



**UNITED STATES
NUCLEAR REGULATORY COMMISSION**
REGION II
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ATLANTA, GEORGIA 30303-1257

July 1, 2011

Mr. R. M. Krich
Vice President, Nuclear Licensing
Tennessee Valley Authority
1101 Market Street, LP 3R-C
Chattanooga, TN 37402-2801

**SUBJECT: WATTS BAR NUCLEAR PLANT - NRC TRIENNIAL FIRE PROTECTION
INSPECTION REPORT 05000390/2010007**

On October 8, 2010, the U. S. Nuclear Regulatory Commission (NRC) completed the onsite portion of an inspection at your Watts Bar Nuclear (WBN) facility, Unit 1. The enclosed report documents the inspection results which were discussed on October 8, 2010, with Mr. Don Grissette, Site Vice President WBN 1 and other members of your staff. Based upon additional information provided by your staff to the NRC after the initial exit date, a re-exit was completed November 17, 2010, by telephone with Mr. Don Grissette and other members of your staff. On February 28, 2011, the NRC briefed Mr. Greg Boerschig, WBN Plant Manager, and members of your staff regarding the status of the NRC's ongoing in-office inspection. As a result of NRC review of additional information provided to NRC after the April 19, 2011, an exit was conducted via telephone with Mr. Don Grissette and other members of your staff. Based upon additional information received after the April 19, 2011, the NRC conducted an exit via telephone to discuss the final inspection results with Mr. Greg Boerschig, WBN Plant Manager, and members of your staff on June 16, 2011.

During this inspection, the NRC staff examined activities conducted under your license as they relate to public health and safety and compliance with the Commission's rules and regulations. Within these areas, the inspection consisted of selected examination of procedures and representative records, observations of activities, and interviews with licensee personnel.

Based on the results of this inspection, no findings of significance were identified.

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/

Rebecca L. Nease, Chief
Engineering Branch 2
Division of Reactor Safety

Docket No. 50-390
License No. NPF-90

Enclosure:
NRC Inspection Report 05000390/2010007
w/Attachment: Supplemental Information

cc w/encl: (See page 3)

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/

Rebecca L. Nease, Chief
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2010007\WBN TFPI 2010-007 final_06172011

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U.S. NUCLEAR REGULATORY COMMISSION

REGION II

Docket Nos.: 50-390

License Nos.: NPF-90

Report Nos.: 05000390/2010007

Licensee: Tennessee Valley Authority

Facility: Watts Bar Nuclear Plant

Location: Spring City, TN 37381

Dates: September 20 – 24, 2010 (Week 1)
October 4 – 8, 2010 (Week 2)

Inspectors: R. Fanner, Reactor Inspector (Lead Inspector)
L. Suggs, Reactor Inspector
N. Staples, Reactor Inspector
G. Wiseman, Senior Reactor Inspector

Approved by: Rebecca L. Nease, Chief
Engineering Branch 2
Division of Reactor Safety

Enclosure

SUMMARY OF FINDINGS

IR 05000390/2010007; 09/20-24/2010, and 10/04-08/2010; Watts Bar Nuclear Plant Unit 1; Fire Protection.

This report covers an announced two-week period of inspection by a team of four regional inspectors. No findings of significance were identified. The significance of most findings is indicated by their color (Green, White, Yellow, Red) using Inspection Manual Chapter (IMC) 0609, "Significance Determination Process" (SDP). The cross cutting aspects are determined using IMC 0310, "Components within the Cross Cutting Areas". Findings for which the SDP does not apply may be Green or be assigned a severity level after NRC management review. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process."

A. NRC-Identified and Self-Revealing Findings

Cornerstone: Mitigating Systems

REPORT DETAILS

1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, Barrier Integrity

1R05 Fire Protection

This report presents the results of a triennial fire protection inspection of Watts Bar Nuclear Plant, Unit 1. The inspection was conducted in accordance with NRC Inspection Procedure (IP) 71111.05T, "Fire Protection (Triennial)," dated December 24, 2009. The IP specifies a minimum sample size of three fire areas (FAs) and one B.5.b implementing strategy for addressing large fires and explosions. The inspectors selected four FAs for detailed review to examine the licensee's implementation of their NRC-approved fire protection program (FPP) and one B.5.b implementing strategy for addressing large fires and explosions. The selection of FAs was based on available risk information as analyzed onsite by a Region II senior reactor analyst, 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. The relative complexity of the post-fire safe shutdown procedure for the various FAs was also a consideration. This inspection fulfilled the requirements by examining the following FAs:

- Fire Area 48, Analysis Volume (AV)-076, Computer Room, Room No. 708.0-C3
- Fire Area 32, AV-058, 480V Board Rm. 1-A, Room No. 772.0-A1
- Fire Area 37, AV-064, Transformer Rm. 1-A, Room No. 772.0-A6
- Fire Area 63, AV-094, Turbine Bldg Area (Railroad Bay)

The inspectors evaluated the licensee's FPP against applicable requirements, including Operating License Condition 2.F; *Title 10 of the Code of Federal Regulations*, Part 50 (10 CFR 50), Appendix R; 10 CFR 50.48, "Fire Protection," commitments to Appendix A of Branch Technical Position (BTP) Auxiliary and Power Conversion Systems Branch (APCSB) 9.5-1; Watts Bar Plant Updated Final Safety Analysis Report (UFSAR); related NRC Safety Evaluation Reports (SERs); and plant Technical Specifications. The review of the B.5.b mitigating strategies were based on the B.5.b submittal letters, related NRC SERs, licensee commitments, B.5.b implementing procedures, and previous NRC inspection reports. The inspectors evaluated all areas of this inspection, as documented below, against these requirements. Specific licensing basis documents reviewed are listed in the Attachment.

.01 Safe Shutdown Capability from the Main Control Room

a. Inspection Scope

The inspectors selected FAs 32 (AV-058), 37 (AV-064), and 63 (AV-094) for review to meet the inspection requirements in this section. The inspectors reviewed portions the fire protection licensing basis as specified in NUREG-0847, Supplemental Safety Evaluation Reports (SSERs) 18 (October 1995) & 19 (November 1995). The inspectors

used current inspection guidance and information provided by the licensee to verify the credited licensee staff and systems required to achieve and maintain post-fire SSD were capable of controlling reactivity, reactor coolant makeup, reactor heat removal, process monitoring, and to support associated system functions. The inspectors reviewed and verified the licensee's engineering and licensing documents (e.g., license amendments, SERs, exemptions, and deviations) which supported the designated actions in approved procedures. The inspectors also reviewed and verified, on a sampling basis, systems and equipment credited by approved procedures were consistent with the approved licensing basis requirements. The inspectors performed scenario based procedure reviews, reviewed job performance measures credited for the training of staff, and performed walk-downs with licensee staff credited for implementing the procedures to verify the training and implementation aspects. The inspectors conducted a review of procedural actions identified by the licensee to be operator manual actions (OMAs).

b. Findings

Introduction: The inspectors opened an unresolved issue (URI) pending NRC review of recently-received requested information related to questions regarding the licensee compliance with all provisions of their approved FPP. Specifically, the inspectors requested information regarding the licensee's reliance and use of post-fire OMAs that may have not been approved by the NRC in SSERs 18 or 19.

Description: In SSER 18, the NRC approved certain post-fire OMAs used to compensate for fire-induced equipment failures. The licensee calculation WBN-OSG-165, Rev. 5, "Manual Actions Required for Safe Shutdown Following a Fire," which was referenced in SSER 18, section 3.5, identified OMAs credited for achieving and maintaining safe shutdown conditions for certain fire events. In this calculation, the licensee identified the OMAs which needed to be accomplished to achieve safe shutdown, established time requirements to accomplish these OMAs, and quantified expected completion times for performance of these OMAs. The licensee credited the use of Abnormal Operating Instruction (AOI 30.2) as its post-fire safe-shutdown procedure per SSER 18, section 3.5.1, "Safe-Shutdown Procedures and Manpower." The inspectors identified at least two instances, one onsite and one in-office, where OMAs were not listed in the calculation WBN-OSG-165, Rev. 5.

