



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

May 1, 2017

Mr. Keith Taber, Vice President
Southern Nuclear Operating Company, Inc.
Vogtle Electric Generating Plant
7821 River Road
Waynesboro, GA 30830

**SUBJECT: VOGTLE ELECTRIC GENERATING PLANT - NRC INTEGRATED INSPECTION
REPORT 05000424/2017001; AND 05000425/2017001**

Dear Mr. Taber:

On March 31, 2017, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at your Vogtle Electric Generating Plant, Units 1 and 2. On April 5, 2017, the NRC inspectors discussed the results of this inspection with you and other members of your staff. Inspectors documented the results of this inspection in the enclosed inspection report.

The inspections examined activities conducted under your license as they relate to safety and compliance with the Commission's rules and regulations and with the conditions of your license. The inspectors reviewed selected procedures and records, observed activities, and interviewed personnel. No findings were identified.

This letter, its enclosure, and your response (if any) will be made available for public inspection and copying at <http://www.nrc.gov/reading-rm/adams.html> and at the NRC Public Document Room in accordance with 10 CFR 2.390, "Public Inspections, Exemptions, Requests for Withholding."

Sincerely,

/RA/

Shane Sandal, Chief
Reactor Projects Branch 2
Division of Reactor Projects

Docket Nos. 50-424 and 50-425
License Nos. NPF-68 and NPF-81

Enclosure:
IR 05000424/2017001; 05000425/2017001
w/Attachment: Supplemental Information

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SUBJECT: VOGTLE ELECTRIC GENERATING PLANT - NRC INTEGRATED INSPECTION
REPORT 05000424/2017001; AND 05000425/2017001 May 1, 2017

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REGION II

Docket Nos.: 50-424, 50-425

License Nos.: NPF-68, NPF-81

Report No.: 05000424/2017001 and 05000425/2017001

Licensee: Southern Nuclear Operating Company, Inc.

Facility: Vogtle Electric Generating Plant, Units 1 and 2

Location: Waynesboro, Georgia

Dates: January 1, 2017 through March 31, 2017

Inspectors: M. Endress, Senior Resident Inspector
A. Alen, Resident Inspector
D. Mas-Peñaranda, Project Engineer
R. Carrion, Senior Reactor Inspector (1R08)
R. Williams, Senior Reactor Inspector (1R08)

Approved by: Shane Sandal, Chief
Reactor Projects Branch 2
Division of Reactor Projects

Enclosure

SUMMARY

IR 05000424/2017001 and 05000425/2017001, January 1, 2017 through March 31, 2017; Vogtle Electric Generating Plant, Units 1 and 2; Quarterly Integrated Inspection Report.

The report covered a three-month period of inspection by resident and regional inspectors. The Nuclear Regulatory Commission's program for overseeing the safe operations of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 6. Documents reviewed by the inspectors which are not identified in the Report Details are identified in the List of Documents Reviewed section of the Attachment.

REPORT DETAILS

Summary of Plant Status

Unit 1 began the report period at full rated thermal power (RTP). On February 3, 2017, operators manually tripped the unit when the loop 1 steam line outboard main steam isolation valve (MSIV) began to drift closed. The cause of the MSIV drifting closed was a hydraulic fluid leak on the valve's actuator. Following repairs, the unit was restarted on February 7, 2017, and attained full RTP on February 8, 2017. On March 12, 2017, the unit was shut down for planned refueling outage 20 (1R20) and remained shut down for the remainder of the inspection period.

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

1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, and Barrier Integrity

1R04 Equipment Alignment (71111.04) – 4 samples

a. Inspection Scope

Partial Walkdown: The inspectors verified that critical portions of the following four systems were correctly aligned by performing partial walkdowns. The inspectors determined the correct system lineup by reviewing plant procedures and drawings listed in the Attachment.

- Unit 1, auxiliary feed water (AFW) trains 'B' and 'C' while train 'A' AFW motor-driven (MD) pump was out of service (OOS) for planned maintenance.
- Unit 1, centrifugal charging pump (CCP) train 'A' and normal charging pump (NCP) while train 'B' CCP was OOS for planned maintenance.
- Unit 1, AFW trains 'A' and 'B' MD pumps while train 'C' AFW turbine-driven pump was OOS for planned maintenance.
- Unit 1, residual heat removal (RHR) train 'B' while train 'A' RHR was OOS for planned maintenance.

b. Findings

No findings were identified.

1R05 Fire Protection (71111.05AQ) – 5 samples

a. Inspection Scope

Quarterly Inspection: The inspectors evaluated the adequacy of fire plans by comparing the fire plans to the defined hazards and defense-in-depth features specified in the fire protection program for the following five fire areas.

- Unit 1, control building, 1E 'A' and 'B' train battery and switchgear rooms, Fire Zones 71, 76, 77A, 77B, 78A, and 78B
- Unit 1, control building, 1E 'C' and 'D' train battery and switchgear rooms, Fire Zones 56A, 56B, 79A, 79B, 83, and 152
- Unit 1, emergency diesel generator (EDG) fuel oil storage tank rooms, Fire Zones 165 and 166
- Unit 2, EDG fuel oil storage tank rooms, Fire Zones 165 and 166
- Unit 1, 'A' and 'B' train auxiliary component cooling water heat exchanger rooms, Fire Zones 49 and 52

The inspectors assessed the following:

- control of transient combustibles and ignition sources
- fire detection systems
- water-based fire suppression systems
- gaseous fire suppression systems
- manual firefighting equipment and capability
- passive fire protection features
- compensatory measures and fire watches
- issues related to fire protection contained in the licensee's corrective action program
- material condition and operational status of fire protection equipment

b. Findings

No findings were identified.

1R08 Inservice Inspection Activities (71111.08) – 1 sample

a. Inspection Scope

Non-Destructive Examination Activities and Welding Activities

From March 20 – 24, 2017, the inspectors conducted an onsite review of the implementation of the licensee's inservice inspection (ISI) program for monitoring degradation of the reactor coolant system boundary, risk-significant piping and component boundaries, and containment boundaries in Unit 1.

