



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

February 7, 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
05000327/2013005 AND 05000328/2013005**

Dear Mr. Shea:

On December 31, 2013, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at your Sequoyah Nuclear Plant, Units 1 and 2. On January 13, 2014, 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 self-revealing finding of very low safety significance (Green) in this report. This finding involved a violation of NRC requirements. 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 this NCV, 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, D.C. 20555-0001; with copies to the Regional Administrator, Region II; the Director, Office of Enforcement, U.S. Nuclear Regulatory Commission, Washington, D.C. 20555-0001; and the NRC Resident Inspector at the Sequoyah Nuclear Plant.

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

As a result of the Safety Culture Common Language Initiative, the terminology and coding of cross-cutting aspects were revised beginning in calendar year (CY) 2014. New cross-cutting aspects identified in CY 2014 will be coded under the latest revision to Inspection Manual Chapter (IMC) 0310. Cross-cutting aspects identified in the last six months of 2013 using the previous terminology will be converted to the latest revision in accordance with the cross-reference in IMC 0310. The revised cross-cutting aspects will be evaluated for cross-cutting themes and potential substantive cross-cutting issues in accordance with IMC 0305 starting with the CY 2014 mid-cycle assessment review.

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 05000327/2013005, 05000328/2013005
w/Attachment: Supplementary Information

cc: via ListServ distribution

J. Shea

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Letter to J.W. Shea from Jonathan H. Bartley dated February 7, 2014

SUBJECT: SEQUOYAH NUCLEAR PLANT - NRC INTEGRATED INSPECTION REPORT
05000327/2013005 AND 05000328/2013005

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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.: 05000327/2013005, 05000328/2013005

Licensee: Tennessee Valley Authority (TVA)

Facility: Sequoyah Nuclear Plant, Units 1 and 2

Location: Sequoyah Access Road
Soddy-Daisy, TN 37379

Dates: October 1 – December 31, 2013

Inspectors: G. Smith, Senior Resident Inspector
W. Deschaine, Resident Inspector
M. Speck, Senior Emergency Preparedness Inspector (Sections 1R04.1 and 1R05)
L. Lake, Senior Reactor Inspector (Section 1R08)
R. Hamilton, Senior Health Physicist (Section 2RS8)
R. Kellner, Health Physicist (Sections 2RS1, 4OA1)

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

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SUMMARY

IR 05000327/2013-005, 05000328/2013-005; 10/1/2013 - 12/31/2013; Sequoyah Nuclear Plant, Units 1 and 2; Other Activities

The report covered a three-month period of inspection by resident inspectors and announced inspections by regional inspectors. One self-revealing finding 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, "Components Within the Cross-Cutting Areas," dated October 28, 2011. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 4, dated December 2006.

A. NRC-Identified and Self-Revealing Findings

Cornerstone: Mitigating Systems

Green: A self-revealing non-cited violation of 10 CFR 50 Appendix B, Criterion XVI, "Corrective Action," was identified for the licensee's failure to promptly correct a condition adverse to quality within a reasonable time. Timely corrective actions were not taken to correct a dual position indication (open and closed lights both illuminated) on the Unit 1 'A' train residual heat removal (RHR) containment sump suction flow control valve (FCV) 1-FCV-63-72. This licensee entered this issue into the corrective action program as problem evaluation report (PER) 772193 and performed repairs to the valve to restore the system to operable status.

This finding was determined to be more than minor because it was associated with the Design Control attribute of the Mitigating Systems cornerstone and adversely affected the cornerstone's objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences (i.e., core damage). Specifically, the finding reduced the reliability and capability of the 'A' train RHR system to perform its safety function as designed. The finding required a detailed risk analysis as the 'A' RHR system was inoperable beyond its allowed outage time of 72 hours. The detailed risk analysis concluded that the finding was of very low safety significance (Green). This finding was determined to have a cross-cutting aspect relating to the proper classification, prioritization, and evaluation of operability and reportability of conditions adverse to quality in the Corrective Action component of the Problem Identification and Resolution area. [P.1(c)] (Section 4OA5)

B. Licensee-Identified Violations

None

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REPORT DETAILS

Summary of Plant Status:

Unit 1 operated at or near 100 percent rated thermal power (RTP) until September 9, 2013, when the unit entered a power coast down period until October 14 when the unit shut down for a refueling outage. Unit 1 returned to 100 percent RTP on November 24 where it operated for the remainder of the inspection period.

Unit 2 operated at or near 100 percent RTP for the entire inspection period.

1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, and Barrier Integrity

1R01 Adverse Weather Protection

a. Inspection Scope

.1 Readiness for Seasonal Extreme Weather Conditions

The inspectors reviewed design features and licensee preparations for protecting the essential raw cooling water (ERCW) intake structure and both Unit 1 and 2 refueling water storage tanks (RWSTs) from extreme cold and freezing conditions. The inspectors reviewed the Updated Final Safety Analysis Report (UFSAR) and Technical Specifications (TS), reviewed implementation of licensee freeze protection procedures, walked down portions of the systems to assess deficiencies and system readiness for extreme cold weather, and discussed prioritization and status of correcting deficiencies with licensee personnel. Documents reviewed are listed in the Attachment. The inspectors completed one sample.

b. Findings

No findings were identified.

1R04 Equipment Alignment

.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

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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 3 samples.

- Spent fuel pool cooling during core empty period of U1R19
- 1A emergency core cooling train while 1B 669 penetration cooler out-of-service
- 2A auxiliary feed-water and 2A emergency diesel generator while 2B under-voltage coils out-of-service

.2 Complete System Walkdown

a. Inspection Scope

The inspectors performed a complete system walkdown of the: 1) emergency gas treatment system/auxiliary building gas treatment system (ABGTS); and 2) auxiliary building ventilation/control building ventilation systems. The purpose of this inspection was 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 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:

- Dampers were correctly positioned.
- Electrical power was available as required.
- Hangers and supports were correctly installed and functional.
- Essential support systems were operational.
- Ancillary equipment or debris did not interfere with system performance.
- Breakers were correctly positioned.
- Major system components were correctly labeled.
- Cabinets, cable trays, and conduits were correctly installed and functional.
- Visible cabling appeared to be in good material condition.

In addition, the inspectors reviewed corrective action items and design issues associated with the systems to determine whether any condition described in those documents could adversely impact current system operability. Documents reviewed are listed in the Attachment. The inspectors completed two samples.

b. Findings

No findings were identified.

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1R05 Fire Protection

.1 Fire Protection Tours

a. Inspection Scope

The inspectors conducted a tour of the six 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 six samples.

- Unit 1 Lower Containment Building
- Unit 1 Upper Containment Building
- Control Building Elevation 685 (Auxiliary Instrument Room)
- Control Building Elevation 706 (Cable Spreading Room)
- ERCW Building - Elevations 688/704/720
- Turbine Building - Elevations 662/685

b. Findings

No findings were identified.

1R06 Flood Protection Measures

.1 Internal Flooding

a. Inspection Scope

The inspectors examined internal flood protection measures associated with the 1A and 1B safety injection (SI) pump rooms' internal flood design in order to verify that flood mitigation plans were consistent with the design requirements and risk analysis assumptions. The inspectors verified that equipment essential for reactor shutdown was properly protected from a flood caused by pipe breaks in the 1A & 1B SI pump room. Specifically, the inspectors reviewed the licensee's moderate energy line break flooding study to fully understand the licensee's flood mitigation strategy, reviewed licensee drawings and then verified that the assumptions and results remained valid. The inspectors walked down the 1A & 1B SI pump room to verify the assumed flooding sources, adequacy of common area drainage, and flood detection instrumentation to ensure that a flooding event would not impact reactor shutdown capabilities. The inspectors completed one sample.

b. Findings

No findings were identified.

1R08 Non-Destructive Examination Activities and Welding Activities

a. Inspection Scope

From October 21-25, 2013, the inspectors conducted an on-site review of the implementation of the licensee's in-service inspection (ISI) Program for monitoring degradation of the reactor coolant system; emergency feedwater systems, risk-significant piping and components, and containment systems in Unit 1.

The inspectors' activities included a review of non-destructive examinations (NDEs) to evaluate compliance with the applicable edition of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code, Section XI, and to verify that indications and defects were appropriately evaluated and dispositioned in accordance with the requirements of the ASME Code, Section XI, acceptance standards or NRC approved alternative requirement.

The inspectors directly observed or reviewed records of the following NDEs mandated by the ASME Code to evaluate compliance with the ASME Code Section XI and Section V requirements, and if any indications and defects were detected. Inspectors also reviewed evaluations of results that were dispositioned in accordance with the ASME Code or an NRC-approved alternative requirement.

- Directly observed:
 - Ultrasonic testing (UT) examinations of the reactor pressure vessel head to shell flange studs
 - General visual examination of the outside surface of the containment shell
- Reviewed records:
 - UT examinations of reactor coolant pump #4 bolting
 - VT-3 visual examination of containment penetration bolting
 - Work Order 113312025 modification of component cooling water system piping

The inspectors reviewed documentation for the repair/replacement of the following pressure boundary welds. The inspectors evaluated if the licensee applied the pre-service non-destructive examinations and acceptance criteria required by the Construction Code. In addition, the inspectors reviewed the welding procedure specifications, welder qualifications, welding material certifications, and supporting weld procedure qualification records to evaluate if the weld procedures were qualified in accordance with the requirements of the Construction Code and the ASME Code Section XI.

PWR Vessel Upper Head Penetration (VUHP) Inspection Activities: For the Unit 1 vessel head, a bare metal visual examination and a volumetric examination required in accordance with the requirements of ASME Code Case N-729-1 and 10 CFR 50.55a(g)(6)(ii)(D) were conducted in the previous outage and therefore not required to be performed this outage.

