



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

February 13, 2018

Mr. George A. Lippard III
Vice President, Nuclear Operations
South Carolina Electric & Gas Company
Virgil C. Summer Nuclear Station
P.O. Box 88, Mail Code 800
Jenkinsville, SC 29065

**SUBJECT: VIRGIL C. SUMMER NUCLEAR STATION, UNIT 1 – NRC INTEGRATED
INSPECTION REPORT 05000395/2017004 AND NOTICE OF VIOLATION**

Dear Mr. Lippard:

On December 31, 2017, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at your Virgil C. Summer Nuclear Station, Unit 1. On January 31, 2018, the NRC inspectors discussed the results of this inspection with you and other members of your staff. The results of this inspection are documented in the enclosed report.

The enclosed report discusses a violation associated with a finding of very low safety significance (Green). The NRC evaluated this violation in accordance Section 2.3.2.a of the NRC Enforcement Policy, which appears on the NRC's Web site at <http://www.nrc.gov/about-nrc/regulatory/enforcement/enforce-pol.html>. The violation is cited in the enclosed Notice of Violation (Notice) and the circumstances surrounding it are described in detail in the subject inspection report. We determined that this violation did not meet the criteria to be treated as a non-cited violation because compliance has not been restored. Specifically, the licensee failed to ensure that conditions adverse to quality were promptly corrected as noted in a previous NRC-identified Green NCV, 05000395/2005007-01, "EFW Flow Control Valves Are Susceptible to Plugging by Tubercles or Other Debris from Service Water." As of September 30, 2017, compliance had not been restored.

You are required to respond to this letter and should follow the instructions specified in the enclosed Notice of Violation (Notice) when preparing your response. If you have additional information that you believe the NRC should consider, you may provide it in your response to the Notice. The NRC's review of your response to the Notice will also determine whether further enforcement action is necessary to ensure your compliance with regulatory requirements.

If you contest the violations or respective significance, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001; with copies to the Regional Administrator, Region II; the Director, Office of Enforcement, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001; and the NRC Resident Inspector at Virgil C. Summer Nuclear Station, Unit 1.

The NRC inspectors also identified two findings of very low safety significance (Green) in this report. One of these findings involved a violation of NRC requirements. NRC inspectors documented one finding that did not involve a violation of NRC requirements. Further, inspectors documented a licensee-identified violation which was determined to be of very low safety significance in this report. Because these violations are of very low safety significance, and because the issues were entered into your corrective action program, the NRC is treating these violations as non-cited violations (NCVs) consistent with Section 2.3.2.a of the 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 II; the Director, Office of Enforcement, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001; and the NRC Resident Inspector at the Virgil C. Summer Nuclear Station, Unit 1.

If you disagree with a cross-cutting aspect assignment or a finding not associated with a regulatory requirement 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 II; and the NRC resident inspector at the Virgil C. Summer Nuclear Station, Unit 1.

This letter, its enclosure, and your response 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/

LaDonna B. Suggs, Chief
Reactor Projects Branch 3
Division of Reactor Projects

Docket No.: 50-395
License No.: NPF-12

Enclosures:

1. Notice of Violation
2. IR 05000395/2017004 w/Attachment:
Supplemental Information

cc Distribution via ListServ

G. Lippard

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SUBJECT: VIRGIL C. SUMMER NUCLEAR STATION, UNIT 1 – NRC INTEGRATED
INSPECTION REPORT 05000395/2017004 AND NOTICE OF VIOLATION
February 13, 2018

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NOTICE OF VIOLATION

South Carolina Electric and Gas Company (SCE&G)
Virgil C. Summer Nuclear Station, Unit 1

Docket No. 50-395
License No. NPF-12

During an NRC inspection conducted between October 1 and December 31, 2017, a violation of NRC requirements was identified. In accordance with the NRC Enforcement Policy, Section 2.3.3, (ADAMS Accession No. ML16271A446) the violation is listed below:

10 CFR 50, Appendix B, Criterion XVI states, in part, that measures shall be established to assure that conditions adverse to quality (CAQs) are promptly identified and corrected.

Contrary to the above, as of December 31, 2017, the licensee failed to correct a CAQ involving Emergency Feedwater (EFW) flow control valves that were susceptible to plugging by tubercles or other debris when the safety-related Service Water system was used as the essential suction source for the EFW pumps. NRC Inspection Report 05000395/2005007, (Agency Document Access and Management System (ADAMS) Accession No. ML050700044) issued on March 10, 2005, identified a previous 10 CFR 50, Appendix B, Criterion XVI non-cited violation (NCV 05000395/2005007-01, "EFW Flow Control Valves Are Susceptible to Plugging by Tubercles or Other Debris from Service Water") which involved the failure to correct this CAQ. As of December 31, 2017, the licensee had not corrected the CAQ involving the EFW control valves.

This violation was associated with a very low safety significance (Green), reactor oversight process (ROP) finding as determined by the significance determination process (SDP).

Pursuant to the provisions of 10 CFR 2.201, SCE&G is hereby required to submit a written statement or explanation to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001 with a copy to the Regional Administrator, Region II, and a copy to the NRC Resident Inspector at the facility that is the subject of this Notice, within 30 days of the date of the letter transmitting this Notice of Violation (Notice). This reply should be clearly marked as a "Reply to a Notice of Violation" and should include:

(1) the reason for the violation, or, if contested, the basis for disputing the violation or severity level, (2) the corrective steps that have been taken and the results achieved, (3) the corrective steps that will be taken, and (4) the date when full compliance will be achieved. Your response may reference or include previous docketed correspondence, if the correspondence adequately addressed the required response. If an adequate reply is not received within the time specified in this Notice, an order or a Demand for Information may be issued as to why the license should not be modified, suspended, or revoked, or why such other action as may be proper should not be taken. Where good cause is shown, consideration will be given to extending the response time.

If you contest this enforcement action, you should also provide a copy of your response, with the basis for your denial, to the Director, Office of Enforcement, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001.

Because your response will be made available electronically for public inspection in the NRC Public Document Room or from the NRC's document system (ADAMS), accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html>, to the extent possible, it should not include any personal privacy, proprietary, or safeguards information so that it can be made available to the public without redaction. If personal privacy or proprietary information is

necessary to provide an acceptable response, then please provide a bracketed copy of your response that identifies the information that should be protected and a redacted copy of your response that deletes such information. If you request withholding of such material, you must specifically identify the portions of your response that you seek to have withheld and provide in detail the bases for your claim of withholding (e.g., explain why the disclosure of information will create an unwarranted invasion of personal privacy or provide the information required by 10 CFR 2.390(b) to support a request for withholding confidential commercial or financial information). If safeguards information is necessary to provide an acceptable response, please provide the level of protection described in 10 CFR 73.21.

In accordance with 10 CFR 19.11, you may be required to post this Notice within two working days of receipt.

