



**UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
REGION II**

245 PEACHTREE CENTER AVENUE NE, SUITE 1200  
ATLANTA, GEORGIA 30303-1257

August 12, 2016

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 - NRC INTEGRATED INSPECTION REPORT  
05000327/2016002 and 05000328/2016002**

Dear Mr. Shea:

On June 30, 2016, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at your Sequoyah Nuclear Plant, Units 1 and 2. On July 20, the NRC inspectors discussed the results of this inspection with Mr. Schwarz and other members of your staff. Inspectors documented the results of this inspection in the enclosed inspection report.

The enclosed inspection report discusses a finding for which the NRC has not yet reached a preliminary significance determination. As described in Section 1R04 of the enclosed report, this finding involved the failure to adequately implement the clearance process such that a significant portion of the site fire suppression system was rendered non-functional on March 29, 2016 for a period in excess of its allowed outage time according to your fire protection plan. This finding did present an immediate safety concern. Immediate compensatory actions were taken to restore portions of the fire suppression system and compensatory fire watches were established until complete system restoration was achieved. The NRC will inform you in a separate correspondence when the preliminary significance has been determined.

We intend to complete and issue our final safety significance determination within 90 days from the date of this letter. The NRC's significance determination process (SDP) is designed to encourage an open dialogue between your staff and the NRC; however, the dialogue should not affect the timeliness of our final determination. Because the NRC has not made a final determination in this matter, no notice of violation is being issued for this inspection finding at this time.

If you contest this violation, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington DC 20555-0001; with copies to the Regional Administrator, Region II; the Director, Office of Enforcement, U.S. 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, the Regional Administrator, Region II; and the NRC resident inspector at the Sequoyah Nuclear Plant.

In accordance with Title 10 of the *Code of Federal Regulations* 2.390, "Public Inspections, Exemptions, Requests for Withholding," 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's Public Document Room or from the Publicly Available Records (PARS) component of the NRC's Agencywide Documents Access and Management System (ADAMS). ADAMS is accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html> (the Public Electronic Reading Room).

Sincerely,

*/RA/*

Alan Blamey, Branch Chief  
Reactor Projects Branch 6  
Division of Reactor Projects

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

Enclosure: Inspection Report 05000327/2016002, 05000328/2016002  
w/Attachment: Supplementary Information

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Letter to J.W. Shea from Alan Blamey dated August 12, 2016

SUBJECT: SEQUOYAH NUCLEAR PLANT - NRC INTEGRATED INSPECTION REPORT  
05000327/2016002 and 05000328/2016002

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**U. S. NUCLEAR REGULATORY COMMISSION**

**REGION II**

Docket Nos.: 50-327, 50-328

License Nos.: DPR-77, DPR-79

Report Nos.: 05000327/2016002, 05000328/2016002

Licensee: Tennessee Valley Authority (TVA)

Facility: Sequoyah Nuclear Plant, Units 1 and 2

Location: Sequoyah Access Road  
Soddy-Daisy, TN 37379

Dates: April 1 – June 30, 2016

Inspectors: G. Smith, Senior Resident Inspector  
W. Deschaine, Resident Inspector  
S. Roberts, Project Engineer (1R04, 1R05)

Approved by: Alan Blamey, Chief  
Reactor Projects Branch 6  
Division of Reactor Projects

Enclosure

## SUMMARY OF FINDINGS

IR 05000327/2016002, 05000328/2016002; 4/1-6/30/2016; Sequoyah Nuclear Plant, Units 1 and 2; Equipment Alignment.

The report covered a three-month period of inspection by resident inspectors and announced inspections by region-based inspectors. One violation was 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) dated April 29, 2015. Cross-cutting aspects are determined using IMC 0310, "Components Within the Cross Cutting Areas" dated December 4, 2014. All violations of NRC requirements are dispositioned in accordance with the NRC's Enforcement Policy dated February 4, 2015. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 6. However, the significance of the below finding has yet to be determined.

### A. NRC-Identified and Self-Revealing Findings

#### **Cornerstone: Initiating Events**

TBD. A self-revealing apparent violation (AV) of the facility operating licenses DPR-77 and DPR-79 conditions 2.C.(16) and 2.C.(13) was identified for the licensee's failure to properly implement the clearance process such that the fire suppression system was rendered non-functional for approximately 48 hours. The licensee inappropriately expanded an existing clearance on March 29 in order to attempt to reduce boundary valve leakage affecting existing maintenance on the fire suppression system within a valve pit. Subsequently, on March 30, during fire system testing, technicians noted a lack of system pressure and it was ultimately concluded the clearance expansion had inadvertently isolated fire suppression water to a significant portion of the site. Upon discovery of the clearance error, the system was restored to a functional status after being isolated for approximately 48 hours. The licensee entered the issue into their corrective action program as condition report (CR) 1155763.