Boric Acid Corrosion Control (BACC) Inspection Activities: The inspectors reviewed the licensee's BACC program activities to ensure implementation with commitments made in response to NRC Generic Letter 88-05, "Boric Acid Corrosion of Carbon Steel Reactor Pressure Boundary," and applicable industry guidance documents. Specifically, the inspectors performed an on-site record review of procedures and the results of the licensee's containment walkdown inspections performed during the current refueling outage. The inspectors also reviewed Focused Self-Assessment CRP-ENG-F-13-031 of the Boric Acid Program.

The inspectors also interviewed the BACC program owner, conducted an independent walkdown of containment to evaluate compliance with licensee's BACC program requirements, and verified that degraded or non-conforming conditions, such as boric acid leaks, were properly identified and corrected in accordance with the licensee's BACC and corrective action programs.

The inspectors reviewed the following evaluations and corrective actions related to evidence of boric acid leakage to evaluate if the corrective actions completed were consistent with the requirements of the ASME Code Section XI and 10 CFR Part 50, Appendix B, Criterion XVI.

- Problem Event Report (PER) 618770 - Boron buildup on 1B-B SI pump pedestal
- PER 691545 - Boric acid build up and wet boric acid are present on transmitter sensing line 1-FT-72-41

Steam Generator (SG) Tube Inspection Activities:

There were no SG tube eddy current examinations conducted during this outage. The inspectors reviewed the following documentation and evaluated them against the licensee's TS, commitments made to the NRC, ASME Section XI, and Nuclear Energy Institute (NEI) 97-06, "Steam Generator Program Guidelines," to ensure that the licensee was in compliance with the schedule to skip the SG eddy current testing inspections for the 1R19 outage:

- AREVA document # 51-9178898-001, Sequoyah Unit Condition Monitoring for Cycle 18 and Operational Assessment for Cycles 19, 20 and 21

Identification and Resolution of Problems:

The inspectors performed a review of selected ISI-related problems that were identified by the licensee and entered into the corrective action program as PERs. The inspectors reviewed the PERs to confirm the licensee had appropriately described the scope of the problem and had initiated corrective actions. The review also included the licensee's

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consideration and assessment of operating experience events applicable to the plant. The inspectors performed this review to ensure compliance with 10 CFR Part 50, Appendix B, Criterion XVI, "Corrective Action," requirements. Documents reviewed are listed in the Attachment.

b. Findings

No findings were identified.

1R11 Licensed Operator Regualification Program

.1 Quarterly Review of Licensed Operator Regualification

a. Inspection Scope

The inspectors performed one licensed operator regualification program review. The inspectors observed a simulator session on October 9, 2013. The training scenario involved Just-In-Time Training for Pre-Refueling Outage risk significant activities such as placing the RHR system in service. 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 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. The inspectors completed one 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

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- 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:

- Unit 1 reactor shutdown and plant cool down/depressurization
- Unit 1 refueling and other outage activities
- Unit 1 startup, including Mode changes
- Unit 2 down power with turbine in manual for valve testing

Documents reviewed are listed in the Attachment. The inspectors completed one sample.

b. Findings

No findings were identified.

.3 Annual Review of Licensee Regualification Examination Results

a. Inspection Scope

On September 13, 2013, the licensee completed the annual requalification operating examinations required to be administered to all licensed operators in accordance with 10 CFR 55.59(a)(2), "Requalification requirements," of the NRC's "Operators' Licenses." The inspectors performed an in-office review of the overall pass/fail results of the individual operating examinations and the crew simulator operating examinations in accordance with Inspection Procedure (IP) 71111.11, "Licensed Operator Requalification Program and Licensed Operator Performance." The results were compared to the thresholds established in Section 3.02, "Requalification Examination Results," of IP 71111.11.

b. Findings

No findings were identified.

1R12 Maintenance Effectiveness

a. Inspection Scope

The inspectors reviewed five 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

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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 5 samples.

- MR 11th Periodic Assessment Report (PE sample)
- Cause Determination and Evaluation (CDE) #2700, FCV-63-72 Failure
- CDE #2696, EBGTS 'B' Fan Failure
- CDE #2686, 'A' Shutdown Boardroom Chiller Failure
- CDE #2674, 'B' Main Condenser Test Connection Failure

b. Findings

No findings were identified.

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. Documents reviewed are listed in the Attachment. The inspectors completed 2 samples.

- Review U1R19 Outage Schedule
- Review of risk during ABGTS outage

b. Findings

No findings were identified.

1R15 Operability Determinations and Functionality Assessments

a. Inspection Scope

For the eight operability evaluations described in the 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

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evaluations to 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. Documents reviewed are listed in the Attachment. The inspectors completed 8 samples.

- PER 789552 - Unit 2 Turbine Controls in Manual
- PER 795451 - POE WO 113223153 T1 motor lead pinch
- PER 799097 - POE TS LCO 3.7.4 action for FCV-67-146
- PER 800432 - POE (ABSCE boundary issue)
- PER 795433 - PDO (During U1R19 water found leaking out of conduit in bioshield wall)
- PER 801415 - PDO EDG 1B 2 sec load sequence
- PER 803833 - PDO U-1 Rx Head Vent Valve Stroke
- PERs 816731, 815638, 817841 - FEs associated with the Unit 1 loose parts alarm

b. Findings

No findings were identified.

1R18 Plant Modifications

.1 Permanent Modifications

a. Inspection Scope

The inspectors reviewed the 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.

- DCN 22643 – Replace Pressurizer Power Operated Relief Valves (PORVs)

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 did note that, ultimately, the installed PORVs did not meet the acceptance criteria associated with the close stroke time. As a result, the licensee chose to cut out/remove the new style PORVs and reinstall the original PORVs prior to plant startup in November 2013. Documents reviewed are listed in the Attachment. The inspectors completed one sample.

b. Findings

No findings were identified.

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1R19 Post Maintenance Testinga. Inspection Scope

The inspectors reviewed the post maintenance tests associated with the nine work orders (WO) 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 nine samples.

- WO 113377829 – Repack Valve (1-LCV-3-175) and perform Aircet test
- WO 112096045 – Repair isolation check valve (1-VLV-026-1296)
- WO 111234712 – 5 year PM to swap 480V Shutdown board breaker with a refurbished breaker
- WO 113806636 – Perform 0-MI-EPM-317-102.0 on CCS pump C-S and clean/replace motor air filter
- WO 114560807 – Centrifugal charging pump (CCP) room cooler fan motor current check, bearing lubrication and cleaning
- WO 114198329 – EQ maintenance and inspection
- WO 113408190 – Change out electrolytic capacitors in the Woodward 2301A governor card
- WOs 114306842, 114306841, 114325805, 114325799 – Aux Feedwater valves – 836 & 837
- WO 113756597 – PORVs – PCV-68-340 & PCV-68-334

b. Findings

No findings were identified.

1R20 Refueling and Other Outage Activities.1 Unit 1 Refueling Outage Cycle 19a. Inspection Scope

For the Unit 1 refueling outage that began on October 14, 2013, the inspectors evaluated licensee activities to verify that the licensee considered risk in developing outage schedules, followed risk reduction methods developed to control plant configuration, developed mitigation strategies for the loss of key safety functions, and adhered to operating license and TS requirements that ensure defense-in-depth. The inspectors also walked down portions of Unit 1 not normally accessible during at-power

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operations to verify that safety-related and risk-significant SSCs were maintained in an operable condition. Specifically, between October 14 and November 21, the inspectors performed inspections and reviews of the following outage activities. Documents reviewed are listed in the Attachment. The inspectors completed one sample.

- Outage Plan. The inspectors reviewed the outage safety plan and contingency plans to confirm that the licensee had appropriately considered risk, industry experience, and previous site-specific problems in developing and implementing a plan that assured maintenance of defense-in-depth.
- Reactor Shutdown. The inspectors observed the shutdown in the control room from the time the reactor was tripped until operators placed it on the RHR system for decay heat removal to verify that TS cool down restrictions were followed. The inspectors also toured the lower containment as soon as practicable after reactor shutdown to observe the general condition of the reactor coolant system (RCS) and emergency core cooling system components and to look for indications of previously unidentified leakage inside the polar crane wall.
- Licensee Control of Outage Activities. On a daily basis, the inspectors attended the licensee outage turnover meeting, reviewed PERs, and reviewed the defense-in-depth status sheets to verify that status control was commensurate with the outage safety plan and in compliance with the applicable TS when taking equipment out of service. The inspectors further toured the main control room and areas of the plant daily to ensure that the following key safety functions were maintained in accordance with the outage safety plan and TS: electrical power, decay heat removal, spent fuel cooling, inventory control, reactivity control, and containment closure. The inspectors also observed a tag-out of the "B" Train CCP system to verify that the equipment was appropriately configured to safely support the work and testing. To ensure that RCS level instrumentation was properly installed and configured to give accurate information, the inspectors reviewed the installation of the Mansell level monitoring system. Specifically, the inspectors discussed the system with engineering, walked it down to verify that it was installed in accordance with procedures and adequately protected from inadvertent damage, verified that Mansell indication properly overlapped with pressurizer level instruments during pressurizer drain-down, verified that operators properly set level alarms to procedurally required set-points, and verified that the system consistently tracked RCS level while lowering to reduced inventory conditions. The inspectors also observed operators compare the Mansell indications with locally-installed ultrasonic level indicators during entry into reduced inventory conditions.