The inspectors reviewed the following nondestructive examinations (NDEs) mandated by the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code (Code of Record: 2001 Edition with 2003 Addenda) to evaluate compliance with the ASME Code, Section XI and Section V requirements and, if any indications or defects were detected, to evaluate if they were dispositioned in accordance with the ASME Code or an NRC-approved alternative requirement. The inspectors also reviewed the qualifications of the NDE technicians performing the examinations to determine whether they were current and in compliance with the ASME Code requirements.

The inspectors reviewed the following ultrasonic examinations:

- NDE Report S17V1U0001, 2" Elbow to Pipe, RCS Drain Line (Loop 1) , Class 1
- NDE Report S17V1U0003, 2" Elbow to Pipe, RCS Drain Line (Loop 4) , Class 1

The inspectors reviewed the following Fully Encoded Phased Array Ultrasonic Examination of Dissimilar Metal Piping Welds for:

- Loop 1 RPV Inlet Safe-End to Nozzle: ISI-11201-V6-001-W35
- Loop 2 RPV Inlet Safe-End to Nozzle: ISI-11201-V6-001-W34
- Loop 3 RPV Inlet Safe-End to Nozzle: ISI-11201-V6-001-W39
- Loop 4 RPV Inlet Safe-End to Nozzle: ISI-11201-V6-001-W38

In addition, under the MRP-146 surveillance for thermal fatigue cracking, an augmented ultrasonic examination of weld 11204-246-36 (3" Reducer to Branch Connection) was conducted and ultrasonic indications were identified in the base metal of the 3" nozzle connected to the Loop 4 RCS Cold Leg. The indications were evaluated to the applicable ASME Section XI acceptance standard (Table IWB-3514-2) and were determined to be rejectable. Condition Report 10345327 was generated and the licensee decided to do a weld overlay of the nozzle to protect the integrity of the pressure boundary and preclude a through-wall leak. Work Order SNC852693 was generated to do the weld overlay and it was successfully completed prior to unit startup. (Note: This configuration/location is examined on all four loops for every outage. No indications were identified on the other three loops during this outage nor in Loop 4 examinations conducted during previous outages.)

The inspectors reviewed the following welding packages and associated documents in order to evaluate compliance with procedures and the ASME Code, Section XI and Section IX requirements.

- Welds 718254W1 (Valve Inlet) and 718254W2 (Valve Outlet), RCS Reactor Head Vent Valve, ASME Class 1 (reviewed)
- Weld 11204-246-36 (3" Reducer to Branch Connection of the Loop 4 RCS Cold Leg), ASME Class 1 (reviewed) (Note: This was the weld overlay referenced above.)

During nondestructive surface and volumetric examinations performed since the previous refueling outage, the licensee did not identify any relevant indications that were analytically evaluated and accepted for continued service; therefore, no NRC review was completed for this inspection procedure attribute.

Pressurized Water Reactor (PWR) Vessel Upper Head Penetration Inspection Activities

The inspectors verified that a bare metal visual examination was required for the Unit 1 vessel upper head during this outage (1R20) in accordance with the requirements of ASME Code Case N-729-1, Item Number B4.10. The inspectors reviewed the licensee's visual examination report (S17V1V012) for the vessel upper head and discussed the results with the examiners. No indications were identified.

The inspectors verified that a volumetric examination of the vessel upper head was not required during this outage.

Boric Acid Corrosion Control Inspection Activities

The inspectors reviewed the licensee's boric acid corrosion control (BACC) program activities to determine if the activities were implemented in accordance with the commitments made in response to NRC's Generic Letter 88-05, "Boric Acid Corrosion of Carbon Steel Reactor Pressure Boundary Components in PWR Plants," and applicable industry guidance documents. Specifically, the inspectors performed an onsite records review of procedures and the results of the licensee's containment walkdown inspections performed during the current refueling outage. The inspectors also interviewed the BACC program owner; conducted an independent walkdown of the containment building 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 engineering evaluations completed for evidence of boric acid leakage to determine if the licensee properly applied applicable corrosion rates to the affected components and properly assessed the effects of corrosion induced wastage on structural or pressure boundary integrity in accordance with the licensee procedures.

- Corrosion Assessment 1205-2015-004
- Corrosion Assessment 1205-2015-008
- Corrosion Assessment 1205-2016-007
- Corrosion Assessment 1205-2016-011
- Corrosion Assessment 1205-2017-001

The inspectors reviewed the following condition reports and associated 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 and 10 CFR Part 50, Appendix B, Criterion XVI.

- 10120996, Minor dry white boric acid residue noted in the packing area of valve 1HV8808B
- 10120999, Minor dry white boric acid residue noted in the packing area of valve 1HV8808C
- 10121004, Minor dry white boric acid residue noted in the packing area of valve 11204X4370
- 10121005, Minor dry white boric acid residue noted on the pipe cap of valve 11204X4220
- 10128417, Minor dry white boric boron observed at packing for 1-1204-U4-053
- 10239460, Minor to moderate dry white boric acid residue noted around valve stem of 1-1201-U4-209
- 10345415, Boric acid condition yoke-to-body connection of 11201X4158
- 10345433, Minor to moderate dry slightly discolored boric acid residue discovered originating from the packing of 11204U4290
- 10345440, Minor amount of dry white boric acid residue noted originating from the packing of 11204X4192
- 10345472, Minor amount of dry white boric acid residue noted originating from the packing of 11204X4369

- 10345474, Minor amount of dry white boric acid residue noted originating from the packing of 11901U4015
- 10345503, Boric acid condition stain below 1PV0456A

Steam Generator Tube Inspection Activities

The inspectors reviewed the Unit 1 steam generator maintenance program. This inspection schedule was verified with the requirements of the ASME Code, the licensee's Technical Specifications, and applicable industry guidance. For steam generators 1, 2, 3, and 4, the inspectors performed the following activities to verify compliance with program requirements, regulatory requirements, and industry guidance.

