UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION IV
1600 E. LAMAR BLVD.
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February 3, 2017

Mr. M. E. Reddemann
Chief Executive Officer
Energy Northwest
P.O. Box 968, Mail Drop 1023
Richland, WA 99352-0968

SUBJECT: COLUMBIA GENERATING STATION – NRC INTEGRATED INSPECTION REPORT 05000397/2016004

Dear Mr. Reddemann:

On December 31, 2016, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at your Columbia Generating Station. On December 29, 2016, the NRC inspectors discussed the results of this inspection with Mr. A. Javorik, Vice President, Engineering, and other members of your staff. The results of this inspection are documented in the enclosed report.

NRC inspectors documented three findings of very low safety significance (Green) in this report. All of these findings involved violations of NRC requirements; one of these violations was determined to be Severity Level IV under the traditional enforcement process. The NRC is treating these violations as non-cited violations (NCVs) consistent with Section 2.3.2.a of the Enforcement Policy.

Further, inspectors documented a licensee-identified violation, which was determined to be of very low safety significance, in this report. The NRC is treating this violation as a non-cited violation (NCV) consistent with Section 2.3.2.a of the NRC Enforcement Policy.

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

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 U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001; with copies to the Regional Administrator, Region IV; and the NRC resident inspector at the Columbia Generating Station.

In accordance with Title 10 of the *Code of Federal Regulations* (10 CFR) 2.390, "Public Inspections, Exemptions, Requests for Withholding," a copy of this letter, its enclosure, and your response (if any) will be made available electronically for public inspection in the NRC's Public Document Room or the NRC's Agencywide Documents Access and Management System (ADAMS), accessible from the NRC Web site at http://www.nrc.gov/reading-rm/adams.html. To the extent possible, your response, if any, should not include any personal privacy, proprietary, or safeguards information so that it can be made available to the public without redaction.

Sincerely,

/RA/

Jeremy R. Groom, Chief
Project Branch A
Division of Reactor Projects

Docket No. 50-397
License No. NPF-21

Enclosure:
Inspection Report 05000397/2016004
w/ Attachment: Supplemental Information

COLUMBIA GENERATING STATION – NRC INTEGRATED INSPECTION REPORT
05000397/2016004

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☒ SUNSI Review By: JGroom/dll		ADAMS ☒ Yes ☐ No	☒ Non-Sensitive ☐ Sensitive	☒ Publicly Available ☐ Non-Publicly Available		Keyword: NRC-002	
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U.S. NUCLEAR REGULATORY COMMISSION

REGION IV

Docket:	05000397
License:	NPF-21
Report:	05000397/2016004
Licensee:	Energy Northwest
Facility:	Columbia Generating Station
Location:	North Power Plant Loop Richland, WA 99354
Dates:	October 1 through December 31, 2016
Inspectors:	G. Kolcum, Senior Resident Inspector D. Bradley, Acting Senior Resident Inspector T. Lamb, Acting Resident Inspector S. Hedger, Operations Engineer J. Kirkland, Senior Operations Engineer C. Osterholtz, Senior Operations Engineer
Approved By:	Jeremy R. Groom Chief, Projects Branch A Division of Reactor Projects

Enclosure

SUMMARY

IR 05000397/2016004; 10/1/2016 – 12/31/2016; Columbia Generating Station; Licensed Operator Requalification Program & Licensed Operator Performance; and Operability Determinations & Functionality Assessments.

The inspection activities described in this report were performed between October 1 and December 31, 2016, by the resident inspectors at Columbia Generating Station, inspectors from the NRC's Region IV office, and other NRC offices. Three findings of very low safety significance (Green) are documented in this report. All of these findings involved violations of NRC requirements; one of these violations was determined to be Severity Level IV under the traditional enforcement process. Additionally, NRC inspectors documented in this report one licensee-identified violation of very low safety significance. The significance of inspection findings is indicated by their color (Green, White, Yellow, or Red), which is determined using Inspection Manual Chapter 0609, "Significance Determination Process," dated April 29, 2015. Their cross-cutting aspects are determined using Inspection Manual Chapter 0310, "Aspects within the Cross-Cutting Areas," dated December 4, 2014. Violations of NRC requirements are dispositioned in accordance with the NRC Enforcement Policy. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," dated July 2016.

Cornerstone: Mitigating Systems

- Severity Level IV. The inspectors identified a Severity Level IV, non-cited violation of 10 CFR 55.49, "Integrity of Examinations and Tests," associated with a Green finding, for the failure to ensure the integrity of simulator scenario tests, given as part of the 2015 licensed operator annual operating test, were maintained. The administration practices for the years 2015 and 2016 were reviewed to determine if they were consistent with industry standards used to enforce uniform conditions on the examination process. During the 2015 annual operating test, three licensed operators received two of three simulator scenario tests that had been previously administered to other licensed operators in previous weeks, and two licensed operators received two of two simulator scenario tests that had been previously administered to other licensed operators in previous weeks. Allowing more than 50 percent of an operating test section to be comprised of examination material previously administered on any other test in the same examination cycle is considered an examination integrity compromise. However, an evaluation of the 2015 examination results for the affected population showed that the compromise did not have an actual effect on the equitable and consistent administration of the examination. The licensee entered the finding into the corrective action program as Action Request 358890.

  The failure of the licensee's training staff to maintain the integrity of examinations administered to licensed operations personnel was a performance deficiency. The performance deficiency was more than minor, and therefore a finding, because it adversely affected the human performance attribute of the Mitigating Systems Cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Using NRC Inspection Manual Chapter 0609, "Significance Determination Process," Attachment 4, Tables 1 and 2 worksheets, and the corresponding Appendix I, "Licensed Operator Requalification Significance Determination Process (SDP)," the finding was determined to have very low safety significance (Green). Although the 2015 finding resulted in a compromise of the integrity of the annual operating tests, with no compensatory actions immediately taken when the compromise should have

been discovered, the equitable and consistent administration of the annual operating test was not actually affected by this compromise. In addition, the failure to meet 10 CFR 55.49 was evaluated through the traditional enforcement process, which resulted in its association with a Severity Level IV (SL-IV) violation consistent with Sections 2.2.4 and 6.4d of the NRC Enforcement Policy. This finding had a cross-cutting aspect in the area of resources associated with ensuring that procedures are adequate to ensure nuclear safety. A review of the procedure used to develop and administer requalification program examinations revealed that it did not specify the industry standards or guidelines that ensure that 50 percent or less of the examination material is repeated on a given examination in comparison to those examination elements used in previous weeks' examinations at the individual level [H.1]. (Section 1R11)

- Green. The inspectors reviewed a self-revealed, non-cited violation of 10 CFR Part 50, Appendix B, Criterion III, "Design Control," for the licensee's failure to verify the adequacy of design of the reactor core isolation cooling (RCIC) system. Specifically, in 2001, the licensee implemented a design change to the keep-fill pump, RCIC-P-3, that changed its operation from continuous to intermittent, and did not verify the adequacy of the design for all methods of operation, including surveillance testing. Placing the RCIC-P-3 pressure switch downstream of the steam-driven RCIC pump's discharge check valve allows a subsequent hydraulic transient to depressurize RCIC piping below the system's low pressure trip set point. This failure to provide design control measures resulted in RCIC tripping three separate times when RCIC-P-3 was unable to keep up with hydraulic transients. In response to this condition, the licensee changed their operation of the keep-fill pump to running continuously and initiated Action Request 352594 to address long-term issues such as procedure revisions and system design changes.

  The failure to verify the adequacy of design of the RCIC system was a performance deficiency. Specifically, in 2001, the licensee implemented a design change to the keep-fill pump, RCIC-P-3, that changed its operation from continuous to intermittent and did not verify the adequacy of the design for all methods of operation, including surveillance testing. The performance deficiency was more than minor, and therefore a finding, because it affected the design control attribute of the Mitigating System Cornerstone and adversely affected the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, this modification was inadequate, resulted in RCIC tripping three separate times when RCIC-P-3 was unable to keep up with hydraulic transients, and required compensatory measures to prevent future trips. The inspectors performed the initial significance determination using NRC Inspection Manual Chapter 0609, Appendix A, Exhibit 2, "Mitigating Systems Screening Questions." The inspectors determined that the finding was of very low safety significance (Green) because: (1) the finding was not a deficiency affecting the design or qualification of a mitigating system; (2) the finding did not represent a loss of system and/or function; (3) the finding did not represent an actual loss of function of a single train for greater than its technical specification allowed outage time; and (4) the finding did not represent an actual loss of function of one or more nontechnical specification trains of equipment designated as high safety-significant in accordance with the licensee's maintenance rule program for greater than 24 hours.