- **Refueling Activities.** The inspectors observed fuel movement at the spent fuel pool and at the refueling cavity in order to verify compliance with TS and that each assembly was properly tracked from core offload to core reload. In order to verify proper licensee control of foreign material, the inspectors verified that personnel were properly checked before entering any foreign material exclusion (FME) areas, reviewed FME procedures, and verified that the licensee followed the procedures. To ensure that fuel assemblies were loaded in the core locations specified by the design, the inspectors independently reviewed the recording of the licensee's final core verification.
- **Reduced Inventory and Mid-Loop Conditions.** Prior to the outage, the inspectors reviewed the licensee's commitments to Generic Letter 88-17. Before entering reduced inventory conditions the inspectors verified that these commitments were in place, that plant configuration was in accordance with those commitments, and that distractions from unexpected conditions or emergent work did not affect operator ability to maintain the required reactor vessel level. Mid-loop conditions were not entered during this outage since SG eddy current testing was not required.
- **Heat-up and Start-up Activities.** The inspectors toured the containment prior to reactor startup to verify that debris that could affect the performance of the containment sump had not been left in the containment. The inspectors reviewed the licensee's mode-change checklists to verify that appropriate prerequisites were met prior to changing TS modes. To verify 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 examined portions of the low power physics testing surveillance.

b. Findings

No findings were identified.

1R22 Surveillance Testing

a. Inspection Scope

For the twelve 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 twelve samples.

In-Service Tests:

- 1-SI-SXP-003-202.B, Motor Driven Auxiliary Feedwater Pump 1B-B Comprehensive Performance Test, Revision 7
- 1-SI-SXP-074-202.0, RHR Pump 1A-A and 1B-B Comprehensive Performance and Check Valve Test, Revision 10

RCS leakage test:

- 0-SI-OPS-068-137.0, Reactor Coolant System Water Inventory, Revision 32

Routine Surveillance Tests:

- 1-SI-OPS-088-001.0, Phase A Isolation Test, Revision 14
- 1-SI-OPS-082-026A, Loss of Offsite Power with Safety Injection D/G 1A-A Test, Revision 46
- 0-SI-SFT-072-138.0, Unit 1 Containment Spray – Spray Nozzle Test, Revision 6
- 0-SI-SXV-063-203.2, Full Stroking of Safety Injection Cold Leg Accumulator Isolation Valves, Revision 1

Ice Condenser Surveillance Test:

- 0-SI-MIN-061-105.0, Ice Condenser Ice Weighing, Revision 11

Containment Isolation Valve (CIV) Surveillance Tests:

- 0-SI-SLT-067-258.2, Containment Isolation Valve Local Leak Rate Test Lower Compartment Essential Raw Cooling Water, Revision 13
- 0-SI-SLT-088-259.4, Upper Personnel Airlock Interlock Operability Test, Revision 2
- 0-SI-SLT-088-259.1, Upper Personnel Airlock Overall Leak Rate Test and General Inspection, Revision 6
- 0-SI-SLT-081-258.1, Containment Isolation Valve Local Leak Rate Test Primary Water System, Revision 5

b. Findings

No findings were identified.

Cornerstone: Emergency Preparedness

1EP2 Alert and Notification System Evaluation

a. Inspection Scope

The inspectors evaluated the adequacy of the licensee's methods for testing and maintaining the alert and notification system in accordance with NRC Inspection Procedure 71114, Attachment 02, Alert and Notification System Evaluation. The

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applicable planning standard, 10 CFR Part 50.47(b)(5) and its related 10 CFR Part 50, Appendix E, Section IV.D requirements were used as reference criteria. The criteria contained in NUREG-0654, Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants, Revision 1, were also used as a reference.

The inspectors reviewed various documents which are listed in the Attachment, interviewed personnel responsible for system performance, and observed aspects of periodic siren maintenance and testing. This inspection activity satisfied one inspection sample for the alert and notification system on a biennial basis.

b. Findings

No findings were identified.

1EP3 Emergency Response Organization Staffing and Augmentation System

a. Inspection Scope

The inspectors reviewed the licensee's Emergency Response Organization (ERO) augmentation staffing requirements and process for notifying the ERO to ensure the readiness of key staff for responding to an event and timely facility activation. The qualification records of key position ERO personnel were reviewed to ensure all ERO qualifications were current. A sample of problems identified from augmentation drills or system tests performed since the last inspection was reviewed to assess the effectiveness of corrective actions.

The inspection was conducted in accordance with NRC Inspection Procedure 71114, Attachment 03, Emergency Response Organization Staffing and Augmentation System. The applicable planning standard, 10 CFR 50.47(b)(2), and its related 10 CFR 50, Appendix E requirements were used as reference criteria.

The inspectors reviewed various documents which are listed in the Attachment. This inspection activity satisfied one inspection sample for the ERO staffing and augmentation system on a biennial basis.

b. Findings

No findings were identified.

1EP4 Emergency Action Level and Emergency Plan Changes

a. Inspection Scope

The NRC Office of Nuclear Security and Incident Response headquarters staff performed an in-office review of the latest revisions of various Emergency Plan Implementing Procedures (EPIPs) and the Emergency Plan located under ADAMS

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Accession numbers ML12326A678, ML12353A050, ML13025A102, ML13070A025, ML13219A022, and ML13246A091.

The licensee determined that in accordance with 10 CFR 50.54(q), the changes made in the revisions resulted in no reduction in the effectiveness of the Plan, and that the revised Plan continued to meet the requirements of 10 CFR 50.47(b) and Appendix E to 10 CFR Part 50. The NRC review was not documented in a safety evaluation report and did not constitute approval of licensee-generated changes; therefore, these revisions are subject to future inspection. Documents reviewed are listed in the Attachment. The inspectors completed one sample.

b. Findings

No findings were identified.

1EP5 Maintenance of Emergency Preparedness

a. Inspection Scope

The inspectors reviewed the corrective actions identified through the Emergency Preparedness program to determine the significance of the issues, the completeness and effectiveness of corrective actions, and to determine if issues were recurring. The licensee's post-event after action reports, self-assessments, and audits were reviewed to assess the licensee's ability to be self-critical, thus avoiding complacency and degradation of their emergency preparedness program. Inspectors reviewed the licensee's 10 CFR 50.54(q) change process, personnel training, and selected screenings and evaluations to assess adequacy. The inspectors toured facilities and reviewed equipment and facility maintenance records to assess licensee's adequacy in maintaining them. The inspectors evaluated the capabilities of selected radiation monitoring instrumentation to adequately support Emergency Action Level (EAL) declarations.

The inspection was conducted in accordance with NRC Inspection Procedure 71114.05, Maintenance of Emergency Preparedness. The applicable planning standards, related 10 CFR 50, Appendix E requirements, and 10 CFR 50.54(q) and (t) were used as reference criteria.

The inspectors reviewed various documents which are listed in the Attachment. This inspection activity satisfied one inspection sample for the maintenance of emergency preparedness on a biennial basis.

b. Findings

No findings were identified.

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2. RADIATION SAFETY (RS)

Cornerstones: Occupational Radiation Safety (OS) and Public Radiation Safety (PS)

2RS1 Radiological Hazard Assessment and Exposure Controls

a. Inspection Scope

Hazard Assessment and Instructions to Workers: During facility tours, the inspectors directly observed labeling of radioactive material and postings for radiation areas, high radiation areas (HRAs), and airborne radioactivity areas established within the radiologically controlled area (RCA) of the Unit 1 containment, Unit 1 and Unit 2 auxiliary buildings, Independent Spent Fuel Storage Installation (ISFSI), and radioactive waste (radwaste) processing and storage locations. The inspectors independently measured radiation dose rates or directly observed conduct of licensee radiation surveys for RCA areas in the Unit 1 containment, Unit 1 and Unit 2 Auxiliary buildings, and ISFSI. The inspectors reviewed survey records for several plant areas including surveys for alpha emitters, airborne radioactivity, and pre-job surveys for selected Unit 1 Refueling Outage 19 (U1R19) tasks. The inspectors also discussed changes to plant operations that could contribute to changing radiological conditions since the last inspection and reviewed U1R19 crud burst results and post crud burst dose rate surveys. For selected U1R19 outage jobs, the inspectors attended, or reviewed, pre-job briefings and radiation work permit (RWP) details to assess communication of radiological control requirements and current radiological conditions to workers. Selected U1R19 work activities included Unit 1 control rod drive mechanism duct work, Unit 1 Refueling Activities, Unit 1 Head O-ring Surface Work & Inspection, and work in the Unit 1 Equipment Pit and transfer canal.

Hazard Control and Work Practices: The inspectors evaluated access barrier effectiveness for selected Unit 1 and Unit 2 Locked High Radiation Area (LHRA) and Very High Radiation Area (VHRA) locations. Changes to procedural guidance for LHRA and VHRA controls were discussed with health physics (HP) supervisors. Controls and their implementation for storage of irradiated material within the spent fuel pool (SFP) were reviewed and discussed in detail. Established radiological controls (including airborne controls) were evaluated for selected U1R19 tasks including refueling and reactor cavity work activities, work in auxiliary building HRAs, and radwaste processing and storage. In addition, licensee controls for areas where dose rates could change significantly as a result of plant shutdown and refueling operations were reviewed and discussed.

Occupational workers' adherence to selected RWPs and HP technician (HPT) proficiency in providing job coverage were evaluated through direct observations and interviews with licensee staff. Electronic dosimeter (ED) alarm set points and worker stay times were evaluated against area radiation survey results for refueling and reactor cavity work. ED alarm logs were reviewed and worker response to dose and dose rate alarms during selected work activities was evaluated. For HRA tasks involving significant dose rate gradients, e.g. reactor head O-ring work, the inspectors evaluated the use and placement of whole body and extremity dosimetry to monitor worker exposure.