The performance deficiency was determined to be more than minor because it was associated with the protection against external events (fire) attribute of the mitigating systems cornerstone and adversely affected the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. The inability to pressurize the high pressure fire protection (HPFP) system from either the electric or diesel-driven fire pumps rendered the fire suppression system inoperable. The finding could not be screened to Green and is pending a significance determination. The inspectors determined that the finding had a cross-cutting aspect of "Procedural Adherence" within the Human Performance area, because the licensee failed to consider the effect that changing a clearance order could have on the operability of the fire suppression system. (H.8). (1R04.2)

### B. Licensee-Identified Violations

None

## REPORT DETAILS

### Summary of Plant Status:

Unit 1 operated at or near 100 percent rated thermal power (RTP) for the entire inspection period.

Unit 2 operated at or near 100 RTP for the entire inspection period until May 6 where the unit was taken offline in order to perform a balance shot to the main turbine as a result of higher than normal vibrations. Following the turbine work, the unit was returned to 100 percent RTP on May 12 where it continued to operate until May 27 when power was reduced to 85 percent to address a failed heater drain system level control valve. Following repairs to the level control valve the unit was restored to 100 percent RTP on May 28 where it continued to operate until June 17 when power was reduced to 55 percent RTP as a result of a failed level control valve in the heater drain system. Following repairs to the level control valve, the unit was restored to 100 percent RTP on June 18 where it continued to operate for the remainder of the inspection period.

#### 1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, and Barrier Integrity

#### 1R04 Equipment Alignment (71111.04)

##### .1 Partial System Walkdown

##### a. Inspection Scope

The inspectors performed partial walkdowns of the following three systems to verify the operability of redundant or diverse trains and components when safety equipment was inoperable. The inspectors focused on identification of discrepancies that could impact the function of the system and, therefore, potentially increase risk. The inspectors reviewed applicable operating procedures, walked down control system components, and determined whether selected breakers, valves, and support equipment were in the correct position to support system operation. The inspectors also verified that the licensee had properly identified and resolved equipment alignment problems that could cause initiating events or impact the capability of mitigating systems or barriers and entered them into the corrective action program (CAP). Documents reviewed are listed in the Attachment. The inspectors completed three samples, as defined in Inspection Procedure (IP) 71111.04.

- Unit 2 A-train Centrifugal Charging Pump (CCP) while the 'B' train CCP was out of service for maintenance
- Unit 1 A-train Residual Heat Removal (RHR) train while the B-train RHR was out of service for maintenance
- Unit 2 A-train Safety Injection (SI) train while the B-train SI was out of service (OOS) for maintenance

b. Findings

No findings were identified.

.2 Complete System Walkdown

a. Inspection Scope

The inspectors performed a complete system walkdown of the HPFP System and support systems to verify proper equipment alignment, to identify any discrepancies that could impact the function of the system and increase risk, and to verify that the licensee properly identified and resolved equipment alignment problems that could cause events or impact the functional capability of the system.

The inspectors reviewed the Updated Final Safety Analysis Report (UFSAR), system procedures, system drawings, and system design documents to determine the correct lineup and then examined system components and their configuration to identify any discrepancies between the existing system equipment lineup and the correct lineup. During the walkdown, the inspectors reviewed the following:

- Valves were correctly positioned and did not exhibit leakage that would impact the functions of any given valve.
- Electrical power was available as required.
- Major system components were correctly labeled, lubricated, cooled, ventilated, etc.
- Hangers and supports were correctly installed and functional.
- Essential support systems were operational.
- Ancillary equipment or debris did not interfere with system performance.
- Tagging clearances were appropriate.
- Valves were locked as required by the locked valve program.

In addition, the inspectors reviewed outstanding maintenance work requests and design issues on the system to determine whether any condition described in those work requests could adversely impact current system operability. Documents reviewed are listed in the Attachment to this report. The inspectors completed one sample, as defined in IP 71111.04.

b. Findings

Introduction. A self-revealing apparent violation (AV) of the facility's operating license was identified for the licensee's failure ensure the fire suppression system was operable and capable of suppressing fires. Specifically, the licensee inadvertently disabled the HPFP water system in excess of 24 hours and concurrently failed to implement required compensatory measures for the disabled header contrary to the approved fire protection report (FPR).

Description. On March 23, 2016, the licensee established a clearance on the high pressure fire water system in order to perform planned maintenance in a valve pit. Subsequently, it was determined that the clearance boundary was inadequate in that one of the boundary valves leaked by the seat. On March 29, the clearance boundary was expanded in order to reduce any leakage into the affected work area. On March 30,

during routine fire operation testing, operators noted that water was not available at a hose station near the emergency diesel generator (EDG) building. Subsequent investigation revealed the expanded clearance had isolated the main fire suppression system from the fire pumps and fire tanks. Thus, if a fire had occurred, no suppression would have been available to most of the plant site. The affected areas included the control building, turbine building, auxiliary building, and the EDG building. Upon discovery, the licensee implemented the requirements of the fire protection report (FPR). This, included fire operating requirement (FOR), 14.2.1, 14.3.1, and 14.5.1 for fire water suppression system, spray/sprinkler systems, and fire hose stations, respectively. On March 31, full functionality of the HPFP system was restored and operations exited the requirements of the FPR. The exposure time for the disabled HPFP system was approximately 40 hours.