  The inspectors did not identify a cross-cutting aspect for this issue. Specifically, the design change occurred approximately 15 years ago and does not represent current licensee performance. (Section 1R15)

- Green. The inspectors reviewed a self-revealed, non-cited violation of Technical Specification 5.4.1.a, "Procedures," for the licensee's failure to implement adequate work instructions for performing maintenance on residual heat removal flow indicating switch RHR-FIS-10B. Specifically, the flow indicating switch's upper drive arm and internal mechanical stops were improperly adjusted which led to increased internal friction. As a result, the associated minimum flow control valve, RHR-FCV-64B, failed to open when securing the system from a surveillance test. As an immediate corrective action, the licensee declared the Division 2 RHR system inoperable, replaced the flow indicating switch, and performed post-maintenance testing. The licensee entered this issue into the corrective action program as Action Request 355027.

  The failure to implement adequate work instructions for performing maintenance on residual heat removal flow indicating switch RHR-FIS-10B was a performance deficiency. Specifically, the flow indicating switch's upper drive arm and internal mechanical stops were improperly adjusted which led to increased internal friction. As a result, the associated minimum flow control valve, RHR-FCV-64B, failed to open when securing the system from a surveillance test. The performance deficiency was more than minor, and therefore a finding, because it affected the equipment performance attribute of the Mitigating Systems Cornerstone and adversely affected the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, RHR-FIS-10B failed to change state, the Division 2 RHR system was declared inoperable, and the licensee replaced the flow indicating switch. The inspector performed the initial significance determination using NRC Inspection Manual Chapter 0609, Appendix A, Exhibit 2, "Mitigating Systems Screening Questions." The inspectors determined that the finding was of very low safety significance (Green) because: (1) the finding was not a deficiency affecting the design or qualification of a mitigating system; (2) the finding did not represent a loss of system and/or function; (3) the finding did not represent an actual loss of function of a single train for greater than its technical specification allowed outage time; and (4) the finding did not represent an actual loss of function of one or more nontechnical specification trains of equipment designated as high safety-significant in accordance with the licensee's maintenance rule program for greater than 24 hours.

  This finding had a cross-cutting aspect in the area of human performance, avoid complacency, in that the licensee failed to recognize and plan for the possibility of mistakes, latent issues, and inherent risk, even while expecting successful outcomes. Specifically, the station technicians did not recognize their improper adjustment of the flow indicating switch could lead to failure although training was given on adjustments [H.12]. (Section 1R15)

Licensee-Identified Violations

A violation of very low safety significance that was identified by the licensee has been reviewed by the inspectors. Corrective actions taken or planned by the licensee have been entered into the licensee's corrective action program. This violation and associated corrective action tracking numbers are listed in Section 4OA7 of this report.

PLANT STATUS

The plant began the inspection period at 100 percent power. On October 7, 2016, the plant reduced power to approximately 90 percent for control rod testing. On October 8, 2016, the plant further reduced power to approximately 60 percent for maintenance on the recirculation pump drive system and feedwater system. The plant returned to 100 percent power on October 9, 2016.

On October 15, 2016, the licensee reduced power to approximately 92 percent for control rod and steam valve testing. The plant returned to 100 percent power on October 16, 2016.

On November 18, 2016, the licensee reduced power to approximately 92 percent for control rod and steam valve testing. On November 19, 2016, the plant further reduced power to approximately 70 percent for a control rod sequence exchange and steam valve testing. The plant returned to 100 percent power on November 20, 2016.

On December 17, 2016, the licensee reduced power to approximately 85 percent for control rod and steam valve testing. The plant returned to 100 percent power on December 18, 2016.

Later on December 18, 2016, the plant automatically scrammed due to a loss of the 500 kV circuit at the Ashe substation and the associated trip of the main generator output circuit breakers. The plant restarted on December 23, 2016. The plant returned to 100 percent power on December 27, 2016, and remained there for the remainder of the inspection period.

REPORT DETAILS

1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, and Barrier Integrity

1R01 Adverse Weather Protection (71111.01)

Readiness for Impending Adverse Weather Conditions

a. Inspection Scope

On November 16, 2016, the inspectors completed an inspection of the station's readiness for impending adverse weather conditions. The inspectors reviewed plant design features, the licensee's procedures to respond to seasonal cold temperatures, and the licensee's planned implementation of these procedures. The inspectors evaluated operator staffing and accessibility of controls and indications for those systems required to control the plant.

These activities constituted one sample of readiness for impending adverse weather conditions, as defined in Inspection Procedure 71111.01.

b. Findings

No findings were identified.

1R04 Equipment Alignment (71111.04)

Partial Walk-Down

a. Inspection Scope

The inspectors performed partial system walk-downs of the following risk-significant systems:

- November 17, 2016, control rod drive and hydraulic control units
- November 25, 2016, Division 2 standby gas treatment

The inspectors reviewed the licensee's procedures and system design information to determine the correct lineup for the systems. They visually verified that critical portions of the systems or trains were correctly aligned for the existing plant configuration.

These activities constituted two partial system walk-down samples, as defined in Inspection Procedure 71111.04.

b. Findings

No findings were identified.

1R05 Fire Protection (71111.05)

Quarterly Inspection

a. Inspection Scope

The inspectors evaluated the licensee's fire protection program for operational status and material condition. The inspectors focused their inspection on five plant areas important to safety:

- October 15, 2016, fire areas DG-4, DG-5, and DG-6, emergency diesel generator fuel oil storage tank rooms
- October 17, 2016, fire area RC-3, radioactive waste building vertical cable chase
- November 10, 2016, fire areas RC-2/1 and RC-13/2, cable spreading room and adjacent hallways
- November 27, 2016, fire areas R-1 and R-18/2, reactor building 522 foot elevation
- November 27, 2016, fire area R-1, reactor building 572 foot elevation

For each area, the inspectors evaluated the fire plan against defined hazards and defense-in-depth features in the licensee's fire protection program. The inspectors evaluated control of transient combustibles and ignition sources, fire detection and suppression systems, manual firefighting equipment and capability, passive fire protection features, and compensatory measures for degraded conditions.

These activities constituted five quarterly inspection samples, as defined in Inspection Procedure 71111.05.

b. Findings

No findings were identified.

1R06 Flood Protection Measures (71111.06)

a. Inspection Scope

On November 28, 2016, the inspectors completed an inspection of the station's ability to mitigate flooding due to internal causes. After reviewing the licensee's flooding analysis, the inspectors chose the cable spreading room as a plant area containing risk-significant structures, systems, and components that were susceptible to flooding.

The inspectors reviewed plant design features and licensee procedures for coping with internal flooding. The inspectors walked down the selected areas to inspect the design features, including the material condition of seals, drains, and flood barriers. The inspectors evaluated whether operator actions credited for flood mitigation could be successfully accomplished.

These activities constituted completion of one flood protection measures sample, as defined in Inspection Procedure 71111.06.

b. Findings

No findings were identified.

1R11 Licensed Operator Requalification Program and Licensed Operator Performance (71111.11)

.1 Review of Licensed Operator Requalification

a. Inspection Scope

On November 8, 2016, the inspectors observed a portion of an annual requalification test for licensed operators. The inspectors assessed the performance of the operators and the evaluators' critique of their performance. The inspectors also assessed the modeling and performance of the simulator during the requalification activities.

These activities constituted completion of one quarterly licensed operator requalification program sample, as defined in Inspection Procedure 71111.11.

b. Findings

No findings were identified.

.2 Review of Licensed Operator Performance

a. Inspection Scope

The inspectors observed the performance of on-shift licensed operators in the plant's main control room. At the time of the observations, the plant was in a period of heightened activity or risk. The inspectors observed the operators' performance of the following activities:

- October 3, 2016, loss of a non-safety reactor building ventilation fan
- November 28, 2016, licensed operator turnover

In addition, the inspectors assessed the operators' adherence to plant procedures, including conduct of operations procedure and other operations department policies.

These activities constituted completion of one quarterly licensed operator performance sample, as defined in Inspection Procedure 71111.11.

b. Findings

No findings were identified.

.3 Biennial Review of Requalification Program

The licensed operator requalification program involves two training cycles that are conducted over a 2-year period. In the first cycle, the annual cycle, the operators are administered an operating test consisting of job performance measures and simulator scenarios. In the second part of the training cycle, the biennial cycle, operators are administered an operating test and a comprehensive written examination. The examiners observed the associated training cycles during this inspection period.

a. Inspection Scope

To assess the performance effectiveness of the licensed operator requalification program, the inspectors conducted personnel interviews, reviewed both the operating tests and written examinations, and observed ongoing operating test activities.