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Control of Radioactive Material: The inspectors observed surveys of material and personnel being released from the RCA using small article monitor, personnel contamination monitor, and portal monitor instruments. The inspectors reviewed the last two calibration records for selected release point survey instruments and discussed equipment sensitivity, alarm set points, and release program guidance with licensee staff. The inspectors compared recent 10 CFR Part 61 results for the Dry Active Waste (DAW) radioactive waste stream with radionuclides used in calibration sources to evaluate the appropriateness and accuracy of release survey instrumentation. The inspectors also reviewed records of leak tests on selected sealed sources and discussed nationally tracked source transactions with licensee staff.

Problem Identification and Resolution: PERs associated with radiological hazard assessment and control were reviewed and assessed. The inspectors evaluated the licensee's ability to identify and resolve the issues in accordance with procedure NPG-SPP-22.300, "Corrective Action Program," Rev. 0. The inspectors also evaluated the scope of the licensee's internal audit program and reviewed recent assessment results.

Radiation protection activities were evaluated against the requirements of UFSAR Section 12; TS Sections 6.8 and 6.12; 10 CFR Parts 19 and 20; and approved licensee procedures. Licensee programs for monitoring materials and personnel released from the RCA were evaluated against 10 CFR Part 20 and IE Circular 81-07, "Control of Radioactively Contaminated Material." Documents reviewed are listed in the Attachment. The inspectors completed one sample.

b. Findings

No findings were identified.

2RS8 Radioactive Solid Waste Processing and Radioactive Material Handling, Storage, and Transportation

a. Inspection Scope

Waste Processing and Characterization: During inspector walkdowns, accessible sections of the liquid and solid radwaste processing systems were assessed for material condition and conformance with system design diagrams. Inspected equipment included radwaste storage tanks; resin transfer piping, resin, and filter packaging components; and abandoned boric acid evaporator equipment. The inspectors discussed component function, processing system changes, and radwaste program implementation with licensee staff.

The radionuclide characterizations for 2010, and 2012, for selected waste streams were reviewed and discussed with Radwaste/Transportation staff. For primary resin, reactor coolant system filters, and DAW, the inspectors evaluated analyses for hard-to-detect nuclides, reviewed the use of scaling factors, and examined quality assurance comparison results between licensee waste stream characterizations and outside laboratory data. Waste stream mixing and concentration averaging methodology for resins and filters was evaluated and discussed with Radwaste/Transportation staff. The

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inspectors also reviewed the licensee's procedural guidance for monitoring changes in waste stream isotopic mixtures. The 10 CFR 61 analysis results were also discussed with Chemistry personnel.

Radioactive Material Storage: During walkdowns of indoor and outdoor radioactive material storage areas, the inspectors observed the physical condition and labeling of storage containers and the posting of Radioactive Material Areas. The inspectors also reviewed licensee procedural guidance for storage and monitoring of radioactive material.

Transportation: The inspectors observed a shipment of vendor equipment during the week of inspection. The inspectors reviewed shipping procedure requirements and discussed preparation of shipping documents, package marking and labeling, and interviewed shipping technicians regarding Department of Transportation (DOT) regulations.

Selected shipping records were reviewed for consistency with licensee procedures and compliance with NRC and DOT regulations. The inspectors reviewed emergency response information, DOT shipping package classification, waste classification, radiation survey results, and evaluated whether receiving licensees were authorized to accept the packages. Licensee procedures for handling shipping containers were compared to Certificate of Compliance requirements and manufacturer recommendations. In addition, training records for selected individuals currently qualified to ship radioactive material were reviewed.

Radwaste processing activities and equipment configuration were reviewed for compliance with the licensee's Process Control Program and UFSAR, Chapter 11. Waste stream characterization analyses were reviewed against regulations detailed in 10 CFR Part 20, 10 CFR Part 61, and guidance provided in the Branch Technical Position on Waste Classification (1983). Radioactive material and waste storage activities were reviewed against the requirements of 10 CFR Part 20. Transportation program implementation was reviewed against regulations detailed in 10 CFR Part 20, 10 CFR Part 71, 49 CFR Parts 172-178, as well as the guidance provided in NUREG-1608. Training activities were assessed against 49 CFR Part 172, Subpart H.

Problem Identification and Resolution: The inspectors reviewed PERs in the area of radwaste processing and transportation. The inspectors evaluated the licensee's ability to identify and resolve the issues in accordance with procedure NPG-SPP-22.300,. The inspectors also evaluated the scope of the licensee's internal audit program and reviewed recent assessment results. Documents reviewed are listed in the Attachment. The inspectors completed one sample.

b. Findings

No findings were identified.

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4. OTHER ACTIVITIES

4OA1 Performance Indicator (PI) Verification

a. Inspection Scope

Occupational Radiation Safety Cornerstone: The inspectors reviewed the Occupational Exposure Control Effectiveness PI results for the Occupational Radiation Safety Cornerstone from October 2012 through October 2013. For the assessment period, the inspectors reviewed ED alarm logs and selected PERs related to controls for exposure significant areas. The inspectors also reviewed licensee procedural guidance for collecting and documenting PI data. Documents reviewed are listed in the Attachment. The inspectors completed one sample.

Emergency Preparedness Cornerstone:

- Drill/Exercise Performance (DEP)
- Emergency Response Organization Drill Participation (ERO)
- Alert and Notification System Reliability (ANS)

For the specified review period, the inspectors examined data reported to the NRC, procedural guidance for reporting PI information, and records used by the licensee to identify potential PI occurrences. The inspectors verified the accuracy of the PI for ERO drill and exercise performance through review of a sample of drill and event records. The inspectors reviewed selected training records to verify the accuracy of the PI for ERO drill participation for personnel assigned to key positions in the ERO. The inspectors verified the accuracy of the PI for alert and notification system reliability through review of a sample of the licensee's records of periodic system tests. The inspectors also interviewed the licensee personnel who were responsible for collecting and evaluating the PI data. Documents reviewed are listed in the Attachment. This inspection satisfied three inspection samples for PI verification on an annual basis.

b. Findings

No findings were identified.

4OA2 Problem Identification and Resolution

.1 Routine Review

a. Inspection Scope

As required by IP 71152, "Problem Identification and Resolution," 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.

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b. Findings

No findings were identified.

.2 Annual Follow-up of Selected Issuesa. Inspection Scope

The inspectors performed an in-depth review of PER 665633, "NRC identified freeze protection issues." The inspectors reviewed the actions taken to determine if the licensee had adequately addressed the following attributes. Documents reviewed are listed in the Attachment. The inspectors completed one sample for Annual Follow-up of Selected Issues.

- 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

No findings were identified.

.3 Semiannual Trend Reviewa. Inspection Scope

As required by IP 71152, the inspectors performed a 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 January 2013 through December 2013, 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. Documents reviewed are listed in the Attachment. The inspectors completed one sample for Semiannual Trend Review.

b. Findings and Observations

No findings were identified. In general, the licensee had identified trends and

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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 previously unidentified trends of significance were identified.

.4 Annual Follow-up of Operator Workarounds

a. Inspection Scope

The inspectors reviewed the operator workaround (OWA) program to verify that OWAs were identified at an appropriate threshold, were entered into the CAP, and that corrective actions were appropriate and timely. Specifically, the inspectors reviewed the licensee's workaround lists and repair schedules, reviewed CAP word searches, conducted tours and interviewed operators and operations department support staff. Additionally, the inspectors checked for undocumented workarounds by observing operators perform rounds, reviewed operator deficiency lists, reviewed appropriate system health documents, attended plant health committee meetings, and verified that identified program deficiencies were corrected. The inspectors evaluated all workarounds for their aggregate impact. Documents reviewed are listed in the Attachment. The inspectors completed one sample for Annual Follow-up of Operator Workarounds.

b. Findings

No findings were identified.

4OA5 Other Activities

.1 (Closed) Unresolved Item (URI) 050000327/2013004-01, Water Intrusion into Actuator of Valve 1-FCV-63-72

a. Inspection Scope

The inspectors opened this URI as a result of water intrusion into the actuator of 1-FCV-63-72, which is the 'A' train containment sump suction for the Unit 1 'A' RHR train. This issue was noted during an operability inspection conducted last quarter. The inspectors determined more inspection was required in order to resolve the issue. On August 8, 2013, an operator noted the valve exhibited dual indication and on August 14, a related valve, 1-FCV-74-3, failed its periodic stroke test. The following day, 1-FCV-63-72 was noted to be failed as well due to a large amount of water buildup in the actuator. A subsequent root cause of the failure was completed during this inspection period and concluded the water intrusion was due to groundwater which migrated through the wall of the RHR valve vault room and into the valve conduit. Although the circumstances regarding the water intrusion may have been beyond the licensee's ability to predict, the

inspectors noted there were opportunities before August 14 to identify and correct the deficient condition. Thus, the inspectors identified the following non-cited violation (NCV) as discussed below. Documents reviewed are listed in the Attachment.

b. Findings

Introduction: A self-revealing Green NCV of 10 CFR 50 Appendix B, Criterion XVI, "Corrective Action," was identified for the licensee's failure to correct a condition adverse to quality within a reasonable amount of time. Timely corrective actions were not taken to correct a dual position indication (open and closed lights both illuminated) on the Unit 1 'A' train RHR containment sump suction flow control valve 1-FCV-63-72.

