected from the potentially adverse effects of fire damage or analyzed to show that fire induced faults (e.g. hot shorts, open circuits, and shorts to ground) would not prevent post-fire SSD. The inspectors reviewed the licensee's electrical coordination study to determine if power supplies were susceptible to fire damage, which would potentially affect the credited components for the FAs chosen for review. The inspectors reviewed FHA calculation SQN-26-D054/EPM-ABB-IMPFA, Appendix A for fire areas FAC-017, FAA-067, FAA-069 and FAA-073. The inspectors selected the 125V DC Vital Battery Board I for inspection, which was a credited power system component for FAs FAA-067 and FAA-073. The inspectors reviewed applicable drawings, circuit breaker selective coordination, overload protection, cable protection, and interrupting capacity of devices to determine if there was reasonable assurance that the circuit breakers would operate and protect the cables as intended for the 125V DC Vital Battery Board I. The specific components reviewed are listed in the Attachment.

b. Findings

Introduction: The inspectors identified a Green NCV (with two examples) of 10 CFR Part 50, Appendix B, Criterion III, Design Control, for the licensee's failure to assure that design documents were controlled and appropriate quality standards for design were specified as required by site procedures.

Description: The inspectors reviewed safety-related calculation SQN-CPS-051, Circuit Protective Device Evaluation, Rev. 51 for the cable fault current withstand evaluation of Westinghouse (W) type HFB 50 Amp (DC molded case) circuit breakers 203 and 206, which are located in the 125V DC Vital Battery Board I. The inspectors noted that cables 1B16I and 1B19I, for circuit breakers 203 and 206, respectively, were documented on the cable fault current withstand evaluation as #2 AWG cables, however, the #2 AWG cable was not plotted on the coordination and cable damage curve with the W type HFB 50 Amp circuit breaker to demonstrate that the cable was evaluated. The inspectors discussed this deficiency with the licensee and PER 846017 was initiated to address the issue. Further review of calculation SQN-CPS-051 and discussion with the licensee revealed that circuit breakers 203 and 206 as identified in the calculation were not the W type HFB 50 Amp circuit breakers. The licensee informed the inspectors that the W circuit breakers were replaced with the Cutler-Hammer type HFD 50 Amp (DC molded case) circuit breakers under Procurement Engineering Group (PEG) Package CMD948E, approved December 2006, because the W breakers were obsolete. A review of PEG Package CMD948E identified a total of 10 work orders that replaced 10 circuit breakers during the SQN Unit 2 Cycle 14 refueling outage, of which two work orders were specific for replacement of the 600V AC/250V DC molded case circuit breakers 203 and 206, which were used in DC circuit applications in the 125V DC Vital Battery Board I.



The inspectors noted that the licensee failed to revise calculation SQN-CPS-051 to reflect the replacement circuit breakers and the associated time current curve technical details as specified in PEG Package RFQ123122CO and required by procedures NEDP-2, "Design Calculation Process Control, Rev. 17" and NEDP-8, "Technical Evaluation for Procurement of Materials and Services, Rev. 8." The licensee informed the inspectors that PEG Package CMD948E was initiated as a result of W Technical Bulletin (TB)-04-13, dated 06/28/2004, and additional PEG packages were initiated at SQN to replace various obsolete W type circuit breakers. The inspectors requested the licensee to provide a list of PEG package evaluations that had been prepared, approved and issued specifically for W TB-04-13. The licensee response identified 24 PEG packages for breaker substitution approval without associated calculation updates and initiated PERs 845951 and 848756.

The inspectors reviewed procedure NEDP-8 in parallel with PEG Package CMD948E and noted that the PEG Package evaluation did not contain adequate documented evidence to support the DC critical characteristics (interrupting capacity) for circuit breakers used in a DC application, as required by NEDP-8 and as defined in Calculation SQN-CPS-051, Section 1.0. The licensee included this deficiency in previously mentioned PER 845951. The licensee's further evaluation of PER 848756 identified four of the 24 PEG packages did not specify the DC critical characteristic (interrupting capacity) and initiated PER 849220.

The inspectors compared the 50 Amp Westinghouse HFB series circuit breaker time-current curve with the replacement 50 Amp Cutler-Hammer HFD series circuit breaker time-current curve; and, reviewed the Cutler-Hammer manufacturer's specification sheet which provided details on the DC critical characteristic attribute (UL 489 interrupting capacity ratings) for the replacement Cutler-Hammer HFD series DC circuit breakers. Based on these reviews, the inspectors concluded there was reasonable assurance that circuit breakers 203 and 206 would perform their intended safety function in the 125V DC circuit application.

Analysis: The licensee's failure to assure that design documents were controlled and appropriate quality standards for design were specified in accordance with design control procedures was a performance deficiency. The performance deficiency was more than minor because if left uncorrected it could lead to installation of breakers that may not meet the critical characteristics needed to perform their safety function. The finding was screened in accordance with NRC IMC 0609, "Significance Determination Process," dated June 2, 2011; Appendix A, "The Significance Determination Process for Findings At-Power," dated June 19, 2012. Using IMC 0609, Appendix A, Exhibit 2, "Mitigating Systems Screening Questions," the finding was determined to be of very low safety significance (Green) because it did not represent an actual loss of safety function. No cross-cutting aspect was identified, since the issue was determined to not reflect current licensee performance.

Enforcement: 10 CFR Part 50, Appendix B, Criterion III, Design Control, required, in part, that design control measures shall include provisions to assure that appropriate quality standards are specified and included in design documents, measures shall also be established for the selection and review for suitability of application of materials, parts, equipment, and processes that are essential to the safety-related functions of the structures, systems and components. SQN Procedure NEDP-2, Design Calculation

Process Control, Rev. 17, Section 3.1 General Requirements, states, in part, that calculation and calculation revisions shall be issued before or concurrent with issuance of documents, input or output, which they support. Procedure NEDP-8, Technical Evaluation for Procurement of Materials and Services, Rev. 23, Section 5.0, states, in part, that the critical characteristics for design are those properties or attributes which are essential for the item's form, fit, and functional performance. These are identifiable and/or measurable attributes of a replacement item which will provide assurance that the replacement item will perform its design function.

Contrary to the above, on March 5, 2014, the inspectors identified two examples where the licensee's design control measures failed to assure that appropriate quality standards for design were specified and technical details were translated to controlled design documents. The licensee failed to translate from PEG Package CMD948E to applicable safety-related calculations, the manufacturer's time current curve analysis along with other technical details, for 600V AC/250V DC replacement circuit breakers; and failed to evaluate the DC interrupting capacity ratings (critical characteristics) for qualification of the replacement Cutler-Hammer 600V AC/250V DC molded case circuit breakers to safety-related applications within the station's 125V DC system. Because the finding was of very low safety significance (Green) and was entered into the licensee's CAP as PERs 845951, 846017, 848756, and 849220, this violation is being treated as an NCV, consistent with Section 2.3.2 of the NRC Enforcement Policy. This violation is identified as NCV 05000327, 328/2014007-03, Design Control Requirements not met During Safety-Related Circuit Breaker Replacements.

#### .07 Communications

##### a. Inspection Scope

The inspectors reviewed the communications capabilities required to support plant personnel in the performance of OMAs to achieve and maintain SSD, as credited in the SQN FPR. The inspectors performed plant walkdowns with the licensee's operations staff to assess the credited method of communications used to complete SSD actions as specified in post-fire SSD procedures for the selected FAs. The inspectors also verified that portable radio communications and fixed emergency communication systems were available, operable, and adequate for the performance of designated activities to support fire event notification and fire brigade firefighting activities. The inspectors reviewed a completed surveillance procedure, 0-PI-OPS-000-708.0, "10CFR50 Appendix R Compliance Verification, Appendix F, Verification of Radio Communications," dated January 23, 2014, to verify that the communication equipment was being properly maintained and tested.

##### b. Findings

No findings were identified.

#### .08 Emergency Lighting

##### a. Inspection Scope

The inspectors reviewed maintenance and design aspects of the fixed 8-hour battery pack emergency lighting units (ELUs) required by SQN's approved FPP. The inspectors

performed plant walkdowns of the post-fire SSD procedures for the selected FAs to observe the placement and coverage area of the ELUs required to illuminate operator access and egress pathways, and any equipment requiring local operation and/or instrumentation monitoring for post-fire SSD. The inspectors reviewed completed procedure 0-PI-OPS-247-529.1, Emergency Lighting Illumination Test, dated January 2010, to verify that ELUs provided adequate lighting. The inspectors reviewed corrective action documents associated with deficiencies identified in procedure 0-PI-OPS-247-529.1 to verify that adequate compensatory measures had been established pending final resolution of identified deficiencies. The inspectors also reviewed 8-hour test result to verify that adverse trends were being identified and corrected.

b. Findings

No findings were identified.