Dated this 13th day of February, 2018

U. S. NUCLEAR REGULATORY COMMISSION

REGION II

Docket No. 50-395

License No. NPF-12

Report Nos. 05000395/2017004

Licensee: South Carolina Electric & Gas (SCE&G) Company

Facility: Virgil C. Summer Nuclear Station, Unit 1

Location: Jenkinsville, SC 29065

Dates: October 1 through December 31, 2017

Inspectors: J. Reece, Senior Resident Inspector
E. Hilton, Resident Inspector
D. Lanyi, Senior Operations Engineer (Section 1R11.3)

Approved by: LaDonna B. Suggs, Chief
Reactor Projects Branch 3
Division of Reactor Projects

SUMMARY

IR 05000395/2017004; October 1, 2017 – December 31, 2017: Virgil C. Summer Nuclear Station, Unit 1; Adverse Weather Protection, Problem Identification and Resolution, Followup of Events and Notices of Enforcement Discretion. .

The report covered a three-month period of inspection by resident inspectors and one regional specialist inspector. One Green NRC-identified finding, one self-revealing non-cited violation (NCV) and one NRC-identified cited violation were identified. The significance of most findings is indicated by their color (Green, White, Yellow, Red) using Inspection Manual Chapter (IMC) 0609, "Significance Determination Process" (SDP), dated April 29, 2015. The cross-cutting aspects were determined using IMC 0310, "Aspects Within the Cross Cutting Areas," dated December 4, 2014. All violations of NRC requirements were dispositioned in accordance with the NRC's Enforcement Policy dated November 1, 2016. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision (Rev.) 6.

Cornerstone: Mitigating Systems

- Green. The NRC identified a Green finding (FIN) for the failure of the licensee to accomplish operations administrative procedure, OAP-109.1, "Guidelines for Severe Weather," Rev. 4H, for adequate control of sandbags used for ground level plant building access door protection during a permissible maximum precipitation (PMP) or other adverse rainfall events. The licensee entered the issue in their corrective action program as condition reports, CR-17-05632 and CR-17-05783.

The inspectors reviewed IMC 0612, Appendix B, "Issue Screening," and determined the performance deficiency (PD) was more than minor and therefore a finding because the PD affected the Mitigating Systems Cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences and the respective attribute of protection against external factors (i.e., flooding). Specifically, without the sandbag container sealed, the licensee would not be able to expedite the sandbags into the protected area (PA), and degradation of the sandbags would have prevented use as specified. The inspectors reviewed IMC 0609, Attachment 4, Appendix A, and Exhibit 4, for the significance determination, and determined the finding was of very low safety significance, or Green, because the finding does not involve the total loss of any safety function, identified by the licensee through a probabilistic risk analysis (PRA), individual plant examination of external events (IPEEE), or similar analysis, that contributes to external event initiated core damage accident sequences (i.e., flooding). Specifically, the time afforded the licensee via weather forecasting would have allowed other measures to mitigate ingress of flood waters into plant areas.

The inspectors reviewed IMC 0310, "Aspects Within Cross-Cutting Areas," and determined the cause of the finding involved the area of human performance and the aspect of H.1: "Resources: Leaders ensure that personnel, equipment, procedures, and other resources are available and adequate to support nuclear safety," because the licensee did not ensure that resources were available to check the security seals on the containers and the licensee did not ensure the sandbags were capable of meeting its intended function. (Section 1R01.2)

- Green. The inspectors identified a Green finding associated with a cited violation of 10 CFR 50, Appendix B, Criterion XVI, "Corrective Action," for the failure to ensure that conditions adverse to quality as noted in a previous NRC-identified Green NCV, 05000395/2005007-01, "EFW Flow Control Valves Are Susceptible to Plugging by Tubercles or Other Debris from Service Water," were corrected. The licensee entered the issue in their corrective action program as condition report, CR-17-04630.

The inspectors determined that the failure to promptly identify and correct the conditions adverse to quality (CAQ) for a design in which the emergency feedwater (EFW) flow control valves were susceptible to plugging by tubercles or other debris from the service water (SW) system was a performance deficiency (PD). The inspectors reviewed IMC 0612, Appendix B and determined the PD was more than minor and therefore a finding, because it affected the Mitigating Systems Cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences and the respective attribute of design control because the EFW flow control valves were susceptible to plugging by SW debris. This finding had been evaluated and screened to a low safety significance (Green) and documented in the previous NRC-identified Green NCV, 05000395/2005007-01. Because the licensee failed to implement corrective actions and restore compliance in a timely manner, this violation is being treated as a cited violation, consistent with Section 2.3.3 of the NRC Enforcement Policy.

The inspectors used IMC 0310 and determined this finding has a cross-cutting aspect of resolution in the area of Problem Identification and Resolution because the organization failed to take effective corrective actions to address issues in a timely manner commensurate with their safety significance and restore compliance (P.3). (Section 4OA2.2)

- Green. A self-revealing, Green, non-cited violation (NCV) of Technical Specification (TS) 3.3.2 was identified involving the failure of the "C" main feedwater pump to trip and resultant loss of an emergency feedwater auto start actuation signal. The licensee entered the issue in their corrective action program as condition report, CR-17-01611.

The inspectors reviewed IMC 0612, Appendix B, "Issue Screening," and determined that the PD was more than minor and therefore a finding because it impacted the Mitigating Systems Cornerstone by adversely affecting the cornerstone objective to ensure in part the availability of systems that respond to initiating events to prevent undesirable consequences. Specifically, the equipment reliability attribute was impacted because a failure of the "C" main feedwater pump to trip when required rendered an EFW auto start actuation signal inoperable. The inspectors used IMC 0609, "Significant Determination Process," Attachment 4, and Appendix A – Exhibit 2, and determined that the finding was of very low safety significance, Green, because there was no design deficiency or loss of function. Specifically, EFW auto start capability remained operable for other functions to maintain short term heat removal capability.

The inspectors reviewed IMC 0310, "Aspects Within Cross Cutting Areas," and determined the cause of this finding involved the cross-cutting area of Human Performance and the aspect of problem identification and resolution, P.2, because the licensee had previous indications of water intrusion and feedwater pump control issues and failed to thoroughly evaluate to address the cause. (Section 4OA3.1)

Licensee-Identified Violations

One violation of very low safety significance (Green), which 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 (CAP). This violation and the associated corrective action tracking number is listed in Section 4OA7 of this report.

REPORT DETAILS

Summary of Plant Status

Unit 1 began the inspection period at full rated thermal power (RTP) and continued until November 7, 2017, when Unit 1 experienced a reactor trip following failure of a surge arrestor on the main transformer. Unit 1 return to service on November 10, and full RTP on November 11. The licensee remained at or near full RTP for the remainder of the quarter.

1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, Barrier Integrity

1R01 Adverse Weather Protection (Inspection Procedure (IP) 71111.01)

.1 Readiness for Seasonal Extreme Weather Conditions

a. Inspection Scope

The inspectors performed one seasonal extreme weather inspection for readiness of cold weather for two risk-significant components. The inspectors verified the licensee had implemented applicable sections of operations administrative procedure, OAP-109.1, "Guidelines for Severe Weather," Revision (Rev.) 4E. The inspectors reviewed preparations for extreme cold weather and walked down the refueling water storage tank (RWST), and the sodium hydroxide (NaOH) tank to assess whether the equipment was adequately protected from cold weather and would function as expected during an accident event. Also, the inspectors reviewed the licensee's corrective action program (CAP) database to verify that freeze protection problems were being identified at the appropriate level, entered into the CAP, and appropriately resolved. This inspection constitutes one sample.

b. Findings

No findings were identified.