Description: On August 8 at 0709, the Unit 1 control room operator noted that valve 1-FCV-63-72 showed dual position indication on the control board. This valve is the 'A' train RHR suction valve from the reactor containment sump and is normally closed, showing only a single position indication lamp on the control board. Valve 1-FCV-63-72 was verified to be locally closed. No other activities were noted that would have caused the valve to come off its closed seat. Initial troubleshooting for the dual indication consisted of: 1) a visual inspection of the valve; 2) a visual inspection of the motor control center (MCC) cubicle during an attempted closure of the valve; 3) a review of the wiring diagram by a troubleshooting team; 4) replacement of the MCC light indicating bulb; and 5) a visual inspection of the main control room (MCR) hand switch. Based on the troubleshooting team's analysis of the wiring diagrams, no impact was expected on the interlocks associated with 1-FCV-63-72. The team initially concluded that the most likely cause of the indication was a short circuit in the control power indication in the MCR valve hand switch. Based on this conclusion, plus the fact that the valve is not normally stroked at power (due to concerns of accidentally transferring borated water from the RWST to the containment sump), the licensee chose not to immediately stroke test 1-FCV-63-72. Instead, the licensee declared the position indication for the valve inoperable per Post Accident Monitoring requirements as delineated in TS 3.9.1. This was a 30 day limiting condition for operation. The licensee then began development of a troubleshooting plan which would require more intrusive troubleshooting of the issue starting the following week.

On August 14 at 2315, during a routine quarterly inservice testing valve stroke activity, valve 1-FCV-74-3 failed to stroke in the closed direction from the control room. This valve is the 'A' train RHR suction valve from the RWST and is normally open. Valve 1-FCV-74-3 was immediately declared out of service and the 72-hour Emergency Core Cooling Systems (ECCS) TS 3.5.2 action statement was entered. During troubleshooting, operators attempted to close valve 1-FCV-74-3 remotely from the MCC cubicle. This action blew control power fuses. The licensee then attempted local manual operation and noted 1-FVC-74-3 could be manually closed without binding. Valve 1-FCV-74-3 was partially manually closed and then reopened from the MCC without incident. Due to the relationship between valves 1-FCV-63-72 and 1-FCV-74-3 (interlocks, shared wiring in junction boxes, etc.) the licensee suspected that the failure of valve 1-FCV-74-3 to close and valve 1-FCV-63-72 dual position indication were related.

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The licensee subsequently opened the 1-FCV-63-72 actuator and noted that a significant amount of water had accumulated inside the actuator. This water caused significant electrical shorting in the valve control circuit and rendered the valve inoperable. Also, the water affected valve 1-FCV-74-3, as this valve utilizes contacts from valve 1-FCV-63-72 circuitry. It was noted that a low current short caused the failure of the closing coil for valve 1-FCV-74-3. Following repairs to both 1-FCV-63-72 and 1-FCV-74-3, the ECCS system was returned to operable status on August 17 at 0200.

The licensee's past operability determination concluded that 1-FCV-63-72 and 1-FCV-74-3 were likely inoperable beginning on August 8 when 1-FCV-63-72 was noted to have a dual indication. Thus the 'A' train ECCS system was most likely inoperable for approximately nine days, which exceeded the TS allowable outage time. On October 21, 2013, Licensee Event Report 50-327/2013-003 was submitted as a result of this issue. The licensee concluded that the source of the water was ground water that had migrated through the concrete ceiling that housed the valve and actuator cables. The ground water leaked through the threaded penetration seal and inside the conduit and flowed down into the valve actuator. During the most recent Unit 1 refueling outage in November 2013, the licensee redesigned the conduit penetration to prevent the intrusion of moisture into the conduit. The licensee noted the rate of moisture intrusion was most likely higher in the recent months due to a higher than normal amount of rainfall that temporarily raised the water table in the vicinity of the plant. The inspectors also noted that on February 29, 2012, the licensee discovered water buildup in the actuator of 1-FCV-63-72. This deficiency was entered into the CAP; however it appears that this precursor was not adequately evaluated such that continued water intrusion ultimately led to the failure noted on August 8, 2013.

Analysis: The licensee's failure to take timely actions to correct a condition adverse to quality was a performance deficiency. The inspectors concluded that testing and inspection could have determined that valve 1-FCV-63-72 was inoperable much earlier than August 14 when it was noted that RHR suction valve to the RWST, 1-FCV-74-3, did not pass its routine surveillance test. This finding was determined to be more than minor because it was associated with the Design Control attribute of the Mitigating Systems cornerstone and adversely affected the cornerstone's objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences (i.e., core damage). Specifically, the finding reduced the reliability and capability of the 'A' train RHR system to perform its safety function as designed. Using IMC 0609.04, "Initial Characterization of Findings," dated June 19, 2012, and IMC 0609, Appendix A, Exhibit 4 – "External Events Screening Questions," dated June 19, 2012, the finding required a detailed risk analysis as the 'A' RHR system was inoperable beyond its TS-allowed outage time of 72 hours. The detailed risk analysis concluded that the finding was of very low safety significance (Green).

A Phase 3 analysis was performed by the regional Senior Reactor Analyst to determine the impact of the finding. The analysis assumed a recoverable failure of the 1-FCV-63-72 valve, along with a dependent failure of the 1-FCV-74-3 valve. The major impacts were in the swapover from the RWST to the containment sump as the source of water to

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mitigate medium and smaller LOCA sequences. Because of the low exposure time, the availability of the opposite train, and the ability of the operations staff to operate the effected valves manually, the finding was determined to be Green.

The cause of this finding was determined to have a cross-cutting aspect relating to the proper classification, prioritization, and evaluation of operability and reportability of conditions adverse to quality in the Corrective Action component of the Problem Identification and Resolution area, in that, on February 29, 2012, the licensee discovered water buildup in the actuator of 1-FCV-63-72 and did not adequately evaluate the condition adverse to quality such that continued water intrusion ultimately led to the failure noted on August 8, 2013. [P.1(c)]

Enforcement: Title 10 of the Code of Federal Regulations Part 50, Appendix B, Criterion XVI, "Corrective Action," requires, in part, that measures shall be established to assure that conditions adverse to quality, such as failures, malfunctions, deficiencies, deviations, defective material and equipment, and non-conformances are promptly identified and corrected. Contrary to the above, from August 8 through August 17, 2013, the licensee failed to assure that a condition adverse to quality, the failure of valve FCV-63-72, was corrected in a timely manner. Specifically, the licensee failed to sufficiently evaluate and correct a moisture intrusion problem associated with the RHR containment suction motor-operated valve. Corrective actions taken by the licensee included redesigning and modifying the conduit penetration to prevent the intrusion of moisture into the conduit. The violation was entered into the licensee's CAP as PER 772193. This violation is being treated as an NCV, consistent with Section 2.3.2 of the Enforcement Policy and will be identified as NCV 05000327/2013005-01, "Unit 1 Train 'A' RHR Containment Suction Valve Failure."

.2 Quarterly Resident Inspector Observations of Security Personnel and Activities

a. Inspection Scope

During the inspection period, the inspectors conducted observations of security force personnel and activities to ensure that the activities were consistent with licensee security procedures and regulatory requirements relating to nuclear plant security. These observations took place during both normal and off-normal plant working hours.

These quarterly resident inspector observations of security force personnel and activities did not constitute any additional inspection samples. Rather, they were considered an integral part of the inspectors' normal plant status review and inspection activities.

b. Findings

No findings were identified.

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.3 Review of the Operation of an Independent Spent Fuel Storage Installation (ISFSI) (60855.1)

a. Inspection Scope

The inspectors performed a walkdown with the field operator of the ISFSI storage pad on December 26, 2013, 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 40 multi-purpose canisters (MPCs) positioned on the ISFSI pad. The inspectors verified the MPC vents were in good condition and free of obstruction. The inspectors also verified natural circulation within 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 10 CFR 72.48. Documents reviewed are listed in the Attachment.

b. Findings

No findings were identified.

4OA6 Meetings

.1 Exit Meeting Summary

On January 13, 2014, the resident inspectors presented the inspection results to Mr. Carlin and other members of his staff, who acknowledged the finding. The inspectors asked the licensee whether any of the material examined during the inspection should be considered proprietary. No proprietary information was identified.

ATTACHMENT: SUPPLEMENTARY INFORMATION

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SUPPLEMENTARY INFORMATION

KEY POINTS OF CONTACT

Licensee personnel

J. Alfultis, Director of Modifications & Projects
J. Carlin, Site Vice President
J. Cross, Chemistry Manager
A. Day, Radiation Protection Manager
D. Erb, Work Control Manager
M. Henderson, ISI Program Engineer
H. Hill, Rad Waste Superintendent
J. Johnson, Program Manager Licensing
A. Little, Site Security Manager
K. Loomis, Boric Acid Program Engineer
T. Marshall, Operations Manager
M. McBrearty, Licensing Manager
S. McCamy, Quality Assurance Manager
S. Mohorn, Rad Waste Superintendent
P. Noe, Director Safety and Licensing
C. Owens, Rad Waste HP
W. Pierce, Site Engineering Director
P. Pratt, Manager, Maintenance
J. Rolph, Radiation Protection Technical Support Superintendent
P. Simmons, Plant Manager
K. Smith, Director of Training
D. Sutton, Licensing
J. Stamey, Rad Waste Health Physicist
J. Stewart, Chemist

NRC personnel

S. Lingam, Project Manager, Office of Nuclear Reactor Regulation

LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

Opened and Closed

05000327/2013005-01	NCV	Unit 1 Train 'A' RHR Containment Suction Valve Failure (Section 4OA5)
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Closed

05000327/2013004-01	URI	Water Intrusion Into Actuator of Valve 1-FCV-63-72 (Section 4OA5)
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LIST OF DOCUMENTS REVIEWED

