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

July 27, 2016

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

SUBJECT: VIRGIL C. SUMMER NUCLEAR STATION, UNIT 1 – NRC INTEGRATED INSPECTION REPORT 05000395/2016002

Dear Mr. Lippard:

On June 30, 2016, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at your Virgil C. Summer Nuclear Station, Unit 1. On July 21, 2016, the NRC inspectors discussed the results of this inspection with you and members of your staff. Inspectors documented the results of this inspection in the enclosed inspection report.

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

If you contest the violation 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 Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001; with copies to the Regional Administrator, Region II; the Director, Office of Enforcement, United States Nuclear Regulatory Commission, Washington, DC 20555-0001; and the NRC Resident Inspector at the Virgil C. Summer Nuclear Station, Unit 1.

If you disagree with a cross-cutting aspect assignment in this report, you should provide a response within 30 days of the date of this inspection report, with the basis for your disagreement, to the Regional Administrator, Region II, and the NRC Resident Inspector at the Virgil C. Summer Nuclear Station, Unit 1.

In accordance with Title 10 of the *Code of Federal Regulations* 2.390, “Public Inspections, Exemptions, Requests for Withholding,” of the NRC's "Agency Rules of Practice," a copy of this letter, its enclosure, and your response (if any) will be available electronically for public inspection in the NRC’s Public Document Room or from the Publicly Available Records (PARS) component of the NRC's Agencywide Documents Access and Management System (ADAMS). ADAMS is accessible from the NRC Web site at http://www.nrc.gov/reading-rm/adams.html (the Public Electronic Reading Room).

Sincerely,

/RA/

Steven D. Rose, Chief
Reactor Projects Branch 5
Division of Reactor Projects

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

Enclosure:
IR 05000395/2016002
w/Attachment: Supplemental Information

cc: Distribution via ListServ

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Letter to George A. Lippard, III from Steven D. Rose dated July 27, 2016.

SUBJECT: VIRGIL C. SUMMER NUCLEAR STATION, UNIT 1 - NRC INTEGRATED INSPECTION REPORT 05000395/2016002

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REGION II

Docket No.	50-395
License No.	NPF-12
Report Nos.	05000395/2016002
Licensee:	South Carolina Electric & Gas (SCE&G) Company
Facility:	Virgil C. Summer Nuclear Station, Unit 1
Location:	P.O. Box 88 Jenkinsville, SC 29065
Dates:	April 1, 2016, through June 30, 2016
Inspectors:	J. Reece, Senior Resident Inspector E. Coffman, Resident Inspector P. Cooper, Reactor Inspector (Section IR07)
Approved by:	Steven D. Rose, Chief Reactor Projects Branch 5 Division of Reactor Projects

Enclosure

SUMMARY

IR 05000395/2016002; 04/01/2016 - 06/30/2016: Virgil C. Summer Nuclear Station, Unit 1; Maintenance Risk Assessment and Emergent Work Control.

The report covered a three-month period of inspection by resident inspectors and a regional reactor inspector. One NRC-identified violation was identified and documented in this report. 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 are dispositioned in accordance with the NRC's Enforcement Policy dated February 4, 2015. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 5.

A. NRC-Identified and Self-Revealing Findings

Cornerstone: Mitigating Systems

- Green. The inspectors identified a Green, non-cited violation (NCV) of 10 CFR 50.65(a)(4), "Requirements for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants," involving the licensee's failure to develop and implement specific risk management actions (RMAs) for a yellow risk condition associated with solid state protection system (SSPS) surveillance testing. The issue was entered into the licensee's corrective action program (CAP) as condition report (CR)-16-02504.

  The inspectors identified a performance deficiency (PD) for the failure to manage the increase in risk associated with 'A' train SSPS surveillance testing which was indicative of the lack of programmatic requirements for assessing and managing risk subsequent to equipment out of service (EOOS) model updates. The inspectors reviewed inspector manual chapter (IMC) 0612, Appendix B, "Issue Screening," dated September 7, 2012, and determined that the PD was more than minor and therefore a finding because (1) it was associated with the Mitigating Systems Cornerstone and adversely affected the cornerstone objective to ensure in part the availability of systems that respond to initiating events to prevent undesirable consequences, and (2) if left uncorrected the PD would have the potential to lead to a more significant safety concern. Specifically, the failure to manage the increase in risk jeopardizes the availability of remaining safety systems to combat the consequences of an initiating event. The inspectors reviewed IMC 0609, Appendix K, "Maintenance Risk Assessment and Risk Management Significance Determination Process," dated May 19, 2005, and determined that the finding was of very low safety significance, Green, because the incremental core damage probability (ICDP) for the SSPS surveillance test was less than 1E-6. The inspectors reviewed IMC 0310, "Aspects Within Cross Cutting Areas," dated December 4, 2014, and determined that this finding had a cross-cutting aspect in the area of Work Management (H.5), because the licensee did not develop specific RMAs for a yellow risk condition which was indicative of the lack of programmatic requirements for assessing and managing risk subsequent to EOOS model updates. (Section 1R13)

One violation of very low safety significance that was identified by the licensee has been reviewed by the NRC. Corrective actions taken or planned by the licensee have been entered into the licensee's CAP. The violation and corrective action tracking numbers are 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 operated at or near full RTP throughout the period.