.09 Cold Shutdown Repairs

a. Inspection Scope

The inspectors reviewed the SQN FPP and AOPs to verify that the licensee identified repairs needed to reach and maintain cold shutdown and had dedicated repair procedures, equipment, and materials to accomplish these repairs after a fire event, assuming no offsite power was available. The inspectors verified that the fire damage repair procedures were current and adequate. The inspectors reviewed the inventory inspection work order records and compared them to the equipment and tool lists to verify that all required replacement parts and equipment were being accounted for and were available for use.

b. Findings

Introduction: The inspectors identified a Green NCV of Sequoyah Operating License Conditions 2.C.(16) and 2.C.(13), for Units 1 and 2 respectively, for the licensee's failure to maintain necessary materials and procedures for cold shutdown repairs.

Description: Procedure SMI-317-18, Appendix R - Casualty Procedures [C.1], Rev. 14, directed cold shutdown repair actions for fires in the auxiliary building, reactor building and annulus. Procedure 0-PI-FPU-317-538.0, Equipment Inventory, Rev. 7, listed and inventoried the required cold shutdown repair materials. The following deficiencies were identified by the team and entered into the licensee's corrective action program.

- PER 847449, Deficiencies in Appendix R Repair Procedure documented the following deficiencies:
  - Procedure SMI-317-18, Sections 6.17 - 6.26, provided guidance for repairing approximately 25 valves; however, the required repair parts were not listed in procedure 0-PI-FPU-317-538.0.
  - Procedure SMI-317-18, Sections 6.11 and 6.13 directed the installation of a temporary three phase power supply for residual heat removal (RHR) pumps and RHR room coolers; however, the procedure did not provide guidance on where to terminate cables inside the breaker cubicles.
  - Procedure SMI-317-18 had multiple sections that did not provide terminal block identification numbers for lifting and landing wires.

- PER 847428, Review Section 6.12 of SMI-0-317-18, documented the lack of adequate instructions for repairing eight flow control valves; however, the procedure did not provide any repair instructions.
- PERs 644619, 713847, and 823207 documented inadequate procedural guidance and a lack of materials for repairing letdown isolation valves. The issue was identified by the licensee on November 19, 2012, but had not been corrected at the time of the inspection.
- PERs 845931, 847420, 847462 documented additional cold shutdown repair procedure discrepancies that were identified during the inspection.

Analysis: The licensee's failure to provide adequate guidance for all repairs listed in procedure "SMI-317-18, Appendix R - Casualty Procedures," and, failure to maintain the required repair parts for the same procedure was a performance deficiency. The performance deficiency was more than minor because it was associated with the procedure quality attribute of the Mitigating Systems Cornerstone and it adversely affected the cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events (fire) to prevent undesirable consequences. Specifically, inadequate procedural guidance and the lack of required materials adversely affected the licensee's capability to achieve and maintain cold shutdown conditions. The finding was screened in accordance with NRC IMC 0609, "Significance Determination Process," dated June 2, 2011; Attachment 4, "Initial Characterization of Findings," dated June 19, 2012, which determined that an IMC 0609, Appendix F, "Fire Protection Significance Determination Process," dated September 20, 2013, review, was required as the finding affected fire protection defense-in-depth strategies involving post-fire SSD. Using IMC 0609, Appendix F, Attachment 1, "Fire Protection Significance Determination Process Worksheet," dated September 20, 2013, the inspectors determined that the finding was of very low safety significance (Green) at Task 1.3.1, because it was determined that the reactor was able to reach and maintain a hot safe shutdown condition. The cause of this finding was determined to have a cross-cutting aspect of Teamwork (H4) in the Human Performance cross-cutting area because the licensee failed to assure that individuals and work groups communicated and coordinated their activities within and across organizational boundaries to ensure nuclear safety was maintained. Specifically, the coordination between operation's department procedure writers, maintenance department procedure writers, and fire operations department personnel was inadequate to ensure the adequacy of cold shutdown repair procedures and the availability of required materials.

Enforcement: Sequoyah Operating License Conditions 2.C.(16) and 2.C.(13) for Units 1 and 2 respectively, state in part, that TVA shall implement and maintain in effect all provisions of the approved FPP referenced in SQN UFSAR. UFSAR Section 9.5.1, Fire Protection System states that the fire protection system and fire protection features are described in the FPR. The FPR, "Part IX - Appendix R Compliance Report," states in part, that materials required for cold shutdown repairs will be readily available onsite and procedures will be in effect to implement the repairs such that cold shutdown can be achieved within 72 hours.

Contrary to the above, on March 5, 2014, the inspectors identified that the licensee failed to implement and maintain in effect all provisions of the approved FPP relative to the availability of cold shutdown repair materials and failed to provide adequate procedures to implement such repairs. Specifically, the licensee failed to provide adequate

guidance for all repairs listed in procedure SMI--317-18, "Appendix R - Casualty Procedures;" and the licensee failed to maintain the repair parts that would be installed by the same procedure. Because this finding was of very low safety significance (Green), and was entered into the licensee's CAP as PERs 845931, 847420, 847428, 847449, and 847462, this violation is being treated as an NCV, consistent with Section 2.3.2 of the NRC Enforcement Policy. This finding is identified as NCV 05000327, 328/2014007-04, Failure to Maintain Necessary Materials and Procedures for Cold Shutdown Repairs.

.10 Compensatory Measures

a. Inspection Scope

Compensatory Measures for Degraded Fire Protection Components

The inspectors reviewed the administrative controls for out-of-service, degraded and/or inoperable fire protection features (e.g. detection and suppression systems, and passive fire barriers) to verify that short-term compensatory measures were adequate for the degraded function or feature until appropriate corrective actions could be taken. The inspectors reviewed impairment and compensatory measures forms for fire watch tours to confirm they were being performed within the allowable time frames.

Manual Actions as Compensatory Measures for Safe Shutdown

The inspectors reviewed the FHA, calculation SQS40127, "Equipment Required for Safe Shutdown per 10CFR50 Appendix R," Rev. 51, procedure EPM-10, "AOP-N.08 Manual Action Reliability Study," Rev. 10 and procedure EPM-11, "AOP-C.04 Manual Action Reliability Study," Rev. 5 to identify OMA credited for safe shutdown. In cases where local OMAs were credited in lieu of cable protection or separation of SSD equipment, the inspectors reviewed and performed walkdowns of those applicable OMAs to verify that the OMAs were feasible utilizing the guidance of NRC IP 71111.05T, paragraph 02.02.j.2.

b. Findings

No findings were identified.

.11 Review and Documentation of Fire Protection Program Changes

a. Inspection Scope

The inspectors reviewed a sample of FPP changes made between July 2011 and January 2014 to determine if the changes to the FPP were in accordance with the fire protection license conditions and had no adverse effect on the ability to achieve SSD. The inspectors reviewed DCN D22547 "Reactor Head Vents and Pressurizer PORV and Block Valves, System 068," Rev. A, to assess the licensee's effectiveness review and to determine if the resulting changes to the FPP were in accordance with the fire protection license conditions.

b. Findings

Introduction: The inspectors identified a Green non-cited violation (NCV) of Sequoyah Operating License Conditions 2.C.(16) and 2.C.(13), for Units 1 and 2 respectively, for the licensee's failure to perform the required reviews when adding fire watches to the fire protection program.

Description: In December 2009, the licensee initiated PER 211202, "Procedure for Isolation of PORV May Conflict with Fire Safe Shutdown Analysis," when it was identified that the actions taken to mitigate a leaking pressurizer power operated relief valve (PORV) would result in the isolation of the credited PORV for four FAs. Isolation of the PORV occurs when operators close the associated block valve as required by Technical Specifications (TS) and as directed by procedure 0-SO-68-3, Pressurizer Pressure Control System. During a fire event, the credited PORV would remain isolated because the closed block valve could not be opened due to a lack of electrical power. Early in a fire event, the fire safe shutdown procedure de-energizes the electrical bus that provides motive power to the block valve. PER 211202 instituted an interim compensatory measure to establish an hourly or continuous fire watch whenever the applicable PORV was isolated. Procedure 0-SO-68-3 was revised to require fire watches whenever the applicable block valve was closed. Additionally, in March 2010, the licensee initiated PER 223631 "*Appendix R MSO #18 Review of Pressurizer Letdown Path to Assess the Appendix R SSD*" concerning the closure of the block valves which conflicted with the Appendix R fire safe shutdown analysis. In 2012, as a corrective action, the licensee revised the FHA to state that a fire watch was required if a leaking PORV was isolated during normal operation. The inspectors identified that the FHA was revised without performing the required evaluations or fire protection program reviews. The FHA was revised on November 4, 2011, during implementation of DCN D22547. The DCN did not discuss or evaluate the use of fire watches as part of an effective safe shutdown strategy.