This event was entered into the licensee's corrective action program as CR 1155763. A root cause team was formed in order to determine the cause of the fire header isolation. The team concluded that the direct cause of the failure to comply with the FORs was due to an inadequate review of the system impact caused by the expanded clearance boundary. The root cause was attributed to a shift in responsibility for fire compliance to the fire operations personnel rather than maintaining the responsibility within the operations group. Concurrently with the establishment of a root cause team, the licensee began an effort to appropriately analyze the risk significance of the event.

Analysis. The licensee's failure to properly assess the system impact of a clearance revision for the High Pressure Fire Protection (HPFP) suppression header and enter the required FPR Operating Requirement (FOR) Action was a performance deficiency. Specifically, the licensee expanded a clearance that isolated the HPFP suppression header to the control building, auxiliary building, turbine building, diesel generator building, and both containments without conducting reviews required per NPG-SPP-10.2, "Clearance Procedure to Safely Control Energy." The performance deficiency was determined to be more than minor because it was associated with the protection against external events (fire) attribute of the mitigating systems cornerstone and adversely affected the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. The inability to pressurize the HPFP system from either the electric or diesel-driven fire pumps rendered the fire suppression system inoperable.

The inspectors performed an initial screening of the finding using NRC Inspection Manual Chapter 0609, Attachment 4, Phase 1 – "Initial Screening and Characterization of Findings," which affected the mitigating systems cornerstone and required further evaluation in accordance with Manual Chapter 0609 Appendix F, Attachment 1, "Fire Protection SDP Phase 1 Worksheet," as the finding involved the inability of a fixed fire protection system to confine a fire. In accordance with Attachment 1, the finding was assigned to section 1.4.7 "Fire Water Supply," where it was determined that due the large number of affected buildings and areas, it was unknown whether the reactor would be able to reach and maintain safe shutdown given a complete loss of suppression. Additionally, using Attachment 2, the degradation of the suppression system was determined to be "high" as the system was unable to be pressurized from the installed plant fire pumps. Given the potential effect on safe shutdown and the "high" degradation of the HPFP system, the finding was evaluated using Task 1.4.7, "Fire Water Supply," as described in Attachment 1. Due to the large number of areas affected, the inspectors determined that the delta CDF was greater than 1E-06 and thus requires additional

analysis to reach an initial significance characterization.

The finding does not present an immediate safety concern because the fire suppression system was quickly returned to service upon discovery of the clearance error and is currently fully functional. Because the significance determination is pending an initial significance determination, it is being documented with a significance of To Be Determined (TBD). Using Manual Chapter 0310, "Aspects Within the Cross-Cutting Areas," the inspectors identified a cross-cutting aspect in the Procedural Adherence component of the Human Performance area, because the licensee failed consider the effect that changing a clearance order could have on the operability of the fire suppression system. [H.8]

Enforcement: Facility operating licenses DPR-77 and DPR-79 conditions 2.C.(16) and 2.C.(13), respectively, state that TVA shall implement and maintain in effect all provisions of the approved fire protection program referenced in Sequoyah Nuclear Plant's Final Safety Analysis Report as approved in applicable NRC Safety Evaluation Reports. The Sequoyah Fire Protection Report Part II, Section 14.2, "Fire Suppression Water," FOR 14.2.1 requires, that with no fire pump functional, then establish contingency measures and restore the system to operable status within 24 hours or place the unit in Mode 3 within 7 hours, Mode 4 with 13 hours, and Mode 5 within 37 hours. The Sequoyah Fire Protection Report Part II, Section 14.3, "Spray and/or Sprinkler Systems," FOR 14.3.1 requires, that with one or more sprinkler systems inoperable, then establish fire watches within one hour. The Sequoyah Fire Protection Report Part II, Section 14.5, "Fire Hose Stations," FOR 14.5.1 requires, that with one or more required fire hose stations nonfunctional, then within one hour, route an equivalent capacity fire hose to the unprotected area. Contrary to the above, from March 29 to March 31 or approximately 48 hours, the licensee isolated the HPFP header from the normal sources of water that effectively disabled all fire pumps, suppression system, and hose stations to various safety-related areas without the implementation of any contingency measures such as the prestaging of backup water supplies and hoses, as well as the establishment of hourly fire watches. Upon discovery of the clearance error, the system was restored to a functional status after being isolated for approximately 48 hours. The licensee entered the issue into their corrective action program as CR 1155763. This violation is being treated as an AV pending a final significance determination and is identified as AV 05000327, 328/2016002-01: Isolation of Fire Suppression System to a Significant Portion of the Plant Site.

1R05 Fire Protection (71111.05)

.1 Fire Protection Tours

a. Inspection Scope

The inspectors conducted a tour of the four areas important to safety listed below to assess the material condition and operational status of fire protection features. The inspectors evaluated whether: combustibles and ignition sources were controlled in accordance with the licensee's administrative procedures; fire detection and suppression equipment was available for use; passive fire barriers were maintained in good material condition; and compensatory measures for out-of-service, degraded, or inoperable fire protection equipment were implemented in accordance with the licensee's fire plan. Documents reviewed are listed in the Attachment. The inspectors completed four

samples, as defined in IP 71111.05.