.2 External Flooding

a. Inspection Scope

The inspectors reviewed the licensee's external flood design mitigation plans to determine consistency with design requirements, updated final safety analysis report (UFSAR) and flood analysis documents. The inspectors performed walkdowns of the station to verify flood protection features remained generally as described in the UFSAR and flood analysis documents. Specifically, the inspectors performed visual examinations of the permissible maximum precipitation (PMP) inside the protected area. Documents reviewed are listed in the Attachment. This inspection constitutes one sample.

b. Findings

Introduction: The NRC identified a Green finding (FIN) for the failure of the licensee to accomplish operations administrative procedure, OAP-109.1, "Guidelines for Severe Weather," Rev. 4H. This procedure, in part, controlled sandbags used for ground level plant building access door protection to preclude water intrusion in safety-related component areas during a permissible maximum precipitation (PMP) or other adverse rainfall events.

Description: On October 25, 2017, the inspectors performed an external flood inspection and identified that sandbag container security seals were compromised on both containers stored on the platform of Warehouse "B." In response, the licensee initiated condition report CR-17-05632 for corrective actions. Subsequently, the inspectors reviewed the licensee's process to re-inventory the contents prior to installing new security seals which were used to facilitate transfer of the containers into the protected area (PA), if needed, as stipulated by OAP-109.1. During the re-inventory process the inspectors observed that the sandbags had degraded such that they were no longer able to maintain their integrity. The licensee initiated CR-17-05783 to document this condition. The licensee obtained new sandbags to correct the adverse conditions.

The inspectors reviewed OAP-109 and noted the following self-imposed requirements:

- Step 6.6 part d. states, "If the weather forecast predicts a storm event where rainfall totals are expected to exceed 8 inches in a 24-hour period, install sandbags at the ground level doors per Shift Supervisor discretion as described in Enclosure E."
- Enclosure A, "Hurricane Action Timeline, Note 1 states, "The lids on the Sandbag boxes have Security Seals on them. In order to expedite bringing these boxes into the Protected Area these seals must not be broken until the boxes are inside the Protected Area." Enclosure E, "Guidelines for Sandbagging Ground Level Plant Doors," Note E repeats this requirement.

The inspectors concluded that the self-imposed requirements identified in OAP-109.1 as noted above were not met and would not have been implemented due to the severe degradation of the existing sandbags.

Analysis: The inspectors determined that the failure to meet the self-imposed requirements identified in OAP-109.1 relative to sandbags was a performance deficiency (PD). The inspectors reviewed Inspection Manual Chapter (IMC) 0612, Appendix B, "Issue Screening," and determined the PD was more than minor and therefore a finding because the PD affected the Mitigating Systems Cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences and the respective attribute of protection against external factors (i.e., flooding). Specifically, without the sealed container, the licensee would not be able to expedite the sandbags into the PA, and degradation of the sandbags would have prevented their use as specified.

In accordance with NRC IMC 0609, Appendix A, "The Significance Determination Process (SDP) for Findings at-Power," Attachment 4 – Exhibit 4, the inspectors determined the finding was of very low safety significance, or Green, because the finding did not involve the total loss of any safety function, identified by the licensee through a probabilistic risk assessment (PRA), individual plant examination of external events

(IPEEE), or similar analysis, that contributed to external event initiated core damage accident sequences (i.e., flooding). Specifically, the time afforded to the licensee via weather forecasting would have allowed other measures to mitigate ingress of flood waters into plant areas.

The inspectors reviewed IMC 0310, "Aspects Within The Cross-Cutting Areas," and determined the cause of the finding involved the area of human performance and the aspect of Resources (H.1), because leaders did not ensure that personnel, equipment, procedures, and other resources were available and adequate to support nuclear safety by checking the security seals on the containers and ensuring the sandbags were capable of meeting their intended function.

Enforcement: The inspectors did not identify a violation of regulatory requirements associated with this finding which is identified as FIN 05000395/2017004-01, "Failure to Accomplish Station Procedures for Severe Weather."

1R04 Equipment Alignment (IP 71111.04)

.1 Partial System Walkdowns (IP 71111.04Q)

a. Inspection Scope

The inspectors conducted partial equipment alignment walkdowns, which are listed below, to evaluate the operability of selected redundant trains, or backup systems, with the other train or system inoperable or out of service (OOS). Correct alignment and operating conditions were determined from the applicable portions of drawings, system operating procedures (SOP), and technical specifications (TS). The inspections included review of outstanding maintenance work orders (WOs) and related condition reports (CRs) to verify that the licensee had properly identified and resolved equipment alignment problems that could lead to the initiation of an event or impact mitigating system availability. This inspection constitutes three quarterly samples.

- Walkdown of "A" motor driven emergency feedwater (MDEFW) and turbine driven emergency feedwater (TDEFW) during scheduled maintenance on "B" MDEFW
- Walkdown of "B" residual heat removal (RHR) during scheduled maintenance on "A" RHR
- Walkdown of "A" reactor building (RB) spray during scheduled maintenance on "B" RB spray

b. Findings

No findings were identified.

.2 Complete System Walkdown (IP 71111.04S)

a. Inspection Scope

The inspectors performed a detailed review and walkdown of the service water (SW) supply/return to reactor building cooling units to check for water hammer indications,

and identify any discrepancies between the current operating system equipment lineup and the designed lineup. In addition, the inspectors reviewed SOPs, applicable sections of the UFSAR, design basis documents, plant drawings, completed surveillance procedures, outstanding WOs, system health reports, and related CRs to verify that the licensee had properly identified and resolved equipment problems that could affect the availability and operability of the system. This inspection constitutes one complete system walkdown sample.

b. Findings

No findings were identified.

1R05 Fire Protection

Quarterly Fire Protection Walkdowns (IP 71111.05Q)

a. Inspection Scope

The inspectors reviewed recent CRs, WOs, and impairments associated with the fire protection system. The inspectors reviewed surveillance activities to determine whether they supported the operability and availability of the fire protection system. The inspectors assessed the material condition of the active and passive fire protection systems and features, and observed the control of transient combustibles and ignition sources. The inspectors conducted routine inspections of the following four areas which constitute four samples (respective fire zones also noted):

- Auxiliary building 374 elevation (fire zones AB01.01.01, AB01.01.02, AB01.02, AB01.03)
- Auxiliary building 397 and 388 elevations (fire zone AB01.04)
- Auxiliary building 436 elevation (fire zones AB01.18.01, AB01.18.02)
- Fire service (FS) pumps and alternate FS pump area (fire zones AFSPH01, CWPH01, CWPH02)

b. Findings

No findings were identified.