The inspectors interviewed four licensee personnel from the training staff to determine their understanding of the policies and practices for administering requalification examinations. The inspectors also reviewed operator performance on the written examinations and operating tests. These reviews included observations of portions of the operating tests by the inspectors. The operating tests observed included six job performance measures and three scenarios that were used in the current biennial requalification cycle. These observations allowed the inspectors to assess the licensee's effectiveness in conducting the operating test to ensure operator mastery of the training program content.

The results of these examinations were reviewed to determine the effectiveness of the licensee's appraisal of operator performance and to determine if feedback of performance analyses into the requalification training program was being accomplished. The inspectors interviewed members of the training department and reviewed minutes of

training review group meetings to assess the responsiveness of the licensed operator requalification program to incorporate the lessons learned from both plant and industry events. Examination results were also assessed to determine if they were consistent with the guidance contained in NUREG 1021, "Operator Licensing Examination Standards for Power Reactors," Revision 10, and NRC Inspection Manual Chapter 0609, Appendix I, "Licensed Operator Requalification Significance Determination Process."

On December 20, 2016, the licensee informed the inspectors of the completed cycle results for the station for both the written examinations and the operating tests:

- 7 of 7 crews passed the simulator portion of the operating test
- 55 of 55 licensed operators passed the simulator portion of the operating test
- 54 of 55 licensed operators passed the job performance measure portion of the operating test
- 51 of 55 licensed operators passed the written examination

There were five licensed operators that failed a portion of the examination. Four licensed operators failed the biennial written examination and one licensed operator failed the job performance measure portion of the operating test. The individuals that failed the written exam and the job performance measure portion of the operating test were remediated, retested, and passed their retake examinations or tests, with the exception of one operator. This individual, one that failed the written examination, was being remediated at the end of December 2016. In early January 2017, the individual will be retested.

The inspectors compared these results to NRC Inspection Manual Chapter 0609, Appendix I, "Licensed Operator Requalification Significance Determination Process," values and determined that there were no findings based on these results and because all of the individuals that failed the applicable portions of their examinations and/or operating tests were remediated, retested, and passed their retake examinations prior to returning to shift.

The inspectors observed examination security measures in place during administration of the exams (including controls and content overlap) and reviewed any remedial training and re-examinations, if necessary. The inspectors also reviewed medical records of six licensed operators for conformance to license conditions and the licensee's system for tracking qualifications and records of license reactivation for four operators. In addition, the inspectors reviewed simulator performance for fidelity with the actual plant and the overall simulator program of maintenance, testing, and discrepancy correction.

These activities constituted completion of one biennial licensed operator requalification program sample, as defined in Inspection Procedure 71111.11.

b. Findings

Introduction. The inspectors identified a Severity Level IV, non-cited violation of 10 CFR 55.49, "Integrity of Examinations and Tests," associated with a Green finding, for the failure to ensure the integrity of simulator scenario tests, given as part of the 2015

licensed operator annual operating test, were maintained. The administration practices for the years 2015 and 2016 were reviewed to determine if they were consistent with industry standards used to enforce uniform conditions on the examination process. During the 2015 annual operating test, three licensed operators received two of three simulator scenario tests that had been previously administered to other licensed operators in previous weeks, and two licensed operators received two of two simulator scenario tests that had been previously administered to other licensed operators in previous weeks. Allowing more than 50 percent of an operating test section to be comprised of examination material previously administered on any other test in the same examination cycle is considered an examination integrity compromise. However, an evaluation of the 2015 examination results for the affected population showed that the compromise did not have an actual effect on the equitable and consistent administration of the examination.

Description. The licensee administered the required annual operating test to licensed operators over the course of a 7-week cycle. The first week was dedicated to testing licensed operators not assigned to a specific operations crew (Staff), and the following weeks were scheduled to evaluate their six operations crews (Crew A through F). Each individual is required to be evaluated on a minimum of two simulator scenarios. On December 12, 2016, the inspectors discovered that during the 2015 annual operating test, five licensed operators received an annual operating test that was composed of an excess of simulator scenarios previously administered to other licensed operators during the Crew F and Staff crew annual operating tests. This resulted in these groups of licensed operators receiving the following amounts of overlap on their re-take operating test components:

- Two licensed operators evaluated as part of Crew A had 100 percent overlap on their operating test simulator scenarios, (both operators evaluated on two of two simulator scenarios that were previously administered to other licensed operators, during the Crew F annual operating test)

- Three licensed operators evaluated as part of Crew E had 67 percent overlap on their operating test simulator scenarios, (all three operators evaluated on two of three simulator scenarios that were previously administered to other licensed operators, during the Staff crew annual operating test)

The inspectors reviewed Procedure TDI-23, “LORQ Annual Exam Development and Administration,” Revision 6. The procedure states, “To assure no exam overlap issues with the Simulator Examination, verify the following: Each scenario set for each crew should consist of at least 50 percent new scenarios which is defined as scenarios that have not been previously used in the current exam cycle. Each scenario set should be at least 50 percent different between and among crews.” The inspectors noted that the procedure does not verify at least 50 percent new scenarios on an individual level, only on the crew level.

The inspectors noted that the licensee failed to ensure portions of the 2015 annual operating test were constrained by the 50 percent overlap criteria. This constituted a compromise of examination integrity required by 10 CFR 55.49, in that, it is a practice which, if left uncorrected, could affect the equitable and consistent administration of the examinations.

The affected licensed operators were in Crew A and Crew E. At the time of discovery, four of the five affected licensed operators had completed their 2016 annual operating tests satisfactorily. The fifth individual had their licensed terminated prior to administration of the 2016 annual operating test and is no longer employed by the licensee.

The licensee evaluated the 2015 overlap event to determine its effect on the equitable and consistent administration of the exam. Portions of this evaluation were submitted to the NRC on December 15 and 20, 2016. The scope of the evaluation included review of examination security agreements signed by the licensed operators during examination administration, interviews with the licensed operator population to determine if information about the content of the examination was discussed amongst them during the examination administration period, and a review of examination performance to see if there was a noticeable increase in satisfactory performance in the examination elements. Based on this review, there was no indication that the examination overlap issue had an actual effect on the results of the 2015 annual operating test. The inspectors concluded that, although the integrity of the 2015 operating test was not maintained, no actual effect on the equitable and consistent administration of the 2015 operating test had occurred. The licensee documented this issue in Action Request 358890.

Analysis. The failure of the licensee's training staff to maintain the integrity of examinations administered to licensed operations personnel was a performance deficiency. The failure constituted a violation of 10 CFR 55.49, which impacts the regulatory process, and is therefore, evaluated through the traditional enforcement process. The Significance Determination Process, which was used to evaluate this performance deficiency, does not specifically consider the impact on the regulatory process. Thus, although related to a common regulatory concern, it is necessary to address both the violation and finding using different processes to correctly reflect both the regulatory importance of the violation and the safety significance of the associated performance deficiency.

The performance deficiency was more than minor, and therefore a finding, because it adversely affected the human performance attribute of the Mitigating Systems Cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Using NRC Inspection Manual Chapter 0609, "Significance Determination Process," Attachment 4, Tables 1 and 2 worksheets (issue date October 7, 2016), and the corresponding Appendix I, "Licensed Operator Requalification Significance Determination Process (SDP)," flowchart Block 10 (issue date December 6, 2011), the finding was determined to have very low safety significance (Green). Although the 2015 finding resulted in a compromise of the integrity of the annual operating tests, with no compensatory actions immediately taken when the compromise should have been discovered, the equitable and consistent administration of the annual operating test was not actually affected by this compromise.

The failure to meet 10 CFR 55.49 was determined to be a Severity Level IV (SL-IV) violation, as specified in Section 6.4.d.1.(a) of the NRC Enforcement Policy (issued November 1, 2016). The violation involved a failure to ensure the integrity of the simulator scenario operating tests that were performed in 2015. The NRC determined that the failure was a non-willful compromise of the integrity of five exams, required by

10 CFR Part 55, that did not contribute to the NRC making an incorrect regulatory decision. The violation was evaluated in accordance with Section 2.2.4 of the NRC Enforcement Policy, because the violation may have impacted the ability of the NRC to perform its regulatory oversight function. The issue was entered into the licensee's corrective action program as Action Request 358890, and therefore, this violation is being treated as an SL-IV, non-cited violation consistent with Section 2.3.2.a of the NRC Enforcement Policy.

This finding had a cross-cutting aspect in the area of resources associated with ensuring that procedures are adequate to ensure nuclear safety. A review of the procedure used to develop and administer requalification program examinations revealed that it did not specify the industry standards or guidelines that ensure that 50 percent or less of the examination material is repeated on a given examination in comparison to those examination elements used in previous weeks' examinations at the individual level. The procedure reviewed to confirm this was TDI-23, "LORQ Annual Exam Development and Administration," Revision 6 (last revised June 23, 2016) [H.1].

