



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

October 30, 2014

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

**SUBJECT: SEQUOYAH NUCLEAR PLANT - NRC INTEGRATED INSPECTION REPORT
05000327/2014004 AND 05000328/2014004**

Dear Mr. Shea:

On September 30, 2014, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at your Sequoyah Nuclear Plant, Units 1 and 2. On October 2, the NRC inspectors discussed the results of this inspection with Mr. Carlin and other members of your staff. Inspectors documented the results of this inspection in the enclosed inspection report.

NRC inspectors documented one finding of very low safety significance (Green) in this report. This finding was determined to involve a violation of NRC requirements. Additionally, inspectors documented two licensee-identified violations which were determined to be of very low safety significance in this report. The NRC is treating this violation as a non-cited violation (NCV) consistent with Section 2.3.2.a of the NRC Enforcement Policy.

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

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

J. Shea

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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 NRC's Agencywide Documents Access and Management 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/

Jonathan H. Bartley, Chief
Reactor Projects Branch 6
Division of Reactor Projects

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

Enclosure: Inspection Report 05000327/2014004, 05000328/2014004
w/Attachment: Supplementary Information

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Letter to Joseph W. Shea from Jonathan H. Bartley dated October 30, 2014

SUBJECT: SEQUOYAH NUCLEAR PLANT - NRC INTEGRATED INSPECTION REPORT
05000327/2014004 AND 05000328/2014004

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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.: 05000327/2014004, 05000328/2014004

Licensee: Tennessee Valley Authority (TVA)

Facility: Sequoyah Nuclear Plant, Units 1 and 2

Location: Sequoyah Access Road
Soddy-Daisy, TN 37379

Dates: July 1 – September 30, 2014

Inspectors: G .Smith, Senior Resident Inspector
W. Deschaine, Resident Inspector
C. Kontz, Senior Project Inspector
P. Braaten, Project Inspector

Approved by: Jonathan H. Bartley, Chief
Reactor Projects Branch 6
Division of Reactor Projects

Enclosure

SUMMARY

IR 05000327/2014-004, 05000328/2014-004; 7/1-9/30/2014; Sequoyah Nuclear Plant, Units 1 and 2; Event Follow-up

The report covered a three-month period of inspection by resident inspectors and announced inspections by regional 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 June 2, 2011. Cross-cutting aspects are determined using IMC 0310, "Aspects Within Cross Cutting Areas," dated December 19, 2013. All violations of NRC requirements are dispositioned in accordance with the NRC's Enforcement Policy, dated July 9, 2013. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process" Revision 5.

A. NRC-Identified and Self-Revealing Findings

Cornerstone: Barrier Integrity

- Green: A Self-revealing Green Non-Cited Violation (NCV) of Technical Specification (TS) 6.8.1.a. was identified for the licensee's failure to adequately implement a maintenance procedure associated with a vacuum relief containment isolation valve. Specifically, during a refueling outage on May 24, 2014, the licensee failed to properly install a locking wire associated with the spring tension bolts on the Unit 2 containment vacuum relief valve. This error ultimately led to a failure of the valve on June 24 at 1600 and entry into TS 3.6.3, "Containment Isolation Valves." The valve was ultimately repaired and the valve was declared operable on June 26 at 0026. The inspectors determined that the licensee's failure to adequately develop and implement a procedure governing the maintenance of a containment isolation valve was a performance deficiency.

This finding was determined to be greater than minor because it was associated with the Configuration Control attribute of Barrier Integrity cornerstone and adversely affected the cornerstone's objective to ensure the structural integrity of the containment boundary. Specifically, the finding challenged containment integrity. A screening analysis was conducted using the assumption that all core damage sequences would lead to a Large Early Release. This was an overestimation of risk, since actions to mitigate a release were possible. The short exposure time multiplied by the Core Damage Frequency for the plant resulted in less than a 1E-7 increase in Large Early Release Probability, and the finding is Green. The cause of this finding was determined to have a cross-cutting aspect in the Human Performance component, relating to the assurance by supervision that procedures are adequate to ensure nuclear safety. [H.1]. (Section 1R12)

B. Licensee-Identified Violations

Violations of very low safety significance, which were identified by the licensee were reviewed by the inspectors. Corrective actions taken or planned by the licensee have been entered into the licensee's corrective action program (CAP). These violations and corrective action tracking numbers are listed in Section 4OA7 of this report.

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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.

1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, and Barrier Integrity

1R01 Adverse Weather Protection

.1 External Flooding Review

a. Inspection Scope

The inspectors reviewed the licensee's readiness prior to the onset of adverse weather that poses a risk of flooding. Specifically, the inspectors reviewed flood design documents and abnormal operating procedure (AOP)-N.03, Flooding. The inspectors walked down flood protection barriers in the auxiliary building and emergency diesel generator (EDG) building and verified required temporary spool pieces and required tools used in station procedures were complete and in their specified locations. The inspectors also verified that infrequently operated flood mode pumps were in good working order, that maintenance and testing was current, and that minor deficiencies were identified in the licensee's corrective action program (CAP) with scheduled completion dates. This review constituted one inspection sample. Documents reviewed are listed in the Attachment.

b. Findings

No findings were identified.