1R06 Flood Protection Measures

Internal Flooding (IP 71111.06)

a. Inspection Scope

The inspectors reviewed and walked down portions of the auxiliary building 374 elevation regarding internal flood protection features and equipment to determine consistency with design requirements, UFSAR, and flood analysis documents. Risk significant structure, system, and components (SSCs) in these areas included the SW pumps, SW pump motor switchgear, and associated SW valves. The inspectors reviewed the licensee's CAP database to verify that internal flood protection problems were being identified at the appropriate level, entered into the CAP, and

appropriately resolved. Documents reviewed are listed in the Attachment. This inspection constitutes one internal flooding sample.

b. Findings

No findings were identified.

1R11 Licensed Operator Regualification Program

.1 Licensed Operator Regualification (IP 71111.11Q)

a. Inspection Scope

The inspectors observed an operator regualification simulator exam scenario occurring on October 23, 2017, involving multiple failures leading to entry into abnormal operating procedures followed by emergency operating procedures in order to combat the problems. The inspectors observed crew performance in terms of communications; ability to prioritize failures in order to take timely and proper actions; prioritizing, interpreting, and verifying alarms; correct use and implementation of procedures, including the alarm response procedures; timely control board operation and manipulation, including high-risk operator actions; and oversight and direction provided by the shift supervisor, including the ability to identify and implement appropriate TS actions and emergency action levels. The inspectors reviewed the licensee's critique comments to verify that any performance deficiencies were captured for appropriate corrective action. This inspection constitutes one quarterly licensed operator regualification sample.

b. Findings

No findings were identified.

.2 Resident Quarterly Observation of Control Room Operations (IP 71111.11Q)

a. Inspection Scope

During the inspection period, the inspectors conducted control room observations of licensed reactor operator activities to ensure consistency with licensee procedures and regulatory requirements. For the listed activities covering a total four-hour period, the inspectors observed the following elements of operator performance: 1) operator compliance and use of plant procedures including TS; 2) control board component manipulations; 3) use and interpretation of plant instrumentation and alarms; 4) documentation of activities; 5) management and supervision of activities; and 6) control room communications. This inspection constitutes three licensed operator control room observation samples.

- Operator response for reactor trip recovery
- Operators performed functional test of train 'A' SW to EF cross connect circuits
- Operators performed solid state protection system (SSPS) 'A' surveillance test

b. Findings

No findings were identified.

.3 Annual Review of Licensee Requalification Examination Results (IP 71111.11A)

a. Inspection Scope

On September 26, 2017, the licensee completed the comprehensive biennial requalification written examinations and the annual requalification operating examinations required to be administered to all licensed operators in accordance with Title 10 of the *Code of Federal Regulations* 55.59(a)(2), "Requalification Requirements," of the NRC's "Operator's Licenses." The inspectors performed an in-office review of the overall pass/fail results of the individual operating examinations and the crew simulator operating examinations in accordance with Inspection Procedure (IP) 71111.11, "Licensed Operator Requalification Program." These results were compared to the thresholds established in Section 3.02, "Requalification Examination Results," of IP 71111.11. This inspection constitutes one annual licensed operator requalification sample.

b. Findings

No findings were identified.

1R12 Maintenance Effectiveness (IP 71111.12)

a. Inspection Scope

The inspectors evaluated the equipment issues described in the CRs listed below to verify the licensee's effectiveness with the corresponding preventive or corrective maintenance associated with SSCs. The inspectors reviewed Maintenance Rule (MR) implementation to verify that component and equipment failures were identified, entered, and scoped within the MR program. Selected SSCs were reviewed to verify proper categorization and classification in accordance with 10 CFR 50.65. The inspectors examined the licensee's 10 CFR 50.65(a)(1) corrective action plans to determine if the licensee was identifying issues related to the MR at an appropriate threshold and that effective corrective actions were implemented. The inspectors' review evaluated if maintenance preventable functional failures or other MR findings existed that the licensee had not identified. The inspectors reviewed the licensee's controlling procedures consisting of engineering services procedure (ES)-514, Rev. 7, "Maintenance Rule Program Implementation," and station administrative procedure (SAP)-0157, Rev. 2, "Maintenance Rule Program," to verify consistency with the MR program requirements. This inspection constitutes two routine maintenance effectiveness samples. The review associated with CR-17-05921 constitutes one quality control (QC) sample.

- CR-17-05719, Maintenance Rule (a)(1) evaluation required for chemical and volume control system (CVCS) function CS12, provide alternate seal injection to reactor coolant pump (RCP) seals

- CR-17-06061, Maintenance Rule (a)(1) evaluation required for FW (feedwater) system due to exceeding plant level performance criteria for SCRAMs on June 29, 2017
- CR-17-05921, Operational Decision Making Team to determine evaluations and actions for voltage problems associated with cells in 'B' vital battery (QC Sample)

b. Findings

No findings were identified.

1R13 Maintenance Risk Assessment and Emergent Work Control (IP 71111.13)

a. Inspection Scope

The inspectors performed risk assessments, as appropriate, for the scheduled work activities listed below to assess, as appropriate: 1) the effectiveness of the risk assessments performed before maintenance activities were conducted; 2) the management of risk; 3) that, upon identification of an unforeseen situation, necessary steps were taken to plan and control the resulting emergent work activities; and 4) that emergent work problems were adequately identified and resolved. The inspectors evaluated the licensee's work prioritization and risk characterization to determine, as appropriate, whether necessary steps were properly planned, controlled, and executed for the planned and emergent work activities. This inspection constitutes two samples.

- Yellow risk condition for "B" train SSPS surveillance test during work week 40
- Yellow risk condition for "A" train SSPS surveillance test during work week 46

b. Findings

No findings were identified.

1R15 Operability Determinations and Functionality Assessments (IP 71111.15)

a. Inspection Scope

The inspectors reviewed the operability evaluations listed below, affecting risk significant mitigating systems to assess, as appropriate: 1) the technical adequacy of the evaluations; 2) whether operability was properly justified and the subject component or system remained available, such that no unrecognized increase in risk occurred; 3) whether other existing degraded conditions were considered; 4) that the licensee considered other degraded conditions and their impact on compensatory measures for the condition being evaluated; and 5) the impact on TS limiting conditions for operations and the risk significance in accordance with the significance determination process. The inspectors verified that the operability evaluations were performed in accordance with SAP-209, Rev. 1C, "Operability Determination Process," and SAP-999, Rev. 15, "Corrective Action Program." This inspection constitutes five samples.

- CR-17-01611, Past operability review of 'C' main FW pump failure to trip
- CR-17-05588, TDEFW governor speed control knob found not fully clockwise

- CR-17-05413, “A” charging pump outboard seal leak impact on emergency core cooling system (ECCS) recirculation path leakage
- CR-17-01635, Abnormal noise from gearbox for “C” charging pump
- CR-17-05528, Postulated clogging of EFW components from SW debris.

b. Findings

A cited violation associated with EFW system flow components is discussed in Section 4OA2.2. A licensee identified violation concerning CR-17-05588 is discussed in Section 4OA7.