Enforcement. Title 10 CFR 55.49, "Integrity of Examinations," requires, in part, that facility licensees shall not engage in any activity that compromises the integrity of any application, test, or examination. The integrity of a test or examination is considered compromised if any activity, regardless of intent, affected or, but for detection, would have affected the equitable and consistent administration of the test or examination. This includes activities related to the preparation, administration, and grading of tests and examinations. Contrary to the above, during the weeks of November 9 and November 23, 2015, the licensee engaged in an activity that compromised the integrity of a test required by 10 CFR Part 55. Specifically, training personnel administered annual operating test simulator scenarios to three licensed operators who received two of three simulator scenario tests that had been previously administered to other licensed operators in previous weeks, and two licensed operators received two of two simulator scenario tests that had been previously administered to other licensed operators in previous weeks. This resulted in these groups of licensed operators receiving 67 percent and 100 percent overlap, respectively, on their retake simulator scenario tests. Administering an operating test with greater than 50 percent overlap from previously administered operating tests is considered a compromise of the integrity of the test, in that, it is a practice that, but for detection, would affect the equitable and consistent administration of these tests.

The inspectors determined that the compromise of the 2015 annual operating test re-take examinations did not result in an actual effect on the equitable and consistent administration of the examination. Because this finding was of very low safety significance (Green), the associated violation resulted in no or relatively inappreciable potential safety consequences (SL-IV), and it has been entered into the licensee's corrective action program to address recurrence as Action Request 358890, this violation is being treated as a non-cited violation consistent with Section 2.3.2.a of the NRC Enforcement Policy. (NCV 05000397/2016004-01, "Failure to Maintain Licensed Operator Examination Integrity")

1R12 Maintenance Effectiveness (71111.12)

a. Inspection Scope

The inspectors reviewed one instance of degraded performance or condition of safety-related structures, systems, and components (SSCs):

- October 11, 2016, main steam pressure switch, MS-PS-413A, surveillance test valve leakage including quality control

The inspectors reviewed the extent of condition of possible common cause SSC failures and evaluated the adequacy of the licensee's corrective actions. The inspectors reviewed the licensee's work practices to evaluate whether these may have played a role in the degradation of the SSCs. The inspectors assessed the licensee's characterization of the degradation in accordance with 10 CFR 50.65 (the Maintenance Rule), and verified that the licensee was appropriately tracking degraded performance and conditions in accordance with the Maintenance Rule.

These activities constituted completion of one maintenance effectiveness quality control sample, as defined in Inspection Procedure 71111.12.

b. Findings

No findings were identified.

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

a. Inspection Scope

The inspectors reviewed two risk assessments performed by the licensee prior to changes in plant configuration and the risk management actions taken by the licensee in response to elevated risk:

- October 10, 2016, Yellow risk for reactor core isolation cooling testing
- November 11, 2016, Green risk for work on circuit breaker E-CB-S/3

The inspectors verified that these risk assessment were performed timely and in accordance with the requirements of 10 CFR 50.65 (the Maintenance Rule) and plant procedures. The inspectors reviewed the accuracy and completeness of the licensee's risk assessments and verified that the licensee implemented appropriate risk management actions based on the result of the assessments.

These activities constituted completion of two maintenance risk assessment inspection samples, as defined in Inspection Procedure 71111.13.

b. Findings

No findings were identified.

1R15 Operability Determinations and Functionality Assessments (71111.15)

a. Inspection Scope

The inspectors reviewed three operability determinations that the licensee performed for degraded or nonconforming SSCs:

- October 7, 2016, operability determination of the residual heat removal system for minimum flow control valve failing to cycle under Action Request 355027
- October 12, 2016, operability determination of reactor core isolation cooling system for post-surveillance trips under Action Request 352594
- December 16, 2016, operability determination of reactor core isolation cooling system for loss of one valve position indication under Action Request 358833

The inspectors reviewed the timeliness and technical adequacy of the licensee's evaluations. Where the licensee determined the degraded SSC to be operable, the inspectors verified that the licensee's compensatory measures were appropriate to provide reasonable assurance of operability. The inspectors verified that the licensee had considered the effect of other degraded conditions on the operability of the degraded SSC.

These activities constituted completion of three operability review samples, as defined in Inspection Procedure 71111.15.

b. Findings

.1 RCIC Trips After Surveillances

Introduction. The inspectors reviewed a self-revealed, Green, non-cited violation of 10 CFR Part 50, Appendix B, Criterion III, "Design Control," for the licensee's failure to verify the adequacy of design of the reactor core isolation cooling (RCIC) system. Specifically, during a 2001 design change, the licensee placed the RCIC keep-fill pump pressure transmitter in a location subjected to hydraulic transients. The incorrect location of the pressure transmitter resulted in RCIC tripping three separate times because the keep-fill pump was unable to keep up with the hydraulic transient that follows surveillance testing.

Description. As described in the Final Safety Analysis Report (FSAR), Section 5.4.6, the RCIC system is designed to ensure that sufficient reactor water inventory is maintained in the reactor vessel to permit adequate core cooling. RCIC prevents reactor fuel overheating should the reactor vessel be isolated and accompanied by a loss-of-coolant flow from the reactor feedwater system. The RCIC system, however, is neither an emergency core cooling system (ECCS) nor an engineered safety feature (ESF) system since no credit is taken for its operation in the accident analysis of FSAR, Chapter 6 or 15. The steam-driven RCIC pump, RCIC-P-1, automatically starts on a low reactor water level (Level 2) signal and automatically secures on a high reactor water level (Level 8) signal. The RCIC system can also be controlled manually as needed.

In order to maintain RCIC system piping filled with water, the keep-fill pump (also known as a water leg pump), RCIC-P-3, provides approximately 75 psig water to the system when RCIC is in a standby lineup. Prior to 2001, this keep-fill pump operated continuously per the original vendor design. The licensee modified the design of RCIC under Engineering Change 394 on June 14, 2001, to add a RCIC-P-1 discharge check valve, low pressure switches, and intermittent operation of RCIC-P-3 via a pressure switch. The goal of this design change was to address concerns about water hammer. Notably for this inspection issue, the location of the RCIC-P-3 pressure switch was on the discharge-side of the RCIC-P-1 discharge check valve.

After this design change, the RCIC turbine unexpectedly tripped after three surveillance tests and was documented in the following Action Requests (ARs): October 10, 2006 (AR 45003), December 15, 2015 (AR 341596), and July 22, 2016 (ARs 355923 and 352594). For the 2006 issue, RCIC tripped one week after the test was completed. At the time, the licensee could not determine a cause, ruling out a hydraulic transient as not credible, and assigned the most likely cause of personnel inadvertently bumping the instruments. For the 2015 issue, the licensee could not obtain computer data after starting a surveillance test due to a computer network issue, stopped the surveillance, and RCIC tripped approximately 1.5 hours later. The licensee determined that the cause of this trip was an inadequate procedure when aborting the test mid-performance. In July 2016, RCIC was run to provide support to a residual heat removal (RHR) heat exchanger test. Following this test, RCIC again tripped after approximately 1.5 hours of being secured. The licensee determined that the cause of this trip was an inadequate procedure for system restoration.

The licensee performed additional instrumented troubleshooting on the RCIC system and determined that the trips were caused by hydraulic transients. Specifically, after RCIC is run, the pressure in the portion of piping between the RCIC-P-1 discharge check valve and the reactor injection valve, decays slowly from a high pressure of approximately 1000 psig. The remaining portion of RCIC will quickly decay to about 15 psig due to normal system head pressure. Since the keep-fill pump pressure switch is on the high pressure side of the RCIC-P-1 discharge check valve, the keep-fill pump does not run during this decay period. Specifically, the location of the keep-fill pump pressure switch is the inadequate design issue. After approximately 1.5 hours of decay, the RCIC-P-1 discharge check valve will unseat due to decreasing differential pressure across it. This unseating causes portions of RCIC piping containing the keep-fill pump pressure switch and the RCIC low pressure trip switch to drop below the low pressure trip set point. Although the keep-fill pump receives a start command due to low pressure, the keep-fill pump cannot overcome the hydraulic transient before the RCIC low pressure trip value is reached. When RCIC receives a low pressure trip, the system isolates from the steam supply and prevents automatic initiation.