- Auxiliary Building Elevation 690
- Auxiliary Building Elevation 714
- Auxiliary Building Elevation 749
- Control Building Elevation 732

b. Findings

No findings were identified.

.2 Annual Drill Observations

a. Inspection Scope

On April 22, 2016, the inspectors observed an unannounced fire drill in the Unit 2, 734' elevation of the Auxiliary Building, in the Emergency Gas Treatment System (EGTS) room. Additionally, on June 29, 2016, the inspectors observed an unannounced fire drill in the Unit 1, 749' elevation of the Auxiliary Building, in the 480V Shutdown board rooms. For both of these drills the inspectors assessed fire alarm effectiveness; response time for notifying and assembling the fire brigade; the selection, placement, and use of firefighting equipment; use of personnel fire protective clothing and equipment (e.g., turnout gear, self-contained breathing apparatus); communications; incident command and control; teamwork; and firefighting strategies. The inspectors also attended the post-drill critique to assess the licensee's ability to review fire brigade performance and identify areas for improvement. Following the critique, the inspectors compared their findings with the licensee's observations and to the requirements specified in the licensee's Fire Protection report. This activity coupled with prior performances of this inspection constituted one inspection sample, as defined in IP 71111.05.

b. Findings

No findings were identified.

1R06 Flood Protection Measures (71111.06)

Annual Review of Cables Located in Underground Bunkers/Manholes

a. Inspection Scope

The inspectors conducted a review of licensee inspections of safety-related cables located in underground bunkers/manholes subject to flooding. Specifically, inspectors reviewed maintenance records of inspections and physically conducted an inspection of Underground Vaults 12 and 31 to determine if water was present and, if found, whether it would affect safety-related system operation. These vaults were opened as a result of troubleshooting efforts to locate Essential Raw Cooling Water (ERCW) cable splice grounds. In addition, the inspectors reviewed the licensee's corrective action program to ensure that the licensee was identifying underground cabling issues and that they were properly addressed for resolution. Documents reviewed are listed in the Attachment. The inspectors completed one sample, as defined in IP 71111.06.

b. Findings

No findings were identified.

1R11 Licensed Operator Requalification Program (71111.11)

.1 Quarterly Review

a. Inspection Scope

The inspectors performed one licensed operator requalification program review. The inspectors evaluated a simulator session on May 5, 2016. The training scenario involved a steam generator tube rupture and included a pressurizer pressure instrument failure, a power range instrument failure and a main generator failure. The inspectors observed crew performance in terms of: communications; ability to take timely and proper actions; prioritizing, interpreting and verifying alarms; correct use and implementation of procedures, including the alarm response procedures; timely control board operation and manipulation, including high risk operator actions; oversight and direction provided by shift manager, including the ability to identify and implement appropriate Technical Specification (TS) action; and, group dynamics involved in crew performance. The inspectors also observed the evaluators' critique and reviewed simulator fidelity to verify that it matched actual plant response. Documents reviewed are listed in the Attachment. This activity constituted one inspection sample, as defined in IP 71111.11.

b. Findings

No findings were identified

.2 Quarterly Review of Licensed Operator Performance

a. Inspection Scope

The inspectors observed and assessed licensed operator performance in the main control room during periods of heightened activity or risk. The inspectors reviewed various licensee policies and procedures such as OPDP-1, Conduct of Operations, NPG-SPP-10.0, Plant Operations, and 0-GO-5, Normal Power Operation. The inspectors utilized activities such as post-maintenance testing, surveillance testing, unplanned transients, infrequent plant evolutions, plant startups and shutdowns, reactor power and turbine load changes, and refueling and other outage activities to focus on the following conduct of operations as appropriate:

- operator compliance and use of procedures
- control board manipulations
- communication between crew members
- use and interpretation of plant instruments, indications and alarms
- use of human error prevention techniques
- documentation of activities, including initials and sign-offs in procedures
- supervision of activities, including risk and reactivity management
- pre-job briefs

Specifically, the inspectors observed licensed operator performance during the following activity:

- Unit 2 shutdown from 100 percent RTP to remove the main turbine from service on May 6, 2016

Documents reviewed are listed in the Attachment. This activity constituted one inspection sample, as defined in IP 71111.11.

b. Findings

No findings were identified

1R12 Maintenance Effectiveness (71111.12)

a. Inspection Scope

The inspectors reviewed the maintenance activities, issues, and/or systems listed below to verify the effectiveness of the licensee's activities in terms of: appropriate work practices; identifying and addressing common cause failures; scoping in accordance with 10 CFR 50.65(b); characterizing reliability issues for performance; trending key parameters for condition monitoring; charging unavailability for performance; classification in accordance with 10 CFR 50.65(a)(1) or (a)(2); appropriateness of performance criteria for structures, systems, or components (SSCs) and functions classified as (a)(2); and appropriateness of goals and corrective actions for SSCs and functions classified as (a)(1). Documents reviewed are listed in the Attachment. The inspectors completed one sample, as defined in IP 71111.12.

- Cause Determination Evaluation 2888 – 2A Shut Down Board Room chiller failure

b. Findings

No findings were identified.