In the first instance, inspectors reviewed credited post-fire operator actions implemented in AOI 30.1, "Plant Fires," Rev. 9, Step 5, and AOI 30.2, "Fire Safe Shutdown," Rev. 27, Step 10. The inspectors found that these actions did not appear to have been analyzed in Rev. 5 of calculation WBN-OSG-165. Therefore, these OMAs may not have been reviewed and approved by the NRC. These actions were brought to the licensee's attention October 6, 2010. The licensee provided an initial response to NRC questions related to these actions on October 7, 2010. Based upon NRC comments, the licensee provided additional information to the inspectors related to these OMAs on December 6, 2010. On December 22, 2010, based upon these responses and review of information, the NRC inspectors requested the licensee to provide a list of all OMAs implemented in lieu of meeting 10 CFR Part 50, Section III.G.2, after SSER 18 was issued, as well as the supporting analyses. After several conference calls, on April 5, 2011, the licensee provided a spreadsheet titled, "Watts Bar Nuclear Plant Manual Operator Actions (MOAs) Developed For and After Revision 6 of Calculation WBN-OSG4-165 (06/30/1995)." The licensee stated that information provided included the list of all OMAs implemented after issuance of SSER 18. The inspectors reviewed the

information and found that the OMAs identified during the onsite portion of the inspection were not included, nor did the list include the associated evaluations. On April 15, 2011, as a result of NRC review and additional questions, the licensee stated that some of the OMAs they listed in their April 5, 2011, response were added June 6, 1995, before Rev. 5 of calculation WBN-OSG-165 and SSER 18 was issued. On a follow-up call to the licensee conducted June 13, 2011, licensee personnel stated the OMAs identified in AOI 30.1, "Plant Fires," Rev. 9, Step 5, and AOI 30.2, "Fire Safe Shutdown," Rev. 27, Step 10 were done so in response to NRC Information Notice (IN) 89-52, Potential Fire Damper Operational Problems.

In the second instance, the inspectors identified seven OMAs which appeared to be added after WBN-OSG-165, Rev. 5. This was based upon the review of information provided to inspectors on April 5, 2011. The inspectors determined that Rev. 5 of calculation WBN-OSG-165 became effective May 3, 1995, and the seven OMAs were added June 30, 1995. On June 13, 2011, the inspectors conducted a follow-up call with the licensee and were provided additional information. Specifically, licensee personnel stated that the seven OMAs were added via a design change before SSER 18 was issued to the licensee in October 1995; however, were not included in calculation WBN-OSG-165. The licensee personnel stated these additional OMAs were added to the FPR in revisions 3 & 4.

Pending review of this additional information, this issue will remain open as unresolved item (URI) 05000390/2010007-001, "Use of OMAs Potentially Not Consistent with the Fire Protection Licensing Basis."

.02 Passive Fire Protection

a. Inspection Scope

For the selected FAs, the inspectors evaluated the adequacy of fire barrier walls, ceilings, floors, mechanical and electrical penetration seals, fire doors, and fire dampers. Where applicable, the inspectors examined installed configurations to the approved construction details and supporting fire endurance test data, which established the fire resistance ratings of the selected fire barriers. The inspectors reviewed licensee evaluations of the non-standard fire barrier penetration seals for FA 32. In addition, the inspectors reviewed licensing bases documentation, such as NRC SERs and deviations from NRC regulations, to verify that passive fire protection features met license commitments.

The inspectors inspected the material condition and as-built configuration of accessible passive fire barriers surrounding and within the FAs selected for review to evaluate the adequacy of the fire resistance in accordance with the requirements of 10 CFR 50, Appendix R, Section III.G, and Appendix A of BTP APCSB 9.5-1. The inspectors reviewed EPM-DOM-012990, Combustible Loading Summary Calculation for the selected fire areas to verify that the plant fire loading used by the licensee was appropriate for the stated fire resistance rating of the fire barrier enclosures. Fire model calculations were generated as appropriate using NRC recommended computer codes to evaluate the selected barrier's effectiveness to contain potential fires. The inspectors reviewed the installation and qualification records for a sample of penetration seals to ensure the seal material was of the appropriate fire rating. A sample of completed surveillance and maintenance procedures for selected fire doors, fire dampers, and

penetration seals was reviewed to ensure that these passive fire barrier features were properly inspected and maintained. Additionally, the inspectors verified that the as-built configurations met engineering design, standard industry practices, and were properly evaluated or qualified by appropriate fire endurance tests.

b. Findings

Introduction: The inspectors opened an URI related to questions regarding the licensee's compliance with all provisions of their NRC-approved FPP. Specifically, the inspectors raised questions regarding the dielectric insulating liquid used for indoor power transformers as specified Appendix FF, Section 5.10.2 of SSER 18 and NRC Position D.1.g of Appendix A to BTP APCS 9.5-I, "Guidelines for Fire Protection for Nuclear Power Plants," dated August 23, 1976.

Description: Fire Area FA 37 (AV-064) contained four liquid-insulated 6.9kV to 480V shutdown board transformers, in groups of two inside containment curbs. These medium voltage transformers were insulated with a silicone-type dielectric insulating fluid. Three of the four transformers (1-OXF-212-A2-A, 1-OXF-212-A1-A, and 1-OXF-212-A-A) contained an estimated 317 gallons of insulating fluid and the other transformer (0-OXF-206-A) contained approximately 205 gallons. Near these transformers were combinations of redundant safety-related cable trays or conduits or both.

While performing the review of FA 37 (AV-064), the inspectors identified the indoor power transformers dielectric insulating liquid was not consistent with that described in SSER 18, section 5.10.2, "Askarel-Insulated Transformers" and NRC Position D.1.g of Appendix A to (BTP) APCS 9.5-I, "Guidelines for Fire Protection for Nuclear Power Plants." Section 5.10.2 of SSER 18 specified that indoor transformers would be either a dry type or insulated with non-combustible liquid. Section 5.10.2 of SSER 18 further stated that Askarel was used as the noncombustible liquid for indoor transformers. The inspectors determined that the SSER reference was based on transformer insulating liquid being noncombustible material (negligible combustible loading) which did not represent an ignition source. However, during the inspection the inspectors found that the transformers in FA 37 did not contain the specified dry type or non-combustible dielectric insulating material, but were insulated with a silicon-based combustible dielectric liquid. Furthermore, Position D.1.g. (ii) of Appendix A to (BTP) APCS 9.5-I specified that safety related systems that are exposed to flammable oil-filled transformers should be protected from the effects of a fire by enclosing the transformer with a three-hour fire barrier and installing an automatic water spray protection. The transformers had not been enclosed with such a barrier.

The inspectors reviewed Part VI of the WBN FPR (Revision 39) and found that the fire rating of the regulatory barriers for the floor and walls in FA 37 was two-hours. The inspectors also reviewed WBN FPR, Part 1, Table 1-1, "Summary of Fire Protection Conformance," (Revision 27) which specified that safe shutdown equipment cables were located in FA 37 and were protected with a credited one-hour rated fire resistive wrap. Table 1-1 of the FPR also identified that the area total fixed combustible load fire severity for a 3-hour rated barrier was classified as "Moderately Severe," e.g., less-than 240,000 Btu/ft². The inspectors reviewed the combustible loading summary calculation EPM-DOM-012990, (Revision 41) for FA 37 and found that the fuel load in the area was 164,549 Btu/ft², which exceeded the 2-hour rated barrier criteria of 160,000

Btu/ft². Additionally, the review of WBN FPR, Part VII, "Deviations and Evaluations," (Revision 10) noted that the licensee's evaluation for deviation 2.4 concerning intervening combustibles did not specifically consider the transformers in the area (insulated with a combustible dielectric liquid) as a potential intervening combustible located between redundant components. The licensee was not able to provide a documented technical evaluation which justified the use of the combustible dielectric insulating liquid and its associated contribution to the area combustible load fire severity or intervening combustible evaluation. In response to the inspectors' questions, the licensee stated that, although SSER 18 did address Askarel oil, no additional evaluations of the type of oil used in indoor transformers was required since the SSER did not reflect the latest information provided by TVA in Revisions 4 and 5 of their FPR submitted to NRC on September 28, 1995, and November 1, 1995, respectively. The licensee stated that these submittals identified that transformers installed within safety-related buildings are either dry-type or insulated and cooled with "high fire point" (650°F) liquid." Based upon the review of the WBN FPR and EPM-DOM-012990, the inspectors concluded that the transformers in the area (insulated with a combustible dielectric liquid) contributed to a total fixed fuel load fire severity that exceeded the credited fire resistive rating of the room fire barriers and could potentially challenge either the credited one-hour barrier for the safety related cables, the walls separating the adjacent FAs or both. The inspectors discussed this issue further with licensee personnel on June 13, 2011 during a teleconference. The licensee personnel stated they would provide additional information related to questions raised by inspectors regarding when the change to the combustible dielectric was made.