1R18 Plant Modifications (IP 71111.18)

a. Inspection Scope

The inspectors reviewed the modification implemented by work order as noted below, for adverse effects on system availability, reliability, and functional capability. Documents reviewed included site drawings, applicable sections of the UFSAR, supporting 10 CFR 50.59 evaluations, TS, and design basis information. The inspectors evaluated the change documents and associated 10 CFR 50.59 reviews against the system design basis documentation and UFSAR to verify that the changes did not adversely affect the safety function of safety systems. The inspectors reviewed any related CRs to confirm that problems were identified at an appropriate threshold, were entered into the CAP, and appropriate corrective actions had been initiated. This inspection constitutes two samples.

- ECR 50695, EFW System Flow Control Enhancements
- WO 1714768, Jumper Out Cell Number 18 on “B” Vital Battery

b. Findings

A cited violation associated with EFW system flow components is discussed in Section 4OA2.2.

1R19 Post Maintenance Testing (IP 71111.19)

a. Inspection Scope

For the maintenance activities listed below, the inspectors reviewed the associated post-maintenance testing (PMT) procedures and either witnessed the testing and/or reviewed test records to assess whether: 1) the effect of testing on the plant had been adequately addressed by control room and/or engineering personnel; 2) testing was adequate for the maintenance performed; 3) test acceptance criteria were clear and adequately demonstrated operational readiness consistent with design and licensing basis documents; 4) test instrumentation had current calibrations, range, and accuracy consistent with the application; 5) tests were performed as written with applicable prerequisites satisfied; 6) jumpers installed or leads lifted were properly controlled; 7) test equipment was removed following testing; and 8) equipment was returned to the status required to perform its safety function. The inspectors verified

that these activities were performed in accordance with general test procedure, GTP-214, "Post Maintenance Testing Guideline," Rev. 5G. This inspection constitutes four samples.

- WO 1705534, Perform PMT for XVG08809A-SI following motor operated valve actuator testing
- WO 1708816, Perform retest on "B" vital battery following jumper of cell number 18
- WO 1716983, Perform retest on 1611 "B" feedwater isolation valve (failure to close during plant trip)
- WO 1716757, Perform retest on "B" vital battery following replacement of cell number 18

b. Findings

No findings were identified.

1R22 Surveillance Testing (IP 71111.22)

a. Inspection Scope

The inspectors observed and/or reviewed the surveillance test procedure (STP) listed below to verify that TS or risk significant surveillance requirements were followed, and that test acceptance criteria were properly specified to ensure that the equipment could perform its intended safety function. The inspectors verified that proper test conditions were established as specified in the procedures, that no equipment preconditioning activities occurred, and that acceptance criteria were met. This inspection constitutes one in-service testing sample.

In-Service Tests

- STP- 220.002, "Turbine Driven Emergency Feedwater Pump and Valve Test," Rev. 9

b. Findings

No findings were identified.

4. OTHER ACTIVITIES

4OA1 Performance Indicator (PI) Verification (IP 71151)

Mitigating Systems Cornerstone

a. Inspection Scope

The inspectors verified the accuracy of the licensee's PI submittals listed below for the period of October 1, 2016 through September 30, 2017. The inspectors used the performance indicator definitions and guidance contained in NEI 99-02, Rev. 7, "Regulatory Assessment Performance Indicator Guideline," and licensee procedure SAP-1360, Rev. 3, "NRC and INPO/WANO Performance Indicators," to check the

reporting of each data element. The inspectors sampled licensee event reports (LERs), operator logs, plant status reports, CRs, and performance indicator data sheets to verify that the licensee had properly reported the PI data. This inspection constitutes three total PI samples as indicated below.

- Mitigating System Performance Index (MSPI) – Heat Removal System
- MSPI – Cooling Water Systems
- Safety System Functional Failures

b. Findings

No findings were identified.

4OA2 Problem Identification and Resolution (IP 71152)

.1 Review of Items Entered into the Corrective Action Program

a. Inspection Scope

As required by IP 71152, "Identification and Resolution of Problems," and in order to help identify repetitive equipment failures or specific human performance issues for follow-up, the inspectors performed a daily screening of items entered into the licensee's CAP. This review was accomplished by either attending daily screening meetings that briefly discussed major CRs, or accessing the licensee's computerized corrective action database and reviewing each CR that was initiated.

b. Findings

No findings were identified.

.2 Annual Sample: Review of the licensee corrective actions for previous NRC-identified Green NCV, 5000395/2005007-01

a. Inspection Scope

The inspectors reviewed licensee corrective actions for previously-issued NRC-identified Green NCV 05000395/2005007-01, "EFW Flow Control Valves Are Susceptible to Plugging by Tubercles or Other Debris from Service Water," documented in NRC inspection report, 05000395/2005007 (Agency Document Access and Management System (ADAMS) Accession No. ML050700044). The inspectors assessed whether the issue was properly identified, documented accurately and completely, properly classified and prioritized, adequately considered extent of condition, generic implications, common cause, and previous occurrences, adequately identified root and apparent causes, and identified appropriate and timely corrective actions. The inspectors also verified the issues were processed in accordance with procedure, SAP-999, "Corrective Action Program," Rev. 15. This inspection constitutes one annual follow-up of selected issue sample.

b. Findings

Introduction: The inspectors identified a Green finding with a cited violation of 10 CFR 50, Appendix B, Criterion XVI, "Corrective Action," for the licensee's failure to ensure that conditions adverse to quality (CAQ) as noted in a previous NRC-identified Green NCV, 05000395/2005007-01, "EFW Flow Control Valves Are Susceptible to Plugging by Tubercles or Other Debris from Service Water," were corrected.

Description: On December 22, 2004, the NRC issued Inspection Report 05000395/2004009, (ADAMS Accession No. ML050060203), which documented completion of an engineering team inspection. This report documented unresolved item (URI) 05000395/2004009-001, "Potential for Emergency Feedwater Flow Control Valves to be Plugged by Tubercles and Other Debris from Service Water." On March 10, 2005, the NRC closed the URI via issuance of Inspection Report 05000395/2005007, (ADAMS Accession No. ML050700044), which discussed two NRC-identified Green NCV's: 1) 2005007-01 for a NCV of 10 CFR 50, Appendix B, Criterion III, for a design in which the EFW flow control valves were susceptible to plugging by tubercles or other debris from the SW system, and 2) 2005007-02 for a NCV of 10 CFR 50, Appendix B, Criterion XVI, for the licensee's inadequate corrective actions in response to potential EFW control valve plugging.

The inspectors noted that the licensee's CAP documents for the CAQ were documented by CR-04-03416. The inspectors reviewed the information within both of the aforementioned reports, and other historical documents and noted the following information:

- 1) On January 31, 1990, the licensee provided their response to Generic Letter (GL) 89-13 "Service Water System Problems Affecting Safety-Related Equipment," to the NRC. The licensee's response for Recommended Action (1) was:

VCSNS is investigating the installation of strainers with forward flush and backwash capabilities on the SW supply lines to the Emergency Feedwater System and to the Reactor Building Cooling Units (RBCU's). If installed these strainers may help prevent plugging of the small diameter RBCU heat exchanger tubes and clogging of the EFW control valves resulting from a switchover to the SW supply.