1R13 Maintenance Risk Assessments and Emergent Work Control (71111.13)

a. Inspection Scope

The inspectors reviewed the following activities to determine whether appropriate risk assessments were performed prior to removing equipment from service for maintenance. The inspectors evaluated whether risk assessments were performed as required by 10 CFR 50.65(a)(4), and were accurate and complete. When emergent work was performed, the inspectors reviewed whether plant risk was promptly reassessed and managed. The inspectors also assessed whether the licensee's risk assessment tool use and risk categories were in accordance with Standard Programs and Processes Procedure NPG-SPP-07.1, "On-Line Work Management," Revision 16 and Instruction 0-TI-DSM-000-007.1, "Risk Assessment Guidelines," Revision 9. Documents reviewed are listed in the Attachment. The inspectors completed six samples, as defined in IP 71111.13.

- Unit 2 Rx Trip Inst FT solid state protection system (SSPS) Train A

- Emergent failure of Rod Control – Card failure Bank “C” Rods
- Unit 1 Open Phase Relay Project work affecting 6.9Kv shutdown boards
- Elevated risk due to 3 of 8 emergency raw cooling water (ERCW) pumps out-of-service (OOS)
- Emergent failure of vital instrument bus breaker #28
- C-B ERCW Traveling Water Screen while the M-B ERCW Pump is unavailable due to a failure of the pump motor VLF test

b. Findings

No findings were identified.

1R15 Operability Determinations and Functionality Assessments (71111.15)

a. Inspection Scope

For the five operability evaluations described in the CRs listed below, the inspectors evaluated the technical adequacy of the evaluations to ensure that TS operability was properly justified and the subject component or system remained available, such that no unrecognized increase in risk occurred. The inspectors compared the operability evaluations to UFSAR descriptions to determine if the system’s or component’s intended function(s) were adversely impacted. In addition, the inspectors reviewed compensatory measures implemented to determine whether the compensatory measures worked as stated and the measures were adequately controlled. The inspectors also reviewed a sampling of CRs to assess whether the licensee was identifying and correcting any deficiencies associated with operability evaluations. Documents reviewed are listed in the Attachment. The inspectors completed five samples, as defined in IP 71111.15.

- CR 1107858 and 1107872– 1A1 and 1A2 CCS Fouling Factor exceeded
- CR 1131893 - U2 pressurizer gas gauge showing 600 psi
- CR 1148618 - C&D pressurizer heater compliance with LCO 3.4.9
- CR 1045770 - RHR Letdown Control Valve, 2-FCV-62-83 stroked in the alert range (PDO)
- CR1166927 – POE on Main Control Room door (C-49)

b. Findings

No findings were identified.

1R19 Post-Maintenance Testing (71111.19)

a. Inspection Scope

The inspectors reviewed the post-maintenance tests associated with the six work orders (WOs) listed below to assess whether procedures and test activities ensured system operability and functional capability. The inspectors reviewed the licensee’s test procedure to evaluate whether: the procedure adequately tested the safety function(s) that may have been affected by the maintenance activity; the acceptance criteria in the procedure were consistent with information in the applicable licensing basis and/or design basis documents; and the procedure had been properly reviewed and approved.

The inspectors also witnessed the test or reviewed the test data to determine whether test results adequately demonstrated restoration of the affected safety function(s). Documents reviewed are listed in the Attachment. The inspectors completed six samples, as defined in IP 71111.19.

- WO 116639084, Emergent failure of Rod Control – Card failure Bank “C” Rods
- WO 115738805, Vital Inverter 1-II Spared Out for 1-PI-250-731.0
- WO 116549967, 6.9KV Shutdown Board 1B-B under voltage relay flag for the C Phase is broken, replace
- WO 117907365, Replace 1A2 Diesel Generator Lube Oil Circulating Pump coupling
- WO 116483314, Inspect and clean the Gas Decay Tank inlet check valve B
- WO 113661465, Perform inspection to determine if valve 0-VLV-077-0736 (waste gas vent header check valve) leaks through

b. Findings

No findings were identified.

1R22 Surveillance Testing (71111.22)

a. Inspection Scope

For the five surveillance tests identified below, the inspectors assessed whether the SSCs involved in these tests satisfied the requirements described in the TS surveillance requirements, the UFSAR, applicable licensee procedures, and whether the tests demonstrated that the SSCs were capable of performing their intended safety functions. This was accomplished by witnessing testing and/or reviewing the test data. Documents reviewed are listed in the Attachment. The inspectors completed five samples, as defined in IP 71111.22.

In-Service Tests:

- 2-SI-SXP-062-201.A, Centrifugal Charging Pump 2A-A Performance Test, Revision 16
- 1-SI-SXP-003-201.S, Turbine Driven Auxiliary Feedwater Pump 1A-S Performance Test, Revision 25

RCS leakage test:

- 0-SI-OPS-068-137.0, Reactor Coolant System Water Inventory, Revision 35

Routine Surveillance Tests:

- 2-SI-OPS-082-007.A Elect Power System DG 2A, Revision 66
- 2-SI-SFT-030-001.B, Containment Air Return Fan 2B-B Quarterly Operability Test, Revision 8

b. Findings

No findings were identified.