Based upon questions raised by the inspectors, 40 additional indoor transformers were identified in Unit 1 and areas of Unit 2 (under construction) to have the same combustible dielectric liquid and located within ten (10) additional AVs (AV-1, AV-51, AV-63, AV-64, AV-68, AV-69, AV-89, AV-94, AV-95, and AV-96) at WBN. The licensee initiated service request (SR) 263312 and problem evaluation report (PER) 265331 to address the issues described in this section. Further review and consultation with NRC experts in the Office of Nuclear Reactor Regulation will be needed to determine the regulatory impacts of this issue. As a result, this issue is identified as URI 05000390/2010007-002, "Installed Insulating Fluid in Interior Transformers Potentially Deviates from License/Design Criterion in SSER 18 and Position D.1.g of Appendix A to BTP (APCSB) 9.5-1."

.03 Active Fire Suppression

a. Inspection Scope

The inspectors reviewed fire detection, fire protection water supply, automatic fire suppression, manual fire fighting fire hose and standpipe systems credited as active fire suppression elements. The inspection scope of fire detection systems included a review and walk-down of the as-built configuration of the systems as compared to the applicable NFPA standards. In general, the acceptance criteria which applied to active fire suppression systems were contained in applicable codes and standards listed in the Attachment as modified by the design basis documents.

The inspectors inspected and reviewed the material condition, and operational lineup of fire detection and fire suppression systems through in-plant observation of systems. The inspectors also reviewed the design and completed testing of the sprinkler systems in reference to the applicable NFPA codes and standards. A review of the fire protection

water supply system and operational valve lineups associated with the electric motor-driven and diesel-driven fire pumps was completed. The inspectors also reviewed the detection and suppression methods for the category of fire hazards in the selected FAs. Specifically, the locations of sprinkler heads in FA 37(AV-064), Transformer Rm. 1-A, Room No. 772.0-A6 were checked for obstructions, which consisted of reviewing the system layout drawings against the field installation. The ability of fire protection water sources and fire pumps to fulfill their fire protection function to provide adequate flow and pressure to hose stations and automatic suppression systems was reviewed by the inspectors and compared to licensing basis requirements. Additionally, the inspectors performed inspections of smoke control equipment to verify the availability and condition, hose station locations, hose lengths, and nozzle types. Particular attention was given to location and capacity of hose stations and approach routes to the FAs under review. The hose stations, as designated in the pre-fire plans for the selected FAs, were reviewed to assess whether adequate reach and coverage were provided.

The inspectors reviewed and walked-down operational aspects of the fire detection system such as the location of panels and alarms. The inspectors compared the detector layout drawings against actual detector field locations, NFPA Code 72E, "Automatic Fire Detectors," spacing, and placement requirements. The testing and maintenance program and its implementation for the fire detection system were also reviewed.

Specific fire brigade attributes were evaluated by the inspectors included: (1) staffing, training, and response strategies; (2) utilization of pre-fire planning; (3) fitness for duty and qualification training; (4) equipment lockers, offsite fire department communications, and staging procedures; and (5) personal protective equipment and emergency lighting. Fire incident reports and fire drill critique reports for the last 12 months at or in the vicinity of the selected FAs were reviewed to assess the fire brigade readiness to respond to fires that may occur. This was augmented by documentation reviews and discussions with persons responsible for fire brigade performance. A physical inspection of the fire brigade staging and dress-out areas was conducted along with an assessment of the operational readiness of fire fighting and smoke control equipment. The fire brigade personal protective equipment and self-contained breathing apparatuses were checked for adequacy and functionality. The inspectors walked down the selected FAs to compare the associated fire fighting pre-plan strategy drawings with as-built plant conditions and fire response procedures. This was done to verify fire fighting pre-plan strategies and drawings were consistent with the fire protection features, pertinent information was provided to fire brigade members to identify potential effects to plant and personnel safety, and to facilitate suppression of an exposure fire that could impact SSD capability.

b. Findings

No findings were identified.

.04 Protection from Damage from Fire Suppression Activities

a. Inspection Scope

The inspectors evaluated whether the automatic fixed sprinkler systems or manual fire fighting activities could adversely affect the credited SSD equipment, inhibit access to

alternate shutdown equipment, and/or adversely affect the local operator actions required for SSD in two of the selected FAs. Specifically, the inspectors evaluated the fixed automatic pre-action sprinkler systems in the 480V Board Room 1-A, Room 772.0-A1 and Transformer Room 1-A, Room 772.0-A6 (FAs 32 and 37). The inspectors considered consequences of a pipe break and inadvertent system actuation. The inspectors also checked that sprinkler system water would either be contained in the fire affected area or be safely drained off.

The inspectors addressed the possibility that a fire in one FA could lead to activation of an automatic suppression system in another FA through the migration of smoke or hot gases, thereby adversely affecting SSD. The inspectors reviewed and assessed air flow paths out of the selected FAs to verify that inter-area migration of smoke or hot gases would not inhibit necessary operator actions. This portion of the inspection was carried out through a combination of walk-downs and a review of drawings and records.

b. Findings

No findings were identified.

.05 Alternative Shutdown Capability

Inspection Scope

The inspectors' objective was to evaluate the licensee's ability to achieve hot and cold shutdown with and without the availability of offsite power for FA 48 (AV-076), Computer Room, Room No. 708.0-C3. The inspection activities focused on ensuring the adequacy of systems selected for reactivity control, reactor coolant makeup, reactor heat removal, process monitoring instrumentation, and support system functions.

Methodology

The inspectors walked down the selected strategy for FA 48 and examined the material condition of the fire detection, suppression, and fire area boundaries. The inspectors compared the fire hazards analysis for the selected area and as discussed in the FPR with AOI-30.1, "Plant Fires," AOI-30.2, "Fire Safe Shutdown," AOI-30.2, Appendix B, "Fire Safe Shutdown Elevation Diagrams," and AOI-30.2 C.69, "Fire Safe Shutdown Control Building" to verify that equipment required for post-fire safe shutdown was adequately protected from fire damage in accordance with the FPP. The inspectors reviewed cable routing information by FA for a selected sample of SSD components credited for use during this shutdown method to evaluate if the components and cables would remain free from fire damage or that approved operator manual actions (OMAs) which had been established in the existing procedures were feasible and reliable.

For a postulated fire in FA 48, the licensee credited achieving hot and cold shutdown utilizing alternate shutdown capability. The inspectors reviewed surveillance test result records for transfer switches used to transfer plant controls from the main control room to the control room evacuation panel to verify that the switches were periodically tested for operability in accordance with the surveillance test program. The inspectors review also included verification that alternative shutdown could be accomplished with or without offsite power.

Operational Implementation

The inspectors reviewed selected training lesson plans and job performance measures for licensed and non-licensed operators to evaluate if the training reinforced the shutdown methodology in the FPR and AOIs for the selected FAs/AVs. The inspectors also conducted interviews, reviewed shift turnover logs and shift manning to verify that personnel required for SSD using alternative shutdown systems and procedures were available onsite, exclusive of those assigned as fire brigade members.