- Reviewed the scope of the eddy current (ET) examinations and the implementation of scope expansion criteria.
- Reviewed documentation for a sample of ET data analysts, probes, and testers to verify that personnel and equipment were qualified to detect the applicable degradation mechanisms.
- Reviewed a sample of site-specific examination technique specification sheets.
- Reviewed the in-situ steam generator tube pressure testing screening criteria. The inspectors verified that the assumed NDE flaw sizing accuracy was consistent with data from the examination technique specification sheets or other applicable performance demonstrations.
- Reviewed a sample of ET data for six steam generator tubes with a qualified data analyst.
- Verified that recordable indications were detected and sized in accordance with vendor procedures.
- Reviewed ET indication reports to determine if steam generator tubes with relevant indications were appropriately screened for in-situ pressure testing.
- Compared the latest ET examination results with the last Condition Monitoring and Operational Assessment report to assess the licensee's prediction capability for maximum tube degradation and number of tubes with indications.
- Verified that the current examination results were bound by the operational assessment projections.
- Assessed the latest ET examination results to verify that new degradation mechanisms, if any, were identified and evaluated before plant startup.
- Reviewed the licensee's secondary side steam generator Foreign Object Search and Retrieval activities.
- Reviewed the steam generator tube plugging procedure and verified that appropriate tubes were selected for plugging based on the required plugging criteria.
- Reviewed plugging activities for steam generator tubes.
- Reviewed a sample of primary-to-secondary leakage data for Unit 1 to confirm that operational leakage in each steam generator remained below the detection or action level threshold during the revision operating cycle.

Furthermore, the inspectors reviewed the results concerning one new degradation mechanism identified during the ET examinations. The inspection results identified a single axial indication of primary water stress corrosion cracking at the expansion transition on the top of tube sheet in tube R2C68 of SG #2. Although this was the first observation of this degradation mechanism at Vogtle Unit 1, it was listed as a potential mechanism in the licensee's Degradation Assessment. This assessment was performed

prior to the inspection in accordance with the Electric Power Research Institute (EPRI) Steam Generator Integrity Assessment Guidelines. The indication did not exceed the Condition Monitoring limits and did not require in-situ pressure testing to demonstrate tube integrity. An expansion of the +Point program was implemented in accordance with the EPRI guidelines and plant technical specifications.

Identification and Resolution of Problems

The inspectors reviewed a sample of ISI-related issues entered into the corrective action program to determine if the licensee had appropriately described the scope of the problem and had initiated corrective actions. The review also included the licensee's consideration and assessment of operating experience events applicable to the plant. The inspectors performed this review to ensure compliance with 10 CFR 50, Appendix B, Criterion XVI, "Corrective Action," requirements.

b. Findings

No findings were identified.

1R11 Licensed Operator Regualification Program and Licensed Operator Performance (71111.11) – 2 samples

a. Inspection Scope

Resident Inspector Quarterly Review of Licensed Operator Regualification

The inspectors observed an evaluated simulator scenario, V-RQ-SE-17101, Version 1.0, administered to an operating crew, on January 31, 2017, conducted in accordance with the licensee's accredited requalification training program.

The inspectors assessed the following:

- Licensed operator performance
- The ability of the licensee to administer the scenario and evaluate the operators
- The quality of the post-scenario critique
- Simulator performance

Resident Inspector Quarterly Review of Licensed Operator Performance

On February 7, 2017, the inspectors observed licensed operator performance in the main control room during Unit 1 reactor startup to Mode 2 following a manual reactor trip due to Loop 1 steam line outboard MSIV failing closed. The inspectors also observed portions of the power ascension and calorimetric associated with the Unit 1 startup.

The inspectors assessed the following:

- use of plant procedures
- control board manipulations
- communications between crew members
- use and interpretation of instruments, indications, and alarms
- use of human error prevention techniques
- documentation of activities

- management and supervision

b. Findings

No findings were identified.

1R12 Maintenance Effectiveness (71111.12) – 2 samples

a. Inspection Scope

The inspectors assessed the licensee's treatment of the two issues listed below to verify the licensee appropriately addressed equipment problems within the scope of the maintenance rule (10 CFR 50.65, "Requirements for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants"). The inspectors reviewed procedures and records to evaluate the licensee's identification, assessment, and characterization of the problems as well as their corrective actions for returning the equipment to a satisfactory condition. The inspectors also interviewed system engineers to assess the accuracy of performance deficiencies and extent of condition.

- Unit 1, nuclear service cooling water (NSCW) train 'B' Fan No. 2 gearbox failure, CR10318007.
- Unit 1, Main Steam Loop 1 inboard MSIV, 1HV3006A, failure due to actuator hydraulic leak, CR10289324

b. Findings

No findings were identified.

1R13 Maintenance Risk Assessments and Emergent Work Control (71111.13) – 5 samples

a. Inspection Scope

The inspectors reviewed the five maintenance activities listed below to verify that the licensee assessed and managed plant risk as required by 10 CFR 50.65(a)(4) and licensee procedures. The inspectors assessed the adequacy of the licensee's risk assessments and implementation of risk management actions. The inspectors also verified that the licensee was identifying and resolving problems with assessing and managing maintenance-related risk using the corrective action program. Additionally, for maintenance resulting from unforeseen situations, the inspectors assessed the effectiveness of the licensee's planning and control of emergent work activities.

- Unit 1, February 8, 2017, GREEN risk profile and risk management actions associated with TDAFW system outage.
- Unit 1, February 15, 2017, GREEN risk profile and risk management actions associated with 'A' train NSCW Fan No. 4 outage.
- Unit 1, February 21, 2017, YELLOW risk profile and risk management actions associated with 'B' train RHR system outage.
- Unit 1, March 8, 2017, GREEN risk profile and risk management actions associated with main steam safety valve testing, component cooling water 'A' train OOS, and NSCW 'A' train valve in-service testing.