1EP6 Drill Evaluation (71114.06)

a. Inspection Scope

Resident inspectors evaluated the conduct of a routine licensee emergency drill on April 13, to identify any weaknesses and deficiencies in classification, notification, and protective action recommendation (PAR) development activities. The inspectors observed emergency response operations in the Technical Support Center and simulated control room to verify that event classification and notifications were done in accordance with EPIP-1, "Emergency Plan Classification Matrix," Revision 52. The inspectors also attended the licensee critique of the drill to compare any inspector observed weakness with those identified by the licensee in order to verify whether the licensee was properly identifying deficiencies. The inspectors completed one sample, as defined in IP 71114.06.

b. Findings

No findings were identified.

4. OTHER ACTIVITIES

Cornerstones: Initiating Events, Mitigating Systems, Barrier Integrity, Emergency Preparedness, Public Radiation Safety, Occupational Radiation Safety, and Security

4OA1 Performance Indicator Verification (71151)

a. Inspection Scope

The inspectors sampled licensee submittals for the three Performance Indicators (PIs) listed below for the period from April, 2015 through March, 2016 for both Unit 1 and Unit 2. Definitions and guidance contained in Nuclear Energy Institute (NEI) 99-02, Regulatory Assessment Indicator Guideline, Revision 6, were used to determine the reporting basis for each data element in order to verify the accuracy of the PI data reported during that period. This activity constitutes three performance indicator samples, as defined by IP 71151.

Cornerstone: Initiating Events

- Unplanned Scrams per 7000 Critical Hours
- Unplanned Scrams with Complications
- Unplanned Power Changes per 7000 Critical Hours

The inspectors reviewed selected Licensee Event Reports and portions of operator logs to verify whether the licensee had accurately identified the number of scrams and unplanned power changes that occurred during the previous four quarters for both units. The inspectors also reviewed the accuracy of the number of critical hours reported and the licensee's basis for addressing the criteria for complications for each of the reported

scrams. Documents reviewed are listed in the Attachment.

b. Findings

No findings were identified.

4OA2 Problem Identification and Resolution (71152)

.1 Daily Review

a. Inspection Scope

As required by Inspection Procedure 71152, Identification and Resolution of Problems, and in order to help identify repetitive equipment failures or specific human performance issues for follow-up, the inspectors performed a daily screening of items entered into the licensee's CAP. This was accomplished by reviewing the description of each new CR and/or attending daily management review committee meetings.

b. Findings

No findings were identified.

.2 Semi-Annual Trend Review

a. Inspection Scope

As required by Inspection Procedure 71152, the inspectors performed a semi-annual review of the licensee's corrective action program and associated documents to identify trends that could indicate the existence of a more significant safety issue. The inspectors' review was focused on repetitive equipment issues, but also included licensee trending efforts and licensee human performance results. The inspectors review nominally considered the twelve-month period of July 2015 through June 2016, although some examples expanded beyond those dates when the scope of the trend warranted. Specifically, the inspectors considered the results of daily inspector screening discussed in Section 4OA2.1 and reviewed licensee trend reports for the period in order to determine the existence of any adverse trends that the licensee may not have previously identified. This inspection satisfied one inspection sample for Semi-annual Trend Review, as defined in IP 71152.

b. Findings and Observations

In general, the licensee had identified trends and appropriately addressed them in their CAP. The inspectors evaluated the licensee trending methodology and observed that the licensee had performed a detailed review. The licensee routinely reviewed cause codes, involved organizations, key words, and system links to identify potential trends in their data. The inspectors compared the licensee process results with the results of the inspectors' daily screening.

No findings were identified. The inspectors did note a negative trend regarding errors associated with the execution of clearance orders. The inspectors performed a more detailed review of the trend under the semi-annual trend review required by IP 71152.

The inspectors concluded there were an excessive amount of these type of events that occurred in the last four months. The below list of CRs involved several human performance-related errors associated with the execution and implementation of clearance orders.

- CR 1155763, Fire Protection Header Isolated, (March 30, 2016)
- CR 1164938, Work on Incorrect Component, (April 29, 2016)
- CR 1171517, Danger Tag placed on Wrong Valve (May 16, 2016)
- CR 1187595, Unplanned Isolation of Auxiliary Control Air Header 'B' (June 30, 2016)

The residents discussed this negative human performance trend with site management. Most of the errors involved a lack of attention-to-detail. The licensee concurred with the observation and noted that Quality Assurance had also concurrently and independently (of the NRC resident staff) identified the same trend. This was documented in CR 1188485 and generated on July 6. Immediate corrective actions to these errors included "stand-downs" emphasizing procedural compliance with the craft personnel and site-wide communications to remind staff to use "error reduction" tools when performing high risk activities. The inspectors noted that the licensee was aggressively dealing with these human performance deficiencies and a reasonable assurance exists that the negative trend with respect to clearance errors can be reversed.