The inspectors determined that the licensee's sole reliance on fire watches for a SSD deficiency was inadequate, in part, because TS allowed operation with a closed block valve for an unlimited time period. This determination was informed by NRC Regulatory Issue Summary 2005-07, "*Compensatory Measures to Satisfy the Fire Protection Program Requirements*," which states that licensees should consider or implement other appropriate interim compensatory measures, such as briefing operators on degraded post-fire, safe-shutdown-system conditions; temporary repair procedures; temporary fire barriers; or detection or suppression systems. The determination was also based on guidance from NRC Information Notice 97-48, "*Inadequate or Inappropriate Interim Fire Protection Compensatory Measures*," which also discusses compensatory measures related to achieving and maintaining post-fire SSD. The inspectors noted that PERs 211202 and 223631 did not implement any corrective actions to provide reasonable assurance that control room operators could achieve safe shutdown during a fire event.

The performance deficiency adversely affected the capability to achieve safe shutdown in four FAs: FAA-054 (Unit 1 and 2), FAA-067 (Unit 1) and FAA-081 (Unit 2). The licensee entered the issue into their CAP as PER 845593. The inspectors determined that Units 1 and 2 were not in the operational alignment associated with the deficiency; therefore, no immediate actions were required.

Analysis: The licensee's failure to perform the required evaluation and review prior to revising the FHA was a performance deficiency. The performance deficiency was more than minor because it was associated with the procedure quality attribute of the

Mitigating Systems Cornerstone and it adversely affected the cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events (fire) to prevent undesirable consequences. Specifically, the sole of use fire watches as a mitigation measure for the unavailability of the credited PORV would adversely affect the capability to achieve and maintain SSD during a fire event. The finding was screened in accordance with NRC IMC 0609, "Significance Determination Process," dated June 2, 2011; Attachment 4, "Initial Characterization of Findings," dated June 19, 2012, which determined that an IMC 0609, Appendix F, "Fire Protection Significance Determination Process," dated September 20, 2013, review, was required as the finding affected fire protection defense-in-depth strategies involving post-fire SSD. Using IMC 0609, Appendix F, Attachment 1, the issue screened as having very low safety significance (Green) at Task 1.5.3 because the change in core damage frequency (CDF) was less than  $1\text{E-}6$  (i.e., delta CDF calculated to be  $6.6\text{E-}7$ ). The cause of this finding was determined to have a cross-cutting aspect of Evaluation (P.2) in the Problem Identification and Resolution cross-cutting area, because the licensee did not thoroughly evaluate the issue to ensure that resolutions addressed causes commensurate with their safety significance. Specifically, the establishment of effective corrective actions was adversely affected by the failure to perform an evaluation prior to revising the FHA.

Enforcement: Sequoyah Operating License Conditions 2.C.(16) and 2.C.(13) for Units 1 and 2 respectively, state in part, that TVA shall implement and maintain in effect all provisions of the approved FPP as referenced in the SQN UFSAR. UFSAR Section 9.5.1, Fire Protection System states that the fire protection system and fire protection features are described in the FPR. The FPR, Part II, Section 8.1, states in part, that "changes to the FPR receive a technical and impact review by qualified individuals."

Contrary to the above, on November 4, 2011, the licensee changed the FPR without qualified personnel performing a technical and impact review. Specifically, the licensee revised the FHA, which is part of the FPR, to include fire watches without performing the required evaluations. Because this finding was of very low safety significance (Green) and was entered into the licensee's CAP as PER 845593, this violation is being treated as a NCV, consistent with Section 2.3.2 of the NRC Enforcement Policy. The violation was entered into the licensee's corrective action program as PER 845593. The finding is identified as NCV 05000327, 328/2014007-05, Failure to Perform the Required Reviews when Adding Fire Watches to the Fire Protection Program.

.12 Control of Transient Combustibles and Ignition Sources

a. Inspection Scope

The inspectors conducted tours of numerous plant areas that were important to reactor safety, including the selected FAs, to verify the licensee's implementation of FPP requirements as described in the SQN FPP and administrative procedure NPG-SPP-18.4.7, "Control of Transient Combustibles." For the selected FAs, the inspectors evaluated generic fire protection training; fire event history; the potential for fires or explosions; the combustible fire load characteristics; and the potential exposure fire severity to determine if adequate controls were in place to maintain general housekeeping consistent with the FPR, administrative procedures, and other FPP procedures. There were no hot work activities ongoing within the selected FAs during the inspection and observation of this activity could not be performed.

b. Findings

No findings were identified.

.13 B.5.b Inspection Activities

a. Inspection Scope

The inspectors reviewed, on a sample basis, the licensee's mitigation measures to manually depressurize the steam generators and use the portable pump for large fires and explosions to verify that the measures were feasible, personnel were trained to implement the strategies, and equipment was properly staged and maintained. The inspectors reviewed the licensee's established program, applicable SERs and submittals which supported the elements outlined by the license condition. The inspectors reviewed inventory, surveillance testing, and maintenance records of required equipment. Through discussions with plant staff, documentation review, and plant walkdowns, the inspectors verified the engineering basis to establish reasonable assurance that the makeup capacity could be provided using the specified equipment and water sources. The inspectors reviewed the licensee's capability to provide a reliable and available water source and the ability to provide the minimum fuel supply. The inspectors performed a walk-down of the storage and staging areas for the B.5.b equipment to verify that equipment identified for use in the current procedures was available and maintained. The inspectors reviewed training records of the licensee's staff to verify that operations and security personnel training/familiarity with the strategy objectives and implementing guidelines were accomplished according to the established training procedures.

b. Findings

No findings were identified.

**4. OTHER ACTIVITIES**

4OA2 Problem Identification and Resolution

a. Inspection Scope

The inspectors reviewed a sample of licensee independent audits, self- assessments, and system/program health reports for thoroughness, completeness and conformance to FPP requirements. The inspectors also reviewed CAP documents, including completed corrective actions documented in selected PERs, to verify that fire protection deficiencies were adequately identified, evaluated, and that appropriate corrective actions were implemented. The inspectors reviewed operating experience program documents to ascertain whether industry identified fire protection issues affecting SQN were appropriately entered into the corrective action program for resolution. The documents reviewed are listed in the Attachment.

b. Findings

No findings were identified.



**4OA6 Meetings, Including Exit**

On March 5, 2014, the lead inspector presented the preliminary inspection results to Mr. P. Simmons, SQN Plant Manager, and other members of the licensee's staff, who acknowledged the results. Following completion of additional reviews in the Region II office, another exit meeting was held by telephone with Mr. M. McBrearty, SQN Licensing Manager and other members of the licensee's staff on April 17, 2014, to provide an update on changes to the preliminary inspection findings. The licensee acknowledged the findings. Proprietary information is not included in this IR.

ATTACHMENT: SUPPLEMENTARY INFORMATION

## **SUPPLEMENTARY INFORMATION**

### **KEY POINTS OF CONTACT**

#### **Licensee Personnel**

J. Alfultis, Director of Modifications and Projects  
L. Amini, Fire Protection/Appendix R Program Owner  
J. Carlin, Site Vice President  
C. Coriell, Fire Protection Supervisor  
J. Cruz, Electrical/I&C Design Engineering Manager  
A. Day, Chemistry/Environmental Manager  
D. Dimopoulos, Design Engineering Manager  
R. Egli, TVA Corporate Fire Protection  
D. Ensminger, Fire Marshall  
G. Garner, Operations Superintendent  
M. Halter, Emergency Preparedness  
M. Henderson, Engineering Programs Manager  
C. Hoffman, Operations Support Superintendent  
T. Marshall, Operations Manager  
M. McBrearty, Licensing Manager  
D. Porter, Operations Procedures  
P. Pratt, Maintenance Manager  
R. Proffitt, Technical Assistant to Plant Manager  
A. Seaborn, Maintenance Procedures  
P. Simmons, Plant Manager  
B. Simril, TVA Corporate Fire Protection Manager  
W. Stadder, Site Engineering  
R. Travis, Licensing Engineer  
E. Turner, Electrical Engineering Design  
R. Williams, Quality Assurance

#### **NRC Personnel**

S. Shaeffer, Chief, Engineering Branch 2, Division of Reactor Safety, Region II  
G. Smith, Senior Resident Inspector

### **LIST OF REPORT ITEMS**

#### **Opened and Closed**

05000327, 328/2014007-01	NCV	Improper Orientation of Fire Dampers in Auxiliary Building (Section 1R05.02)
05000327, 328/2014007-02	NCV	Auxiliary Control Instrument Room 2A Sprinklers Not in Compliance with NFPA 13-1975 (Section 1R05.03)
05000327, 328/2014007-03	NCV	Design Control Requirements not met During Safety-Related Circuit Breaker Replacements (Section 1R05.06)