- Unit 1, March 30, 2017, YELLOW outage risk assessment and risk management actions due to core cooling and reactor coolant system inventory control.

b. Findings

No findings were identified.

1R15 Operability Determinations and Functionality Assessments (71111.15) – 5 samples

a. Inspection Scope

Operability Determinations and Functionality Assessments Review

The inspectors selected the five operability determinations or functionality evaluations listed below for review based on the risk-significance of the associated components and systems. The inspectors reviewed the technical adequacy of the determinations to ensure that technical specification operability was properly justified and the components or systems remained capable of performing their design functions. To verify whether components or systems were operable, the inspectors compared the operability and design criteria in the appropriate sections of the technical specification and updated final safety analysis report to the licensee's evaluations. Where compensatory measures were required to maintain operability, the inspectors determined whether the measures in place would function as intended and were properly controlled. Additionally, the inspectors reviewed a sample of corrective action documents to verify the licensee was identifying and correcting any deficiencies associated with operability evaluations.

- Units 1 and 2, functionality assessment (FA) for the technical support center (TSC) due to loss of the TSC HVAC chiller temperature control, CR10319517
- Units 2, immediate determination of operability (IDO) for 'A' train EDG due to loss of 'B' control power, CR10320302
- Unit 2, IDO for voids discovered during Emergency Core Cooling Systems flow path verification, CR10321808
- Units 1 and 2, IDO for EDGs due to a 10CFR Part 21 report for manufacturing issues identified on enterprise diesel sub-covers, CR10286734
- Unit 2, IDO for CCW pump no. 1 due to isolation of pressure transmitter 2PT-1852, CR10316694

b. Findings

No findings were identified

1R19 Post-Maintenance Testing (71111.19) – 5 samples

a. Inspection Scope

The inspectors either observed post-maintenance testing or reviewed the test results for the five maintenance activities listed below to verify the work performed was completed correctly and the test activities were adequate to verify system operability and functional capability.

- SNC839624, Unit 2 'A' train EDG light socket replacement for 'B' control power, January 19, 2017
- SNC832082, Unit 2 NSCW Transfer Pump No. 8 motor removal and installed, January 26, 2017
- SNC842603, Unit 1 MSIV 1HV3006B actuator leak repairs (SG1 MSIV), February 5, 2017
- SNC533580, Unit 2 'A' train CCW heat exchanger pressure relief valve, 2PSV-1872 replaced and retested, February 14, 2017
- SNC844232, Diesel Fire Pump No. 1 repaired, March 9, 2017

The inspectors evaluated these activities for the following:

- acceptance criteria were clear and demonstrated operational readiness
- effects of testing on the plant were adequately addressed
- test instrumentation was appropriate
- tests were performed in accordance with approved procedures
- equipment was returned to its operational status following testing
- test documentation was properly evaluated

Additionally, the inspectors reviewed a sample of corrective action documents to verify the licensee was identifying and correcting any deficiencies associated with post-maintenance testing.

b. Findings

No findings were identified.

1R20 Refueling and Other Outage Activities (71111.20) – 1 sample

a. Inspection Scope

For the Unit 1 refueling outage from March 12, 2017, through the remainder of the inspection period, the inspectors evaluated the following outage activities:

- outage planning
- fatigue management
- shutdown, cooldown, and refueling
- reactor coolant system instrumentation and electrical power configuration
- reactivity and inventory control
- decay heat removal and spent fuel pool cooling system operation

The inspectors verified that the licensee:

- considered risk in developing the outage schedule
- controlled plant configuration in accordance with administrative risk reduction methodologies
- developed work schedules to manage fatigue
- developed mitigation strategies for loss of key safety functions
- adhered to operating license and technical specification requirements

Inspectors verified that safety-related and risk-significant structures, systems, and components not accessible during power operations were maintained in an operable condition. The inspectors also reviewed a sample of related corrective action documents to verify the licensee was identifying and correcting any deficiencies associated with outage activities.

b. Findings

No findings were identified

1R22 Surveillance Testing (71111.22) – 7 samples

a. Inspection Scope

The inspectors reviewed the seven surveillance tests listed below. The surveillance test was either observed directly or test results were reviewed to verify testing activities and results provide objective evidence that the affected equipment remain capable of performing their intended safety functions and maintain their operational readiness consistent with the facility's current licensing basis. The inspectors evaluated the test activities to assess for:

- preconditioning of equipment,
- appropriate acceptance criteria,
- calibration and appropriateness of measuring and test equipment,
- procedure adherence, and
- equipment alignment following completion of the surveillance.

Additionally, the inspectors reviewed a sample of significant surveillance testing problems documented in the licensee's corrective action program to verify the licensee was identifying and correcting any testing problems associated with surveillance testing.

Routine Surveillance Tests

- 14609-1, SSPS Slave Relay K601 Train B Test Safety Injection, Version 22

In-Service Tests (IST)

- 14801A-1, Unit 1 NSCW Transfer Pump #7 IST, Version 5.1
- 14803A-2, Unit 2 'A' Train CCW IST, Version 7
- 14806-1, 1A Containment Spray Pump IST, Version 3
- 14825-2, Quarterly In-Service Valve Test (Section 5.3.6.2, Train A RHR Valves - Mode 1/2/3/4), Version 94.3

Containment Isolation Valve

- 14341-1, Containment Penetration No. 41 - Safety Injection Inlet to RWST Drain Local Leak Rate Test, Version 13

Surveillance Test Interval (STI) Extensions

- STI Evaluation No. TE813032, Boron Concentration Test Interval Extension, Revision 0

b. Findings

No findings were identified.

Cornerstone: Emergency Preparedness

1EP6 Drill Evaluation (71114.06) – 1 sample

a. Inspection Scope

The inspectors observed the emergency preparedness drill conducted on February 22, 2017. The inspectors observed licensee activities in the simulator and technical support center to evaluate implementation of the emergency plan, including event classification, notification, dose assessment, and protective action recommendations. The inspectors evaluated the licensee's performance against criteria established in the licensee's procedures. Additionally, the inspectors attended the post-exercise critique to assess the licensee's effectiveness in identifying emergency preparedness weaknesses and verified the identified weaknesses were entered in the corrective action program.

b. Findings

No findings were identified.