2. Summer Readiness of Offsite and Alternate AC Power Systems:

a. Inspection Scope

In early July 2014, the inspectors performed the annual review of the licensee's readiness of offsite and alternate AC power systems prior to the onset of the high grid loading season. The inspectors reviewed procedures affecting these areas and the communications protocols between the transmission system operator and the licensee to verify that appropriate information is exchanged when issues arise that could impact the offsite power system. The inspectors walked down offsite power supply systems and emergency diesel generators, reviewed CAP documents, and interviewed appropriate plant personnel to assess deficiencies and plant readiness for summer high grid loading. This walk down included a detailed visual inspection of the 500 kilovolt (KV) and 161 KV switchyards. Documents reviewed are listed in the Attachment. The inspectors completed one sample.

Enclosure

b. Findings

No findings were identified.

1R04 Equipment Alignment.1 Partial System Walkdowna. Inspection Scope

The inspectors performed partial walkdowns of the following four 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 CAP. The inspectors completed four samples.

- 1B Containment Spray (CS) train while 1A CS pump was out-of-service (OOS)
- 2A auxiliary feed water (AFW) train while 2B AFW train was OOS
- 2B EDG while the 2A was OOS
- 2A charging system (CHS) while the 2B CHS pump was OOS

b. Findings

No findings were identified.

1R05 Fire Protection.1 Fire Protection Toursa. Inspection Scope

The inspectors conducted a tour of the five 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 five samples.

- Vital Battery Rooms I, II, III, IV
- 1A EDG Room
- Auxiliary Building elevation 669 (U1 & U2 CCP, SI)
- ERCW Pumping Station
- Auxiliary Building elevation 714 (General Areas)

b. Findings

No findings were identified.

.2 Annual Drill Observations

a. Inspection Scope

On September 16, the inspectors observed an unannounced fire drill at the hydrogen trailer. 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 constituted one inspection sample.

b. Findings

No findings were identified.

1R06 Flood Protection Measures

.1 Internal Flooding

a. Inspection Scope

The inspectors reviewed related flood analysis documents and walked down the area listed below containing risk-significant structures, systems, and components susceptible to flooding. The inspectors verified that plant design features and plant procedures for flood mitigation were consistent with design requirements and internal flooding analysis assumptions. The inspectors also assessed the condition of flood protection barriers and drain systems. In addition, the inspectors verified the licensee was identifying and properly addressing issues using the corrective action program. The inspectors completed one sample. Documents reviewed are listed in the Attachment.

- 1A EDG Room and Diesel Building Corridor

b. Findings

No findings were identified.

1R11 Licensed Operator Regualification Program

.1 Quarterly Review

a. Inspection Scope

The inspectors performed one licensed operator requalification program review. The inspectors observed a simulator session on September 4, 2014. The training scenario involved a Seal Water Return Heat Exchanger Leak with a Faulted Steam Generator. 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.

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 activities:

- reactivity manipulation involving the dilution of boric acid in the reactor coolant system (RCS)
- reactivity manipulation involving the addition of boric acid in the RCS

Documents reviewed are listed in the Attachment. This activity constituted one inspection sample.

b. Findings

No findings were identified

1R12 Maintenance Effectiveness

a. Inspection Scope

The inspectors reviewed the maintenance issue 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 structure, system, 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.

- CDE #2756 – Failure of Containment Vacuum breaker 2-VLV-30-573

b. Findings

Introduction. A Self-revealing Green NCV of Technical Specification 6.8.1 was noted for the licensee's failure to adequately implement a maintenance procedure associated with a vacuum relief containment isolation valve. Specifically, during a refueling outage on May 24, 2014, the licensee failed to properly install a locking wire associated with the spring tension bolts on the Unit 2 containment vacuum relief valve. This error ultimately led to a failure of the valve on June 24 at 1600 and entry into TS 3.6.3, "Containment Isolation Valves." The valve was ultimately repaired and the valve was declared operable on June 26 at 0026.

Description. On June 24 at 1600, the main control began a routine purge of the containment atmosphere. The purge was secured at 1647. At 2125, Operations personnel noted the vacuum relief valve, 2-VLV-30-573 was not in its normally closed position. This was evidenced by two of the three limit switches indicated the valve was partially open. Following a review of the issue, operations declared the containment isolation function of the vacuum breaker to be inoperable at 2315 and entered TS LCO 3.6.3 action 'a' which required the penetration to be isolated in 4 hours. Maintenance personnel were dispatched to the valve and noted that indeed the valve was cracked open. Maintenance personnel adjusted the valve and established adequate seating and action 'a' was exited at 0311 on June 25. However, the vacuum breaker was deemed inoperable and thus LCO 3.6.6 for the vacuum breaker was entered. This LCO had an action time of 72 hours. VLV-30-573 was subsequently repaired, retested and declared back in service at 0026 on June 26.

An apparent cause evaluation revealed that a locking device (a lock wire) was not appropriately installed on the spring tension bolts inside the valve on May 24 during the last Unit 2 refueling outage. Instead, the lock wire was misapplied to the valve body. This ultimately led to a slow degradation of the valve as the spring nut was allowed to gradually back out and thus reduce the closing spring pressure on the valve. During repair of the valve, it was noted that the as-found spring pressure on the valve was approximately 17 psi while the as-left was nominally 30 psi. The perturbation of the containment purge activity lowered containment pressure enough to momentarily actuate the valve open and the reduced closing spring force allowed the valve to become misaligned as it reclosed. At this point, the valve was partially open and considered failed as it could no longer perform its containment isolation function of closing.