The inspectors performed a tabletop review of AOI-30.1, AOI-30.2, and AOI-30.2 C.69 as well as performing a walk-through of procedure steps to evaluate the implementation and human factors adequacy of the procedures and shutdown strategy. The inspectors verified the SSD procedure included steps to prevent or mitigate the consequences of spurious operations. The inspectors walked down the in-plant locations with operations personnel to evaluate OMAs. The inspectors assessed the expected and actual ambient conditions as well as the relative difficulty associated with each OMA. The inspectors observed the operator familiarization associated with the OMAs as well.

b. Findings

Introduction: The inspectors opened an URI involving an OMA credited for establishing (RCP) seal cooling. Specifically, a handwheel on a valve required by procedure to be closed in the event of a fire in the control building, FA 48 (AV-076), was missing. The licensee maintained that the action, if not performed, would not have an effect on their ability to achieve and maintain safe shutdown. This item is pending further inspector review.

Description: In the event of a fire in AV-076, procedure AOI-30.2 C69, "Fire Safe Shutdown Control Building," directed operators to establish RCP seal injection via air-operated valve 1-FCV-62-93. While performing a field walk-down of procedure AOI-30.2 C69, the inspectors identified that Step 4 of Auxiliary Unit Operator Checklist 1 could not be completed as directed, because the hand wheel for valve 1-ISV-32-2934 was missing. Valve 1-ISV-32-2934 is a manual air isolation valve on a ¾ inch air line to air-operated valve 1-FCV-62-93. The procedure directed the operator to close valve 1-ISV-32-2934 to isolate air to valve 1-FCV-62-93, and open the petcock on the regulator for valve 1-FCV-62-93 to bleed off the air, which forced valve 1-FCV-62-93 to fail open. This would allow charging flow to the RCP seals to be controlled by the seal water injection filter via a series of manually-operated valves. This would also provide make-up to the RCS since the primary injection path would be isolated. The inspectors identified that the last time valve 1-ISV-32-2934 was operated was on February 23, 2008, per Work Order WO 07-816218-000. The licensee staff initially told the NRC inspectors that this manual action was not required for SSD. Inspectors requested an evaluation of the impact of the failure to perform this manual action on the ability to achieve and maintain SSD.

Upon identification of the missing handwheel on October 8, 2010, the licensee initiated Service Request SR-262219 to replace the missing handwheel. On October 20, 2010, the inspectors requested a copy of the corrective action documents for the missing handwheel, and were told that the service request had been closed to a work order which was still open. As a result, the handwheel had not been replaced. The licensee

informed the inspectors that in accordance with their corrective action program, a PER should have been initiated for this issue. The licensee then initiated SR 269706 to address the failure to write a PER and untimely replacement of the handwheel. The handwheel was replaced by licensee staff on October 30, 2010, per WO 11524638. The licensee had not established compensatory measures for the time period the hand wheel was missing, because tools were available in an Operation's personnel cabinet for individuals to use. However, the need to obtain the necessary tools to manually close valve 1-ISV-32-2934 was not discussed in procedure AOI-30.2 C69 or evaluated to determine if extra time was available to obtain the tools. On October 22, 2010, inspectors requested information on the effect on SSD if the action was not completed successfully, the fire areas where the action was credited, and the design basis impact if the RCP seal cooling flow criteria was not met.

The licensee staff provided a response to the inspectors on November 8, 2010, in which they indicated that RCP seal injection flow rates would be adequate without closing valve 1-ISV-32-2934. As a result of reviewing this information the inspectors requested additional information regarding seal injection flow rates and the effect on the pressurizer. The licensee provided additional information to NRC on December 1, 2010. A conference call with the licensee was conducted on February 24, 2011, to discuss a discrepancy between the licensee's November 8, 2010, response and calculation WBN-OSG4-031. On March 24, 2011, the licensee provided clarifying information to the inspectors related to this issue. Pending NRC review of all information this issue is identified as URI 05000390/2010007-003, "Questions Related to OMA to Establish RCP Seal Cooling in the Event of a Fire in AV-076, Computer Room."

.06 Circuit Analysis

Inspection Scope

The WBN Unit 1 fire safe shutdown analysis was based the requirements of Appendix R Sections II.G.1, III.G.2a, III.G.2b, and III.G.2c. Based upon this analysis, detailed procedures were developed to ensure fire safe shutdown capability in case of an Appendix R fire in the identified locations where applicable. The inspectors reviewed the credited post-fire safe shutdown analysis identified in the FPR, Section 10.0, "SSD Separation Evaluation Methodology" and verified that the fire safe shutdown analysis evaluated the systems, components, and cables required for post fire safe shutdown in the selected FAs. The inspectors reviewed a sample of selected components to ensure adequate protection and separation existed.

The inspectors also reviewed design drawings for a sample of components credited in the alternative shutdown procedures to verify that the transfer switches associated with these components would adequately transfer control and power from the MCR to the Emergency Control Station, in accordance with AOI-30.2 C.69, Fire Safe Shutdown Control Building. The inspectors reviewed associated surveillance records to ensure surveillances were completed and conducted in accordance with Limiting Condition of Operation (LCO) requirements. Cable routing data was also reviewed for these components to verify that the cables for the sampled transfer switches were not routed in the selected fire areas and/or were adequately protected. If there was a potential for components to be impacted by fire, the inspectors performed additional analysis and reviewed credited resolutions. The SSD components whose control cables were routed through the selected FAs were examined for potential spurious operation that could

either affect system operation or which could affect high/low pressure system interface boundaries. For those components subject to spurious operation the inspectors assessed the adequacy of the licensee's action to resolve the condition. The inspectors noted that the licensee was in the process of identifying and completing a review of plant specific components that may be susceptible to multiple spurious operations. This review by the licensee was performed to identify potential scenarios that may require analysis and treatment as part of the resolution of the industry issue related to the resolution of Multiple Spurious Operations (MSOs).

b. Findings

No findings were identified.

.07 Communications

a. Inspection Scope

The inspectors reviewed plant communication capabilities to evaluate the availability of the communication systems to support plant personnel in response to 10 CFR 50, Appendix R, fire events. The inspectors reviewed the communication systems available at different locations within the plant that would be relied upon to support fire event notification and fire brigade fire fighting activities. During the review, the inspectors considered the effects of ambient noise levels, clarity of reception, and reliability of the systems. The inspectors also reviewed preventative maintenance and surveillance test records to verify the communications equipment was being properly maintained.

Operational

The inspectors reviewed plant communication capabilities to evaluate the availability of the communication systems credited to support plant personnel in the performance of local operator manual actions to achieve and maintain SSD conditions. The inspectors observed the use and availability of portable radios and fixed communication equipment.

Fire Brigade

The inspectors reviewed plant communications equipment used for notification and fire brigade fire fighting activities. The inspectors review verified adequate communications were available and reliable for the various locations credited for response to the chosen areas. During this review the inspectors considered the effects of ambient noise levels, clarity of reception, reliability and coverage patterns. In addition, the inspectors reviewed the electrical power supplies and cable routing for the communication systems to verify that the plant telephones and portable radios would be available to support the fire brigade in the conduct and coordination of their required duties during a fire.

b. Findings

No findings were identified.

.08 Emergency Lighting

a. Inspection Scope

The inspectors reviewed maintenance and design aspects of the emergency lighting units (ELUs) required by 10 CFR 50, Appendix R, Section III.J and the guidelines contained in Section D.5.a of Appendix A to BTP APCS 9.5-1. The inspectors reviewed the battery power supplies to verify they were rated for at least an eight-hour capacity. The inspectors reviewed preventive maintenance procedures and completed surveillance tests to ensure adequate surveillance testing and periodic battery replacements were in place to ensure reliable operation of the emergency lighting units. The inspectors reviewed vendor manuals to ensure that the emergency lights were being maintained consistent with the manufacturer's recommendations. The inspectors verified the illumination provided by the emergency lighting to ensure it was sufficient to allow the operator safe access or egress to those plant areas where shutdown functions must be performed. In addition, the inspectors verified the emergency lighting illumination level was adequate to enable a qualified operator to perform the required manual action if needed.