Section 1R01: Adverse Weather Protection

Procedures

0-PI-OPS-006.0, Freeze Protection, Rev. 55

Service Requests (SRs)

SR 807550

SR 825408

SR 821489

Section 1R04: Equipment Alignment

Partial System Walkdowns

Procedures

0-GO-16, System Operability Checklists, Rev. 4

Other documents

UFSAR Section 9

Procedures

0-SI-OPS-030-021.A, Auxiliary Building Gas Treatment System Train A, Rev. 6

0-SI-OPS-030-021.B, Auxiliary Building Gas Treatment System Train B, Rev. 6

0-SO-30-18, Auxiliary Building Gas Treatment System, Rev. 14

0-SO-65-1, Emergency Gas Treatment System Air Cleanup and Annulus Vacuum, Rev. 27

0-SO-30-1, Control Building Heating, Air Conditioning, and Ventilation, Rev. 39

0-SO-30-10, Auxiliary Building Ventilation Systems, Rev. 54

Section 1R05: Fire Protection

Procedures

FPDP-1, Conduct of Fire Protection, Rev. 2

0-PI-FPU-317-299.W, Att. 8, Shift Check List, Rev. 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, Rev. 28

Other documents

Fire Protection Pre-Fire Plans for Unit 1 Lower Containment Building

Fire Protection Pre-Fire Plans for Unit 2 Lower Containment Building

Fire Protection Pre-Fire Plans for Control Building Elevation 685 (Auxiliary Instrument Room)

Fire Protection Pre-Fire Plans for Control Building Elevation 706 (Cable Spreading Room)

Fire Protection Pre-Fire Plans for ERCW Building - Elevations 688/704/720

Fire Protection Pre-Fire Plans for Turbine Building - Elevations 662/685

Section 1R06: Flood Protection Measures

Work Orders

WO 11108121224, Check Standing Water Level in Manholes/Handholes

Enclosure

Other documents

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

Section 1R08: Inservice Inspection ActivitiesProcedures

N-VT-15 - Visual Examination of Class MC and Metallic Liners of Class CC Components of Light-Water cooled Plants, Rev. 11

N-VT-16 – General Visual Examination Containment Vessel Integrity Verification, Rev. 05

N-UT-67 – Generic Procedure for Straight Beam Ultrasonic Examination of Bolts and Studs, Rev. 05

PDI-UT-5 – Generic Procedure for Straight Beam Ultrasonic Examination of Bolts and Studs, Rev. D34

IEP-200 – Qualification and Certification Requirements for TVA Inspection Services Organization (ISO) Nondestructive (NDE) Personnel, Rev. 13

Corrective Action Documents

PER 618770 – Boron buildup on 1B-B SIS Pump Pedestal

PER 691545 – Boric acid build up and wet boric acid are present on transmitter sensing line 1-ft-72-41

PER 01-010244 – Minor concrete voids in U1C11 Vt-3 inspection

PER 169175 – Airline cracks in ceiling beneath reactor cavity and reactor wall

SR 797854 – Hairline cracking in the concrete beneath the fuel transfer canal in lower containment

SR 526607 – Spalling on baseplate of Protection Device No. 1 on Drawing 48N1701-17.

SR 797166 – Boric acid on Reactor Coolant Pump #1 on #3 seal

SR 797061 – Boric acid on valve 1-FCV-063-0098

SR 797072 – Two areas of white deposit in Fan Room 2

Other documents

Periodic Instruction 0-PI-DXI-000-116.2, ASME Section XI IWE/IWL Containment Inservice Inspection (CSI) Program, Rev. 05

Q-NIC-100 – Written Practice for the Qualification and Certification of Nondestructive Examination (NDE) Personnel, Rev. 20-TVA

IHI Southwest Technologies, Inc. Operating Procedure 2.0-NDES-001, Nondestructive Examination Personnel Qualification and Certification, Rev. 06

WO 113312025 – Modify Component Cooling Piping to eliminate interference with actuator for 1-FC-063-011

Section 1R12: Maintenance EffectivenessProcedures

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

Other documents

MR 11th Periodic Assessment Report (PE sample)

Cause Determination and Evaluation (CDE) #2700, FCV-63-72 Failure

CDE #2696, EBGTS 'B' Fan Failure

CDE #2686, 'A' Shutdown Boardroom Chiller Failure
 CDE #2674, 'B' Main Condenser Test Connection Failure

Section 1R13: Maintenance Risk Assessments and Emergent Work Control

Procedures

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

Section 1R15: Operability Determinations and Functionality Assessments

Procedures

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

PERs

789552 - Unit 2 Turbine Controls in Manual
 795451 - POE WO 113223153 T1 motor lead pinch
 799097 - POE TS LCO 3.7.4 action for FCV-67-146
 800432 - POE (ABSCE boundary issue)
 795433 - PDO (During U1R19 water found leaking out of conduit in bioshield wall)
 801415 - PDO EDG 1B 2 sec load sequence
 803833 - PDO U-1 Rx Head Vent Valve Stroke
 816731, 815638, 817841 - FEs associated with the Unit 1 loose parts alarm

Section 1R18: Plant Modifications

Procedures

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

Other documents

DCN 22643 – Replace Pressurizer PORVs

Section 1R19: Post Maintenance Testing

Procedures

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

Work Orders

114306842 – Disassemble and reassemble valve in support of 113716425
 114306841 – Remove actuator, install actuator, set up calibration in support of 113716425
 114325805 – Disassemble and reassemble valve in support of 113716459
 114325799 – Remove and install actuator in support of 113716459
 113756597 – PORVs – PCV-68-340 & pcv-68-334 Replacement activities
 113377829 – Repack Valve (1-LCV-3-175) and perform AIRCET test
 112096045 – Repair isolation check valve (1-VLV-026-1296)
 111234712 – 5 year PM to swap 480V Shutdown board breaker with a refurbished breaker
 113806636 – Perform 0-MI-EPM-317-102.0 on CCS pump C-S and clean/replace motor air filter
 114560807 – CCP room cooler fan motor current check, bearing lubrication and cleaning
 114198329 – EQ maintenance and inspection
 113408190 – Change out electrolytic capacitors in the Woodward 2301A governor card

Section 1R20: Refueling and Other Outage Activities**Procedures**

FHI-3, Movement of Fuel, Rev. 65
 0-GO-15, Containment Closure Control, Rev. 34
 0-GO-13, Reactor Coolant System Drain and Fill Operations, Rev. 71
 NPG-SPP-08.1, Nuclear Fuel Management, Rev. 00
 0-PI-OPS-000-011.0, Containment Access Control During Modes 1-4, Rev. 1

Section 1R22: Surveillance Testing**Procedures**

NPG-SPP-06.9.1, Conduct of Testing, Rev. 8
 0-SI-SXV-072-266.0, ASME Code Valve Testing, Rev. 12
 0-SI-OPS-068-137.0, Reactor Coolant System Water Inventory, Rev. 32
 0-SI-SFT-072-138.0, Unit 1 Containment Spray – Spray Nozzle Test, Rev. 6
 0-SI-SLT-081-258.1, Unit 1 Primary Water LLRT, Rev. 5
 0-SI-SLT-088-259.1, Upper Personnel Airlock Overall Leak Rate Test and General Inspection, Rev. 6
 0-SI-SLT-088-259.4, Upper Personnel Airlock Interlock Operability Test, Rev. 2
 1-SI-SXP-003-202.B, Motor Driven Auxiliary Feedwater Pump 1B-B Comprehensive Performance Test, Rev. 7
 1-SI-SXP-074-202.0, RHR Pump 1A-A and 1B-B Comprehensive Performance and Check Valve Test, Rev. 10
 0-SI-OPS-068-137.0, Reactor Coolant System Water Inventory, Rev. 32
 1-SI-OPS-088-001.0, Phase A Isolation Test, Rev. 14
 1-SI-OPS-082-026A, Loss of Offsite Power with Safety Injection D/G 1A-A Test, Rev. 46
 0-SI-SFT-072-138.0, Unit 1 Containment Spray – Spray Nozzle Test, Rev. 6
 0-SI-SXV-063-203.2, Full Stroking of Safety Injection Cold Leg Accumulator Isolation Valves, Rev. 1
 0-SI-MIN-061-105.0, Ice Condenser Ice Weighing, Rev. 11
 0-SI-SLT-067-258.2, Containment Isolation Valve Local Leak Rate Test Lower Compartment Essential Raw Cooling Water, Rev. 13

PERs

801081, FME concern while performing air flow test during core reload

Other documents

1-47W437-4, Mechanical Containment Spray System Piping, Rev. 1
 1-47W437-5, Mechanical Containment Spray System Piping, Rev. 4
 1-47W812-1, Flow Diagram Containment Spray System, Rev. 45
 Technical Specification Surveillance Requirement 4.6.2.1.1.d and 4.6.2.1.2.b

Section 1EP2: Alert and Notification System EvaluationProcedures and Reports

NP-REP, Appendix B, Sequoyah Nuclear Plant Radiological Emergency Plan, Rev. 101
 EPFS-9, Inspection, Service, and Maintenance of the Prompt Notification System (PNS) at Browns Ferry, Sequoyah, and Watts Bar Nuclear Plants, Rev. 8
 Sequoyah FEMA REP-10 Report, Revision 2
 EPDP-10, Facilitation of the ANS and Notification Tests, Rev. 6
 EPDP-14, Evaluation of Changes to Alert and Notification Systems (ANS), Rev 0

Records and Data

Weekly Silent Tests, 2011-September 2013
 Monthly Siren Tests, October 2011 – October 2013