Analysis. The licensee's failure to adequately develop and implement a procedure governing the maintenance of a containment isolation valve was a performance deficiency. Specifically, failure to follow a work order package precluded the proper installation of a lock wire inside a containment isolation valve. This then led to the gradual loosening of the spring nut which led to a reduction of the closing spring force on the valve. The containment purge evolution led to the ultimate failure of the valve during the momentary opening and closing of the valve. The inspectors evaluated this issue in accordance with the NRC's significance determination process (SDP). This finding was determined to be greater than minor because it was associated with the Configuration Control attribute of Barrier Integrity cornerstone and adversely affected the cornerstone's objective to ensure the structural integrity of the containment boundary. Specifically, the finding challenged containment integrity. Using IMC 0609.04, Initial Characterization of Findings and IMC 0609 Appendix A, Exhibit 3 – Barrier Screening Questions, the finding required analysis using MC 0609, Appendix 'H', "Containment Integrity Significance Determination Process," as the finding represented an open pathway in the physical integrity of containment via a valve. According to Appendix H, the finding represented a Type B finding as it did not directly affect the core damage frequency. The finding was then processed under Section 6 using a phase 2 analysis. The inspectors performed the phase 2 analysis using Sec 6.2 of Appendix H. The inspectors determined, based on the actual circumstances being evaluated, that a more detailed assessment needed to be performed in a SDP Phase 3 evaluation. The regional Senior Reactor Analyst

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performed a Phase 3 SDP for the finding. A screening analysis was conducted using the assumption that all core damage sequences would lead to a Large Early Release. This was an overestimation of risk, since actions to mitigate a release were possible. The short exposure time multiplied by the Core Damage Frequency for the plant resulted in less than a 1E-7 increase in Large Early Release Probability, and the finding is GREEN. The cause of this finding was determined to have a cross-cutting aspect in the Human Performance component, relating to the assurance by supervision that procedures are adequate to ensure nuclear safety. [H.1].

Enforcement: Unit 2 TS 6.8.1.a. required, in part, that written procedures be established, implemented, and maintained covering the activities specified in Appendix A, "Typical Procedures for Pressurized Water Reactors and Boiling Water Reactors," of Regulatory Guide (RG) 1.33, "Quality Assurance Program Requirements (Operations)," Revision 2, dated February 1978. RG 1.33 Appendix A Section 9.a, "Procedures for Performing Maintenance," required, in part, that maintenance that can affect the performance of safety-related equipment should be properly pre-planned and performed in accordance with written procedures, documented instructions, or drawings appropriate to the circumstances. The work instructions from WO 07-779292-000 (step 5.7.21) required installation of the safety wire (lock wire) but did not provide any detail for how this was to be accomplished. Contrary to the above, on May 24, 2014, the licensee failed to properly install the safety wire such that the spring nut was precluded from loosening. Specifically, the maintenance procedure failed to provide adequate detail and guidance to ensure the safety wire was properly installed to ensure the spring nut was adequately locked. Corrective actions included: 1) repair of the vacuum relief valve; 2) the development of a maintenance case study for inclusion into maintenance training; and 3) Revision of the operating instruction to provide validation of containment vacuum relief valve position following containment purges. Because the finding was of very low safety significance and has been entered into the licensee's CAP as PER 902721, this violation is being treated as an NCV, consistent with the NRC Enforcement Policy: NCV 05000328/2014004-01, Failure of Containment Vacuum Relief.

1R13 Maintenance Risk Assessments and Emergent Work Control

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 3, and Instruction 0-TI-DSM-000-007.1, "Risk Assessment Guidelines," Revision 9. The inspectors completed five samples.

- emergent work 2A EDG Lube oil recirculation pump replacement
- emergent failure of overcurrent 51 relay on 1B CHS pump breaker
- yellow Risk due to 1A main control room (MCR) chiller work
- yellow Risk due to 1B residual heat removal pump breaker change-out
- Unit 2 elevated risk for planned maintenance on the B Train auxiliary building gas treatment system (ABGTS), 714 penetration room cooler, motor-driven AFW Pump, and auxiliary air compressor

b. Findings

No findings were identified.

1R15 Operability Determinations and Functionality Assessments

a. Inspection Scope

For the operability evaluations described in the problem event reports (PERs) 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 the Updated Final Safety Analysis Report (UFSAR) descriptions to determine if the system 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 PERs to assess whether the licensee was identifying and correcting any deficiencies associated with operability evaluations. The inspectors completed four samples.

- PER 907134, prompt determination of operability (PDO) on 2A Pipe Chase Cooler leak
- PER 922622, PDO on Unit 1 Ice Condenser Icing
- PER 914789, Foreign material (10" rubber material) found in main turbine oil strainer
- SRs 932083 & 932087 associated with U2 Eagle 21 TSP failure

b. Findings

No findings were identified.

1R18 Plant Modifications

.1 Temporary Modifications

a. Inspection Scope

The inspectors reviewed the temporary modification listed below and the associated 10 CFR 50.59 screening, and compared it against the UFSAR and TS to verify whether the modification affected operability or availability of the affected system.