Operations

The inspectors performed plant walkdowns of selected fire areas to verify the licensee commitment to provide fixed, self-contained lighting consisting of fluorescent or sealed-beam units with individual 8-hour minimum battery power supplies in areas that must be manned for safe shutdown and in access and egress routes to and from all fire areas containing equipment required for safe shutdown. The inspectors observed the placement and coverage area of fixed eight-hour battery pack (ELUs) throughout the selected FAs to evaluate their adequacy for illuminating access and egress pathways and any equipment requiring local operation and/or instrumentation monitoring for post-fire SSD actions. During walkdowns, the inspectors requested the licensee activate the test button on a sample of emergency light fixtures. Preventive maintenance procedures and completed surveillance tests were reviewed to ensure that adequate surveillance testing and periodic battery replacements were completed by the licensee. In addition, the inspectors verified the operation of the fixed and portable emergency lights by randomly selecting lighting to be operated.

b. Findings

No findings were identified.

.09 Cold Shutdown Repairs

a. Inspection Scope

The inspectors reviewed the licensee's cold shutdown activities that were addressed in the maintenance procedures. The inspectors reviewed specific actions contained in Maintenance Instruction MI-0.047, "Appendix R Safe Shutdown Repairs," for the selected areas. The inspectors toured designated areas where cold shutdown repair equipment was stored and examined the material condition of the parts being stored. The inspectors reviewed and performed an independent inventory check, in accordance

with preventive maintenance instruction, PM-JB-291-6917 to verify that all required repair and installation parts were being accounted for and were available for use.

b. Findings

No findings were identified.

.10 Compensatory Measures

a. Inspection Scope

The inspectors reviewed the administrative controls for out-of-service, degraded, and/or inoperable fire protection features (e.g., detection and suppression systems and equipment, passive fire barriers, or pumps, valves or electrical devices providing SSD functions or capabilities). The inspectors reviewed selected items on the fire protection impairment list and compared them with the FAs selected for inspection. The inspectors checked that the risk associated with removing the fire protection feature from service was properly assessed and adequate compensatory measures were implemented in accordance with the approved FPR. Additionally, the inspectors reviewed the licensee's short term compensatory measures (compensatory fire watches) to verify that they were adequate to compensate for a degraded function or feature until appropriate corrective actions were taken and that the licensee was effective in returning the equipment to service in a reasonable period of time.

b. Findings

No findings were identified

.11 Control of Combustibles and Ignition Sources

a. Inspection Scope

The inspectors reviewed the administrative control of combustible materials and ignition sources. Plant administrative procedures were reviewed to determine if adequate controls were in place to control the handling of in-situ and transient combustibles in the plant. The inspectors walked down numerous areas in the plant, including the selected FAs, for control of combustible materials, storage of in-plant materials, transient combustibles and general housekeeping. The inspectors verified that containers with combustibles were Underwriters Laboratories or Factory Mutual listed. There were no hot work activities ongoing during the inspection, so observation of this activity could not be performed.

b. Findings

No findings were identified.

.12 B.5.b Implementing Strategy Review

a. Inspection Scope

The inspectors reviewed the licensee's established program for responding to a large fire or explosion event consistent with the established license condition. The inspectors reviewed applicable SERs and submittals which supported the elements outlined by the license condition. The inspectors reviewed applicable training of staff as well as credited procedures used for strategy implementation. The inspectors also assessed the adequacy of surveillance and maintenance of credited equipment by reviewing a sample of completed records. The inspectors conducted tabletops of applicable strategies under review with licensee personnel credited for responding to an event. The inspectors performed walkdowns with individuals provided by the licensee staff to assess the implementation capabilities of the individuals and the adequacy of procedures.

b. Findings

No findings were identified.

4. OTHER ACTIVITIES

4OA2 Identification and Resolution of Problems

a. Inspection Scope

As part of the triennial fire protection inspection procedure, the inspectors verified that the licensee entered issues associated with fire protection into the corrective action program in a timely manner. Additionally, the inspectors verified that the licensee was identifying issues at an appropriate threshold and verified that problems included in the licensee's corrective action program were properly addressed for resolution. The inspectors review was to insure and verify the licensee characterization of the issue was a complete and accurate identification of the problem. The inspectors reviewed licensee's self assessments, audits, Licensee Event Reports (LERs), and previous PERs for thoroughness, completeness and conformance to requirements. The requirement for the independent audits are contained in Regulatory Guide 1.189, "Fire Protection for Operating Nuclear Power Plants," Generic Letter 82-21, "Technical Specifications for Fire Protection Audits," and the licensee's procedure SPP-10.12, "Fire Protection Quality Assurance." The inspectors also reviewed previously identified issues from inspections as well as those identified by the licensee to ensure identified issues were adequately addressed with the appropriate corrective actions.

b. Findings

No findings were identified.

4OA5 Other Activities

4OA6 Meetings, Including Exit

On October 8, 2010, the senior reactor inspector presented the preliminary inspection results to Mr. Don Grissette, Site Vice President, and other members of the licensee's staff. The licensee acknowledged the results. A re-exit was conducted by the lead inspector with Mr. Don Grissette, Site Vice President, and other members of the licensee's staff on November 17, 2010. Based upon additional in-office review and additional information received by members of your staff, an additional telephone exit was conducted on February 28, 2011, to discuss the inspection results. The NRC conducted a re-exit on April 19, 2011 to discuss the inspection results based upon in-office review. The NRC received information after the April 19, 2011 date for in-office review and conducted a final exit on June 16, 2011 via telephone. The licensee also confirmed that proprietary information was not provided or examined during the inspection.

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Licensee personnel

D. Grissette, Site Vice President Unit 1
G. Boerschig, WBN Plant Manager
R. Krich, NPG Licensing
C. Riedl, Site Licensing Supervisor
B. Simril, NPG Fire Protection & Projects
D. Green, NPG Licensing
J. Shea, NPG Licensing
J. Bushnell, Jerry Bushnell
S. Switzer, Operations
E. Haston, WBN Engineering Programs
J. Ricks, WBN Electrical Engineering
J. Sterchi, Fire Operations
J. Ricks, Engineering
L. Amini, Corporate Engineering
K. Manney, Fire Operations
M. Brandon, Engineering
B. Dolan, NPG Engineering PRA
C. Borrelli, NPG Engineering PRA

NRC personnel

R. Monk, Senior Resident Inspector, Watts Bar Nuclear, Unit 1
K. Miller, Resident Inspector, Watts Bar Nuclear, Unit 1
R. Nease, Chief, Engineering Branch 2, Division of Reactor Safety, Region II

LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

05000390/2010007-01	URI	Use of OMAs Potentially Not Consistent with the Fire Protection Licensing Basis (Section 1R05.01)
05000390/2010007-02	URI	Installed Insulating Fluid in Interior Transformers Potentially Deviates from License/Design Criterion in SSER 18 and Position D.1.g of Appendix A to BTP (APCSB) 9.5-1 (Section 1R05.02)
05000390/2010007-03	URI	Questions Related to OMA to Establish RCP Seal Cooling in the Event of a Fire in AV-076, Computer Room (Section 1R05.05)