4. OTHER ACTIVITIES

4OA1 Performance Indicator Verification (71151) – 6 samples

a. Inspection Scope

The inspectors reviewed a sample of the performance indicator (PI) data submitted by the licensee for Unit 1 and Unit 2 listed below. The inspectors reviewed plant records compiled between January 1, 2016, and December 31, 2016, to verify the accuracy and completeness of the data reported for the station. The inspectors verified that the PI data complied with guidance contained in Nuclear Energy Institute 99-02, "Regulatory Assessment Performance Indicator Guideline," and licensee procedures. The inspectors verified the accuracy of reported data that were used to calculate the value of each PI. In addition, the inspectors reviewed a sample of related corrective action documents to verify the licensee was identifying and correcting any deficiencies associated with PI data.

Cornerstone: Initiating Events

- unplanned scrams per 7,000 critical hours
- unplanned power changes per 7,000 critical hours
- unplanned scrams with complications

b. Findings

No findings were identified.

4OA2 Problem Identification and Resolution (71152) – 1 sample

.1 Routine Review

The inspectors screened items entered into the licensee's corrective action program in order to identify repetitive equipment failures or specific human performance issues for follow-up. The inspectors reviewed condition reports, attended screening meetings, or accessed the licensee's computerized corrective action database.

.2 Annual Follow-up of Selected Issues

a. Inspection Scope

The inspectors conducted a detailed review of condition reports (CR) 10124103 and 10326461, associated with failures to manually trip the Unit 1 'B' main feed pump.

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

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

b. Findings

No findings were identified.

4OA5 Other Activities

.1 (Closed) Temporary Instruction (TI) 2515/192, Inspection of the Licensee's Interim Compensatory Measures Associated with the Open Phase Condition Design Vulnerabilities in Electric Power Systems

a. Inspection Scope

The objective of this performance-based TI is to verify implementation of interim compensatory measures associated with an open phase condition design vulnerability in electric power system for operating reactors. The inspectors conducted an inspection to determine if the licensee had implemented the following interim compensatory

measures. These compensatory measures are to remain in place until permanent automatic detection and protection schemes are installed and declared operable for the open phase condition design vulnerability.

The inspectors verified that the licensee performed the following:

- Identified and discussed with plant staff the lessons learned from the open phase condition events at U.S. operating plants including the Byron Station open phase condition and its consequences. This included conducting operator training for promptly diagnosing, recognizing consequences, and responding to an open phase condition.
- Updated plant operating procedures to help operators promptly diagnose and respond to open phase conditions on offsite power sources credited for safe shutdown of the plant.
- Established and implemented periodic walkdown activities to inspect switchyard equipment such as insulators, disconnect switches, and transmission line and transformer connections associated with the offsite power circuits to detect a visible open phase condition.
- Ensured that routine maintenance and testing activities on switchyard components have been implemented and maintained. As part of the maintenance and testing activities, the licensee assessed and managed plant risk in accordance with 10 CFR 50.65(a)(4) requirements.

b. Findings

No findings were identified.

4OA6 Meetings, Including Exit

On April 5, 2017, the resident inspectors presented the inspection results to Mr. Keith Taber and other members of the licensee's staff. The inspectors confirmed that proprietary information provided or examined during the inspection period was properly controlled.

ATTACHMENT: SUPPLEMENTAL INFORMATION

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Licensee personnel:

T. Baker, Security Manager
D. Komm, Operations Director
E. Berry, Engineering Director
J. Dixon, Radiation Protection Manager
T. Fowler, Chemistry Manager
D. Sutton, Regulatory Affairs Director
S. Harris, Operations Manager
D. Myers, Plant Manager
K. Taber, Site Vice-President
I. White, Licensing Supervisor
K. Walden, Licensing Engineer
L. Beasley, Chemistry Supervisor
M. Williams, RP Superintendent
J. August, Steam Generator Site Lead
E. Aycock, SNC ISI Level III
C. Blackburn, Steam Generator Corporate Lead
D. Brown, SNC NDE Corporate Outage Services
S. Kowalski, Engineering Manager
J. Santana, Boric Acid Corrosion Control Program Engineer

NRC personnel:

Shane Sandal, Chief, Region II Reactor Projects Branch 2

LIST OF REPORT ITEMS

Opened and Closed

None

Closed

TI 2515/192

Inspection of the Licensee's Interim Compensatory Measures Associated with the Open Phase Condition Design Vulnerabilities in Electric Power Systems (4OA5.1)

LIST OF DOCUMENTS REVIEWED

Section 1R04: Equipment Alignment

Drawings

1X4DB186-7, P&I Diagram – Instrument Air System – Auxiliary Bldg. Level C & D – System 2420, Versions 14.0
1X4DB122, Version 52, Unit 1 P&I Diagram – Residual Heat Removal System – System 1204
1X4DB161-1, Version 46, Unit 1 P&I Diagram – Auxiliary Feedwater System – Condensate Storage and Degasifier System – System No. 1302
1X4DB161-2, Version 29, Unit 1 P&I Diagram – Auxiliary Feedwater System – System No. 1302
1X4DB161-3, Version 42, Unit 1 P&I Diagram – Auxiliary Feedwater System (Aux Feedwater Pump Turbine Driver) – System No. 1302
1X4DB116-2 Version 32, Unit 1 P&I Diagram – Chemical and Volume Control System No. 1208
1X4DB121 Version 50, Unit 1 P&I diagram – Safety Injection System No. 1204

Other

Tagout 1-DT-16-1205-00019, RHR Pump – Train A
Tagout 1-OP-16-1205-00008, RHR Heat Exchanger Ret Bypass
Tagout 1-DT-16-1302-00001, AFW Pump Motor Driver Train A