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- TACF – SQN-1-2014-085-001 – DC Wetting Current Source Installation for Rod Position Indicator (RPI) E-5

Following installation and testing, the inspectors observed indications affected by the modification, discussed them with operators, and verified that the modification was installed properly and its operation did not adversely affect safety system functions. The inspectors completed one sample.

b. Findings

No findings were identified.

1R19 Post-Maintenance Testing (PMT)

a. Inspection Scope

The inspectors reviewed the post-maintenance tests associated with the 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). The inspectors completed five samples.

- 116008676, Restore from Abnormal Operating Procedure and Verify Operability of Drawer N-44A
- 116027085, Replace 50/51 OC relays on A & C phase of 1B CHS Pump
- 115603969, Calibrate Auxiliary Air Compressor A-A oil level switch
- 116156226, U2 Stroking valves for PMT or release from HO
- 115725379, RHR HX Outlet valve

b. Findings

No findings were identified.

1R20 Refueling and Outage Activities

a. Inspection Scope

Unit 2 Refueling Outage Heat-up and Start-up Activities

To verify reactor coolant safety (RCS) integrity and containment integrity, the inspectors further reviewed the licensee's RCS leakage calculations and containment isolation valve lineups. In order to verify that core operating limit parameters were consistent with

core design, the inspectors also observed portions of the low power physics testing, including reactor criticality. The inspectors also reviewed the physics testing results. The inspectors completed one sample.

b. Findings

No findings were identified.

1R22 Surveillance Testing

a. Inspection Scope

For the surveillance tests identified below, the inspectors assessed whether the structures, systems, and components (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. The inspectors completed three samples.

Routine Surveillance Tests:

- 2-SI-EDC-082-307.A, Undervoltage/Degraded Voltage EDG Start and Load Shedding Time Response Relay Test, Revision 17
- 1-SI-OPS-082-024.A, 1A-A DG 24 hour Run and Load Rejection Test, Rev. 26

RCS leakage test:

- 0-SI-OPS-068-137.0, Reactor Coolant System Water Inventory, Rev. 34

b. Findings

No findings were identified.

Cornerstone: Emergency Preparedness

1EP6 Drill Evaluation

a. Inspection Scope

Resident inspectors evaluated the conduct of routine licensee emergency drill on July 8, and August 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 simulated control room to verify that event classification and notifications were done in accordance with EPIP-1, Emergency Plan Classification Matrix, Revision 51. 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 two samples.

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b. Findings

No findings were identified.

OTHER ACTIVITIES

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

4. OTHER ACTIVITIES

4OA1 Performance Indicator (PI) Verification

a. Inspection Scope

The inspectors sampled licensee submittals for the Performance Indicators (PI) listed below for the period from July 1, 2013, through June 30, 2014 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.

Cornerstone: Mitigating Systems

- Mitigating Systems Performance Index: Emergency AC Power
- Mitigating Systems Performance Index: High Pressure Injection System
- Mitigating Systems Performance Index: Heat Removal System (AFW)
- Mitigating Systems Performance Index: Residual Heat Removal System
- Mitigating Systems Performance Index: Cooling Water System
- Safety System Functional Failures

The inspectors reviewed portions of the operations logs and raw performance index (PI) data developed from monthly operating reports and discussed the methods for compiling and reporting the PIs with engineering personnel. The inspectors also independently calculated selected reported values to verify their accuracy and compared graphical representations from the most recent PI report to the raw data to verify that the data was correctly reflected in the report. Specifically for the Mitigating Systems Performance Index (MSPI), the inspectors reviewed the basis document and derivation reports to verify that the licensee was properly entering the raw data as suggested by NEI 99-02. For Safety System Functional Failures, the inspectors also reviewed licensee event reports (LERs) issued during the referenced timeframe. The inspectors completed 12 samples (six per unit).

b. Findings

No findings were identified.

4OA2 Identification and Resolution of Problems

.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 PER and attending daily management review committee meetings.

b. Findings and Observations

No findings were identified.

.2 Selected Issue Follow-up: Four NCVs with Cross Cutting Aspect of Evaluation

a. Inspection Scope

The inspectors performed an in-depth review of PER 876781. In April 2014, the licensee noted there were four NRC-issued NCVs received within the previous 12 months that exhibited the cross cutting aspect of "evaluation" as described in NRC manual chapter (MC) 0310, "Aspects Within Cross Cutting Areas." The cross cutting aspects were part of four separate issues (NCVs): 1) Failure to evaluate motor operated valves with regard to lower degraded voltage values, 2) Failure to correct in a timely manner a dual indication on residual heat removal (RHR) valve, 1-FCV-63-72, 3) Failure to install sprinklers in accordance with the fire protection program (FPP) and code requirements, and 4) Failure to perform the required review when adding fire watches to the FPP. MC 0310 describes a cross cutting aspect as a performance characteristic of a finding that is the most significant causal factor of the performance deficiency. Specifically, the four findings above were related to "evaluations" (Section 06.02.P.2 under MC 0310) and noted to contain licensee weaknesses regarding the thorough evaluation of issues to ensure that resolutions addressed causes and extent of conditions commensurate with their safety significance.