The inspectors concluded that the licensee was aware of the plugging vulnerabilities of the EFW flow control valves each of which contain a cage with 492 orifices sized at .051 inches and 192 orifices sized at .072 inches.

- 2) On December 17, 1991, the licensee provided a "notification of completion" for GL 89-13 that stated:

The installation of strainers on the service water supply lines to the [RBCU's] and the Emergency Feedwater pumps has been investigated per the SCE&G response to GL 89-13 on January 31, 1990. As a result of the investigation, the current methods of fouling control are considered to be effective, precluding the need for installing strainers.

- 3) The inspector identified licensee notes in response to various questions regarding the SW system, of which one was "Does the SW have strainers? Are there PM's on these?" The licensee's response was:

No, the SW system does not have strainers. Some years ago, it was proposed that two sets of strainers be installed in the system: (1) one set associated with the Reactor Building Cooling Units and (2) another set associated with the service water and emergency feedwater cross-connect line. The expense of this strainer installation was regarded as too great when compared to their benefit and they were not installed.

The inspectors noted that the cost reasoning appeared to contradict the licensee's previous response to the NRC.

The inspectors reviewed CR-09-02282, which documented results and actions of self-assessment SA08-DE-01, "Component Design Basis Inspection Gap Analysis," which was initiated on June 9, 2009, or approximately 4 years after report 05000395/2005007, (ADAMS Accession No. ML050700044) was issued. Of the eight program deficiencies identified by the self-assessment, number (6) stated, "Licensee corrective actions have not adequately resolved a potential design vulnerability for the EFW flow control valves to become plugged by tubercles and other debris from service water, which could result in a common mode failure of the EFW system." Action 006 of CR-09-02282 stated, "SA08-DE-01 Objective 1 Performance Deficiency 6 Action: Resolve CR-04-03416 by developing and implementing ECR 50695 "EFW System Flow Control Enhancements." Per SAP-0999, this CR Action is being closed to ECR 50695."

The inspectors reviewed ECR 50695 and noted the following:

- 1) In order to prevent tubercles and other corrosion products from growing, forming or residing in the stagnant SW-to-EFW cross over piping, phase I of the ECR installed Cured-In-Place Piping (CIPP) inside of the existing 8-inch cross connect lines in both trains, from the respective SW supply header up to near the inlet side of valves XVG01037A-EF and XVG01037B-EF (SW to EFW supply isolations).
- 2) The last portion of ECR 50695 to install CIPP was completed during the Spring, 2017 refueling outage or approximately 12 years from the issuance of Inspection Report 05000395/2005007, (ADAMS Accession No. ML050700044).

The inspectors also noted that the CIPP process addressed the formation of tubercles in the stagnant SW to EFW piping. However, it did not address SW debris including tubercles from other parts of the system or debris from the SW intake which has traveling screens which screen out debris down to 0.25 inches.

The inspectors noted that 10 CFR 50, Appendix B, Criterion XVI, "Corrective Action," required, in part, that measures be established to assure that CAQs were promptly identified and corrected. The inspectors concluded the licensee failed to fully correct the CAQ identified in NCV 2005007-01. The licensee entered the issue in their corrective action program as condition report, CR-17-04630.

Analysis: The inspectors determined that the failure to promptly identify and correct the CAQ, as required by 10 CFR 50, Appendix B, Criterion XVI, for a design in which the EFW flow control valves were susceptible to plugging by tubercles or other debris from the SW system was a performance deficiency (PD).

The inspectors reviewed IMC 0612, Appendix B and determined the PD was more than minor and therefore a finding, because it affected the Mitigating Systems Cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences and the respective attribute of design control because the EFW flow control valves were susceptible to plugging by SW debris. This finding had been evaluated and screened to a low safety significance (Green) and documented in the previous NRC-identified Green NCV, 05000395/2005007-01. Because the licensee failed to implement corrective actions and restore compliance in a timely manner, this violation is being treated as a cited violation, consistent with Section 2.3.3 of the NRC Enforcement Policy, (ADAMS Accession No. ML16271A446).

The inspectors used IMC 0310, "Aspects Within The Cross-Cutting Areas," and determined this finding had a cross-cutting aspect of resolution in the area of Problem Identification and Resolution because the organization failed to take effective corrective actions to address issues in a timely manner commensurate with their safety significance and restore compliance (P.3).

Enforcement: 10 CFR 50, Appendix B, Criterion XVI stated, in part, that measures shall be established to assure that CAQs are promptly identified and corrected. Contrary to the above, as of December 31, 2017, the licensee failed to promptly identify and correct a CAQ involving a design in which the EFW flow control valves were susceptible to plugging by tubercles or other debris from the SW system. Because the licensee failed to restore compliance within a reasonable period of time or demonstrate objective evidence of plans to restore compliance, the licensee did not satisfy the non-cited criteria of Enforcement Policy Section 2.3.2.a.2. As such, this violation is cited in accordance with the NRC Enforcement Policy, Section 2.3.3. A Notice of Violation is included with this report: VIO 05000395/2017004-02, "Failure to Implement Corrective Actions to Restore Compliance for Previous NRC-identified Green NCV 05000395/2005007-01."

.3 Annual Sample: Operator Workaround (OWA) Review

a. Inspection Scope

The inspectors reviewed the licensee's list of identified OWAs and burdens associated with mitigating system equipment to determine whether any new items since the previous review conducted in 2016 would adversely affect any mitigating system function or affect the operators' ability to implement abnormal or emergency operating procedures. Additionally, the inspectors performed an independent review of outstanding control board WOs and known problems with mitigating system equipment to identify any potential OWA's or burdens that had not been formally identified and evaluated by the licensee.

b. Findings

No findings were identified. The inspectors concluded the licensee was adequately identifying OWA's and burdens to ensure appropriate tracking within their CAP. This inspection constitutes one annual follow-up of selected issue sample.

.4 Semi-annual Trend Review

a. Inspection Scope

The inspectors performed a review of the licensee's CAP and associated documents to identify trends that could indicate the existence of a more significant safety issue. The review was focused on repetitive equipment issues, but also considered trends in human performance errors, the results of daily inspector corrective action item screening discussed in Section 4OA2.1 above, licensee trending efforts, and licensee human performance results. The review focused on years 2016 and 2017. Documents reviewed included, as applicable: licensee monthly and quarterly corrective action trend reports, engineering system health reports, maintenance rule documents, department self-assessment activities, and quality assurance audit reports. This inspection constitutes one semi-annual trend review sample.

b. Findings

No findings were identified. The inspectors reviewed licensee CAP documents related to adverse impacts on Unit 1 from grid perturbations consisting of faults, lightning strikes or equipment problems and noted that there were 19 CRs and 13 CRs initiated in 2016 and 2017 respectively. Additionally, CR-16-02204 was initiated on May 3, 2016, for a common cause evaluation. The inspectors noted the following from CR-16-02204:

- Six CRs were reviewed from 2013, four CRs from 2014, one CR from 2015, and seven CRs from 2016.
- The events were grouped by cause into categories such as lightning strikes, component failures, and natural causes such as trees or animals.
- The licensee stated, "No interim actions were identified. It would be very difficult and excessively expensive to attempt to minimize plant equipment impacts due to fault induced 230 kiloVolt (kV) grid voltage. The only recommended action was to discuss wooden tower arm aging with appropriate Power Delivery personnel."