Corrective Action documents

442747; During Monthly Siren Test Five Sirens Did Not Operate
 521663; Siren Damaged by Storm
 591666; Two ANS Sirens Failed to Operate During Monthly Test
 701363; Siren Relocations Due to Land Owner Rejections
 711912; Loss of DC Power Indication for ANS Siren 12
 727891; Loss of DC Power Indication for ANS Siren 26
 751936; Two ANS Sirens Failed to Operate During Monthly Test

Section 1EP3: Emergency Response Organization Staffing and Augmentation SystemProcedures

TRN-30, Radiological Emergency Preparedness Training, Rev. 24
 EPDP-3, Emergency Plan Exercises and Preparedness Drills, Rev. 7
 EPDP-10, Facilitation of the Alert and Notification System and Pager Tests, Rev. 6
 EPIP-3, Alert, Rev 36
 EPIP-6, Activation and Operation of the Technical Support Center, Rev. 49
 EPIP-7, Activation and Operation of the Operations Support Center, Rev. 28

Records and Data

SNQ-EP-S-13-02, snapshot self-assessment SCBA Qualification of Site Personnel, March 2013
 EPT202.000, ERO Training Plan – TSC Training, Rev. 12
 EPT900.010, ERO Training Plan, ERO Fundamentals, Rev. 4
 Radiological Emergency Preparedness Training Oversight Committee minutes 2012/2013
 2012/2013 ERO Augmentation test results
 Results of periodic ERO notification tests

Corrective Action documents

786990; TRN error in CECC qualification requirement

Section 1EP4: Emergency Action Level and Emergency Plan Changes

Change Packages

TVA Radiological Emergency Plan, Revs. 99 and 100
 EPIP-1, "Emergency Plan Classification Matrix," Revs. 48 and 49
 CECC EPIP-2, "Operations Duty Specialist Procedure for Notification of Unusual Event," Rev. 43
 CECC EPIP-3, "Operations Duty Specialist Procedure for Alert," Rev. 44
 CECC EPIP-4, "Operations Duty Specialist Procedure for Site Area Emergency," Rev. 45
 CECC EPIP-5, "Operations Duty Specialist Procedure for General Emergency," Rev. 50
 CECC EPIP-7, "CECC Radiological Assessment Staff Procedure for Alert, Site Area Emergency, and General Emergency," Rev. 34
 TVA Radiological Emergency Plan, Rev. 101
 Evacuation Time Estimate Study Update

Section 1EP5: Maintenance of Emergency Preparedness

Procedures

CECC EPIP-9, Emergency Environmental Radiological Monitoring Procedures, Rev. 49
 EPDP-17, NPG Emergency Plan Effectiveness Review [10 CFR 50.54(q)], Rev. 3
 NPG-SPP-7.1, On-Line Work Management, Rev. 10
 NPG-SPP-18.3.5, Designated Emergency Response Equipment (DERE), Rev. 0
 NPG-SPP-22.300, Corrective Action Program, Rev. 0

Records and Data

Drill and exercise reports 2011-2013
 TVA Quality Assurance Audit Report SSA 1203 dated April 16, 2012
 TVA Quality Assurance Audit Report SSA 1305 dated June 17, 2013
 Focused Self-Assessment SQN-EP-F-13-001, NRC Inspection Preparation
 SQN QA Quarterly Rating Report August 13, 2013

Corrective Action documents

571999; Maintenance Personnel Not Evacuated in a Timely Manner During REP Drill
 572584; RP Was Slow to Perform Airborne Sampling During REP Drill
 608785; Dose assessment error
 581795; No Additional Fire Brigade Personnel Onsite During REP Drill
 582858; TSC SED Filled Out Wrong Form Which Delayed CECC PAR Development
 582751; MERT Failed 4 of 6 Drill Objectives
 619808; RP Tech Left Team to Get Equipment During Graded Exercise
 619847; Inside Van Tech Did Not Grab All Equipment Required During Graded Exercise
 695758; MET Unavailable – Lessons Learned
 704845; Evaluate EPIP-1 Classification of EAL 4.2 for Explosion
 708940; Questioned CET Readings During Drill
 711961; REP Assignment Cannot Meet 1-Hour Requirement to Respond
 720352; 8 Personnel Were Not Accounted For During REP Drill
 722951; KI Tablets Should Be Evaluated for Issue Earlier Under Emergency Conditions
 732171; Clarify EPDP-11 regarding 10 CFR 50.54(t) requirements
 751183; Wrong Pocket Ion Chambers in REP Van #3

Section 2RS1: Radiological Hazard Assessment and Exposure Controls

Procedures, Guidance Documents, and Manuals

NPG-SPP-05.1.1, Alpha Radiation Monitoring Program, Rev. 3
 NPG-SPP-05.6, Controlling Byproduct and Source Material, Rev. 2
 NPG-SPP-22.300, Corrective Action Program, Rev. 0
 RCDP-1, Conduct of Radiological Controls, Rev. 5
 RCI-01, Radiation Protection Program, Rev. 78
 RCI-14, Radiation Work Permit (RWP) Program, Rev. 57
 RCI-15, Radiological Postings, Rev. 24
 RCI-17, Control of Byproduct and Source Material, Rev. 19
 RCI-18, Vacuum Cleaner Control Within the Radiologically Controlled Area, Rev. 9
 RCI-21, Control of Radioactive Materials, Rev. 19
 RCI-29, Control of Radiation Protection Keys, Rev. 15
 RCI-101, Radiation Operations Routines, Rev. 3
 RCI-106, Radiation Protection Standards and Expectations, Rev. 3
 RCI-201, Radiation and Contamination Surveys, Rev. 13
 RCI-202, Airborne Radioactivity Surveys, Rev. 7
 RCI-204, Radiological Surveys of Equipment and Materials Leaving the RCA, Rev. 7
 RCI-209, Radiological Surveys of Personnel Leaving the RCA or Protected Area, Rev. 3
 RCI-301, Radionuclide Tracking and Assessment (RTA) Program, Rev. 2
 RCI-412, Radiation Protection Surveys during Initial Spent Fuel Assembly Movement, Rev. 1
 RCI-417, Radiological Monitoring of the Hydrogen Peroxide Injection Crud Burst, Rev. 1
 RCTP-106, Special Dosimetry Operations, Rev. 2
 0-TI-NUC-000-002.0, Storing Material in Spent Fuel Pool or New Fuel Vault, Rev. 21

Records and Data

Air Sample Detail Report for 10/13/2013 thru 11/5/2013, 11/5/2103
 Air Sample 101713018, U1 Equipment Pit, 10/17/2013
 Air Sample 101813018, U1 734' RFF GA, 10/18/2013
 Air Sample 102313006, U1 Rx Head Stand, 10/23/2013
 Air Sample 102313014, U1 653' 1B RHR Pump Room, 10/23/2013
 Air Sample 102313023, U1 653' 1B RHR Pump Room, 10/23/2013
 Air Sample 102613003, U1 Upper Rx Head O-ring Cleaning, 10/26/2013
 Air Sample 110213012, U1 Upper GA, 11/2/2013
 ALARA Plan 2013-010, Refueling Operations
 ALARA Plan 2013-011, Mechanical Maintenance Group (MMG)
 ALARA Plan 2013-018, MODS - Ice Condenser/Snubbers/Insulation/Scaffolds/Painting
 Instrument Calibration/Check Source Certificates:
 Vendor Source No. I3-328, TVA No. 2530, 7/29/2011
 Vendor Source No. I3-329, TVA No. 2531, 7/29/2011
 Vendor Source No. I3-330, TVA No. 2532, 7/29/2011
 Vendor Source No. G4-975, TVA No. 2483, 10/9/2009
 Vendor Source No. 92421, TVA No. 2571, 12/7/2012
 Vendor Source No. 52736-185D2, TVA No. 2245, 5/19/2003
 Instrument Calibration Records:
 Canberra GEM-5 Personnel Monitor, Serial No. 0909-179, 3/23/2012 and 3/18/2013
 ARGOS-5AB Personnel Monitor, Instrument No. 860587, 5/11/2012 and 5/2/2013
 iSolo, Instrument No. 860494, 12/6/2012 and 10/11/13