The inspectors questioned the recent trips of the RCIC turbine and the ability of the keep-fill pump for maintaining operability of the RCIC system. The inspectors reviewed Engineering Change 394 and determined that the licensee failed to verify the adequacy of the design change. Specifically, the inspectors determined that placing the RCIC-P-3 pressure switch downstream of the RCIC-P-1 discharge check valve allows a subsequent hydraulic transient to depressurize RCIC piping below the low pressure trip set point. This determination is similar to the licensee's apparent cause evaluation performed under AR 352594, which indicated an organizational and programmatic cause of "inadequate design process." The inspectors also determined that RCIC was

vulnerable to this failure mechanism as early as 2001, when the engineering change was installed.

The licensee determined that RCIC remained operable despite this design deficiency. Each of the observed trips occurred following a surveillance test that did not include a post-test fill-and-vent restoration. The design vulnerability only occurs after RCIC is shutdown, significant time has elapsed, and no action has been taken such as the normally performed fill-and-vent steps found in other licensee procedures for RCIC. When the system is in a standby lineup, RCIC will appropriately start in automatic and provide water to the reactor. Manual operation of RCIC, discussed in FSAR Section 5.4.6, and Technical Specification bases for Section 3.5.3, is an acceptable method of controlling RCIC after an automatic start and represents the preferred method used by the licensee for operating RCIC during plant events. The inspectors reviewed the past operability determination and concluded that RCIC would have been able to perform its safety function.

In response to this condition, the licensee implemented continuous operation of the keep-fill pump and initiated AR 352594 to address long-term issues such as procedure revisions and system design changes.

Analysis. The failure to verify the adequacy of design of the RCIC system was a performance deficiency. Specifically, in 2001, the licensee implemented a design change to the keep-fill pump, RCIC-P-3, that changed its operation from continuous to intermittent and did not verify the adequacy of the design for all methods of operation, including surveillance testing. The performance deficiency was more than minor, and therefore a finding, because it affected the design control attribute of the Mitigating System Cornerstone and adversely affected the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, this modification was inadequate, resulted in RCIC tripping three separate times when RCIC-P-3 was unable to keep up with hydraulic transients, and required compensatory measures to prevent future trips. The inspectors performed the initial significance determination using NRC Inspection Manual Chapter 0609, Appendix A, Exhibit 2, “Mitigating Systems Screening Questions.” The inspectors determined that the finding was of very low safety significance (Green) because: (1) the finding was not a deficiency affecting the design or qualification of a mitigating system; (2) the finding did not represent a loss of system and/or function; (3) the finding did not represent an actual loss of function of a single train for greater than its technical specification allowed outage time; and (4) the finding does not represent an actual loss of function of one or more nontechnical specification trains of equipment designated as high safety-significant in accordance with the licensee’s maintenance rule program for greater than 24 hours.

The inspectors did not identify a cross-cutting aspect for this issue. Specifically, the design change occurred approximately 15 years ago and does not represent current licensee performance.

Enforcement. Title 10 CFR Part 50, Appendix B, Criterion III, “Design Control,” requires, in part, that design control measures shall provide for verifying or checking the adequacy of design, such as by the performance of design reviews, by the use of alternate or simplified calculational methods, or by the performance of a suitable testing program. The licensee established Engineering Change (EC) 394, in part, to meet the

requirements of 10 CFR Part 50, Appendix B, Criterion III. Contrary to the above, from June 14, 2001 to July 22, 2016, the licensee failed to provide design control measures for verifying or checking the adequacy of design of the RCIC system to which 10 CFR Part 50, Appendix B applies. Specifically, in 2001, the licensee implemented a design change, EC 394, to the keep-fill pump, RCIC-P-3, that changed its operation from continuous to intermittent and did not verify the adequacy of the design for all methods of operation. Placing the RCIC-P-3 pressure switch downstream of the RCIC-P-1 discharge check valve allows a subsequent hydraulic transient to depressurize RCIC piping below the low pressure trip set point. This failure to provide design control measures for verifying or checking the adequacy of design of RCIC resulted in RCIC tripping three separate times when RCIC-P-3 was unable to keep up with hydraulic transients and required compensatory measures to prevent future trips. As an immediate corrective action, the licensee changed their operation of the keep-fill pump to running continuously and initiated AR 352594. Because this finding is of very low safety significance (Green) and was entered into the licensee's corrective action program, this violation is being treated as a non-cited violation consistent with Section 2.3.2.a of the NRC Enforcement Policy. (NCV 05000397/2016004-02, "RCIC Trips After Surveillances")

.2 Flow Indicating Switch Adjustment

Introduction. The inspectors reviewed a self-revealed, Green, non-cited violation of Technical Specification 5.4.1.a, "Procedures," for the licensee's failure to implement adequate work instructions for performing maintenance on residual heat removal (RHR) flow indicating switch RHR-FIS-10B. Specifically, the flow indicating switch's upper drive arm and internal mechanical stops were improperly adjusted leading to increased internal friction. As a result, the associated minimum flow control valve, RHR-FCV-64B, failed to open when securing the system from a surveillance test.

Description. The Division 2 residual heat removal (RHR) flow indicating switch, RHR-FIS-10B, is a Barton 288A instrument that provides indication of flow through the system. Further, this instrument provides control signals to the associated minimum flow control valve, RHR-FCV-64B, to ensure the RHR system maintains a minimum flowpath to prevent damage from deadheading.

In June 2015, the licensee experienced failures of a similar Barton instrument associated with a non-cited violation in Section 4OA7 of NRC Inspection Report 05000397/2015004 (ML16032A034). Specifically, the licensee failed to include instructions for setting the mechanical stop inside Barton switches for reactor water level instruments. As part of the corrective actions for this 2015 issue, the licensee performed an extent-of-condition review and identified other Barton instruments that required internal mechanical stop adjustments including RHR-FIS-10B. On January 24, 2016, the licensee performed the corrective actions for RHR-FIS-10B by installing the internal mechanical stop under Work Order 02070349.

On September 17, 2016, while securing the Division 2 RHR system from a surveillance test, control room operators noted that RHR-FCV-64B did not respond as expected and secured the RHR pump. The licensee's troubleshooting identified that the RHR-FIS-10B needle was intermittently slow to respond to RHR system flow and the Division 2 RHR system was declared inoperable. The licensee replaced RHR-FIS-10B, performed post-maintenance testing, and restored the Division 2 RHR system to operable.

Engineering personnel performed an analysis of the removed Barton instrument and determined that the mechanical stop had been improperly adjusted. Specifically, the high pressure stop was improperly bent by maintenance technicians. This improper work caused deformation damage and small metallic burrs that increased friction with the indicating needle during operation. The licensee determined the apparent cause of the improper adjustment of RHR-FIS-10B was a failure of maintenance technicians to correctly implement procedure instructions when performing the stop bracket adjustment.

Regarding the past operability of the Division 2 RHR system, the licensee determined that the system remained operable. The September 17, 2016, failure was the only failure since maintenance had been performed in January 2016. Additionally, RHR-FIS-10B had correctly performed its function several times in the preceding 24 hours as the licensee initiated the Division 2 RHR system in suppression pool cooling mode for testing. The licensee evaluated the effect of short-term deadheading of RHR under Engineering Change 15991 and determined that the RHR would remain operable. The inspectors reviewed the past operability determination and concluded that RHR would have been able to perform its safety function.

As an immediate corrective action, the licensee declared the Division 2 RHR system inoperable, replaced the flow indicating switch, and performed post-maintenance testing. The licensee entered this issue into the corrective action program as Action Request 355027.

Analysis. The failure to implement adequate work instructions for performing maintenance on residual heat removal flow indicating switch, RHR-FIS-10B, was a performance deficiency. Specifically, the flow indicating switch's upper drive arm and internal mechanical stops were improperly adjusted, which led to increased internal friction. As a result, the associated minimum flow control valve, RHR-FCV-64B, failed to open when securing the system from a surveillance test. The performance deficiency was more than minor, and therefore a finding, because it affected the equipment performance attribute of the Mitigating Systems Cornerstone and adversely affected the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, RHR-FIS-10B failed to change state, the Division 2 RHR system was declared inoperable, and the licensee replaced the flow indicating switch. The inspector performed the initial significance determination using NRC Inspection Manual Chapter 0609, Appendix A, Exhibit 2, "Mitigating Systems Screening Questions." The inspectors determined that the finding was of very low safety significance (Green) because: (1) the finding was not a deficiency affecting the design or qualification of a mitigating system; (2) the finding did not represent a loss of system and/or function; (3) the finding did not represent an actual loss of function of a single train for greater than its technical specification allowed outage time; and (4) the finding does not represent an actual loss of function of one or more nontechnical specification trains of equipment designated as high safety-significant in accordance with the licensee's maintenance rule program for greater than 24 hours.