### .3 Annual Follow-up of Selected Samples

#### a. Inspection Scope

The inspectors conducted a detailed review of the following condition report:

- CR 1108346, "Lower Internals Contact with Stand bending Guide Tube Nozzle"

The inspectors evaluated the following attributes of the licensee's actions:

- complete and accurate identification of the problem in a timely manner
- evaluation and disposition of operability/reportability issues
- consideration of extent of condition, generic implications, common cause, and previous occurrences
- classification and prioritization of the problem
- identification of apparent and contributing causes of the problem
- identification of any additional condition reports
- completion of corrective actions in a timely manner

Documents reviewed are listed in the Attachment. The inspectors completed one sample, as defined in IP 71152.

#### b. Findings and Observations

No findings were identified. In general, the inspectors verified that the licensee had proposed or implemented appropriate corrective actions.

#### 40A5 Other Activities

##### Review of the Operation of an Independent Spent Fuel Storage Installation (60855.1)

###### a. Inspection Scope

On June 15, the inspectors performed a walk-down of the Independent Spent Fuel Storage Installation (ISFSI) storage pad with the auxiliary unit operator in order to verify that operations were conducted in a safe manner in accordance with approved procedures and without undue risk to the health and safety of the public. The inspectors noted that there were 45 multi-purpose canisters (MPC) positioned on the ISFSI pad. The inspectors verified the MPC vents were in good condition and free of obstruction. The inspectors also verified that appropriate radiation surveys were being performed in the vicinity of the MPCs. The inspectors verified that any ISFSI problems were placed in the CAP. The inspectors also reviewed ISFSI document control practices to verify that changes to the required ISFSI procedures and equipment were performed in accordance with guidelines established in local procedures and 10CFR72.48. Documents reviewed are listed in the Attachment.

###### b. Findings

No findings were identified.

#### 40A6 Meetings, Including Exit

On July 20, 2016, the resident inspectors presented the inspection results to Mr. Schwarz and other members of his staff, who acknowledged the findings. The inspectors asked the licensee whether any of the material examined during the inspection should be considered proprietary. No proprietary information was identified.

ATTACHMENT: SUPPLEMENTAL INFORMATION

## **SUPPLEMENTAL INFORMATION**

### **KEY POINTS OF CONTACT**

#### **Licensee personnel**

J. Alfultis, Senior Manager Site Projects  
D Dimopoulos, Director Plant Support  
G. Garner, Director Work Management  
M. Halter, Senior Manager Radiation Protection  
A. Little, Senior Manager Nuclear Site Security  
T. Marshall, Director Operations  
W. Pierce, Director Engineering  
P. Pratt, Plant Manager  
M. Rasmussen, Director Maintenance  
K. Smith, Director Training  
J. Johnson, Program Manager Licensing  
M. Lovitt, Chemistry Manager  
M. McBrearty, Licensing Manager  
C Schwarz, Site Vice President

#### **NRC personnel**

A. Hon, Project Manager, Office of Nuclear Reactor Regulation

## LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

### Opened

05000327,328/2016002-01	AV	Isolation of Fire Suppression System to a Significant Portion of the Plant Site (Section 1R04)
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## **LIST OF DOCUMENTS REVIEWED**

The following is a list of documents reviewed during the inspection. Inclusion on this list does not imply that the NRC inspectors reviewed the documents in their entirety but rather that selected sections or portions of the documents were evaluated as part of the overall inspection effort. Inclusion of a document on this list does not imply NRC acceptance of the document or any part of it, unless this is stated in the body of the inspection report.

### **Section R04: Equipment Alignment**

#### Procedures

0-SO-26-1, High Pressure Fire Protection, Revision 69

0-SO-26-2, High Pressure Fire Protection (New), Revision 13

SQN-FPR-Part-II, SQN Fire Protection Report Part II – Fire Protection Plan, Revision 35

#### Drawings

1,2-47W611-26-1, Mechanical Logic Drawing High Pressure Fire Protection, Revision 20

1,2-47W611-26-2, Mechanical Logic Drawing High Pressure Fire Protection, Revision 21

### **Section R05: Fire Protection**

#### Procedures

SQN-FPR-Part-II, SQN Fire Protection Report Part II – Fire Protection Plan, Revision 35

FPDP-1, Conduct of Fire Protection, Revision 7

FPDP-1, Fire Protection Program Plan, Revision 3

NPG-SPP-18.4.7, Control of Transient Combustibles, Rev. 8

0-SI-FPU-410-703.0, Inspection of FPR Required Fire Doors, Rev. 6

CON-0-732-00, Fire Protection Pre-Fire Plans Control Building - El. 732, Revision 8

AUX-0-749-00, Fire Protection Pre-Fire Plans Auxiliary Building - El. 749, Revision 4

AUX-0-690-00, Fire Protection Pre-Fire Plans Auxiliary Building - El. 690, Revision 4

AUX-0-714-00, Fire Protection Pre-Fire Plans Auxiliary Building - El. 714, Revision 4

### **Section R06: Flood Protection Measures**

#### Procedures

AOP-M.08, Internal Flooding, Revision 3

AOP-N.03 Part 1, External Flooding, Revision 55

#### Calculation

SQS40056, Moderate Energy Line Break Flooding Study, Revision 16

#### Other documents

TVA letter to NRC dated May 4, 2007. TVA response to GL 2007-01

SQN Probabilistic Risk Assessment – Internal Flooding Analysis, Revision 3

## **Section R12: Maintenance Effectiveness**

### Procedures

NPG-SPP-03.4, Maintenance Rule Performance Indicator Monitoring, Trending, and Reporting  
10CFR50.65, Revision 25