**LIST OF COMPONENTS REVIEWED FOR INSPECTION
(Refer Report Section 1RO5.06- Circuit Analysis)**

1. 1-PVC-68-334A, Pressurizer PORV
2. 1-MTR-3-128-B, Motor Driven AFW Pump 1B-B
3. 1-HTR-68-341D, Pressurizer Backup Heater Group B
4. 1-LI-63-52, RWST Level Indication
5. 1-LI-62-129A, VCT Level Indication
6. 1-FCV-62-91-B, CVCS Charging Header Isolation
7. 1-FCV-72-22-A, RWST to Containment Spray Pump 1A-A
8. 1-FCV-74-3-A, RHR Pump 1A-A Suction
9. 0-MTR-31-96/1-B, MCR Chill Water Pump B-B
10. 1-PVC-1-30, S/G 4 PORV
11. 1-MTR-70-38-B, CCP 1B-B
12. 1-LCV-3-148, S/G 3&4 Level Control Valve (LCV)
13. 1-PCV-1-23, SG #3 PORV
14. 1-FI-3-170A, AFW FLOW
15. 1A CCS Pump, Component Cooling Water Pump 1A
16. 1B CCS Pump, Component Cooling Water Pump 1B
17. 1-FCV-67-143, CCS Hx A ERCW Outlet Flow Control
18. 1-HS-68-334A, PZR PORVs 334 to Close
19. TVC-70-192, Letdown Hx Outlet Temp
20. 1-BKR-81-7, Primary Water Makeup Pump
21. 1-XS-72-2, CS HDR B ISOL (1-FCV-72-2)
22. 1-XS-67-91, LWR CNTMT CLR HDR C ERCW SUP (1-FCV-67-91)
23. 0-XS-70-194-B, CCS HX C OUT ERCW HDR B FLOW CNTL
24. 0-HS-67-152C, CCS HX C OUT ERCW HDR B FLOW CNTL
25. 1-XS-74-3, RHR PUMP 1A-A SUCTION TRANSFER SWITCH
26. 1-XS-72-39, CS HDR A ISOL
27. 1-XS-3-116A, ERCW HDR A AFW PMP 1A-A SUCTION
28. 1-XS-1-22B, SG 3 MSIV (Aux Pos Closes)
29. 1-XS-1-24B, SG 3 PORV AUX CONTROL SOLENOID
30. 1-XS-3-148A, AFW TO SG 3

LIST OF FIRE BARRIER FEATURES INSPECTED
(Refer Report Section 1RO5.02- Passive Fire Barriers)

Fire Door Identification

A197, Fire Area 32, Room 772.0A1, Elev. 772'
A180, Fire Area 32, Room 772.0A1, Elev. 772'
A186, Fire Area 37, Room 772.0A6, Elev. 772'
C23, Fire Area 48, Control Building Room 708.C3, Elev. 708'

Fire Damper Identification

1-1SD-31-2526, Fire Area 32, 772.0A1, Elev. 772'
1-1SD-31-2554, Fire Area 32, 772.0A1, Elev. 772'
0-1SD-31-3968, Fire Area 48, Control Building Room 708.C3, Elev. 708'
0-1SD-31-3969, Fire Area 48, Control Building Room 708.C3, Elev. 708'

Fire Barrier Penetration Seal Identification

Penetration Firestop, WBN-0-SLV-304-A1616AM, Fire Area 32, Room 772.0A1, Elev. 772'
Penetration Firestop, WBN-0-SLV-304-A13115, Fire Area 32, Room 772.0A1, Elev. 772'
Penetration Firestop, WBN-0-SLV-304-A13315B, Fire Area 32, Room 772.0A1, Elev. 772'
Penetration Firestop, WBN-0-SLV-304-A8888, Fire Area 32, Room 772.0A1, Elev. 772'

Interior Structural Component Identification

Transformer Containment Curbs, Fire Area 37, Room 772.0A6, Elev. 772'

Fire Wall, Ceiling Floor Identification

Floor Construction, Fire Area 32, Room 772.0A1, Elev. 772'
Hatch Construction, Fire Area 32, Room 772.0A1, Elev. 772'

LIST OF DOCUMENTS REVIEWED

Preventive Maintenance and Completed Workorders

PM 0-FPS-777-EQUIP, Emergency Equipment Storage Locations
PM 0-FPS-026-0004, Annual Inspection of Hose and Fittings and Hydrostatic Test of Fire Hose
WO 08-819014-000, TVA Junction Box
WO-08-821057, 18 Month Verification of Remote Shutdown Transfer Switches for Train B Equipment, completed 10/14/2009
WO-08-821057, 18 Month Verification of Remote Shutdown Transfer Switches for Train A Equipment, completed 10/17/2009
0-FOR-13-602, 6 Month Fire Detection Test Panel L602, completed 3/12/2010
0-FOR-13-605, 6 Month Fire Detection Test Panel L605, completed 3/14/2010
0-FOR-26-2, 3 Year High Pressure Fire Protection Hydraulic Performance Verification, completed 8/2/2010
0-FOR-410-1, 31 Day Fire Door Inspection, completed 8/21/2010

Applicable Codes, Specifications, & Standards

NFPA Fire Protection Handbook, 19th Edition
NFPA 12, Carbon Dioxide Extinguishing Systems, 1973 edition
NFPA 13, Automatic Sprinkler Systems, 1975 edition
NFPA 14, Standpipe and Hose Systems, 1974 edition
NFPA 30, Flammable and Combustible Code, 1973 edition
NFPA 72D, Installation, Maintenance and Use of Proprietary Signaling Systems, 1975 edition
NFPA 72E, Automatic Fire Detectors, 1974 edition
N3M-937, Installation, Modification, and Maintenance of Electrical and Mechanical Penetration Seal Assemblies, Rev. 3
N3-13-4002, Fire Detection System, Rev. 3
NUREG-1552, Supplement 1, Fire Barrier Penetration Seals in Nuclear Power Plants, Dated 01/99
OSHA Standard 29 CFR 1910, Occupational Safety and Health Standards
Underwriters Laboratory Standard 555, Standard for Fire Dampers and Ceiling Dampers
Underwriters Laboratory, Fire Resistance Directory, Dated 01/98

Fire Protection Pre-Plans and Fire Drill Critiques

WBN-Fire Protection Pre-Plan, AUX-0-772-01, Rev. 0
WBN-Fire Protection Pre-Plan, CON-0-708-01, Rev. 2

Vendor Supplied Technical Manuals & Information

Promatec Fire Test CTP-1142, Three Hour Fire Qualification Test, Six Inch Depth LDSE W/Aluminum & Steel Penetrants, XLPE/PVC Cable, dated 11/23/1987
Material Safety Data Sheet No. 04088521 for "XIAMETER" Transformer Liquid from Dow Corning, dated 5/17/2010
Paper, Fire Performance of Poly (dimethyl siloxane) Composites Evaluated by Cone Calorimetry, by Antonietta Genovese and Robert Shanks, dated 9/13/2007
Factory Mutual Loss Prevention Data Sheet 5-4/14-8, Dated 09/86
Factory Mutual Research Approval Guide, Transformer Fluids, Dated 01/02
Specification Sheet for Elkhart Brass L-205-EB Fire Hose Nozzle, 10/2/2010

Specification Sheet for Task Force Tips H-VPGI Fire Hose Nozzle, 10/2/2010
 Specification Sheet and User Guide for Super-Vac Electric Ventilators, PS Series, 3/12/2003
 10-453-97, Dow Corning 561 Silicone Transformer Fluid Technical Manual, dated 1997

License Basis Documents

NRC Letter – “Nuclear Plant Fire Protection Functional Responsibilities, Administrative Controls and Quality Assurance,” dated August 29, 1977
 Appendix A to Branch Technical Position APCSB 9.5-I, "Guidelines for Fire Protection for Nuclear Power Plants, dated 8/23/1976
 NUREG-0847, Supplement Number 18, “Safety Evaluation Report related to the operation of Watts Bar Nuclear Plant, Units 1 and 2 Docket Nos. 50-390 and 50-391,” dated October 31, 1995
 TVA Letter – “WBN Supplemental Response to NRC Request for Additional Information –Watts Bar Fire Protection Report (TAC M63648)-Revision to Fire Area Boundaries, dated June 2, 1993
 Watts Bar Nuclear Plant Fire Protection Report, Part I, Introduction, Table 1.1, Summary Compliance Fire Protection Conformance, Rev. 27
 Watts Bar Nuclear Plant Fire Protection Report, Part II, Fire Protection Plan, Rev. 39
 Watts Bar Nuclear Plant Fire Protection Report, Part III, Safe Shutdown Capabilities, Table 3-3, Analysis Volume by Fire Area List, Rev. 27
 Watts Bar Nuclear Plant Fire Protection Report, Part VI, Fire Hazards Analysis, Rev. 10
 Watts Bar Nuclear Plant Fire Protection Report, Part VII, Deviations and Evaluations, Rev. 20
 Watts Bar Nuclear Plant Fire Protection Report, Part X, NFPA Code Evaluation, Rev. 10