The inspectors' review of the associated CRs noted the following typical plant impacts:

- Multiple control room alarms such as current overloads on various safety-related and non-safety-related motors, battery charger failure, standby air compressor, seal water injection filter differential pressure, transformer trouble, incore sump level high, bypass inoperable status indication (BISI) inoperable
- Control room lights flashing
- Multiple relay trips on multiple breakers such as undervoltage
- Main generator alarms such as phase current spread, stator current signal out of range, stator current signal fault, MW signal spread high and fault, A/C source selector auto transfer, under-excitation limiter active
- Output breaker trips of non-safety-related inverters
- Starting of the alternate seal injection pump diesel generator
- Trip of the "A" waste gas hydrogen recombiner
- Impact on data for the non-safety-related plant computer system
- Auto start of the "A" EDG as noted in LER 2013-001-00 and LER 2017-004-00

The inspectors noted that many of the above impacts were repeatable for each grid transient. Additionally, while alarms related to safety-related equipment were received, there were no adverse impacts on safety-related equipment such as trip of a safety-related pump motor. The inspectors determined that the licensee had not yet identified relative design deficiencies leading to the plant impacts from grid transients and continued to monitor licensee actions.

4OA3 Followup of Events and Notices of Enforcement Discretion (IP 71153)

.1 (Closed) LER 05000395/2017-001-00: "C" Main Feedwater Pump Failure to Trip Results in Loss of Emergency Feedwater Auto Start Actuation Signal

a. Inspection Scope

Inspectors reviewed LER 05000395/2017-001-00. On April 7, 2017, the "C" main feedwater pump (MFP) failed to manually trip from the control room and the local trip pull handle. On June 16, 2017, the licensee completed a past-operability evaluation that determined that an EFW auto start actuation signal was inoperable from November 12, 2016, to April 7, 2017, due to failure of the "C" main feedwater pump to trip. This was a violation of TS 3.3.2 due to having less than the minimum number of channels operable for the MDEFW pump actuation as noted in TS Table 3.3-3 functional unit 6.g. The enforcement aspects are discussed below. This LER is closed.

b. Findings

Introduction: A self-revealing, Green, non-cited violation (NCV) of TS 3.3.2 was identified for the failure of the "C" MFP to trip and resultant loss of an emergency feedwater auto start actuation signal.

Description: On April 7, 2017, during shutdown operations to start a refueling outage, the "C" MFP turbine failed to manually trip from the control room and the local trip pull handle. On June 26, 2017, the licensee completed a past operability evaluation which concluded the EFW auto start actuation signal was inoperable from November 12, 2016, to April 7, 2017. The inspectors noted that the cause of the trip failure was corrosion of carbon steel components within the turbine oil system due to water leaking into the oil via an oil cooler. Specifically, the secondary operating cylinder and pilot valve were found in a bound condition thereby preventing the turbine steam inlet valves from closing in order to trip the turbine.

The inspectors also reviewed two other events involving the "C" MFP turbine:

- CR-16-05720 documented speed control issues on November 12, 2016. Subsequently, on November 19, the turbine speed returned to the normal band and stabilized.
- CR-17-01268 documented a second speed control event on March 19, 2017, whereby actual speed was higher than the demand speed. This condition remained until the attempt to trip the turbine on April 7, 2017.

The inspectors noted that the LER stated, "Review of MFP oil samples, which are taken on a monthly basis, indicated that possible water contamination began November 12, 2016." However, the inspectors determined that this was in error following interviews

with licensee engineering personnel. Instead, the date was chosen based on the first indication of malfunction of turbine internal oil system components as exhibited by the problem documented in CR-16-05720 noted above. The inspectors reviewed six chemistry oil sample results between October 11, 2016, and March 3, 2017. Only one sample, taken on November 22, 2016, documented a trace amount of water on the bottom of the lube oil reservoir. The licensee will review and issue a supplement for the LER as necessary.

The inspectors reviewed the applicable TS 3/4.3.2 which stated that the Engineered Safety Feature Actuation System (ESFAS) instrumentation channels and interlocks shown in Table 3.3-3 shall be operable with their trip setpoints set consistent with the values shown in the Trip Setpoint column of Table 3.3-4 and with response times as shown in Table 3.3-5. Action Statement 3.3.2.c stated that with an ESFAS instrument channel or interlock inoperable take the action shown in Table 3.3-3. Table 3.3-3 functional unit 6.g stated that EFW ESFAS instrumentation required the trip of main feedwater pumps to start MDEFW pumps. In Modes 1 and 2 there must be three total channels (one per pump) of this trip present. The inspectors noted that when the licensee attempted to perform the electronic and manual trips on April 7, 2017, no indication was received that the MFP turbine had tripped (i.e. stop valve closure, speed reduction, local indicator lights). Because the trip system would not actuate, one of three channels for MFP trip under TS 3/4.3.2 was inoperable and additionally, was past inoperable as noted above.

Analysis: The inspectors determined that the failure to meet TS 3/4.3.2 requirements for Table 3.3-3 functional unit 6.g was a PD. The inspectors reviewed IMC 0612, Appendix B, "Issue Screening," and determined that the PD was more than minor and therefore a finding because it impacted the Mitigating Systems Cornerstone by adversely affecting the cornerstone objective to ensure in part the availability of systems that respond to initiating events to prevent undesirable consequences. Specifically, the equipment reliability attribute was impacted because a failure of the "C" MFP to trip when required rendered an EFW auto start actuation signal inoperable.

The inspectors used IMC 0609, "Significant Determination Process," Attachment 4, and Appendix A – Exhibit 2, and determined that the finding was of very low safety significance, Green, because there was no design deficiency or loss of function. Specifically, EFW auto start capability remained operable for other functions to maintain short term heat removal capability.

The inspectors reviewed IMC 0310, "Aspects Within The Cross-Cutting Areas," and determined the cause of this finding involved the cross-cutting aspect of evaluation with the area of problem identification and resolution, (P.2), because the licensee had previous indications of water intrusion and feedwater pump control issues and failed to thoroughly evaluate and address the cause.

Enforcement: TS 3/4.3.2 required, in part, that ESFAS instrumentation in Table 3.3-3 shall be operable. Contrary to this, for a period prior to April 7, 2017, Table 3.3-3, function unit 6.g was inoperable because the "C" MFP would not have tripped if required. Because the finding is of very low safety significance and because it has been entered into the licensee's CAP as CR-17-01611, this violation is being treated as a Green NCV, consistent with Section 2.3.2 of the NRC Enforcement Policy: NCV 05000395/2017004-03, "Failure of an Emergency Feedwater Auto Start Actuation Signal."

.2 (Closed) LER 05000395/2017-002-00: Low Feedwater Flow to the 'B' Steam Generator Causes Automatic Reactor Trip

a. Inspection Scope

Inspectors reviewed LER 05000395/2017-002-00. On June 29, 2017, Unit 1 automatically tripped due to low level in the “B” steam generator (SG) coincident with low feedwater flow following a spurious closure of the “B” SG feedwater flow control valve, IFV00488-FW. The trip occurred following a loss of condensate flow and resultant decrease in deaerator tank level with subsequent MFP trips.