This finding had a cross-cutting aspect in the area of human performance, avoid complacency, in that the licensee failed to recognize and plan for the possibility of mistakes, latent issues, and inherent risk, even while expecting successful outcomes. Specifically, the station technicians did not recognize their improper adjustment of the

flow indicating switch could lead to failure although training was given on adjustments [H.12].

Enforcement. Technical Specification 5.4.1.a, "Procedures," requires, in part, that written procedures be established, implemented, and maintained as recommended in Regulatory Guide 1.33, Revision 2, Appendix A, dated February 1978. Paragraph 9.a of Regulatory Guide 1.33, Appendix A, requires written procedures for performing maintenance that can affect the performance of safety-related equipment. The licensee established Work Order 02070349, in part, to meet the Regulatory Guide 1.33 requirement. Contrary to the above, from January 24, 2016 to September 17, 2016, the licensee failed to implement written procedures as recommended in Regulatory Guide 1.33, Revision 2, Appendix A, dated February 1978. Specifically, the licensee failed to implement adequate work instructions for performing maintenance on residual heat removal flow indicating switch RHR-FIS-10B. The flow indicating switch's upper drive arm and internal mechanical stops were improperly adjusted, which led to increased internal friction. As a result, the associated minimum flow control valve, RHR-FCV-64B, failed to open when securing the system from a surveillance test. As an immediate corrective action, the licensee declared the Division 2 residual heat removal system inoperable, replaced the flow indicating switch, and performed post-maintenance testing. The licensee entered this issue into the corrective action program as Action Request 355027. Because this finding is of very low safety significance (Green) and was entered into the licensee's corrective action program, this violation is being treated as a non-cited violation consistent with Section 2.3.2.a of the NRC Enforcement Policy. (NCV 05000397/2016004-03, "Flow Indicating Switch Adjustment")

1R19 Post-Maintenance Testing (71111.19)

a. Inspection Scope

The inspectors reviewed three post-maintenance testing activities that affected risk-significant SSCs:

- October 6, 2016, Division 1 emergency diesel generator under Work Order 02081951
- October 18, 2016, Division 2 residual heat removal system under Work Order 02094685
- November 2, 2016, equipment radioactive drain system under Work Order 02071881

The inspectors reviewed licensing- and design-basis documents for the SSCs and the maintenance and post-maintenance test procedures. The inspectors observed the performance of the post-maintenance tests to verify that the licensee performed the tests in accordance with approved procedures, satisfied the established acceptance criteria, and restored the operability of the affected SSCs.

These activities constituted completion of three post-maintenance testing inspection samples, as defined in Inspection Procedure 71111.19.

b. Findings

No findings were identified.

1R20 Refueling and Other Outage Activities (71111.20)

a. Inspection Scope

During the station's forced outage that concluded on December 23, 2016, the inspectors evaluated the licensee's outage activities. The inspectors verified that the licensee considered risk in developing and implementing the outage plan, appropriately managed personnel fatigue, and developed mitigation strategies for losses of key safety functions. This verification included the following:

- Review of the licensee's forced outage plan
- Review and verification of the licensee's fatigue management activities
- Monitoring of shut-down and cool-down activities
- Verification that the licensee maintained defense-in-depth during outage activities
- Review and verification of drywell closeout inspection
- Monitoring of heat-up and startup activities

These activities constituted completion of one outage activity sample, as defined in Inspection Procedure 71111.20.

b. Findings

No findings were identified.

1R22 Surveillance Testing (71111.22)

a. Inspection Scope

The inspectors observed four risk-significant surveillance tests and reviewed test results to verify that these tests adequately demonstrated that the SSCs were capable of performing their safety functions:

In-service tests:

- November 8, 2016, Division 2 service water pump and valves test

Containment isolation valve surveillance tests:

- December 18, 2016, wetwell and drywell vacuum breaker testing

Other surveillance tests:

- October 26, 2016, post-accident monitoring system channel check

- November 30, 2016, Division 3 emergency diesel generator monthly surveillance test

The inspectors verified that these tests met technical specification requirements, that the licensee performed the tests in accordance with their procedures, and that the results of the test satisfied appropriate acceptance criteria. The inspectors verified that the licensee restored the operability of the affected SSCs following testing.

These activities constituted completion of four surveillance testing inspection samples, as defined in Inspection Procedure 71111.22.

b. Findings

No findings were identified.

4. OTHER ACTIVITIES

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

4OA1 Performance Indicator Verification (71151)

.1 Reactor Coolant System Specific Activity (BI01)

a. Inspection Scope

The inspectors reviewed the licensee's reactor coolant system chemistry sample analyses for the period of July 2015 through September 2016 to verify the accuracy and completeness of the reported data. The inspectors observed a chemistry technician obtain and analyze a reactor coolant system sample on November 22, 2016. The inspectors used definitions and guidance contained in Nuclear Energy Institute Document 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 7, to determine the accuracy of the reported data.

These activities constituted verification of the reactor coolant system specific activity performance indicator, as defined in Inspection Procedure 71151.

b. Findings

No findings were identified.

.2 Reactor Coolant System Total Leakage (BI02)

a. Inspection Scope

The inspectors reviewed the licensee's records of reactor coolant system total leakage for the period of October 2015 through September 2016 to verify the accuracy and completeness of the reported data. The inspectors observed the performance of OSP-INST-H101, "Shift and Daily Instrument Checks (Modes 1, 2, 3)," Revision 86, on October 26, 2016. The inspectors used definitions and guidance contained in Nuclear Energy Institute Document 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 7, to determine the accuracy of the reported data.

These activities constituted verification of the reactor coolant system leakage performance indicator, as defined in Inspection Procedure 71151.

b. Findings

No findings were identified.

4OA2 Problem Identification and Resolution (71152)

.1 Routine Review

a. Inspection Scope

Throughout the inspection period, the inspectors performed daily reviews of items entered into the licensee's corrective action program and periodically attended the licensee's condition report screening meetings. The inspectors verified that licensee personnel were identifying problems at an appropriate threshold and entering these problems into the corrective action program for resolution. The inspectors verified that the licensee developed and implemented corrective actions commensurate with the significance of the problems identified. The inspectors also reviewed the licensee's problem identification and resolution activities during the performance of the other inspection activities documented in this report.

b. Findings

No findings were identified.

.2 Semiannual Trend Review

a. Inspection Scope

The inspectors reviewed the licensee's corrective action program, performance indicators, system health reports, and other documentation to identify trends that might indicate the existence of a more significant safety issue. The inspectors verified that the licensee was taking corrective actions to address identified adverse trends.

These activities constituted completion of one semiannual trend review sample, as defined in Inspection Procedure 71152.

b. Observations and Assessments

On December 1, 2016, the inspectors reviewed action requests (ARs) and history of mechanism operated contacts (MOC) switches in 4160 Vac circuit breakers. To verify that the licensee was taking corrective actions to address identified adverse trends that might indicate the existence of a more significant safety issue, the inspectors reviewed related corrective action program ARs and problem evaluation reports (PERs):

- 2016 MOC switch deficiencies under ARs: 352504, 354620, 352774, 352567, 343739

- Prior MOC switch deficiencies included ARs: 26827, 42357, 43161, 268670, 331377; and PERs: 201-1445, 202-0468

In the case of MOC switch deficiencies identified in 2016, the inspectors noted that the affected components were not safety-related. Specifically, circuit breakers E-CB-S/3 and E-CB-N1/2 have experienced failures where the associated MOC switch failed to change state. These circuit breakers support aligning power to their associated non-safety bus from the normal transformer and from the startup transformer. In the case of MOC switch deficiencies identified prior to 2016, the inspectors determined that safety-related circuit breakers have not experienced a MOC switch failure since 2002. Those safety-related failures were the subject of a special inspection and the results were documented in NRC Inspection Report 05000397/2002005 (ML021430088). The causes of all MOC switch issues varied from inadequate lubrication, increased friction, incorrect assembly of components, and internal switch failures. Although the inspectors noted a design difference between safety-related and non-safety circuit breaker MOC switches, the inspectors did not identify a current, programmatic issue with MOC switch maintenance activities.

The inspectors noted that the licensee appropriately considered extent of condition and cause when scheduling corrective action assignments for these ARs. These actions include a review of MOC switch maintenance activities for safety-related and non-safety circuit breakers. The inspectors assessed the licensee's problem identification threshold, cause analyses, and compensatory actions. The inspectors verified that the licensee appropriately prioritized the planned corrective actions and that these actions were adequate to address the conditions.

c. Findings

No findings were identified.