Procedures

AOI-30.1, Plant Fires, Rev. 09
 AOI-30.2, Fire Safe Shutdown, Rev. 31
 AOI-30.2, App B Fire Safe Shutdown Elevation Diagrams, Rev. 00
 AOI-30.2 C.2, Fire Safe Shutdown Room 772-A1, Rev. 01
 AOI-30.2 C.60, Fire Safe Shutdown Room All, Rev. 03
 AOI-30.2 C.69, Fire Safe Shutdown Control Building, Rev. 03
 EDMG-1, Loss of Main/Auxiliary Control Room Function-Initial Response, Rev. 03
 FPDP-1, Conduct of Fire Protection, Rev. 1
 NPG-SPP-3.1.3, Regulatory Screening, Rev. 0000
 SOI 13.01, Fire Detection System, Revision 0024
 SOI 31.01, Control Building HVAC System, Revision 48
 SPP-5.4, Chemical Traffic Control, Rev. 10
 SPP-10.9, Control of Fire Impairments, Rev. 4
 SPP-10.10, Control of Transient Combustibles, Rev. 5
 SPP-10.11, Control of Ignition Sources (Hot Work), Rev. 4
 SPP-10.12, Fire Protection Quality Assurance (Q07), Rev. 1
 MI-0.047, Appendix R Safe Shutdown Repairs, Rev. 02
 0-FOR-26-9, Quarterly HPFP Valve Alignment Verification, Rev. 7
 0-FOR-228-1A, Quarterly Inspection and Testing of Emergency Light Battery Packs, Diesel Generator and Control Buildings Common and Train A Areas, Revision 27
 0-FOR-228-1B, Quarterly Inspection and Testing of Emergency Light Battery Packs, Diesel Generator and Control Buildings Common and Train B Areas, Revision 23
 0-FOR-228-2A, Quarterly Inspection and Testing of Emergency Light Battery Packs, Auxiliary Building Elevations 692 and 713, Revision 35

- 0-FOR-228-2A, Quarterly Inspection and Testing of Emergency Light Battery Packs, Auxiliary Building Elevations 692, 729, and 737, Revision 29
- 0-FOR-228-2A, Quarterly Inspection and Testing of Emergency Light Battery Packs, Auxiliary Building Elevations 692, 729, and 737, Revision 29
- 0-FOR-228-2A, Quarterly Inspection and Testing of Emergency Light Battery Packs, Auxiliary Building Elevation Above 737 A Train and Common Areas, Revision 25
- 0-FOR-228-2A, Quarterly Inspection and Testing of Emergency Light Battery Packs, Auxiliary Building Elevation Above 737 B Train and Common Areas, Revision 29
- 1-FOR-228-1, Refueling Replacement and Inspection and Testing of Emergency Light Battery Packs Reactor Building, Revision 5
- 1-SI-0-53.1-A, 18 Month Remote Shutdown Transfer Switch Verification Pre-Outage Performance – Train A, Rev. 0
- 1-SI-0-53.1-A, 18 Month Remote Shutdown Transfer Switch Verification Pre-Outage Performance – Train B, Rev. 0
- 1-SI-0-53.2-A, 18 Month Remote Shutdown Transfer Switch Verification Pre-Outage Performance – Train A, Rev. 0
- 1-SI-0-53.2-B, 18 Month Remote Shutdown Transfer Switch Verification Pre-Outage Performance – Train B, Rev. 0
- 1-JB-291-6917, Inventory of Appendix R Repair Equipment in 1-JB-291-6917 or 1-JB-291-6918, Rev. 0

Calculations

- Engineering Report 0006-00922-02, Penetration Seal Program Assessment, Rev. 2
- EPM-DOM-012990, Combustible Loading Summary for Fire Areas 32 and 37, Rev. 42
- EPM-MAST-051695, HPFP System Standpipe Water Supply, Rev. 2
- EPM-MRCT-072792, HPFP System Standpipe Piping Configuration EZFLOW Model, Rev. 2
- WBNP Calculation for Volume Inside Containment Curbs, dated 10/01/2010
- WBNEEBMST1070005, 125V DC Protection and Coordination Calculation, Rev. 53, Dated 08/17/2010
- WBPEVAR8808035, Appendix R: Cables Required for Auxiliary Control System, Dated 08/10/1988
- WBPEVAR9004001, 1-FCV-72-22-A RWST to Spray HDR 1A FCV, Dated 11/22/1992
- WBPEVAR9004001, 1-FCV-74-3-A, Block Diagram No. 5, Sh. D30, Dated 11/22/1992
- WBPEVAR9004001, Appendix R – Cables Required for Safe Shutdown Following a Fire, Rev. 26, Dated 06/23/2010
- WB-DC-30-13, 10 CFR 50, Appendix R, Type I, II, and III Circuits Units 1 & 2
- WBN-EEB-MS-T107-0005, Circuit 60A Fuse & 15A HFB (Typ), Rev. 49
- WBN-EEB-MS-T107-0005, Coordination Summary Table 7, Rev. 51
- WBN-OSG4-165, Manual Actions Required for Safe Shutdown Following a Fire, Rev. 5
- WBN-OSG4-031, Equipment Required for Safe Shutdown per 10 CFR 50, Appendix R, Rev. 18

Drawings

- 1-45W760-3-3, Wiring Diagrams Main and Aux Feedwater System Schematic Diagram, Rev. 1
- 1-45W760-3-4, Wiring Diagrams Main and Aux Feedwater Systems Schematic Diagram, Rev. 1
- 1-45W760-3-5, Wiring Diagrams Main and Aux Feedwater Systems Schematic Diagram, Rev. 1
- 1-45W760-72-2, Wiring Diagrams Containment Spray System Schematic Diagram, Rev. 1
- 1-45W760-74-2, Wiring Diagrams Residual Heat Removal System Schematic Diagram, Rev. 1