Small Article Monitor (Cronos 11), Instrument No. 860653, 8/17/2012 and 7/16/2013
 Small Article Monitor (SAM-11), Instrument No. 860325, 7/6/2012 and 11/17/2012
 List of Active SQN Temporary Shielding Request Forms (TSRFs), 11/6/2013
 National Source Tracking System Annual Inventory Reconciliation Confirmation, 1/24/2013
 National Source Tracking System Inventory Report, Sequoyah Nuclear Plant, 1/24/2013
 RWP Dose by Work Step Report for ALARA Plans 2013-010 to 2013-021 for the period
 10/14/2013 thru 11/6/2013
 RWP Total Dose, Hours and Dose Rate Report for the period 10/14/2013 thru 11/5/2013
 RWP Work Step Dose and Dose Rate Alarm Setpoints for RWP 13140052, 11/5/2013
 RWP 13120122, U1 Seal Table work
 RWP 13140002, U1 Upper Containment High Rad Area Mechanical Maintenance
 RWP 13140052, HRA U1 Refueling Activities for AREVA and Boilermakers
 RWP 13140072, U1 HRA MODS Work: Snubbers, Scaffold, Insulation, Painting
 RWP 13140172, U1 Rx Head Insulation
 RWP 13140252, HRA U1 Upper Containment Rx Cavity
 RWP 13140352, U1 HRA Head O-Ring Surface Work & Inspection (Multibadging)
 RWP 13140353, U1 Equipment Pit – LHRA Vortex Suppressors
 RWP 13140453, U1 Upper Containment, Rx Cavity, LHRA, CRDM duct work, (Multibadging)
 Radiological Survey SQN-M-20131014-23 and SQN-M-20131104-2, U1 Containment
 Equipment Pit
 Radiological Survey SQN-M-20131021-3, SQN-M-20131014-6, SQN-M-20131014-15, and
 SQN-M-20131014-22, U1 Containment Accumulator Rooms #1, #2, #3, and #4
 Radiological Survey SQN-M-20131014-32 and SQN-M-20131017-9, U1 Containment Top of
 Pressurizer
 Radiological Survey SQN-M-20130909-1 and SQN-M-20131014-8, U1 Containment Raceway
 Radiological Survey SQN-M-20131014-14, SQN-M-20131014-7, and SQN-M-20131014-5, U1
 Containment Steam Generator Primary Platform #1, #2, and #3
 Radiological Survey SQN-M-20131014-17 and SQN-M-20131020-7, U1 Containment Inside
 Polar Crane Wall
 Radiological Survey SQN-M-20131021-21, SQN-M-20131014-10, and SQN-M-20131014-18,
 U1 Containment RCP Platform #1, #2, and #3
 Radiological Survey SQN-M-20131020-16, SQN ISFSI Pad
 Radiological Survey SQN-M-20121212-8, U2 Letdown Heat Exchanger Room
 Radiological Survey SQN-M-20131014-26, U1 Letdown Heat Exchanger Room
 Radiological Survey SQN-M-20130502-11 and SQN-M-20131005-1, U1 651' Waste Evaporator
 Feed Pump Room
 Radiological Survey SQN-M-20131018-1 and SQN-M-20131025-1, Radiochemistry Lab
 Radiological Survey SQN-M-20130617-3, SQN-M-20131007-1, and SQN-M-20131104-4,
 Equipment Decon Room
 Radiological Survey SQN-M-20130823-3, and SQN-M-20131016-24, Spent Fuel Heat
 Exchanger Room
 Radiological Survey SQN-M-20130920-5, SQN-M-20131020-4, and SQN-M-20131028-7, Spent
 Fuel Pool Area
 Radiological Survey SQN-M-20131015-8, SQN-M-20131020-9, and SQN-M-20131024-7, 1A
 RHR Pump Room
 Radiological Survey SQN-M-20131015-11, SQN-M-20131022-8, and SQN-M-20131023-10, 1B
 RHR Pump Room
 Radiological Survey SQN-M-20131101-10, 2B RHR Pump Room

Radioactive Sealed Source Leak Test Certification, Source ID 0413-00-00, 7/23/09 and 1/25/10
Sequoyah Nuclear Plant Annual Radionuclide Trending and Assessment Report for 2011,
6/30/2012

Sequoyah Nuclear Plant Annual Radionuclide Trending and Assessment Report for 2012,
4/18/2013

U1R19 Radiation Protection Status Report, 11/5/2013

U1R19 RCS Shutdown Co-58 Activity Graphs (Crud Burst Cleanup), 11/5/2013

U1R19 Crud Burst Cleanup Dose Rate Trending Graphs (1A and 1B RHR Pump and Heat
Exchanger rooms, and 690' and 669' Pipe Chases near RHR Lines), 11/5/2013

Waste Stream Report (10 CFR Part 61 Waste Characterization), DAW 10-22-2010, 5/11/2011

Waste Stream Report (10 CFR Part 61 Waste Characterization), DAW 3-22-2012, 11/4/2012

WO 114067330, 0-SI-RCI-000-056.0 Byproduct Material Inventory and Sealed Source Leak
Test, 7/8/2013

WO 114139751, 0-SI-RCI-000-056.0 Byproduct Material Inventory and Sealed Source Leak
Test, 12/17/2012

CAP Documents

Apparent Cause Evaluation PER Report, SQN PER 782859, 10/20/2013

Site Audit Report SSA1309, Radiation Protection Sequoyah Nuclear Plant, 9/16/2013

TVA Nuclear Power Group Benchmarking Report SQN-RP-I-13-BM09, 8/23/2013

PERs

PER 626962

PER 629341

PER 657724

PER 659369

PER 782859

PER 788604

PER 790597

PER 793236

PER 793935

PER 799256

PER 802329

Section 2RS8: Radioactive Solid Waste Processing and Radioactive Material Handling, Storage, and Transportation

Procedures, Manuals, and Guides

Energy Solutions Cask Book for Model 8-120B USA/9168/B(U)

NPG-SPP-05.7, Radwaste Management, Rev. 0

Process Control Program (PCP), Rev. 4

Radioactive Material Shipment Manual (RMSM, Vol.II –Radioactive Material Shipment, Rev. 42

Radioactive Material Shipment Manual (RMSM, Vol.III –Radwaste Shipment, Rev. 39

RCI-06, Receipt of Radioactive Materials, Rev. 19

RCI-21 Control of Radioactive Materials, Rev. 19

RHSI-1, Packaging Dry Active Waste for Shipment to a Waste Processor/Broker or a
Commercial Radwaste Burial Facility, Rev. 10

RHSI-1.1, Packaging Filters and Items of High Levels of Radiation, Rev. 6

RHSI-6, Bead Resin Activated Carbon Dewatering Procedure for Energy Solutions 14-215 or Smaller Liners, Rev. 8
 RHSI-7, Utilization of Polyethylene High Integrity Containers (HICs) and HIC Overpacks, Rev. 9
 RHSI-11, Control of Radioactive Material and Training, Rev. 6
 RHSI-13, Administration and Control of Onsite Storage of Low Level Radioactive Waste, Rev. 4
 RWTP-100 Attachment A, Radwaste Training Program, Rev. 3
 RWTP-100, Radioactive Material/Waste Shipments, Rev. 7
 RWTP-101, 10 CFR 61 Waste Characterization, Rev. 2
 RWTP-102, Use of Casks, Rev. 2
 O-SO-77-29, Waste Processing, Rev. 9
 O-VI-RCI-077-001.0, Operating Procedure for Duratek Modular Fluidized Transfer Demineralizer System (MFTDS), Rev. 2

Shipping Records and Radwaste Data

Two Design Change Notices were reviewed and both have been accomplished. The first moved Radwaste liquid processing from the railroad bay into the drumming room that was in effect at the start of the period which included back to November 2010 and the second established a lift system to be used for the steam generator replacement in 2012 with a closure date of 8/13/2013.

The licensee provided several drawings delineating abandoned equipment. The inspector chose the abandoned boric acid evaporator system to review.

Shipments:

SNP-12-0111 (LQ)
 SNP-13-0105 (SCO)
 SNP-13-0109 (Type B)
 SNP-13-0307 (LSA)
 SNP-13-0504 (Type A)

CAP Documents

Site Audit Report SSA1309, Radiation Protection, August 19 through August 30, 2013
 Snapshot Self-Assessment Report SQN-RP-S-13-004, Radioactive Solid Waste Processing and Radioactive Material Handling, Storage and Transportation, July 29 through August 9, 2013

PERs

412285
 431332
 488136
 635127
 735591
 765281
 767526
 783784

Section 40A1: Performance Indicator Verification

Procedures, Manuals, and Guides

NSDP-29, Tracking and Trending and NRC Performance Indicators, Rev. 6

NPG-SPP-02.2, "Performance Indicator Program", Rev. 5

RCI-151, Radiation Protection Functional Area Performance Indicators, Rev. 1

PERs

621990

623246

626962

653648

655642

788604

793921

794437

Section 40A2: Problem Identification and Resolution

Procedures

NPG-SPP-03.1, Corrective Action Program, Rev. 1

Section 40A5: Other Activities

0-GO-17, Spent Fuel/Dry Cask Operations, Rev. 5

NPG-SPP-01.2, Administration of Site Technical Procedures, Rev. 9

NFTP-100, Fuel Selection for Dry MPC Storage, Rev. 5 completed for campaign #6

10CFR 72.48 Screening/Evaluation: EDC E22443C

SQN-DCS-300.11, Supplemental Cooling System Operation, Rev. 9

CTP-DCS-100.0, Dry Cask Storage Campaign Guidelines, Rev. 15

SQN-DCS-200.0, Dry Cask Campaign Review Program, Rev. 4

SQN-DCS-200.2, SQN-MPC-Loading and Transport Operations, Rev. 35

LIST OF ACRONYMS

ABGTS	auxiliary building gas treatment system
ALARA	as low as reasonably achievable
ASME	American Society of Mechanical Engineers
BACC	boric acid corrosion control
CAP	corrective action program
CCP	centrifugal charging pump
CDE	cause determination evaluation
CFR	Code of Federal Regulations
CIV	containment isolation valve
DAW	dry active waste
DOT	Department of Transportation
ECCS	emergency core cooling system
ED	electronic dosimeter
ERCW	essential raw cooling water
FCV	flow control valve
FME	foreign material exclusion
HRA	high radiation areas
IMC	inspection manual chapter
IP	inspection procedure
ISFSI	independent spent fuel storage installation
ISI	in-service inspection
MCC	motor control center
MPC	multi-purpose canister
NCV	non-cited violation
NDE	non-destructive examination
NEI	Nuclear Energy Institute
PER	problem evaluation report
PORV	power operated relief valve
Radwaste	radioactive waste
RCA	radiologically controlled area
Rev	revision
RHR	residual heat removal
RS	radiation safety
RTP	rated thermal power
RWP	radiation work permit
RWST	refueling water storage tank
SDP	significance determination process
SI	safety injection
SR	service request
SSC	structure, system, or component
TS	technical specification
TVA	Tennessee Valley Authority
URI	unresolved item
UT	ultrasonic testing
UFSAR	Updated Final Safety Analysis Report
WO	work order