05000327, 328/2014007-04	NCV	Failure to Maintain Necessary Materials and Procedures for Cold Shutdown Repairs (Section 1R05.09)
05000327, 328/2014007-05	NCV	Failure to Perform the Required Reviews when Adding Fire Watches to the Fire Protection Program (Section 1R05.11)

**SUPPLEMENTARY INFORMATION  
LIST OF FIRE BARRIERS INSPECTED**

(Refer to Report Section 1R05.02 - Passive Fire Barriers)

**Fire Barrier Floors, Walls  
and Ceiling Identification**

Walls, Floor and Ceiling

**Description**

Main Control Room (FAC-017)  
6.9Kv Shutdown Board Room "A" (FAA-067)  
125V Vital Battery Board Room "I" (FAA 069)  
480V Shutdown Board Room 1A2 (FAA-073)

**Fire Damper Identification**

1-XFD-313-914  
1-XFD-313-918  
1-XFD-313-919  
2-XFD-313-914  
2-XFD-313-918  
2-XFD-313-919  
1-XFD-313-908  
2-XFD-313-908

**Description**

FAA-066 to FAA-067  
FAA-066 to FAA-088  
FAA-066 to FAA-089  
FAA-066 to FAA-081  
FAA-066 to FAA-090  
FAA-066 to FAA-091  
FAA-068 to FAA-067  
FAA-087 to FAA-081

**Fire Door Identification**

A-140  
A-142  
A-143  
A-147  
A-169  
A-170

**Description**

FAA-67 to FAA 066  
FAA-067 to FAA 069  
FAA-067 to FAA 070  
FAA-067 to FAA 073  
FAA-067 to FAA-086  
FAA-067 to FAA-087

## LIST OF DOCUMENTS REVIEWED

### Procedures

0-MI-MXX-410-003.0, Repair and Maintenance of Fire Doors, Frames and Various Fire Door Hardware, Rev. 4  
0-PI-FPU-026-122.Y, HPFP Yard Flow Tests, Rev. 8  
0-PI-FPU-026-182.R, Fire Brigade Hose Inspection and Testing, Rev. 9  
0-PI-FPU-026-190.Q, Inspection of Non-technical Specification Fire Hose Stations, Rev. 9  
0-SI-FPU-013-614.0, Fire Detection Panel 0-L-614 Test, Rev. 7  
0-SI-FPU-013-616.0, Fire Detection Panel 0-L-616 Test, Rev. 8  
0-SI-FPU-013-617.0, Fire Detection Panel 0-L-617 Test, Rev. 5  
0-SI-FPU-026-192.M, Motor Driven Fire Pump A Operability Test, Rev. 3  
0-SI-FPU-026-193.M, Diesel Driven Fire Pump B Monthly Test, Rev. 7  
0-SI-FPU-026-195.Q, Diesel Fire Pump Battery Quarterly Inspection, Rev. 6  
0-SI-FPU-026-200.R, Diesel Driven Fire Pump B -18 Month Flow Test, Rev. 13  
0-SI-FPU-026-201R, Motor Driven Fire Pump A -18 Month Flow Test, Rev. 5  
0-SI-FPU-026-242, Visual Inspection of Fire Protection Sprinklers in the Control Bldg., Rev. 2  
0-SI-FPU-031-001, Visual Inspection of Fire Dampers, Rev. 6  
0-SI-FPU-302-001.R, Fire Barrier Visual Inspection - Aux Bldg. and Control Bldg., Rev. 11  
0-PI-FPU-317-530.M, Plant Operating Area Fire Extinguisher Monthly Inspection, Rev. 1  
0-SI-FPU-410-703.0, Inspection of FPR Required Fire Doors, Rev. 0  
0-SI-FPU-410-703.0, Inspection of FPR Required Fire Doors, Rev. 5  
0-SI-IFT-013-300.0, Functional Test Fire Det. Sys 13 Console and Peripheral Devices, Rev. 13  
0-SI-FPU-247-001.0, Appendix R Emergency Lighting Auxiliary Building Quarterly Test, Rev. 27  
0-SI-FPU-247-004.0, Aux. Building Appendix R Emergency Lighting Discharge Test, Rev. 26  
0-SI-FPU-013-647.0, Fire Detection Panel 0-L-647 Test, Rev. 8  
0-PI-FPU-013-671.0, Fire Detection Panel 0-L-671 Test, Rev. 4  
0-SO-68-3, Pressurizer Control System, Rev. 24  
AOP-C.04, Shutdown from Auxiliary Control Room, Rev. 33 and Rev. 34  
AOP-N.01, Plant Fires, Rev. 39  
AOP-N.08, Appendix R Fire Shutdown, Rev. 34 and Rev. 35  
AOP-P.02, Loss of 125V DC Vital Battery Board, Rev. 14  
AOP-T.01, Security Events, Rev. 19  
DS-E12.6.3, Auxiliary and Control Power Cable Sizing, up to 15,000 Volts, Rev. 10  
EA-1-2, Local Control of S/G Atmospheric Relief Valves, Rev. 7 and Rev. 8  
EDMG-1, Loss of MCR/ACR Functional – Initial Response, Rev. 5  
EDMG-2, Event Mitigation, Rev. 17  
EPM-10, AOP-N.08, Manual Action Feasibility and Reliability Study, Rev. 10  
EPM-11, AOP-C.04, Manual Action Feasibility and Reliability Study, Rev. 5  
FP-MA-4.0, Fire Protection Mitigating Actions, Rev. 3  
FPDP-3, Management of the Fire Protection Report, Rev. 6  
NEDP-2, Design Calculation Process Control, Rev. 17  
NEDP-8, Technical Evaluation for Procurement of Materials and Services, Rev. 0023  
NPG-SPP-09.3, Plant Modifications and Engineering Change Control, Rev. 0016  
NPG-SPP-09.5, Temporary Modifications, Rev. 08  
NPG-SPP-18.4.6, Control of Fire Protection Impairments, Rev. 4  
NPG-SPP-18.4.7, Control of Transient Combustibles, Rev. 5  
NPG-SPP-18.4.8, Control of Ignition Sources (Hot Work), Rev. 3  
OPDP-7, Fuse Control, Rev. 0005  
SMI-0-317-18, Appendix R – Casualty Procedure [C.1], Rev. 14  
SOI-26.2, Fire Interaction Manual, Rev. 7

SQN-DC-V-7.5, Fire Protection Systems, Rev. 10  
 SQN-DC-V-10.7, 10CFR50, Appendix R, Type I, II & III Circuits, Rev. 03  
 SQN-DC-V-11.3, Power, Control, and Signal Cables for use in Category 1 Structures, Rev. 16  
 SQN-DC-V-12.2, Separation of Electric Equipment and Wiring, Rev. 16  
 SQN-DC-V-2.17, Remote Shutdown Criteria from Location Outside Main Control Room, Rev. 2  
 SQN-DC-V-24.0, Fire Protection for Appendix R Requirements, Rev. 9  
 SQEEI-99001, Evaluation of Littlefuse FLAS-5 Fuse Failures Acceptance Criteria, and Trending of Failures, Rev. 0  
 TI-4, Maint. Rule Perf. Indicator Monitoring, Trending, and Reporting-10CFR50.65, Rev. 25

### **Calculations, Evaluations & Specifications**

Sprinkler System Evaluations for Tennessee Valley Authority Sequoyah Nuclear Plant, Worley Parsons Project No. 51201501, Rev. 0  
 SQN-26-D054/EPM-ABB-IMPFA, SQN Fire Hazards Analysis Calculation for Fire Area(s) FAC-017, FAA-066, FAA-069, FAA-073, FAA-066, FAA-090 and FAA-094, Rev. 93  
 SQN-DC-V-36.0, Design Crit. for Mech. Pent Seal Assemblies for Category 1 Structures, Rev. 5  
 SQN-DC-V-24.0, Fire Protection for Appendix R Requirements, Rev. 8  
 SQN-SQS4-0056, Moderate Energy Line Break, Rev. 8  
 SQN-SQS4-0056, System Isolation for MELB, Rev. 2  
 SQN-SQS4-0056, MELB Safe Shutdown Analysis, Rev. 4  
 MDQ-000-026-2006-0165, Fire Prot. Evaluation of Fire Areas FAA-095 and FAA-107, Rev. 2  
 DESI-021, Evaluation of Unique Thermo-Lag ERFBS Configurations, Rev. 12  
 26D54EPMABBIMPFA, Sequoyah Nuclear Plant – Fire Hazards Analysis, Rev. 86  
 SQNAPPR11, Appendix C, CVCS Letdown Analysis, Rev. 0  
 EEB841003931, Appendix R Analysis for Intra-plant Communication Systems, Rev. 3  
 D2SDJ-P213350, Analysis of the Auxiliary Power System for 10DCFR50, Appendix, Rev. 50  
 SQN-26D54EPMABBIMPFA, SQN - Fire Hazards Analysis Calculation, Rev. 93  
 SQN-CPS-051, Circuit Protective Device Evaluation, Rev. 51  
 SQN-APS-003, 480VAC APS Class 1E Load Coordination Study, Rev. 75  
 SQN-APPR-1, Analysis of AC/DC Instrument and Control (I&C) Power Systems to Identify Associated Circuits – 10CFR50, Appendix R, Rev. 18  
 SQNAPPR3, Electrical Fields in the Appendix R Database, Rev. 30  
 SQNAPPR38&39, Fire Area FAA-068, 734.0-A03, 125V DC Vital Battery Board Room II, Rev. 0  
 SQNAPPR10, Appendix R Hot Short Analysis for NON RCS Interfaces, Rev. 15  
 SQNAPPR11, Appendix R Hot Short Analysis for High/Low RCS Pressure Interfaces, Rev. 3  
 SQNSQS40127, Equipment Required for Safe Shutdown per 10CFR50 Appendix R, Rev. 51