As a result of this identified weakness, the licensee developed an Apparent Cause Evaluation (ACE). The inspectors reviewed the actions taken to determine if the licensee had adequately addressed the following attributes:

- complete, accurate and timely identification of the problem
- evaluation and disposition of operability and reportability issues
- consideration of previous failures, extent of condition, generic or common cause implications
- prioritization and resolution of the issue commensurate with safety significance

- identification of the root cause and contributing causes of the problem
- identification and implementation of corrective actions commensurate with the safety significance of the issue

b. Findings and Observations

The inspectors noted the ACE to be thorough and probing. The conclusion of the ACE was that the staff had knowledge deficiencies in 1) documenting critical thinking; 2) understanding design and licensing bases; and 3) identifying potential impacts to nuclear safety and compliance when performing required problem evaluations. The corrective actions included training and stand-downs to stress the importance of thoroughly evaluating significant safety and regulatory issues. The inspectors also noted that the licensee performed a detailed extent of condition as well as an extent of cause analysis as part of this ACE.

.3 Selected Issue Follow-up: Operator Requalification Training Corrective Actions

a. Inspection Scope

The inspectors performed an in-depth review of PER 909616 associated with the licensed operator training program. In July 2014, during performance of licensed operator requalification training there were issues identified with the critical task standards in the approved simulator scenario. The inspectors reviewed the actions taken to determine if the licensee had adequately addressed the following attributes.

- complete, accurate and timely identification of the problem
- evaluation and disposition of operability and reportability issues
- consideration of previous failures, extent of condition, generic or common cause implications
- prioritization and resolution of the issue commensurate with safety significance
- identification of the root cause and contributing causes of the problem
- identification and implementation of corrective actions commensurate with the safety significance of the issue

b. Findings and Observations

No findings were identified.

4OA3 Event Follow-up

.1 (Closed) Licensee Event Report (LER) 05000328/2014-002-00, Containment Vacuum Relief Valve Inoperable Resulting in Condition Prohibited by Technical Specifications

a. Inspection Scope

On June 24, 2014, at 2125 a MCR operator noted that the containment vacuum relief valve 2-VLV-30-573 was not in its normally closed position. The initial characterization

of this deficiency was that the position indication was faulty but the valve was still operable. This caused the crew to enter TS LCO 3.6.3 action 'c' (Similarly, LCO 3.6.6). Both LCOs were 72 hours and provided the crew time to deal with the issue. However, based on further review of the issue and telephone conversations with management, the crew concluded that, indeed, the valve was inoperable at 2315. This was based on the fact that a containment purge had been performed earlier in the day and was concluded at 1647. The licensee concluded that based on past experience, a vacuum relief can partially open due to localized low pressure areas that may result when purging the containment. However, it was surmised that in this instance, the vacuum relief failed to properly reseal after momentarily opening as evidenced by one of the three closing limit switches failing to actuate. This defeated the containment isolation function of the penetration itself and thus required entry into LCO 3.6.3 action 'a' which is a four hour LCO to isolate the penetration. The crew ultimately isolated the penetration at 0247 on June 25 by jacking closed and de-powering the vacuum relief isolation valve. The vacuum relief was ultimately repaired and placed back in to service at 0256 on June 26.

Further review of this event by the licensee, noted that the conditions were readily available at 2125 that the vacuum relief was partially open and the containment penetration was inoperable. Additionally, the licensee concluded that most likely the vacuum relief became inoperable at 1600 when the purge was started. However, the penetration was not isolated until 0311 the following day for a total of slightly more than 11 hours of inoperability. Considering the LCO action time of four hours to isolate the penetration along with the six hours action time, the total time to be in mode 3 for LCO 3.6.3 action 'a' is 10 hours. Thus, in this instance, failing to isolate the penetration in four hours or placing the Unit 2 in mode 3 in the following six hours (10 hours total) was a condition prohibited by TS. Thus, this LER was required pursuant to 10 CFR 50.73(a)(2)(i)(B) as an operation or condition prohibited by plant technical specifications.

b. Findings

NCV 05000328/2014004-01 was issued as a result of this performance deficiency and is documented in this report under Section 1R12.

.2 (Closed) Licensee Event Report (LER) 05000327/2014-001-00, Never Performed Technical Specification Surveillance for Common Spare Component Cooling System (C-S CCS) Pump

a. Inspection Scope

On December 19, 2013, an operator trainee noted a lack of procedural guidance to perform TS Surveillance Requirement (SR) 4.7.3.b which required the testing of the safety injection system (SIS) start signal to the C-S CCS pump every 18 months. This pump is normally powered from the 480 volt 'A' train safety-related bus on Unit 2 and alternatively can be powered from the 480 volt 'B' train safety-related bus on Unit 1. Based on design documents, the SIS signal from either unit should give a start signal to the C-S CCS pump. Since the pump is normally powered from Unit 2, the SIS start

signal from Unit 2 was tested every 18 months per procedure 2-SI-OPS-082-026.B, "Loss of Offsite Power with Safety Injection – D/G 2B-B Test." This issue was entered into the CAP as PER 826482.