.3 Annual Follow-up of Selected Issues

a. Inspection Scope

The inspectors selected two issues for an in-depth follow-up:

- On October 11, 2016, the inspectors reviewed action requests for motor control center deficiencies including the Division 1 emergency diesel generator fan DEA-FN-11

- On November 10, 2016, the inspectors reviewed action requests for control room air handling unit deficiencies including the Division 2 unit WMA-AH-53B

The inspectors assessed the licensee's problem identification threshold, cause analyses, extent of condition reviews, and compensatory actions. The inspectors verified that the licensee appropriately prioritized the planned corrective actions and that these actions were appropriate.

These activities constituted completion of two annual follow-up samples, as defined in Inspection Procedure 71152.

b. Findings

No finding were identified.

4OA6 Meetings, Including Exit

Exit Meeting Summary

On December 8, 2016, the inspectors presented the requalification program inspection results to Mr. B. Sawatzke, Chief Nuclear Officer, and other members of the licensee's staff. On December 28, 2016, the results of the inspection were telephonically exited with Mr. G. Hettel, Vice President, Operations, and other members of the plant staff. The licensee acknowledged the issues presented. The licensee confirmed that any proprietary information reviewed by the inspectors had been returned or destroyed.

On December 29, 2016, the inspectors presented the inspection results to Mr. A. Javorik, Vice President, Engineering, and other members of the licensee staff. On February 2, 2017, the inspectors presented updated inspection results to Ms. D. Wolfgramm, Compliance Supervisor. The licensee acknowledged the issues presented. The licensee confirmed that any proprietary information reviewed by the inspectors had been returned or destroyed.

4OA7 Licensee-Identified Violations

The following violation of very low safety significance (Green) was identified by the licensee and is a violation of NRC requirements which meets the criteria of the NRC Enforcement Policy for being dispositioned as a non-cited violation.

- Title 10 CFR 55.53, “Conditions of licenses,” Subpart (f)(2), requires that before the resumption of functions, authorized by a license issued under Part 55, begins, an authorized representative of the facility licensee shall certify that a minimum of 40 hours of shift functions, including a complete tour of the plant, is completed, in part, “under the direction of an operator or senior operator as appropriate and in the position to which the individual will be assigned.” Contrary to the above, on April 22, 2015, and October 26, 2016, authorized facility representatives certified that two licensed operators had completed the requirements to re-activate their licenses without completing a plant tour under the direction of the appropriate operator. The licensed operators completed plant tours, but an operator with an active license did not accompany them on their tours. Licensee staff identified this issue while performing a pre-NRC inspection focused self-assessment and subsequent extent of condition reviews. The affected licensed operators had their licenses placed on administrative hold until it was determined that they met the requirements of having active licenses. The violation was of very low safety significance (Green) because a prior and similar violation’s significance bounded this violation’s significance (Comanche Peak NCV 05000445/2011004-02). The licensee entered this issue into their corrective action program in Action Requests 357779 and 358321.

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Licensee Personnel

A. Black, General Manager
O. Brooks, Emergency Preparedness Coordinator
D. Brown, Manager, System Engineering
G. Burton, Principal Health Physicist, Radiation Protection
S. Cooper, Plant Fire Marshal
S. Clizbe, Manager, Emergency Preparedness
M. Davis, Manager, Chemistry/Radiation Safety
D. Gregoire, Manager, Regulatory Affairs and Performance Improvement
G. Hettel, Vice President, Operations
G. Higgs, Manager, Maintenance
M. Hummer, Licensing Engineer
A. Javorik, Vice President, Engineering
M. Laudisio, Manager, Radiological Services
Y. Moore, Dosimetry Specialist, Radiation Protection
C. Moon, Manager, Quality
R. Myers, Manager, Operations Training
T. Parmelee, Licensing Engineer
B. Pease, Manager, Emergency Services
G. Pierce, Manager, Training
R. Prewett, Operations Manager
G. Rheaume, System Engineering Supervisor, NSSS
R. Sanker, Supervisor, Radiation Protection
B. Sawatzke, Chief Nuclear Officer
B. Schuetz, Plant General Manager
D. Stephens, Assistant Manager, Operations
D. Suarez, Licensing Engineer
K. Van Speybroeck, Manager, Plant Support Engineering
L. Williams, Licensing Supervisor
D. Wolfgramm, Compliance Supervisor, Regulatory Affairs
G. Wyatt, Supervisor, Simulator and Examination Group

NRC Personnel

D. Loveless, Senior Risk Analyst

LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

Opened and Closed

05000397/2016004-01	NCV	Failure to Maintain Licensed Operator Examination Integrity (Section 1R11)
05000397/2016004-02	NCV	RCIC Trips After Surveillances (Section 1R15)
05000397/2016004-03	NCV	Flow Indicating Switch Adjustment (Section 1R15)

LIST OF DOCUMENTS REVIEWED

Section 1R01: Adverse Weather Protection

Procedures

Number	Title	Revision
DBD 309	Standby Service Water System	17
SOP-COLDWEATHER-OPS	Cold Weather Operations	28
SOP-HVAC/SW-STBY	Standby Service Water HVAC	0

Action Requests (ARs)

39345	39624	347723	350418

Section 1R04: Equipment Alignment

Procedures

Number	Title	Revision
SOP-CRD-LU	Control Rod Drive System Lineup	0
SOP-SGT-LU	Standby Gas Treatment System Lineup	0
SOP-SGT-START	Standby Gas Treatment Start	6
SOP-CN-CONT-VENT	Containment, Vent, Deinert, Purge, and Ventilating	25
OSP-SGT-M702	Standby Gas Treatment System B Operability	13

Action Requests (ARs)

340037	132310	356209	286361	286805
358102	306614	306616	256136	175439
358009	356737	355575	339498	

Section 1R05: Fire Protection

Procedures

Number	Title	Revision
PFP-DG-BUILDING	Diesel Generator Building	4
PFP-RW-467	Radwaste 467	5
PFP-RW-484-487	Radwaste 484-487	5
PFP-RB-522	Reactor 522	5
PFP-RB-572	Reactor 572	4

Action Requests (ARs)

357462	357601	357603	348217	344795
350919	354127	355408	355668	358284
358494	356253	358491		

Section 1R06: Flood Protection Measures

Miscellaneous Documents

Number	Title	Revision
ME-02-02-23	PFSS Flooding Analysis – Radwaste Building	0
ME-02-03-04	Calculation for Radwaste Building Flooding Analysis	0

Procedures

Number	Title	Revision
1.3.57	Barrier Impairment	35

Action Requests (ARs)

357462	357601	357603	357462	357532
351269				

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

Miscellaneous Documents

Number	Title	Revision/Date
	CGS Simulator Test Process, Transient Test 01 – Manual Scram from 100% Power	September 26, 2016
	CGS Simulator Test Process, Transient Test 02 – Loss of All Feedwater Pumps	September 26, 2016
	CGS Simulator Test Process, Transient Test 03 – Simultaneous Closure of All MSIVs	September 26, 2016
	CGS Simulator Test Process, Transient Test 04 – Loss of All RRC	September 26, 2016
	CGS Simulator Test Process, Transient Test 05 – Loss of a Single RRC Pump	September 27, 2016
	CGS Simulator Test Process, Transient Test 06 – Turbine Trip from Low Power	September 27, 2016
	CGS Simulator Test Process, Transient Test 07 – Max Rate Power Ramp	September 27, 2016
	CGS Simulator Test Process, Transient Test 08 – DBA LOCA and LOOP	September 27, 2016
	CGS Simulator Test Process, Transient Test 09 – Maximum Main Steam Line Rupture	September 27, 2016
	CGS Simulator Test Process, Transient Test 10 – MSIV Closure with Stuck Open SRV	September 27, 2016
	Columbia Generating Station Post Event Simulator Testing Report, SM-3 Induced Feedwater Transient	July 25, 2016
	Columbia Generating Station Post Event Simulator Testing Report, Manual Scram	April 18, 2016
	Columbia Generating Station Post Event Simulator Testing Report, RRC-P-1B Trip	January 20, 2016
	Columbia Generating Station, Simulator Cycle 23 Core Testing Report	August 11, 2016
	Employee Qualification Record for multiple licensed operators	December 8, 2016
	eSoms Report “Credit for Standing Watch” for multiple licensed operators	3rd Quarter 2016
	Scenario Based Testing, Scenario LR001762, Revision 4, IC 176	October 26, 2016