### **Work Orders (WO)**

WO 111484039, Visual Inspection of Fire Dampers, dated 3/6/11  
 WO 111727228, HPFP Yard Flow Tests, dated 5/03/2012  
 WO 112473611, Motor Driven Fire Pump A-18 Month Flow Test, dated 1/26/2012  
 WO 112475680, Inspect Control Building Sprinkler System, dated 2/1/12  
 WO 113876161, Personal Protective Garment Inspection, dated 5/06/13  
 WO 114068934, Auxiliary and Diesel Generator Building System 26 Flow Test, dated 7/25/13  
 WO 114068936, Diesel Driven Fire Pump B-18 Month Flow Test, dated 6/21/2013  
 WO 114211432, HPFP Yard Flow Tests, dated 7/12/2013  
 WO 114475826, Fire Detection Panel 0-L-616 Test-18 Months, dated 9/3/13  
 WO 114475839, Fire Barrier Inspection-Auxiliary Building and Control Building, dated 10/6/13  
 WO 114523561, Fire Detection Panel 0-L-617 Test-18 Month, dated 9/19/13  
 WO 114653554, U0-Plant Operating Area Fire Extinguisher Annual Inspection, dated 11/20/13  
 WO 114753112, Diesel Driven Fire Pump B Mini-Flow Test, dated 12/18/13

WO 114753115, Diesel Fire Pump Battery Quarterly Inspection, dated 12/12/2013  
 WO 114753893, Motor Driven Fire pump A Operability Test, dated 12/18/13  
 WO 114997794, Diesel Driven Fire Pump B Monthly Test, dated 1/16/2014  
 WO 115026063, Motor Driven Fire Pump A Operability Test, dated 1/23/2014  
 WO 114524371, 0-PI-FPU-317-538.0 Appendix R Inventory, dated 09/24/2013  
 WO 115456115, 0-PI-OPS-000-708.0 10CFR50 App R Compl. Verification, dated 01/23/2014  
 WO 113788859, 1-PI-OPS-000-003.0, Periodic Stroke Unit 1 Time Crit. Vlvs, dated 11/10/2013  
 WO 114758368, Spare 125VDC CHGR 2-S DC Xfer Sw. pre-work approval, dated 09/27/2013

### **Drawings**

1-47W491-4, Mechanical Service Air, Water, Fire Prot. & Primary Water Makeup, Rev. 4  
 1, 2-45N631-6, Wiring Diagrams Air Conditioning Sys. Schematic Diagram Sheet 6, Rev. 4  
 1, 2-46W401-7, Architectural Plan EI 732.0 & 734.0  
 1, 2-46W454-1, Architectural Door & Hardware Schedule Typical Details, Rev. 1  
 1, 2-46W454-1-1, Architectural Door & Hardware Schedule Typical Details, Rev. 0  
 1, 2-46W454-1-2, Architectural Door & Hardware Schedule Key Schedule, Rev. 0  
 1, 2-46W454-7, Architectural Door & Hardware Schedule Key Schedule, Rev. 0  
 1, 2-47W200-2, Equipment Plan-EI 749.0 & Above, Rev.4  
 1, 2-47W200-3, Equipment Plan-EI 734.0 and EI 732.0, Rev.8  
 1, 2-47W401-4-1, Mechanical Service Air, Water, Fire Prot & Primary Water Makeup, Rev. 1  
 1, 2-47W401-4-2, Mechanical Service Air, Water, Fire Prot & Primary Water Makeup, Rev. 3  
 1, 2-47W491-4, Mechanical Service Air, Water, Fire Prot & Primary Water Makeup, Rev. 3  
 1, 2-47W491-4-1, Mechanical Service Air, Water, Fire Prot & Primary Water Makeup, Rev. 1  
 1, 2-47W491-4-2, Mechanical Service Air, Water, Fire Prot & Primary Water Makeup, Rev. 4  
 1, 2-47W491-52, Mechanical Fire Protection, Rev. 1  
 1, 2-47W494-1, Fire Prot-Compt-Fire Cells, Liq Piping-Press. Ret. Bdy. Plan EI. 653.0 & 669.0, Rev. 17  
 1, 2-47W494-4, Fire Prot-Compt-Fire Cells, Liq Piping-Press. Ret. Bdy. Plan EI. 734.0, Rev. 12  
 1, 2-47W494-5, Fire Prot-Compt-Fire Cells, Liq Piping-Press. Ret. Bdy. Plan EI. 749.0, 759.0 & 763.0, Rev. 12  
 1, 2-47W494-6, Fire Protection Compartmentation-Fire Cells Plan EI 669.0 & 685.0, Rev. 6  
 1, 2-47W494-7, Fire Prot-Compt-Fire Cells, Liq Piping-Press. Ret. Bdy. Plan EI. 706.0, 732, Rev. 9  
 1, 2-47W494-10, Fire Protection Compartmentation-Fire Cells Plan EI 704.0 & 720.0, Rev. 5  
 1, 2-47W850-2, Flow Diagram Fire Protection, Rev.27  
 1, 2-47W850-6, Flow Diagram Fire Protection, Rev.19  
 1, 2-47W850-9, Flow Diagram Fire Protection, Rev.25  
 1, 2-47W850-27, Mechanical Flow Diagram High Pressure Fire Protection, Rev. 7  
 1, 2-47W866-3, Flow Diagram Heating Vent & Air Cond Air Flow, Rev. 6  
 1, 2-45A706-1-0, 120V Vital AC Power Board 1-I & 2-I List of Connected Loads, Rev. 37  
 1, 2-15E500-1, Key Diagram Station Auxiliary Power System, Rev. 17  
 1, 2-47W803-2, Flow Diagram Residual Heat Removal System, Rev. 53  
 1, 2-47W809-1, Flow Diagram Auxiliary Feedwater, Rev. 68  
 1, 2-47W813-1, Flow Diagram Reactor Coolant System, Rev. 55  
 1, 2-47W845-1, Mechanical Flow Diagram Essential Raw Cooling Water System, Rev. 49  
 1, 2-47W845-2, Mechanical Flow Diagram Essential Raw Cooling Water System, Rev. 109  
 1, 2-47W845-5, Mechanical Flow Diagram Essential Raw Cooling Water System, Rev. 62  
 1, 2-47W845-6, Mechanical Flow Diagram Essential Raw Cooling Water System, Rev. 38  
 1, 2-47W859-1, Mechanical Flow Diagram Component Cooling System, Rev. 54  
 1, 2-47W859-2, Mechanical Flow Diagram Component Cooling System, Rev. 32  
 1, 2-47W859-4, Mechanical Flow Diagram Component Cooling System, Rev. 21