An initial investigation into this issue determined the lack of testing to be a missed surveillance. Operations invoked TS SR 4.0.3 as the total functionality required by SR 4.7.3.b was not fully tested. Since the surveillance frequency of SR4.7.3.b was more than 24 hours (18 months) and the expected retest was to be in excess of 24 hours from the time of discovery, the licensee performed a risk evaluation on how to manage the increased risk of an untested component. On January 13, 2014, the performance of SIS start testing from both units to the C-S CCS pump was completed and SR 4.7.3.b was then met.

Subsequent investigation completed on January 30, revealed that, in fact, the C-S pump was never tested in the Unit 1 configuration and thus the deficiency was reclassified as a never performed surveillance. Thus, this LER was required pursuant to 10 CFR 50.73(a)(2)(i)(B) as an operation or condition prohibited by plant technical specifications as SR 4.7.3.b was deemed never to have been performed.

The inspectors discussed the event with operations, maintenance, engineering, and licensee management personnel to gain an understanding of the conditions leading up to the event and assess licensee actions taken following the event. Additionally, the inspectors reviewed the apparent cause evaluation report to assess the detail and thoroughness of the evaluation and the adequacy of the proposed corrective actions.

b. Findings

This LER resulted in a licensee identified violation which is described in Section 40A7.

.3 (Closed) Licensee Event Report (LER) 05000327/2014-002-00, Lack of Administrative Controls for Some Containment Penetrations During Fuel Movement Results in Condition Prohibited by Technical Specifications

a. Inspection Scope

On June 6, 2014, the licensee completed a review of administrative control of penetrations used for ice condenser maintenance during fuel movement. The licensee concluded that they had been inappropriately crediting engineering evaluations as justification to utilize open penetrations during fuel movement. In 2000, the licensee obtained TS change 99-15 to TS 3.9.4 that permitted some containment penetrations to remain open during fuel movement. Prior to 2000, the licensee used engineering safety evaluation to justify open penetrations during fuel movement. However, in 1999, the NRC deemed the practice of using 10 CFR 50.59 (via engineering evaluation) as inappropriately affected TS 3.9.4 without prior NRC approval and the practice was ceased. Due to a failure to correct a plant procedure 1,2-SI-OPS-088-006.0, "Containment Building Ventilation Isolation," the practice was inadvertently continued from 2000 to 2014 with respect to four containment penetrations: 1) X79A (transfer ice to ice condenser); X79B (transfer ice to ice condenser); X54 (steam generator sludge

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lancing) and X117 (ice condenser condensate drain). This LER was submitted in accordance with 10 CFR 50.73(a)(2)(i)(B) as any operation or condition prohibited by technical specification.

The inspectors discussed the event with operations, maintenance, engineering, and licensee management personnel to gain an understanding of the conditions leading to the event and assess licensee actions taken following the event. Additionally, the inspectors reviewed the apparent cause evaluation report to assess the detail and thoroughness of the evaluation and the adequacy of the proposed corrective actions. One of the corrective actions was to upgrade plant procedures to ensure strict control of penetration during fuel movement and the elimination of the engineering evaluation avenue to comply with TS 3.9.4.

The inspectors reviewed the LER and PER 886970 to verify that the cause of the breached penetration was identified and whether corrective actions were appropriate. The licensee's ACE identified that the controlling procedure did not reference that the four affected penetrations were under administrative control during fuel movement. However, there were other procedures in place that in all likelihood would have caused personnel to isolate these penetrations given a fuel handling accident. Notwithstanding the above, strict TS 3.9.4 compliance was not met regarding the above penetrations. This LER was submitted in accordance with 10 CFR 50.73(a)(2)(i)(B) as any operation or condition prohibited by technical specification.

b. Findings

This LER resulted in a licensee identified violation which is described in Section 4OA7.

4OA5 Other Activities

a. Inspection Scope

(Closed) VIO 05000327,328/2012005-05, Failure to Adequately Evaluate and Qualify Molded Case Circuit Breakers

The inspectors reviewed various documents associated with the above violation. This violation dealt with the seismic mounting characteristics of Heinemann circuit breakers which are used in 120volt vital AC applications. The violation discussed several discrepancies between the physical mounting of these circuit breakers in safety related cabinets and the design documents. The violation also questioned the seismic adequacy of the current mounting design. The licensee analyzed the issue in PER 668367 and formalized a consistent mounting design using Micarta board to ensure adequate seating force for the circuit breakers. The licensee tested the new configuration in a laboratory environment to verify the design could withstand an operating basis earthquake as well as a safe shutdown earthquake. The licensee then performed a plant modification, DCN 23189, "Improvements to Design and Documentation for 120 VAC Vital Instrument Power Board Heinemann Breaker

Mountings,” Rev A. This modification covered 48 circuit breakers on both units and was completed on Unit 1 during the fall 2013 and Unit 2 during the spring 2014. The inspectors reviewed this modification as well as the associated work orders.

b. Findings

No findings were identified.

4OA6 Meetings, Including Exit

.1 Exit Meeting Summary

On October 2, 2014, the resident inspectors presented the inspection results to Mr. Carlin 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.

4OA7 Licensee-identified Violations

The following violations of very low significance (Green) were identified by the licensee and are violations of NRC requirements which meet the criteria of the NRC Enforcement Policy, for being dispositioned as NCVs.