Section 1R05: Fire Protection Annual/Quarterly

Procedures

17103A-C, Annunciator Response Procedures for Fire Alarm Computer, Version 40
927149-1 Revision 3.0, Zone 49 – Auxiliary Building – Level 1, Fire Fighting Preplan
927152-1 Revision 2.0, Zone 52 – Auxiliary Building – Level 1, Fire Fighting Preplan
92756A-1 Revision 0.2, Zone 56A – Control Building – Level B, Fire Fighting Preplan
92756B-1 Revision 1.2, Zone 56B – Control Building – Level B, Fire Fighting Preplan
92771-1 Revision 4.1, Zone 71 – Control Building – Level B, Fire Fighting Preplan
92776-1 Revision 2.1, Zone 76 – Control Building – Level B, Fire Fighting Preplan
92777A-1 Revision 1.1, Zone 77A – Control Building – Level B, Fire Fighting Preplan
92777B-1 Revision 1.2, Zone 77B – Control Building – Level B, Fire Fighting Preplan
92778A-1 Revision 2.1, Zone 78A – Control Building – Level B, Fire Fighting Preplan
92778B-1 Revision 1.2, Zone 78B – Control Building – Level B, Fire Fighting Preplan
92779A-1 Revision 0.2, Zone 79A – Control Building – Level B, Fire Fighting Preplan
92779B-1 Revision 1.2, Zone 79B – Control Building – Level B, Fire Fighting Preplan
92783-1 Revision 2.2, Zone 83 – Control Building – Level B, Fire Fighting Preplan
92852-1 Revision 3.0, Zone 152 – Control Building – Level B, Fire Fighting Preplan
92865-1 Revision 2.2, Zone 165 – Diesel Generator Tanks and Pumphouse Fire Fighting Preplan
92865-2 Revision 0.2, Zone 165 – Diesel Generator Tanks and Pumphouse Fire Fighting Preplan
92866-1 Revision 1.2, Zone 166 – Diesel Generator Tanks and Pumphouse Fire Fighting Preplan
92866-2 Revision 0.2, Zone 166 – Diesel Generator Tanks and Pumphouse Fire Fighting Preplan

Drawings

AX4DJ8046, Unit 2, Fire Areas Diesel Fuel Oil Storage, Pump Room, Valve Room and Diesel Generator Building Floor Plans, Version 5.0
 AX4DJ8037, Unit 1, Fire Areas Diesel Fuel Oil Storage, Pump Room, Valve Room and Diesel Generator Building Floor Plans, Version 5.0
 AX1D94L001 (Sheets 1 and 2), Architectural Penetration Seal Typical Details, Revision 11
 1X1D31H031, Diesel Fuel Oil Storage Tank Pump House Architectural Penetrating Seal Floor Plan – Interior Elevations and Schedule (Level A) Unit 1, Revision 4

Section 1R08: Inservice Inspection ActivitiesProcedures

QA-2.10, Qualification, Training, and Certification of Nondestructive Examination Personnel, Revision 0.2
 ANATEC-08, Certification of NDT Personnel (Eddy Current Method), Revision 25
 Eddy Current Inspection Multi-Frequency Eddy Current Parameter Technique Sheets:
 GAE-01-117, GAE-02-117, GAE-03-117, GAE-04-117, GAE-05-117, GAE-06-117,
 GAE-07-117, GAE-08-117, GAE-09-117, GAE-10-117, GAE-11-117, GAE-12-117,
 GAE-13-117
 NMP-ES-004, Steam Generator Program, Version 13.1
 NMP-ES-004-002, Steam Generator Primary-Side Inspections, Version 9.1
 NMP-ES-004-GL01, Steam Generator Program Strategic Plan, Version 15.1
 NMP-ES-019, Boric Acid Corrosion Control Program, Version 11.1
 NMP-ES-019-001, Boric Acid Corrosion Control Program Implementation, Version 11.1
 NMP-ES-019-003, Boric Acid Deposit Sampling, Analysis and Data Evaluation, Version 2.1
 NMP-ES-019-004, Boric Acid Corrosion Control Program - Corrosion Assessment, Version 5.1

Condition Reports (CRs)

10120996, Minor dry white boric acid residue noted in the packing area of valve 1HV8808B
 10120999, Minor dry white boric acid residue noted in the packing area of valve 1HV8808C
 10121004, Minor dry white boric acid residue noted in the packing area of valve 11204X4370
 10121005, Moderate dry white boric acid residue noted on the pipe cap of valve 11204X4220
 10128417, Minor, dry, white, boron observed at packing for 1-1204-U4-053
 10239460, Minor to moderate dry white boric acid residue noted around valve stem of 1-1201-U4-209
 10345279, Unit 1 1R20 steam generator 1 cladding anomaly
 10345327, ISI Weld 11204-246-36 (3" Reducer to Branch Connection) UT exam resulted in rejectable indications
 10345415, Boric acid condition yoke-to-body connection of 11201X4158
 10345433, Minor to moderate dry slightly discolored boric acid residue discovered originating from the packing of 11204U4290
 10345440, Minor amount of dry white boric acid residue noted originating from the packing of 11204X4192
 10345472, Minor amount of dry white boric acid residue noted originating from the packing of 11204X4369
 10345474, Minor amount of dry white boric acid residue noted originating from the packing of 11901U4015
 10345503, Boric acid condition stain below 1PV0456A

Work Orders (WOs)

WO SNC852693, Weld Overlay ISI Weld 11204-246-36
 WO SNC718254, Replace RCS RV Head Vent Valve 11201U4086

WO SNC852693, Weld Overlay of Weld 11204-246-36 (3" Reducer to Branch Connection of the Loop 4 RCS Cold Leg)

Other Documents

XX300495442, License Amendment Request for Revision to Steam Generator Program Inspection Frequencies and Tube Sample Selection in Accordance with TSTF-510A, Revision 2