1-45W703-1, Wiring Diagrams 125V Vital Battery Board I Single Line, Sh. 1, Rev. 1
 1-45W703-2, Wiring Diagrams 125V Vital Battery Board II Single Line, Sh. 2, Rev. 1
 1-45W703-3, Wiring Diagrams 125V Vital Battery Board III Single Line, Sh. 3, Rev. 1
 1-45W703-4, Wiring Diagrams 125V Vital Battery Board IV Single Line, Sh. 4, Rev. 1
 1-47W611-3-6, Electrical Logic Diagram Feedwater System, Rev. 1
 1-47W803-1, Flow Diagram Feedwater, Rev. 1
 1-47W610-3-5, Electrical Control Diagram Main & Aux Feedwater System, Rev. 1
 1-45W600-3-11, Wiring Diagrams Main and Aux Feedwater System Schematic Diagram, Rev. 1
 1-45W600-3-7, Wiring Diagrams Main and Aux Feedwater System Schematic Diagram, Rev. 1
 45A883-9, Electrical Penetration Seal Details-K1, Rev. 0
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 45N1642-1, Wiring Diagrams Unit Control Board Panel 1-M-3 Connection Diagrams, Sh. 1, Rev. 22
 45N1667-2, Wiring Diagram Process Instr. Control Group 3 Connection Diagrams, Sh. 2, Rev. 6
 45W1673-6, Wiring Diagrams BOP Inst Racks. Non-Div. Connection Diagrams, Sh. 6, Rev. 6
 45N280-1, Electrical Equipment Trans Room Layout-EI 772.0, Plan and Section, Rev. 37
 45N600-62-1, Wiring Diagrams Chemical and Volume Control System Schematic Diagrams, Sh. 1, Rev. T
 47W200-3, Equipment Plan – EL 757.0 & EL 755.0, Rev. N
 47W200-4, Equipment Plan – EL 737.0 & EL 729.0, Rev. 19
 45W202RH, Control, Aux & Reactor Bldg. Electrical Equipment (FSAR Figure 8.3-2), Rev. 6
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 45W866-3, Conduit & Grounding Cable Tray Node Diagrams EL 708.0 NV-2.NV-2E, Rev. 16
 45W866-8, Conduit & Grounding Cable Tray Node Diagrams EL 729.0 NV-2, Rev. 6
 45W866-9, Conduit & Grounding Cable Tray Node Diagrams EL 708.0 NV-2, Rev. 15
 45W866-13, Conduit & Grounding Cable Tray Node Diagrams EL 714.0 NV-3A.NV-3B, NV-2, Rev. 6
 45W866-30, Conduit & Grounding Cable Tray Node Diagrams EL 729.0 COL G-N, NV-2&3, Rev. 2
 47A472-46, Mechanical Penetration Seal Details-XLVI, Rev. 2
 47W240-4, 5, 6, Fire Protection Compartmentation-Fire Cells, Rev. 9, 11 and 8
 47W832-1, 2, 3, Flow Diagram Raw Service Water & Fire Protection System, Rev. 14
 47W850-5, Flow Diagram Fire Protection, Rev. 27
 47W 852-3, Mechanical Flow Diagram Floor and Equipment Drains, Rev. 14
 47W866-3, Flow Diagram, Heating Ventilation and Air Cond. & Air Flow, Rev. 38
 47W866-4, Flow Diagram, Heating Ventilation and Air Cond. & Air Flow, Rev. 39

Plant Modifications and Engineering Changes

DCN-M-08672-A, Retro-fill and Reclassify Askarel Transformers to a Non-PCB Dielectric Fluid, concurrence dated 7/23/1990

Other

3-OT-JPMA045C, Operate #1 SG PORV (Locally with N2) per SOI-1.01
 3-OT-JPMA047A, Local Control of SG Levels
 3-OT-JPMA148, Isolate Letdown, 1-FCV-69, From Train B 6.9KV Shutdown Bd. Room
 NRC IN 2008-04, Counterfeit Parts Supplied to Nuclear Power Plants
 NRC IN 2009-10, Transformer Failures-Recent Operating Experience

NRC IN 2010-09, Importance of Understanding Circuit Breaker Control Panel Indications
 NRC IN 2010-13, Failure to Ensure that the Post-Fire Shutdown Procedures Can Be Performed
 WBN-VM-E353-1840, Exide Electronics Corp 8 Hour Emergency Lighting Battery Pack

List of PERs Reviewed for Inspection

PER 125513, Appendix C.52 of AOI 30.2
 PER 125858, Inadequate Emergency Lighting
 PER 125950, Appendix R Issue with Vital Inverter Cables in Aux Control Room
 PER 126210, App R Lights
 PER 250288, Perform Formal Tracking of ELBP Battery Failures

Problem Evaluation Reports (PERs) Generated as a Result of the Inspection

227842, Questions by NRC staff related to components susceptible to MSO
 247749, NRC Information Notice 2010-013 review since a TVA site was mentioned
 247954, UFSAR Figure 8.3-3 based on drawing 45W204 does not accurately reflect WBN Control and Auxiliary Buildings.
 248119, NRC questions related to Spreader Room EI 729
 255704, Appendix R Placard missing from 480V Shutdown Bd. 1A2A
 256193, 3-OT-JPMA045C errors for JPM steps discovered during TFPI review
 256199, Appendix R ELUs determined to be out of Alignment
 257131, Inconsistencies between SSERs 18 and 19 and WBN design.
 257275, The NRC has raised two questions on transformers as a part of inspection.
 259739, NRC questions related to items included in the Appendix R analysis
 261775, 0-LAC-228-131 & 0-LAC-228-231 missing Appendix R signs
 262951, Questions related to WBN requirement for Steam Generators
 262954, Inadequate review of IN 2010-013
 263010, Revise Pre-Fire Plans to Address Fire Fighting Tactics for Indoor Transformers
 263022, AOI-30.2 C69 does not meet verbatim compliance with SER 18
 263028, Walkdowns of AOI-30.2 C69 identified missing App. R placards
 263044, Inaccessible Operator Manual Action for 1-FCV-67-458
 264607, Appendix R ELU's partially obscured by fire retardant cloth
 265331, Review of Transformer Dielectric Fluid Maintenance Activities
 263661, SR written to address NRC question related to CO₂ system compensatory measures
 265331, NRC questions related to DCN 8672 which change transformer dielectric fluid
 265850, NRC questions related to OMAs for HVAC fans

Service Request (SRs) Generated as a Result of the Inspection

243087, NRC Information Notice 2010-013 review since a TVA site was mentioned
 244704, NRC questions related to Spreader Room EI 729
 254950, App. R placard missing
 255140, Inconsistencies with 3-OT-JPMA045C
 255204, Appendix R Emergency Light Pack lamps discovered out of alignment
 255937, Inconsistencies between SSERs 18 and 19 and WBN design.
 255989, The NRC has raised two questions on transformers as a part of inspection.
 256069, The Fire Protection Report (FPR), Part VI does not address transformer oil consistently.
 259139, NRC questions related to items included in the Appendix R analysis
 261355, NRC questions related to WBN requirement for Steam Generators

261390, Inadequate review of IN 2010-013
260946, 0-LAC-228-131 & 0-LAC-228-231 missing Appendix R signs
262034, Revise Pre-Fire Plans to Address Fire Fighting Tactics for Indoor Transformers
262055, Appendix R ELU's partially obscured by fire retardant cloth
262195, AOI-30.2 C69 does not meet verbatim compliance with SER 18
262219, Missing Handwheel for 1-ISV-32-2934
262230, Walkdowns of AOI-30.2 C69 identified missing App. R placards
263326, SR to address NRC questions related to 1-FCV-67-458
263015, SR written to address NRC question related to CO₂ system compensatory measures
263312, NRC questions related to DCN 8672 which change transformer dielectric fluid
263510, NRC questions related to OMAs for HVAC fans
269706, NRC questions related to SR 262219 being closed to WO without a PER being generated

LIST OF ACRONYMS AND ABBREVIATIONS

AOI	Abnormal Operating Instruction
AUO	Auxiliary Unit Operator
AV	Analysis Volume
APCSB	Auxiliary and Power Conversion Systems Branch
AUO	Auxiliary Unit Operator
BTP	Branch Technical Position
CAP	Corrective Action Program
CCS	Component Cooling Water
CFR	Code of Federal Regulations
DC	Direct Current
ELU	Emergency Lighting Unit
ERFBS	Electrical Raceway Fire Barrier System
FA	Fire Area
FEPs	Fire Emergency Procedures
FPP	Fire Protection Program
FPR	Fire Protection Report
IMC	Inspection Manual Chapter
IP	Inspection Procedure
MCR	Main Control Room
NCV	Non-cited violation
NFPA	National Fire Protection Association
NRC	United States Nuclear Regulatory Commission
NUREG	An explanatory document published by the NRC
OMAs	Operator Manual Actions
PER	Problem Evaluation Reports
Rev	Revision
ROP	Reactor Oversight Process
SCBA	Self-Contained Breathing Apparatus
SER	Safety Evaluation Report
SSER	Supplemental Safety Evaluation Report
SDP	Significance Determination Process
SOI	System Operating Instruction
SR	Service Request
SSA	Appendix R Safe Shutdown Analysis
SSD	Safe Shutdown
SSER	Supplemental Safety Evaluation Report
TFPI	Triennial Fire Protection Inspection
UFSAR	Updated Final Safety Analysis Report
URI	Unresolved Item
VAC	Volts Alternating Current
VDC	Volts Direct Current