.1 Failure to perform a TS required surveillance

Unit 1 SR 4.7.3.b requires in part that at least once per 18 months, each CCS pump start automatically on a SIS signal. Contrary to the above, the C-S (swing) CCS pump was never tested to automatically start using a Unit 1 SIS signal. The licensee considered this to be a never performed surveillance rather than simply a missed surveillance since no testing records since initial operation in 1980 could be located. The pump had been successfully tested every 18 months from the Unit 2 SIS as this pump is normally powered from Unit 2. As an alternate and abnormal lineup, the pump could be powered from Unit 1 and thus the requirement for start testing using the Unit 1 SIS. This finding was considered more than minor because it was associated with the mitigating system cornerstone and affected the cornerstone’s reliability due to the failure to fully test the C-S CCS pump for over 30 years. The finding was considered of very low safety significance as it remained operable and available during the affected period due to successfully passing the initial surveillance test performed on January 13, 2014. The issue was entered into the CAP as PER 826482. Note that this issue is also discussed under Section 4OA3 of this report as it involved a LER.

.2 Lack of Administrative Controls Over Containment Penetrations During Fuel Movement

TS 3.9.4.c requires in part that during fuel movement, all containment penetrations shall be closed or capable of being closed by an automatic valve. In addition, TS 3.9.4.c allows exceptions to this requirement for penetrations that traverse to the auxiliary building secondary containment enclosure (ABSCE) where these penetrations may be open under administrative controls during fuel movement. Contrary to the above, on

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several instances between 2000 and 2014, the licensee opened penetrations (between containment and ABSCE) during fuel movement without adequate administrative controls in place. The finding was considered more than minor because it was associated with the Barrier Integrity cornerstone and affected the cornerstone's ability to preserve the containment boundary. The inspectors determined that, although the finding involved a violation of the containment control, TS 3.9.4, the finding did not: 1) involve a loss of reactor coolant system (RCS) inventory; 2) degrade ability to terminate a leak path or add RCS inventory as needed; or 3) degrade the ability to recover RHR once it was lost. Therefore, according Appendix G, the finding did not require a quantitative (phase 2 or 3) analysis. Findings in the shut-down condition that do not require a quantitative analysis are considered to be of very low safety significance (Green). This issue was entered into the CAP as PER 886970. Note that this issue is also discussed under Section 4OA3 of this report as it involved a LER.

ATTACHMENT: SUPPLEMENTAL INFORMATION

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Licensee personnel

J. Carlin, Site Vice President
A. Day, Chemistry Senior Manager
D. Erb, Work Management Director
E. Henderson, Licensing Manager
J. Johnson, Program Manager Licensing
A. Little, Site Security Manager
T. Marshall, Operations Director
P. Noe, Plant Support Director
W. Pierce, Site Engineering Director
P. Pratt, Plant Maintenance Manager
M. Purcell, Quality Assurance Manager
P. Simmons, Plant Manager

NRC personnel

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

LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

Opened and Closed

05000328/2014004-01	NCV	Failure to Perform Adequate Maintenance on Containment Vacuum Relief Valve (Section 1R12)
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Closed

05000327,328/2012005-05	VIO	Failure to Adequately Evaluate and Qualify Molded Case Circuit Breakers (Section 4OA5)
05000327/2014-001-00	LER	Never Performed TS Surveillance for C-S CCS Pump (Section 4OA3)
05000328/2014-002-00	LER	Containment Vacuum Relief Valve Inoperable Resulting in Condition Prohibited by TS (Section 4OA3)
05000327/2014-002-00	LER	Lack of Administrative Controls for Some Containment Penetrations During Fuel Movement Results in Condition Prohibited by Technical Specifications (Section 4OA3)

Attachment

LIST OF DOCUMENTS REVIEWED

Section R01: Adverse Weather Protection

Procedures

AOP-N.03, Flooding, Revision 32

0-PI-OPS-510-001.0, Flood Preparation Equipment Inventory, Revision 8

Section R05: Fire Protection

Procedures

FPDP-1, Conduct of Fire Protection, Revision 2

0-PI-FPU-317-299.W, Att. 8, Shift Check List, Revision 32

NPG-SPP-18.4.7, Control of Transient Combustibles, Rev. 0

EITP-100, Environmental Compliance, Rev. 6

0-SI-FPU-410-703.0, Inspection of FPR Required Fire Doors, Rev. 5

SQN-FPR-Part-II, SQN Fire Protection Report Part II – Fire Protection Plan, Revision 28

Section R06: Flood Protection Measures

Work Orders

WO 11108121224, Check Standing Water Level in Manholes/Handholes

Other documents

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

Section R11: Licensed Operator Requalification

Procedures

NPG-SPP-17.8.1 rev 10, 11 Licensed Operator Requalification Examination Development and Implementation

NPG-SPP-22.207 rev 0 Procedure Use and Adherence

PERs

PER 907424

PER 909616

Other documents

14-3 CPE Crew documentation and remediations

OPL273E1403 R1 & 2

WCAP-17711-NP1 Pressurized Water Reactor Owners Group Westinghouse Emergency Response Guideline Revision 2-Based Critical Tasks

Section R12: Maintenance Effectiveness

Procedures

TI-4, Maintenance Rule Performance Indicator Monitoring, Trending, and Reporting – 10CFR50.65, Revision 23