TI-4, Maintenance Rule Performance Indicator Monitoring, Trending, and Reporting –  
10CFR50.65, Revision 25

### Other documents

Cause Determination Evaluation 2888 – 2A Shut Down Board Room chiller failure

## **Section R13: Maintenance Risk Assessments and Emergent Work Evaluation**

### Procedures

NPG-SPP-07.1, “On-Line Work Management,” Revision 17

NPG-SPP-07.3, Work Activity Risk Management Process, Revision 19

NPG-SPP-07.2.4, Forced Outage or Short Duration Planned Outage Management, Revision 7

NPG-SPP-07.2, Outage Management, Revision 6

GOI-6, Apparatus Operations, Revision 172

## **Section R15: Operability Evaluations**

### CRs

1107858 - 1A1 and 1A2 CCS Fouling Factor exceeded

1107872 - 1A1 and 1A2 CCS Fouling Factor exceeded

1131893 - U2 pressurizer gas gauge showing 600 psi

1148618 - C&D pressurizer heater compliance with LCO 3.4.9

1045770 - RHR Letdown Control Valve, 2-FCV-62-83 stroked in the alert range

1166927 - POE on Main Control Room door (C-49)

## **Section R19: Post Maintenance Testing**

### Work Orders (WO)

WO 116639084, Emergent failure of Rod Control – Card failure Bank “C” Rods

WO 115738805, Vital Inverter 1-II Spared Out for 1-PI-250-731.0

WO 116549967, 6.9KV Shutdown Board 1B-B under voltage relay flag for the C Phase is broken, replace

WO 117907365, Replace 1A2 Diesel Generator Lube Oil Circulating Pump coupling

WO 116483314, Inspect and clean the Gas Decay Tank inlet check valve B

WO 113661465, Perform inspection to determine if valve 0-VLV-077-0736 (waste gas vent header check valve) leaks through

## **Section R22: Surveillance Testing**

### Procedures

2-SI-SXP-062-201.A, Centrifugal Charging Pump 2A-A Performance Test, Revision 16

1-SI-SXP-003-201.S, Turbine Driven Auxiliary Feedwater Pump 1A-S Performance Test,  
Revision 25

0-SI-OPS-068-137.0, Reactor Coolant System Water Inventory, Revision 35

2-SI-OPS-082-007.A Elect Power System DG 2A, Revision 66

2-SI-SFT-030-001.B, Containment Air Return Fan 2B-B Quarterly Operability Test, Revision 8

**Section 40A1: Performance Indicator Verification**Procedures

NPG-SPP-02.2, Performance Indicator Program, Revision 7

NEI 99-02, Regulatory Assessment Performance Indicator Guideline, Revision 7

**Section 40A2: Problem Identification and Resolution**Procedures

NPG-SPP-22.300, "Corrective Action Program," Revision 6

NPG-SPP-22.301, Condition Report Initiation, Revision 6

NPG-SPP-22.302, Corrective Action Program Screening, Revision 10

**Section 40A5: Other Activities**

0-GO-17, Spent Fuel/Dry Cask Operations, Revision 6

NPG-SPP-01.2, Administration of Site Technical Procedures, Revision 13

NFTP-100, Fuel Selection for Dry MPC Storage, Revision 9

NPG-SPP-09.9, 10CFR72.48 Evaluation of Changes, Test, and Experiments for ISFSI Installation, Revision 4

SQN-DCS-300.11, Supplemental Cooling System Operation, Revision 11

CTP-DCS-100.0, Dry Cask Storage Campaign Guidelines, Revision 19

SQN-DCS-100.11, ISFSI and HI-STORM Annual Inspection and Maintenance, Revision 0

SQN-DCS-200.0, Dry Cask Campaign Review Program, Revision 4

SQN-DCS-200.2, SQN-MPC-Loading and Transport Operations, Revision 39

## ACRONYMS

ADAMS	Agencywide Documents Access and Management System
AV	apparent violation
CAP	corrective action report
CCP	centrifugal charging pump
CFR	Code of Federal Regulations
CR	condition report
EDG	emergency diesel generator
EGTS	emergency gas treatment system
ERCW	essential raw cooling water
FOR	fire protection report operating requirement
FPR	fire protection report
HPFP	high pressure fire protection
IMC	inspection manual chapter
IP	inspection procedure
ISFSI	Independent spent fuel storage installation
MPC	multi-purpose canisters
NEI	Nuclear Energy Institute
NRC	U.S. Nuclear Regulatory Commission
OOS	out-of-service
PAR	protective action recommendation
PI	performance indicator
RHR	residual heat removal
ROP	reactor oversight process
RTP	rated thermal power
S	non-suppression probability
SDP	significant determination process
SSC	structure, systems, and component
SSPS	solid state protection system
TBD	to be determined
TS	technical specifications
TVA	Tennessee Valley Authority
UFSAR	Updated Final Safety Analysis Report
WO	work order