1-47W809-1, Flow Diagram Chemical & Volume Control System, Rev. 79  
 1-47W811-1, Flow Diagram Safety Injection System, Rev. 74  
 12 2-48N1230, Miscellaneous Steel Hatch Frames & Covers Sheet 2, Rev. 3  
 1, 2-50-001184-01D, FSD-31 Ruskin Damper Construction Drawing, Rev 0  
 1, 2-15E500-1 Key Diagram, Station Aux Power System, Rev. 37  
 1, 2-15E500-2 Key Diagram, Station Aux Power System, Rev. 17  
 1, 2-45N204, Electrical Equipment Gen. Arrangement, Plan EL 690.0, 734.0 & 732.0, Rev. 05  
 1-45N1630-41, Wiring Diagrams, Miscellaneous Valves, Connection Diagrams SH 41, Rev. 0  
 1, 2-45N230, Electrical Equipment, Battery and DC EQPT Rms, Plans, Sections, Details, Rev. 7  
 1,2-45N700-1, Key Diagram, 120V AC & 125V DC Vital Plant, Control Power System, Rev. 42  
 1,2-45N703-1, Wiring Diagrams, 125V Vital Battery Board I, Single Line Sheet 1, Rev. 69  
 1,2-45N703-2, Wiring Diagrams, 125V Vital Battery Board II, Single Line Sheet 2, Rev. 34  
 1,2-45N703-3, Wiring Diagrams, 125V Vital Battery Board III, Single Line Sheet 3, Rev. 34  
 1,2-45N703-4, Wiring Diagrams, 125V Vital Battery Board IV, Single Line Sheet 4, Rev. 37  
 1,2-45N703-5, Wiring Diagrams, 125V Vital Battery Board I, PNL 4, Conn. Diag. Sh 5, Rev. 27  
 1,2-45N703-6, Wiring Diagrams, 125V Vital Battery Board II, PNL 4, Conn. Diag., Sh 6, Rev. 25  
 1, 2-45N706-1, Wiring Diagram, 120V AC Vital Instrument, Power Boards 1-I & 2-I, Connection Diagram – Sheet 1, Rev. 49  
 1, 2-45N708-6, Wiring Diagram, Misc 120V AC Distr PNL, Connection Diagrams – SH 6, Rev. 4  
 1, 2-45N709-3, Wiring Diagrams, Charger Inverters & Misc Equip, Conn. Diagrams Sheet 3  
 1-45N1644-1, Wiring Diagrams, Unit Control Board-Panel 1-M-5, Connection Diagrams-Sheet 1, Rev. 8  
 1-45N1644-4, Wiring Diag. Unit Cntrl Board PNL 1-M-5, Connection Diagrams SH 4, Rev. 4  
 1-45N1644-5, Wiring Diag. Unit Cont Board-Panel 1-M-5, Connection Diagrams SH 5, Rev. 2  
 1-45N1644-6, Wiring Diag. Unit Cont Board-Panel 1-M-5, Connection Diagrams SH 6, Rev. 6  
 1-45N1639-2, Wiring Diagrams, Aux Control BD-PNL 1-L-11B, Conn. Diagram SH 2, Rev. 3  
 1-45N1639-7, Wiring Diagrams Aux Control Board-Panel 1-L-11B, Connection Diagram Sheet 7, Rev. 0  
 1-45N1676-7, Wiring Diagrams, Solid State Protection Sys Train A, Connection Diagram SH 7, Rev. 0  
 1-45N1677-7, Wiring Diagrams, Solid State Protection Sys Train B, Connection Diagram SH 7, Rev. 0  
 1-45N1749-1, Wiring Diagrams, 480V Reactor MOV BD 1A1-A, Connection Diagram, SH-1, Rev. 9  
 1-45N1749-15, Wiring Diagrams, 480V Reactor MOV BD 1A1-A, Conn. Diagram, SH-8, Rev. 9  
 1-45N1749-17, Wiring Diagrams, 480V Reactor MOV BD 1A1-A, Conn. Diagram, SH-10, Rev. 8  
 1-45N1750-3, Wiring Diagrams, 480V Reactor MOV BD 1B1-B, Conn. Diagram SH-3, Rev. 8  
 1-45N1750-13, Wiring Diag., 480V Reactor MOV BD 1B1-B, Conn. Diagram-Sheet 7, Rev. 3  
 1-45N1750-18, Wiring Diagrams, 480V Reactor MOV BD 1B1-B, Conn. Diagram SH-12, Rev. 0  
 1-45N721-1, Wiring Diagrams, 6900V Unit Boards 1A & 1B, Single Lines, Rev. 24  
 1-45N721-3, Wiring Diagrams, 6900V Unit Boards 1C & 1D, Single Lines, Rev. 21  
 1, 2-45N721-4, Wiring Diagrams, 6900V Unit Boards 2C & 2D, Single Lines, Rev. 17  
 1-45N724-1, Wiring Diagrams, 6900V Shutdown Board 1A-A, Single Line, Rev. 24  
 1-45N724-2, Wiring Diagrams, 6900V Shutdown Board 1B-B, Single Line, Rev. 22  
 2-45N721-2, Wiring Diagrams, 6900V Unit Boards 2A & 2B, Single Lines, Rev. 29  
 2-45N724-3, Wiring Diagrams, 6900V Shutdown Board 2A-A, Single Line, Rev. 23  
 2-45N724-4, Wiring Diagrams, 6900V Shutdown Board 2B-B, Single Line, Rev. 30  
 1, 2-45N749-2, Wiring Diagrams, 480V Shutdown Board 1A2-A, Single Line, Rev. 37  
 1, 2-45N751-5, Wiring Diagrams, 480 V Reactor MOV BD 1B1-B, Single Line SH -1, Rev. 66  
 1, 2-45N756-1, Wiring Diag. 480V Cont-Aux Bldg Vent BD 1A1-A, Single Line Sheet-1, Rev. 18  
 1, 2-45N756-2, Wiring Diag. 480V Cont-Aux Bldg Vent BD 1A1-A, Single Line Sheet-2, Rev. 28



1, 2-45N756-3, Wiring Diag. 480V Cont-Aux Bldg Vent BD 1A2-A, Single Line SH-1, Rev. 20  
 1, 2-45N756-4, Wiring Diagrams, 480V Cont-Aux Bldg Vent BD 1A2-A, Single Line SH-2, Rev. 7  
 1, 2-45N765-1, Wiring Diag., 6900V Shutdown Aux Power, Schematic Diagram Sh-1, Rev. 25  
 1, 2-45N765-2, Wiring Diag., 6900V Shutdown Aux Power, Schematic Diagram Sh-2, Rev. 25  
 1, 2-45N779-12, Wiring Diagrams, 480V Shutdown Aux Power, Schem. Diag. Sh-12, Rev. 24  
 1, 2-45N779-29, Wiring Diag. 480V Shutdown Aux Power, Schematic Diagrams Sh-29 Rev. 17  
 1, 2-45N881-1D, Cond & Ground Cable Tray Single Line, Node Voltage LVL 2, 6, 7, 8, 9, Rev. 0  
 45N881-11, Conduit & Grounding, Cable Tray Single Line, Node Voltage Level 3, Rev. 8  
 1, 2-45N881-12, Conduit & Grounding, Cable Tray Single Line, Node Voltage LVL 10,11, Rev. 0  
 1-45W655-48, Wiring Diag., Monitoring Light Box XX-55-6K, Unit Control BD PNL 1-M-6, Rev. 3  
 1-45W655-49, Wiring Diag., Monitoring Light Box XX-55-6L, Unit Control BD PNL 1-M-6, Rev. 3  
 1-45W1635-10, Wiring Diag., Local Panel 1-L-650A, Connection Diagrams Sheet 102, Rev. 4  
 1-45W1635-103, Wiring Diag., Local Panel 1-L-650B, Connection Diagrams Sheet 103, Rev. 3  
 1, 2-45W1699-33, Wiring Diag., Co2 Fire Protection Sys., Connection Diagram, SH33, Rev. 4  
 1, 2-45W200-3 Equipment, Plan EL 734.0 and EL 732.0, Rev 08  
 1-47W610-3-3, Mechanical Control Diagram, Auxiliary Feedwater Sys., Rev. 30  
 1, 2-45W611-13-1, Mechanical, Logic Diagram, Fire Detection System, Rev. 13  
 1, 2-45W611-13-2, Mechanical, Logic Diagram, Fire Detection System, Rev. 15  
 1, 2-45W611-13-3, Mechanical, Logic Diagram, Fire Detection System, Rev. 17  
 1, 2-45W611-13-4, Mechanical, Logic Diagram, Fire Detection System, Rev. 16  
 1, 2-45W611-13-5, Mechanical, Logic Diagram, Fire Detection System, Rev. 26  
 1, 2-45W611-13-6, Mechanical, Logic Diagram, Fire Detection System, Rev. 25  
 1, 2-45W611-13-7, Mechanical, Logic Diagram, Fire Detection System, Rev. 14  
 1, 2-45W668-1, Wiring Diagrams, Reactor Coolant System, Schematic Diagrams, Rev. 21  
 1, 2-45W622-4, Wiring Diag. Chemical & Volume Cont Sys, Schematic Diagrams SH 4, Rev. 1  
 1-47W809-1, Flow Diagram, Chemical & Volume Control, System, Rev. 79  
 45N828-1, Conduit & Grounding, Floor El. 734.0, Floor Plan, Rev. Y  
 45N828-6, Conduit & Grounding, Floor El. 734.0, Floor Plan, Rev. 1  
 1-45N1637-2, Wiring Diag. Aux Control Board-Panel 1-L-10, Connection Diagrams SH-2, Rev. 1  
 45N1637-5, Wiring Diag. Aux Control Board-Panel 1-L-10, Connection Diagram Sheet 5, Rev. 6  
 45N1637-7, Wiring Diag. Aux Control Board-Panel 1-L-10, Connection Diagram Sheet 7, Rev. 0  
 1-CO-31704-MKE-E14, Wiring Diagram, Logic Relay Panel 1B-B, Panel 3 Subpanel, Rev. 4