Other documents

CDE #2756 – Failure of Containment Vacuum breaker 2-VLV-30-573

Section R13: Maintenance Risk Assessments and Emergent Work EvaluationProcedures

0-TI-DSM-000-007.1, Risk Assessment Guidelines, Revision 9
 NPG-SPP-07.3, Work Activity Risk Management Process, Revision 3
 NPG-SPP-07.2.4, Forced Outage or Short Duration Planned Outage Management, Revision 0
 NPG-SPP-07.2, Outage Management, Revision 0
 GOI-6, Apparatus Operations, Revision 142

Section R15: Operability EvaluationsProcedures

NEDP-22, Functional Evaluations, Rev. 9
 OPDP-8, Limiting Conditions for Operation Tracking, Rev. 5
 NPG-SPP-03.5, Regulatory Reporting Requirements, Revision 2

PER/SRs

PER 907134, prompt determination of operability (PDO) on 2A Pipe Chase Cooler leak
 PER 922622, PDO on Unit 1 Ice Condenser Icing
 PER 914789, Foreign material (10" rubber material) found in main turbine oil strainer
 SRs 932083 & 932087 associated with U2 Eagle 21 TSP failure

Section R18: Plant ModificationsProcedures

NPG-SPP-09.3, Plant Modifications and Engineering Change Control, Revision 4
 NPG-SPP-09.4, 10 CFR 50.59 Evaluations of Changes, Tests, and Experiments, Revision 1
 NPG-SPP-09.5, Temporary Alterations, Revision 0

Other

TACF – SQN-1-2014-085-001 – DC Wetting Current Source Installation for Rod Position Indicator (RPI) E-5

Section R19: Post Maintenance TestingProcedures

MMDP-1, Maintenance Management System, Revision 20
 MMDP-3, Guidelines for Planning and Execution of Troubleshooting Activities, Revision 6
 NPG-SPP-6.5, Foreign Material Control, Revision 0
 NPG-SPP-6.1, Work Order Process Initiation, Revision 0
 NPG-SPP-06.3, Pre-/Post-Maintenance Testing, Revision 0
 NPG-SPP-06.9, Testing Programs, Revision 0
 NPG-SPP-06.9.1, Conduct of Testing, Revision 1
 NPG-SPP-06.9.3, Post-Modification Testing, Revision 0

Work Orders

116008676, Restore from Abnormal Operating Procedure and Verify Operability of Drawer N-44A
 116027085, Replace 50/51 OC relays on A & C phase of 1B CHS Pump
 115603969, Calibrate Auxiliary Air Compressor A-A oil level switch
 116156226, U2 Stroking valves for PMT or release from HO
 115725379, RHR HX Outlet valve

Section R20: Refueling and Outage Activities

Procedures

FHI-3, Movement of Fuel, Revision 65

0-GO-15, Containment Closure Control, Revision 34

0-GO-13, Reactor Coolant System Drain and Fill Operations, Revision 71

NPG-SPP-08.1, Nuclear Fuel Management, Revision 00

0-PI-OPS-000-011.0, "Containment Access Control During Modes 1-4, Revision 1

Section R22: Surveillance Testing

Procedures

2-SI-EDC-082-307.A, Undervoltage/Degraded Voltage EDG Start and Load Shedding Time Response Relay Test, Revision 17

1-SI-OPS-082-024.A, 1A-A DG 24 hour Run and Load Rejection Test, Revision 26

0-SI-OPS-068-137.0, Reactor Coolant System Water Inventory, Revision 34

Section 4OA1: Performance Indicator Verification

Procedures

NPG-SPP-02.2, Performance Indicator Program, Revision 2

NEI 99-02, Regulatory Assessment Performance Indicator Guideline, Revision 6

Section 4OA5: Other Activities

DCN 23189, "Improvements to Design and Documentation for 120 VAC Vital Instrument Power Board Heinemann Breaker Mountings," Rev A

LIST OF ACRONYMS

ACE	apparent cause evaluation
ABSCE	auxiliary building secondary containment enclosure
ACR	auxiliary control room
ADAMS	Agencywide Documents Access and Management System
AFW	auxiliary feedwater
AOP	abnormal operating procedures
CAP	corrective action program
CAQ	condition adverse to quality
CFR	Code of Federal Regulations
CHS	charging system
CS	containment spray
EDG	emergency diesel generator
EPIP	emergency plan implementing procedures
ERCW	essential raw cooling water
FPP	fire protection program
IMC	inspection manual chapter
IP	inspection procedure
KV	kilovolt
LCO	limiting condition for operation
LER	licensee event report
NCV	non-cited violation
NEI	Nuclear Energy Institute
NRC	U.S. Nuclear Regulatory Commission
OOS	out-of-service
PARS	Publicly Available Records
PER	problem evaluation report
PI	performance indicator
Rev.	Revision
RCS	reactor coolant system
RG	regulatory guide
RHR	residual heat removal
RPI	rod position indicator
RTP	rated thermal power
SDP	significance determination process
SER	safety evaluation report
SIS	safety injection system
SSC	structure, system, or component
TI	temporary instruction
TS	technical specification
TVA	Tennessee Valley Authority
U1	Unit 1
U2	Unit 2
UFSAR	updated final safety analysis report
WO	work order