The inspectors noted that the closure of IFV00488-FW resulted from the failure of a solenoid valve, 20B which intermittently de-energized allowing instrument air to exhaust from the valve actuator and subsequent closure of the valve. The licensee submitted the solenoid valve to a vendor for analysis. A supplemental LER is planned following receipt and review of the vendor’s report. This LER is closed.

b. Findings

No findings or violations of NRC requirements were identified.

.3 (Closed) LER 05000395/2017-004-00: Actuation of “A” Emergency Diesel Generator

a. Inspection Scope

Inspectors reviewed LER 05000395/2017-004-00. On September 11, 2017, a storm-induced fault on the off-site power system occurred which resulted in reduced voltage on the 1DA 7.2 kV emergency bus. The “A” EDG started on loss of voltage signal, but did not load because the low voltage condition cleared within the designed 2 second time delay. The licensee determined the duration of the fault condition was extended due to: (1) a high-speed relay communication scheme failed, and (2) a relay incorrectly interpreted the fault as a power swing condition and blocked the tripping function that would have cleared the fault. The licensee entered the event into their CAP as CR-17-04897.

The inspectors reviewed the respective licensee actions following the event. The inspectors noted the LER stated that there were no previous occurrences within the last 3 years. The inspectors noted that a similar event did occur on March 24, 2013, as documented in LER 2013-001-00. The inspectors also identified additional plant impacts from grid disturbances which are discussed in Section 4OA2.4 of this report. This LER is closed.

b. Findings

No findings or violations of NRC requirements were identified.

.4 Main Transformer Differential results in Main Turbine and Reactor Trip

a. Inspection Scope

On November 7, 2017, the inspectors responded to a Unit 1 automatic reactor trip resulting from a main turbine trip due to loss of MFPs when their respective digital control systems lost power from a non-safety inverter. The inspectors evaluated plant parameters and status, monitored operator actions, and confirmed there were no applicable emergency action levels for the event. The inspectors reviewed the licensee's NRC event notification as required by 10 CFR 50.72.

b. Findings

No findings were identified.

4OA6 Meetings, Including Exit

On January 31, 2018, the resident inspectors presented the integrated inspection report results to Mr. Lippard and other members of the licensee staff. The licensee acknowledged the results of these inspections. The inspectors confirmed that inspection activities discussed in this report did not contain proprietary material.

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 Section 2.3.2 of the NRC Enforcement Policy for characterization as an NCV:

- TS 6.8.1, "Procedures and Programs," requires, in part, that written procedures shall be implemented covering the activities recommended in Appendix A of Regulatory Guide 1.33, Rev. 2, Section 8, "Procedures for Control of Measuring and Test Equipment and for Surveillance Tests, Procedures and Calibrations." Contrary to this, on October 23, 2017, the licensee identified they had failed to correctly implement STP-220.002, "Turbine Driven Emergency Feedwater Pump and Valve Test," Rev. 9, to return the TDEFW pump governor speed control manual adjustment knob to the required position during the surveillance test conducted on the previous shift. The inspectors reviewed IMC 0609 Appendix A and Attachment 4 for Mitigating Systems to determine the finding was of very low safety significance, Green, because there was no design deficiency, loss of system, and the loss of function for the single train was less than the TS LCO action time and less than 24 hours. The licensee has documented this problem in their CAP as CR-17-05588.

ATTACHMENT: SUPPLEMENTAL INFORMATION

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Licensee Personnel

G. Lippard, Vice President, Nuclear Operations
R. Justice, General Manager, Nuclear Plant Operations
A. Barbee, Director, Nuclear Training
T. Bowers, Medical Coordinator, Nuclear Licensing
C. Calvert, Manager, Design Engineering
N. Constance, Manager, Nuclear Training
B. Dalick, Supervisor, Nuclear Licensing
G. Douglass, Manager, Nuclear Protection Services
D. Edwards, Supervisor, Operations
K. Ellison, Manager, Health Physics & Safety
J. Garza, Supervisor, Nuclear Licensing
L. Harris, Manager, Quality Systems
R. Haselden, General Manager, Organizational / Development Effectiveness
A. Ledbetter, Manager, Planning / Outage
G. Lindamood, Santee Cooper
R. Mike, Manager, Chemistry Services
M. Moore, Acting Manager, Nuclear Licensing
R. Ray, Manager, Maintenance Services
S. Reese, Licensing Specialist
S. Rentz, LOR Lead Examiner, Nuclear Training
D. Shue, Manager, Nuclear Operations
W. Stuart, General Manager, Engineering Services
T. Tharp, Supervisor, Emergency Services
B. Thompson, Manager, Nuclear Licensing
E. Warden, Supervisor, Operations Training, Nuclear Training
J. Wasieczko, Manager, Organization Development and Performance
D. Weir, Manager, Plant Support Engineering
R. Williamson, Manager, Emergency Services
S. Zarandi, General Manager, Nuclear Support Services

LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

| | | |
|---------------------|-----|--|
| 05000395/2017004-02 | VIO | Failure to Implement Corrective Actions to Restore Compliance for Previous NRC-identified Green NCV 05000395/2005007-01 (Section 4OA2.2) |
|---------------------|-----|--|

Opened and Closed

| | | |
|---------------------|-----|--|
| 05000395/2017004-01 | FIN | Failure to Accomplish Station Procedures for Severe Weather (Section 1R01.2) |
| 05000395/2017004-03 | NCV | Failure of an Emergency Feedwater Auto Start Actuation Signal (Section 4OA3.1) |

Closed

| | | |
|----------------------|-----|---|
| 05000395/2017-001-00 | LER | 'C' Main Feedwater Pump Failure to Trip Results in Loss of Emergency Feedwater Auto Start Actuation Signal (Section 4OA3.1) |
| 05000395/2017-002-00 | LER | Low Feedwater Flow to the 'B' Steam Generator Causes Automatic Reactor Trip (Section 4OA3.2) |
| 05000395/2017-004-00 | LER | Actuation of 'A' Emergency Diesel Generator (Section 4OA3.3) |

LIST OF DOCUMENTS REVIEWED

Section 1R01: Adverse Weather Protection

WO1717577 - (NRC Identified) Damaged heat trace, RWST pit
WO1717576 - (NRC Identified) Damaged heat trace, RWST pit
WO1717578 - (NRC Identified) Damaged heat trace, RWST pit
WO1717580 - (NRC Identified) Repair terminal box in RWST pit
CR17-06143 - (NRC Identified) Damaged heat trace, RWST pit
CR17-06144 - (NRC Identified) Damaged heat trace, RWST pit
CR17-06145 - (NRC Identified) Damaged heat trace, RWST pit
CR17-06147 - (NRC Identified) Repair terminal box in RWST pit

Section 1R06: Flood Protection Measures

WO1703068 - Calibrate level switches
WO1613897 - Calibrate level switches