Miscellaneous Documents

Number	Title	Revision/Date
	Scenario Based Testing, Scenario LR002153, Revision 2, IC 187	October 26, 2016
	Scenario Based Testing, Scenario LR002048, Revision 1, IC 185	November 19, 2015
	Scenario Based Testing, Scenario LR002181, Revision 1, IC 191	November 12, 2015
	Shift Hours Report for multiple Licensed Operators	April 1 to June 7, 2016
	Simulator Performance Test 01 (SP01) – Steady State Testing	June 16, 2016
LR000155	Job Performance Measure – MSIV Equalizing/Opening Operation (Simulator)	11
LR0002342R1	Energy Northwest, Operations Training, Performance Deficiency Analysis & Remediation	November 17, 2016
LR001472	Evaluated Scenario	November 8, 2016
LR002011	Columbia Generating Station Simulator Examination	3
LR002079	Job Performance Measure – Start SGT Train A and Take Actions for a Fire in the SGT Charcoal (Simulator) (Alt Path)	2
LR002333	Biennial Written Exam RO E1	2017
LR002335	Columbia Generating Station Simulator Examination	0
LR002342	Biennial Written Exam SRO E1	2017
LR002347	Job Performance Measure – Determination of Operating Point and Required Actions Following FW Heater Trip per ABN-POWER (Admin)	0
LR002348	Job Performance Measure – Perform a Dose Assessment and Determine EAL – UE (Admin) (TC)	0

Procedures

Number	Title	Revision
1.3.1	Operating Policies, Programs, and Practices	120
5.1.1	RPV Control	21
5.2.1	Primary Containment Control	23
5.3.1	Secondary Containment Control	20
13.1.1	Classifying the Emergency	47

Procedures

Number	Title	Revision
13.1.1A	Classifying the Emergency – Technical Bases	31
ABN-HVAC	HVAC Trouble	13
OI-9	Operations Standards and Expectation	65
PPM-1.3.1	Operating Policies, Programs and Practices	120/004
PPM-1.8.11	Medical Examination Program for Licensed Operators	011/NA
PPM-18.10	Administration of Medical Qualifications	011/001
SOP-SGT-START-DIV/1-QC	Standby Gas Treatment Start – Quick Card	0
TDI-08	Licensed Operator Requalification Program	011
TDI-24	Exam Security	000
TDI-06	Simulator Management	018
TDI-23	LORQ Annual Exam Development and Administration	006
TDI-20	ILC Exam Development and Administration	004

Action Requests (ARs)

324146	325641	325643	326763	327006
328647	331504	353987	355818	356014
356558	357273	357766	357779	357887
358318	358321	358421	358602	358660
358716	358890	358944	358946	358949

Simulator Discrepancy Reports

1741	1743	2159

Section 1R12: Maintenance Effectiveness

Procedures

Number	Title	Revision
1.3.57	Barrier Impairment	35
1.5.11	Maintenance Rule Program	15
10.27.58D	Backfill RPV Sensing Line for Condensing Chamber MS-CU-4D in Mode 4, Div – 1	8
ISP-MS-Q912	ECCS – LPCS (A) and LPCS Valve Permissive on Low Reactor Pressure – Channels A and C – CFT/CC	5
SWP-CAP-01	Corrective Action Program	36

Action Requests (ARs)

356132	343136	351129	343776

Work Orders

02089184	02102796

Section 1R13: Maintenance Risk Assessments and Emergent Work Control

Miscellaneous Documents

Title	Date
Columbia Daily Work Schedule	Various

Procedures

Number	Title	Revision
1.3.76	Integrated Risk Management	48
1.3.83	Protected Equipment Program	23
1.5.14	Risk Assessment and Management For Maintenance/Surveillance Activities	38
WCI-4	Online Work Control Process	48

Action Requests (ARs)

356204	356248	356513	356593	356697
356999	357566	358124	356260	356290
356293	357525			

Section 1R15: Operability Determinations and Functionality Assessments

Miscellaneous Documents

Number	Title	Revision
EC 394	RCIC Water-Hammer Mitigation	0
EC 15991	RHR-V-64B Fail to Open on Flow Reduction	0

Procedures

Number	Title	Revision
1.3.66	Operability and Functionality Evaluation	33
OI-9	Operations Standards and Expectation	65
OI-14	Columbia Generating Station Operational Challenges and Risk Program	13
OSP-RCIC/IST-Q702	RCIC Valve Operability Test	41
SOP-RCIC-START	RCIC Start in Test Return Mode	6
SOP-RHR-SPC	Suppression Pool Cooling/Spray/Discharge/Mixing	8

Action Requests (ARs)

358833	356087	332078	355030	355027
352594	353597	120197	353607	

Work Orders

02102725	02102724	02102726	02091925

Section 1R19: Post-Maintenance Testing

Procedures

Number	Title	Revision
OSP-EDR/IST-Q701	EDR Valve Operability	5
OSP-ELEC-M701	Diesel Generator 1 – Monthly Operability Test	55
OSP-RHR/IST-Q703	RHR Loop B Operability Test	50
TSP-DG1-B502	Standby Diesel Generator DG1 Load Testing	20

Action Requests (ARs)

355916	356213	357345	354455	355958
355975	357415			

Work Orders

02081951	02094685	02092119	02083832	02071881

Section 1R20: Refueling and Other Outage Activities

Procedures

Number	Title	Revision
1.3.1	Operating Policies, Programs and Practices	120
3.1.2	Reactor Plant Startup	81
3.3.1	Reactor Scram	62
ABN-ELEC-GRID	Degraded Off Site Power Grid	7
ABN-FAZ	FAZ	17
ABN-GENERATOR	Main Generator Trouble	15
ABN-RPS	Loss of RPS	11
ABN-TRANSFORMER	Transformer Abnormal Operation	18
ABN-TURBINE	Main Turbine Generator Trip	2

Action Requests (ARs)

359058	359059	359060	359061	359064
359065	359078	359089	359106	359109
359116	359162	359316	359317	359318
359319	359320			

Section 1R22: Surveillance Testing

Procedures

Number	Title	Revision/Date
ANSI/ISA-67-06.01-2002	Performance Monitoring for Nuclear Safety-Related Instrument Channels in Nuclear Power Plants	May 24, 2002

Procedures

Number	Title	Revision/Date
ISA-S67.06-1984	Response Time Testing of Nuclear Safety-Related Instrument Channels in Nuclear Power Plants	August 29, 1986
OSP-CVB/IST-M701	Vacuum Breaker Operability	16
OSP-ELEC-M703	HPCS Diesel Generator Monthly Operability Test	63
OSP-INST-H101	Shift and Daily Instrument Checks (Modes 1, 2, 3)	86
OSP-SW/IST-Q701	Standby Service Water Loop A Operability	28
RPI-24.0	Technical Specification Programs	0
SOP-DG3-LU	High Pressure Core Spray Diesel Generator Valve Power Supply Lineup	6
SOP-DG3-START	High Pressure Core Spray Diesel Generator Start	26
SWP-IST-01	ASME Inservice Testing	2
TSP-MSRV/IST-R701	Safety/Relief Valve and ADS Operability	9

Action Requests (ARs)

358284	358330	357242	355537	353920
357536	358067	357529	357410	315816
354479	353446	313504		

Work Orders

02074213	02055759	02090544	02084523	02062076
02095221	02024335	02069212	02080782	02079113
02045375				

Section 4OA1: Performance Indicator Verification

Procedures

Number	Title	Revision
CI-10.17	Iodine	12
CSP-I131-W101	Reactor Coolant Isotopic Analysis for I-131 Dose Equivalent	9
OSP-INST-H101	Shift and Daily Instrument Checks (Modes 1, 2, 3)	86

Action Requests (ARs)

344287	347127	347570	349415	350746
343284	348717	356936	344397	345377
357345				

Section 4OA2: Problem Identification and Resolution

Miscellaneous Documents

Number	Title	Revision
ME-02-92-43	Calculation for Room Temperature For DG Building and RW and SW Pumphouse Under Design Basis Accident Conditions	11

Procedures

Number	Title	Revision
10.25.3	Testing Thermal Overload Devices	19
OSP-ELEC-M701	Diesel Generator 1 – Monthly Operability Test	56
OSP-SW-M102	Standby Service Water Loop B Valve Position Verification	35

Action Requests (ARs)

352668	352835	354590	354970	354637
352504	354620	352774	352567	343739
26827	42357	43161	268670	331377

Work Orders

29129758	29129835	02094683	02094683	02088230
02101541	02035806	02100561	29130496	

Section 4OA7: Licensee-Identified Violations

Miscellaneous Documents

Number	Title	Revision
AR-SA 316876	Focused Self-Assessment Report, Operations Training, Pre-NRC 71111.11 Inspection	02

Procedures

Number	Title	Revision
SWP-ASU-02	Self-Assessment and Benchmark Process	018
TDI-03	Training Self-Assessment, Benchmarking, and Continuous Monitoring	021

Action Requests (ARs)

357779 358321