### **Completed Surveillance Procedures, Test Records**

0-PI-FPU-026-190.Q, Inspection of Non-Tech Spec Fire Hose Stations, dated 1/19/2014  
 0-PI-FPU-317-530.M, Plant Operating Area Fire Ext. Monthly Inspection, dated 1/19/2014  
 0-PI-OPS-247-529.1, Emergency Lighting Illumination Test, Rev. 1, dated 01/17/2010  
 0-SI-FPU-410-703.0, Inspection of FPR Required Fire Doors, dated 1/19/2014  
 0-SI-FPU-013-620.0, Fire Detection Panel 0-L-620 Test-12 month, dated 09/10/2013  
 0-SI-FPU-247-001.0, Emergency Lighting (App R), Auxiliary Building, dated 11/04/2013  
 0-SI-FPU-247-002.0 Emergency Lighting (App R), Turbine & Control Building, dated 10/30/2013  
 0-PI-MSC-317-402.0, Blackout Mitigating Actions Inventory of Equipment, dated 12/24/2013  
 0-PI-FPU-026-001.Q, Blackout Diesel Pump Inspection, dated 12/31/2013  
 SQN-0-DG-245-0001, Periodic Inspection and Maint. on Blackout DGs 1&2, dated 12/12/2013  
 SQN-0-XFMR-245-0001, Inspect Blackout DG Transformers, dated 08/26/2013

### **Plant Modifications and Engineering Changes**

SQN-0-2013-012, Provide Temporary Power from Spare 125Volt DC Charger 21-S Transfer Switch to 125 Volt DC Battery Boards I and II, Rev. 0  
 DCNs M08811, M08812 and M08813, Change to Common Unit 1 & 2 Fire Protection / Raw Service Water System Interface and Tie-In

DCNs 22538 and 22545, Re-Route of Appendix "R" Cables  
 DCNs 22541 and 22729, Thermo-lag Appendix "R" Cable Fire Barrier Installation  
 DCN D22547, Resolve Appendix R Concerns with the RCS Credited Letdown Path, Rev. A  
 CMD948E, Tech Evaluation Package RIMS No. B25 061219 109, Rev. 1, approved 12-19-06  
 DCN 11681, Replace Selected FLAS-5, indicating fuses, Rev. B, 11-23-03  
 DCN 21277, Allow replacement of FLAS-5 fuses with BLAS-5 fuses, Rev. A, 7/16/02  
 DCN 22543, Resolve MSO Concerns with D/G Emer. Stop related to App R, Rev. A, 08/31/2010  
 DCN 22541, Resolve MSO Concerns with CCP Suction and CVCS Charging Issues related to  
 Appendix R, Rev. A, 08/31/2010  
 DCN 22616, Install new Unit 1 Generator Circuit Bkr, replace USSTs 1A & 1B, replace Unit 1  
 USST Bus work, Rev. A, 03/11/2011  
 DCN 22886, Appendix R A Train ERCW to TDAFWP Valve Modification, Rev. A  
 DCN 22698, Resolve MOV Stall concerns due to MSO with Unit 1, 2 ERCW to AFW valves,  
 Rev. A, 08/16/2011  
 RFQ123122CO, Interface Review PEG-3107, RIMS No. B25 061208 113, Rev. 0  
 SQN-0-2013-012, T-Modification, Provide Temp. Power from Spare 125 Volt DC charger 2-S  
 Transfer Switch to 125 Volt DC Battery Boards I and II, Rev. 0

### **Fire Fighting Preplan Strategies**

AUX-0-734-01, Auxiliary Building Elev. 734 Unit 1 Side, Rev. 8  
 CON-0-706-00, Control Building Elev. 706, Rev.

### **Applicable Codes and Standards**

NFPA 13-1975 & 2007, Automatic Sprinkler Systems  
 NFPA 14-1974, Standpipes and Hose Systems  
 NFPA 20-1973 & 1993 Centrifugal Fire Pumps  
 NFPA 72D-1975, Proprietary Protective Signaling Systems  
 NFPA 72E-1974, Automatic Fire Detectors  
 NFPA 80-1981, Fire Doors and Windows  
 Underwriters Laboratories Inc. Standard for Safety, UL 555-Fire Dampers

### **Technical Manuals, Vendor Information and Fire Tests**

Carboline Laboratory Test Report, Pyrocrete 201 Thermal Transmission by Mobile Hi-Rise Fire  
 Curve, dated November 2, 1987  
 Ruskin Fire and Smoke Dampers Selection and Application Manual, dated 06/2006  
 Operation, Maintenance and Instruction Manual for EGS Corporation International, P.O. No.  
 4500116470, Sequoyah Nuclear FSD31 Dampers, Ruskin Manufacturing Division, Tompkins  
 Industries, Inc., Manual 1184, dated February 18, 1997  
 Underwriters Laboratories Inc. Building Materials Listings and Classifications, dated 12/16/1994  
 SQN-VM 4437, Lightalarms, Emergency Light Equipment, Rev. 3  
 SQN-VM 4788, Chloride Systems, Inc. Lightguard Division, T675/100/150/225 OT T12 150/200  
 SQN-VTM-E353-4436, Exide Model F100/F100rt ELUs, Fixtures And Accessories, Rev. 4  
 Contract No. 828204, Motorola, 80KJ5-828204, Battery Chargers for MX 300 Series "Handie-  
 Talkie" Radios, dated Oct 28, 1980  
 Contract No. 828204, Motorola MX300 Series "Handie Talkie" FM Two-Way Portable Radios,  
 Sept. 25, 1980  
 OT Emergency Lighting Equipment, Heads, Batteries and Accessories, Rev. 1  
 VTM-E353-4436, Exide Lightguard, LEC-36 Battery, Manufacture Data, Addendum B, Rev. 4

### **Audits and Self-Assessments**

TVA Quality Assurance Nuclear Power Group (NPG) Non-Audit Year Performance QA-CH-11-002, dated December 12, 201  
 TVA Quality Assurance Nuclear Power Group (NPG) Sequoyah Nuclear Plant Fire Protection Audit Report SSA 1214, dated November 13, 2012  
 System Health Report, System 13, Fire Detection 6/01/13 to 9/30/13  
 System Health Report, System 26, High Pressure Fire Protection (HPFP), 6/01/13 to 9/30/13  
 System Health Report, System 39, CO2/ Fire Suppression, 6/01/13 to 9/30/13  
 Program Health Report, Appendix "R", 1/01/13 to 6/30/13

### **Licensing Basis Documents**

Deviation Request from 10 CFR Part 50, Appendix R Section III.G. 2, dated 11/4/1988  
 Deviation Request from 10 CFR Part 50, Appendix R Section III.G. 2, dated 6/30/1989  
 SQN Fire Protection Report, Part Nos. I through X, Rev. 32  
 Supplement No. 1 to the Safety Evaluation Report by the Office of Nuclear Reactor Regulation, Sequoyah Nuclear Plant, Unit 1 and 2, dated 2/10/1980  
 Supplement No. 2 to the Safety Evaluation Report by the Office of Nuclear Reactor Regulation, Sequoyah Nuclear Plant, Unit 1 and 2, dated 8/15/1980  
 Supplement No. 5 to the Safety Evaluation Report by the Office of Nuclear Reactor Regulation, Sequoyah Nuclear Plant, Unit 1 and 2, dated June, 1981