NMP-GM-003-F19, Steam Generator (SG) Program Assessment, Revision 2

LTR-CCOE-17-3, Vogtle 1R20 Spring 2017 Steam Generator Secondary Side Visual Inspection Plan, Revision 0

LTR-SGS-17-001, Use of Qualified Techniques for V1R20 Refueling Outage

GP-19353, Vogtle 1R19 Steam Generator Condition Monitoring and Operational Assessment, Revision 0

Corrosion Assessment 1205-2015-004

Corrosion Assessment 1205-2015-008

Corrosion Assessment 1205-2016-007

Corrosion Assessment 1205-2016-011

Corrosion Assessment 1205-2017-001

Certification Record for Westinghouse Examiners: 20613, 20621, 51753, 10323

Certification Record for ANATEC Primary Analysts: D8021, F1726, P3220, R7770, S4256

Certificate of Calibration for dial indicators #: 0011012604, 0011012605, 0011012606, 0011012607, 0011012608, 0011012609, 0011012610, 0011012611

Certificate of Calibration for distance block #: 0010972917, 0010972934, 0010972935, 0010972930

Certificate of Calibration for pressure gauge #: 0010972998, 0010972940, 0010972946, 0010972949, 0010972984, 0010972985, 0010973010, 0010972969

Certificate of Calibration for Eddy Current Acquisition Systems #: 221040, 221041, 221059, 221062, 221063, 221075, 221450, 221452, 223847, 224316, 224323, 224326, 224328, 224329, 224332, 224333, 224334, 224335

Certificate of Conformance for Eddy Current Probes #: CIC07152015-1, CIC07152015-2, CIC07152015-3, CIC02062016-4, CIC02172017-1, CIC02172017-2

Certification Records of NDE personnel: D. Block, J. Devers, and G. Fuechtmanns

Focused Area Self-Assessment (FASA) Plan and Report for the 2016 Vogtle Engineering Programs, 4/11/16 – 4/15/16

NDE Report S17V1U0001, 2" Elbow to Pipe

NDE Report S17V1U0003, 2" Elbow to Pipe

NDE Report S17V1V012, Vessel Closure Head Exterior

SG-SGMP-17-3, Vogtle 1R20 Steam Generator Degradation Assessment, Revision 0

Site Specific Performance Demonstration (SSPD) Training Information Vogtle Unit 1 (GAE) V1R20 Refueling Outage, Revision 0

Vogtle Electric Generating Plant Units 1 and 2 Inservice Inspection Plan - Third Inspection Interval, Volume 1

Curtis-Wright Documents

LMT-10-PAUT-007, Fully Encoded Phased Array Ultrasonic Examination of Dissimilar Metal Piping Welds, Revision 2

Section 1R11: Licensed Operator Requalification Program and Licensed Operator Performance

Procedures

NMP-EP-110 Version 8.1, Emergency Classification Determination and Initial Action
 NMP-EP-111 Version 11.0, Emergency Notifications 12004-C, Power Operation (Mode 1),
 Version 118.0

Other

V-RQ-SE-17101, Version 1.0, Simulator Exercise Guide

Section 1R12: Maintenance Effectiveness

Procedures:

NMP-ES-027-001, Maintenance Rule Implementation, Version 7
 26854-C, Main Steam Isolation Valve Actuator Maintenance, Version 41

Corrective Action Program Records

Technical Evaluation (TEs)

975941, Extent of condition Review for potentially under torqued pressure switches
 975913, Exelon Lab failure analysis for o-ring failure
 971753, MRule Eval for Loop 1 MSIV (HV-3006A) hydraulic leak
 976150, MRule Eval for 1B NSCW Fan #2 Gearbox failure
 979319, Additional PMs to monitor oil levels of gear reducers
 979326, Determine viability of existing lip seal for gear reducer

Condition Reports (CRs)

CR10289324, Loop 1 MSIV (HV-3006A) hydraulic leak
 CR10300035, MRule Preventable Functional Failure for 1HV3006A
 CR10318007, 1B NSCW Fan #2 Gearbox failure results in MPFF

Corrective Action Reports (CAR)

267698, ERC for Loop 1 MSIV (HV-3006A) failure due to actuator hydraulic leak
 196630, Hydraulic leak found on the pressure switch for 2HV3006B
 268324, MPFF identified for Unit 1 System 1202

Maintenance Work Order (MWO)

SNC839268, Disassemble/reassemble pressure switch for 1HV3006B/16B/26B
 SNC844915, Unit 1A NSCW Tower Gearbox oil level check
 SNC844916, Unit 1B NSCW Tower Gearbox oil level check

Section 1R13: Maintenance Risk Assessments and Emergent Work Control

Procedures

NMP-GM-031-001, Online Maintenance Rule (a)(4) Risk Calculations, Version 3.0
 10032-C, Outage Risk Assessment Monitoring, Version 11

Other

Unit 1, EOOS Integrated Risk Report for February 8, 2017
 Unit 1, EOOS Integrated Risk Report for February 15, 2017
 Unit 1, EOOS Integrated Risk Report for February 21, 2017
 Unit 1, EOOS Integrated Risk Report for March 8, 2017
 Unit 1, Narrative Control Room Logs for February 8, 2017
 Unit 1, Narrative Control Room Logs for February 15, 2017

Unit 1, Narrative Control Room Logs for February 21, 2017

Unit 1, Narrative Control Room Logs for March 8, 2017

Unit 1, 1R20 Refueling Outage Defense-in-Depth Assessment Notes, March 30, 2017

Section 1R15: Operability Determinations and Functionality Assessments

Procedures

NMP-AD-012, Operability Determinations and Functionality Assessments, Version 13.1

Other

PO No. 10122963, Warehouse Receipt / Stock Process Sheet

CR 10314105, 10 CFR Part 21, Worn linkages and bushings of damper 2-TV-12097

Section 1R19: Post Maintenance Testing

Procedures

NMP-MA-014-001, Post Maintenance Testing Guidance, Revision 4.2

NMP-FLS-003, Electrical Work Practices, Revision 7

26584-C, Main Steam Isolation Valve Actuator Maintenance, Revision 41

28213-C, IST Program Valve Set Pressure Testing, Revision 15

26103-C, Pressure Relief Valve Removal and Installation, Revision 6

14951-C, Fire Suppression System Operability Test, Revision 33

27010-C, Aurora Models 411 and 481 Pump Maintenance, Revision 11

Other

CR10320302, 2A EDG B control power failure

CR10326836, Unit 1 HV3006B closure

CR10318513, NSCW Transfer Pump 'A' Train failure indication

CR10328683, Excessive vibration while running Diesel Fire Pump #1

Work Orders

SNC832118, Remove and install NSCW Transfer Pump #8

SNC793642, Scaffold removal for job SNC533580

Section 1R22: Surveillance Testing

Completed Procedures

14609-1, SSPS Slave Relay K601 Train B Test Safety Injection, completed January 24, 2017

Other

LDCR 2015045, Boron Concentration Test Interval Extension, Version 1.0

NEI 04-10 Risk-Informed Technical Specifications Initiative 5b – Risk-Informed Method for

Control of Surveillance Frequencies – Industry Guidance Document, April 2007

Boron Concentration Performance Monitoring (6-Month) – Review Dated August 3, 2016

Boron Concentration Performance Monitoring (6-Month) – Review Dated February 10, 2016

SFCP Meeting Minutes – Meeting No. 2016-03

SFCP Meeting Minutes – Meeting No. 2017-01

Section 1EP6: Drill Evaluation

Records and Data

Facility Activation Drill Documents for February 22, 2017 Drill

Section 4OA1: Performance Indicator VerificationProcedures

00163-C, Revision 14.6, NRC Performance Indicator and Monthly Operating Report Preparation and Submittal

Section 4OA2: Problem Identification and ResolutionProcedures

14236-1, SGFPT A& B Trip Tadot, Version 15

19233-1, FR-H.3 Response to Steam Generator High Level, Version 1

Drawings

1X3D-BB-D02A, Elem. Diagram – Turbine Protection System – SGFPT Trip Interface, Revision 4

1X3D-AA-H06A, 1-Line Diag.– 125V DC Non-Class 1E Distribution 1-1806-S3-DN2 Version 16.0

1X4AA12-00199, SGFPT Controls Diagram Trip System

1X4AA12-00197, SGFPT Controls Diagram – 200 psig Control System

1X4AA12-00170, SGFPT Access - List Solenoid Valves

1X3D-BC-N51F, Elem. Diagram – FDW Pump Turb. Drive Steam System – SGFPT-B Trip and Reset, Version 16.0

1X3D-BC-Q04B, Elementary Diagram – MS System – Safety Actuation Signals, Version 11.0

1X3D-BC-Q04C, Elementary Diagram – MS – Safety Actuation Signals, Version 10.0

1X3D-BC-F05A, Elementary Diagram – AFW System – 1-1302-P4-002-M01, Version 12.0

1X3D-BC-F04A, Elementary Diagram – AFW System – 1-1302-P4-003-M01, Version 11.0

Corrective Action Program RecordsCondition Reports (CRs)

10326461, Failure of main feed pump 1B to trip

10124103, 1B main feed pump failed to trip

Other

NRC Information Notice 2015-05, Inoperability of Auxiliary and Emergency Feedwater auto-start circuits on Loss of Main Feedwater, May 12, 2015

Prompt Determination of Operability (PDO) to defend operability of the unit 1 AFW auto-start circuitry due to sticking SOV (SV-12), March 2, 2017

Maintenance Work Orders

SNC708934, 1306 1HS3170 SGFP Turb 'B' failure to trip work instructions, October 26, 2015

Section 4OA5: Other ActivitiesProcedures

11874-1, Control Room Rounds Sheets, Revision 84

11882-1, Outside Area Rounds Sheets, Revision 98.3

11882-2, Outside Area Rounds Sheets, Revision 83.2

11887-1, Control Building Rounds Sheets, Revision 69.1

11881-1, Auxiliary Building Rounds Sheets, Revision 68.2

17036-1, Annunciator Response Procedures for ALB 36 on EAB Panel, Revision 21

17036-2, Annunciator Response Procedures for ALB 36 on EAB Panel, Revision 20

17037-1, Annunciator Response Procedures for ALB 36 on EAB Panel, Revision 21

17037-2, Annunciator Response Procedures for ALB 36 on EAB Panel, Revision 22

13415-1, Reserve Auxiliary Transformers, Revision 18.1

13418A-1, Standby Auxiliary Transformer Unit 1 Train A Operations, Revision 4.2
13418B-1, Standby Auxiliary Transformer Unit 1 Train B Operations, Revision 4.1
17032-1, Annunciator Response Procedures for ALB 32 on EAB Panel, Revision 24

Corrective Action Program Records

Condition Reports (CRs)

CR10308059, Preliminary Vulnerability Report for Open Phase Detection within Operator Rounds
CR10330344, Vendor quality issue with new Open Phase Detection Panel
CR10332175, Operator training OE from NRC Open Phase Condition inspection at Quad Cities
CR10233628, Training request for Open Phase detection modification on RAT

Technical Evaluations (TEs)

TE496548, Procedure discussion in Operator Continuous Training
TE460990, Add open phase indications to Annunciator Response procedures
TE960334, Open phase current events topic addition to training program

Other

High Voltage Yard Walkdown Inspection Records January 3, 2017 – February 6, 2017
PM A2139SITEUNIT1/2, Thermography PM for Switchyard Systems
System Reliability Performance Criteria for 25kV AC System
System Unavailability Performance Criteria for Offsite Power and High Voltage Switchyard
System Reliability Performance Criteria for Offsite Power and High Voltage Switchyard
V-RQ-PP-63259, Current Events LOCT Segment 20122
V-RQ-PP-63264, Response to Open Phase conditions
V-RQ-SE-16202, Simulator Training Plan, Extended Scenario-Ops Fundamentals