### **Other Documents**

NRC Regulatory Guide 1.189, Fire Protection for Nuclear Power Plants, Rev. 2  
 N BSIR 82-2520, Flow Induced by Fire in a Compartment, dated July 1982  
 Fire Protection Impairment Permit (FPIP), FOR140040, dated 2/10/2014  
 SQN Priority Fire Protection Impairments Database, dated 1/23/2014  
 SQN Fire Impairments with Operational Impacts Database, dated 1/23/2014  
 Impairments Associated with Compensatory Fire Watches Database, dated 8/01/2013  
 Impairments Associated with Compensatory Fire Watches Database, dated 1/17/2014  
 Admin Qualification Matrix Rpt. (Nuclear Fire Brigade Member Qualifications) dated 2/10/2014  
 Qualification Matrix Individual Report, Employee ID ETFNU6KB1, dated 12/18/13  
 Transient Combustible Evaluation Log, January 01-December 31, 2013  
 Transient Combustible Evaluation Log, January 01-December 31, 2014  
 Transient Combustible Evaluation Nos. 2013-20 through 2013-26  
 Transient Combustible Evaluation 2014-003, dated 1/30/2014  
 Fire Drill Evaluation Report 12/06/13 (Off-Site Response)  
 Fire Drill Evaluation Report 12/01/2010 (Unannounced)  
 Fire Drill Evaluation Report 12/27/2010 (Unannounced)  
 Fire Drill Evaluation Report 12/09/2010 (Announced)  
 Fire Drill Evaluation Report 12/27/2010 (Announced)  
 Hot Work Permit DZ 042, dated 12/13/13  
 Hot Work Permit DZ 015, dated 10/21/13  
 Hot Work Permit 111603145, dated 10/28/13  
 TVA Contract No. 50068, Supplement No. 4, Soddy Daisy Fire Department, 12/06/10  
 CFAST-Consolidated Model of Fire Growth and Smoke Transport (Version 6) Users Guide NIST Special Publication 1041, dated December 11, 2008  
 Permit # FOR100015, Inadequate Illumination in the 6.9KV Shutdown Board and Vital Battery Board Rooms, dated 01/31/2010  
 PER 240827 Funct. Evaluation, Reactor Head Vent Valve Flow Capacity for App R Scenarios  
 Screening Review /50.59 Evaluation Coversheet for Procedure 0-SO-68-3, Rev. 20  
 Integrated Cable & Raceway Design System reports (ICARDS) for cable 0PP2125A

ICARDS raceway loading report for OMC00774  
 ICARDS raceway loading report for OB719A  
 ICARDS for cable 0B16II  
 ICARDS for cable 1B12III  
 ICARDS for cable 1B13III  
 ICARDS for cable 1B17III  
 ICARDS for cable 1B18III  
 NRC Information Notice 87-62, Mechanical Failure of Indicating-Type Fuses, dated 12/08/1987  
 0-PI-OPS-000-027.0 ATT5, Monthly AOP-C.04 (EOI) Cabinets Inventory, dated 01/27/2014  
 TB-04-13, Technical Bulletin, Westinghouse, Replacement Solutions for Obsolete Classic  
 Molded Case Circuit Breakers, dated 06/28/2004

**List of Corrective Action Documents Reviewed During the Inspection**

PER 211202, Procedure for Isolation of PORV may Conflict with Fire Safe Shutdown Analysis  
 PER 213819, Appendix R Lighting Illumination Level Inadequate  
 PER 23120, HPFP Water Tank B Leaking From Overflow Drain  
 PER 72752, Off-normal Conditions of Zone 524 and Zone 535  
 PER 147062, Sprinkler Deficiencies in the AB  
 PER 147467, NFPA 2008 TFPI Spreading Room Issue  
 PER 513378, Fire Brigade Member Did Not Complete Required Drills  
 PER 527875, Incomplete Fire Drill Records  
 PER 573505, High Water Tank Level and Low Temperature Nuisance Alarms  
 PER 576921, 10CFR 50 Appendix "R" Components Not Analyzed  
 PER 585139, HPFP Fire Tank Overflow  
 PER 605954, Fire Drill Violation  
 PER 644619, Procedure and Supplies for Post-fire Repair Action  
 PER 675447, Review of Operating Experience (OE), TMI Deluge System Inoperability  
 PER 678981, Fire Watches Not Conducted  
 PER 678982, Fire Watches & Protected Doors  
 PER 703757, Review of NRC IN2013-06, Fire Protection Piping Corrosion  
 PER 708758, AC breaker on 0-CHGB-250-QE-D tripped, 04/09/2013  
 PER 713847, Revise 0-PI-FPU-317-538.0 as Result of SMI-0-317-18, Rev. 14  
 PER 811350, SQN Review of WBN-NOER-13-042  
 PER 823207, Appendix R Supplies Not Identified and Staged

**List of PERs / Service Requests (SR) Generated as a Result of this Inspection**

PER 854513, AB Elevation 714 Sprinkler Head A290 in violation of NFPA-13 due to obstruction  
 PER 854512, Sprinkler Heads in violation of NFPA-13 in 1A & 1B Aux Inst. Control Rooms  
 PER 849220, PEG equivalency evaluations failed to document Vital Battery breaker DC rating  
 PER 848580, Additional inoperable fire dampers  
 PER 848511, Design Standard and ICRDS discrepancy  
 PER 848756, TB-04-13 breaker substitutions have been approved without calculation update  
 PER 847948, Auxiliary Control Instrument Room 2A Sprinkler System  
 PER 847449, Deficiencies in Appendix R repair procedure  
 PER 847428, Review section 6.12 of SMI-0-317-18  
 PER 847420, Reconcile differences between 0-PI-FPU-317-538.0 and SMI-0-317-18  
 PER 847418, 0-PI-FPU-317-538.0 Enhancement  
 PER 847462, Fire safe shutdown repair inventory issues  
 PER 846023, Two completed procedures cannot be found  
 PER 846030, FPPCRR for Closed PZR BLK VLV

PER 845951, Calculation not revised to support equivalency eval. for Cutler-Hammer HFD Brkrs  
PER 845948, FPR Part VIII Section F.5 clarification discussion of barriers between Swgr Rms  
PER 845944, T-MOD learning opportunities  
PER 845931, SMI-0-317-18 needs to be reviewed and revised  
PER 845919, Sprinkler heads not within 12 inches of the ceiling  
PER 845913, Fire Damper Configuration Control  
PER 846017, Coordination calculation #2 AWG cable  
PER 845132, Revise EPIP-12 App B to include funct. check of OSC radios as part of inventory  
PER 845086, B.5.b procedure weakness regarding number of AUOs  
PER 845073, B.5.b issue related to labeling of AFW pipes  
PER 844618, Unnecessary spectacle flange task  
PER 844057, D/G Bldg. Appendix R Emergency Lighting had 4 out of 18 Lights Fail  
PER 844048, Equipment for dual unit event  
PER 842765, EDMG-2 enhancements needed  
PER 842753, Spool piece procedure weaknesses  
PER 842696, B.5.b equipment inventory deficiencies  
PER 842035, ACR Design Criteria enhancement  
PER 842030, FSSD calculation enhancement  
PER 841434, EA-1-2 not referenced for first SG depressurization  
PER 841430, Error in Fire Hazards Analysis and Fire Safe Shutdown procedure  
PER 840874, Changes to equipment staging  
PER 840873, Problem with Fire Hazards Analysis  
PER 840035, Fire safe shutdown procedure weakness  
PER 839604, Tie wrap broken on radio radiax support  
PER 839547, EA-1-2 deficiencies  
PER 839470, 125V DC Vital Battery Board Room I nylon webbing attached to metal support  
PER 839323, Miscellaneous EDMG-2 issues, corrected  
PER 833779, FE requirements not incorporated into fire safe shutdown procedures  
PER 832826, Combustible Loading Calculation  
PER 830599, Appendix R lighting deficiency  
PER 830595, Appendix R radio testing deficiency  
PER 829922, Fire safe shutdown JPMs need to be updated  
SR 839372, Missing bulb in normal lighting fixture

## LIST OF ACRONYMS AND ABBREVIATIONS

AC	Alternate Current
AIC	Amps Interrupting Capacity
Amp	Amperes
AOP	Abnormal Operating Procedure
APCSB	Auxiliary and Power Conversion Systems Branch
AWG	American Wire Gauge
BTP	Branch Technical Position
CAP	Corrective Action Program
CFR	Code of Federal Regulations
DC	Direct Current
DCN	Design Change Notice
ELU	Emergency Lighting Unit
ERFBS	Electrical Raceway Fire Barrier System
FA	Fire Area
FHA	Fire Hazard Analysis
FPR	Fire Protection Report
FPP	Fire Protection Program
ft	feet/foot
ft <sup>2</sup>	Square Feet
IMC	Inspection Manual Chapter
IN	Information Notice
IP	Inspection Procedure
IR	Inspection Report
kV	kilo Volts
MCR	Main Control Room
NCV	Non-Cited Violation
NFPA	National Fire Protection Association
NRC	United States Nuclear Regulatory Commission
OMA	Operator Manual Action
PEG	Procurement Engineering Group
PER	Problem Evaluation Report
Rev	Revision
Rm	Room
SDP	Significance Determination Process
SER	Safety Evaluation Report
SQN	Sequoyah Nuclear Plant
SR	Service Request
SSA	Safe Shutdown Analysis
SSD	Safe Shutdown
TFPI	Triennial Fire Protection Inspection
TVA	Tennessee Valley Authority
UFSAR	Updated Final Safety Analysis Report
V	Volts
WO	Work Order