1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, Barrier Integrity

1R01 Adverse Weather Protection

.1 Offsite and Alternate Alternating Current (AC) Power

a. Inspection Scope

The inspectors evaluated the readiness of the offsite and alternate AC power systems by reviewing the licensee's procedures that address measures to monitor and maintain the availability and reliability of the offsite and alternate AC power systems. The procedures and documents reviewed included those involved with the communication protocols between the plant and transmission system operator to verify that the appropriate information was being exchanged when issues arose that could impact the offsite power system. In addition, the inspectors monitored switchyard upgrade activities to ensure any degradations or adverse material conditions were identified in the licensee's CAP and were being appropriately addressed in a manner commensurate with their significance. The documents reviewed during this inspection are listed in the Attachment.

b. Findings

No findings were identified.

.2 Seasonal Weather Susceptibilities

a. Inspection Scope

The inspectors performed one seasonal extreme weather inspection regarding readiness for hot weather conditions and walked down the following systems to verify the proper operation of cooling systems for these areas: service water (SW), emergency feedwater (EFW), and alternating current (AC) power. Specifically, the inspectors verified the licensee had implemented applicable sections of operations administrative procedure (OAP)-109.1, Revision (Rev.) 4, Change D, "Guidelines for Severe Weather." Additionally, the inspectors reviewed licensee plant computer data associated with the aforementioned areas to ensure that temperatures were within their expected operational range to prevent any challenge to equipment operation. The inspectors also verified the licensee took appropriate actions for temperatures exceeding administrative limits. The inspectors reviewed the licensee's CAP database to verify that high temperature weather-related problems were being identified at the appropriate level, entered into the CAP, and appropriately resolved. Other documents reviewed are listed in the Attachment.

b. Findings

No findings were identified.

.3 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 storm drains inside the protected area. Documents reviewed are listed in the Attachment.

b. Findings

No findings were identified.

1R04 Equipment Alignment

.1 Partial System Walkdowns

a. Inspection Scope

The inspectors conducted three 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. Documents reviewed are listed in the attachment.

- Partial walkdown of 'A' residual heat removal (RHR) during emergent work on 'B' RHR involving control switch replacement
- Partial walkdown of 'A' emergency diesel generator (EDG) during emergent work on 'B' EDG to repair a fuel oil leak on #8 cylinder fuel injector
- Partial walkdown of the of 'A' motor driven emergency feedwater (MDEFW) and turbine driven emergency feedwater (TDEFW) components during scheduled maintenance on 'B' MDEFW

b. Findings

No findings were identified.

.2 Complete System Walkdown

a. Inspection Scope

The inspectors performed a detailed review and walkdown of 'A' safety injection system to identify any discrepancies between the current operating system equipment lineup and the designed lineup. In addition, the inspectors reviewed SOPs, applicable sections of the final safety analysis report (FSAR), design basis document, 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.

b. Findings

No findings were identified.

1R05 Fire Protection

Quarterly Fire Protection Walkdowns

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. Documents reviewed are listed in the Attachment. The inspectors conducted routine inspections of the following five areas (respective fire zones also noted):

- Auxiliary building 374 elevation (fire zones AB-1.1, 1.2, 1.3)
- Auxiliary building 388/397 elevation (fire zone AB-1.4)
- Auxiliary building 436 elevation (fire zone AB-1.18)
- Service water pumphouse (fire zones SWPH-1, 3, 4, 5.1 and 5.2)
- Turbine driven EFW pump room (fire zone IB-25.2)

b. Findings

No findings were identified.

1R06 Flood Protection Measures

Annual Review of Electrical Manholes

a. Inspection Scope

The inspectors reviewed a licensee's periodic inspection of two risk-significant electrical manholes (EMH), EMH-001 and EMH-002, containing safety-related cables for assessment of leaks, cable supports and structures, and general structural integrity. In addition, the inspectors reviewed several past periodic licensee inspection results for the above mentioned manholes to ensure that any degraded conditions identified were appropriately resolved. Documents reviewed are listed in the Attachment.

b. Findings

No findings were identified

1R07 Heat Sink Performance

Triennial Review of Heat Sink Performance (71111.07T)

a. Inspection Scope

The inspectors interviewed plant personnel, conducted plant walkdowns, and reviewed records for a sample of heat exchangers/coolers that were directly cooled by the service water system, to verify that heat exchanger deficiencies or potential common cause problems that could result in initiating events, or affect multiple heat exchangers in mitigating systems, were being identified, evaluated, and resolved. The inspectors selected the following heat exchangers for review based on their risk-significance in the licensee's probabilistic risk assessment (PRA), and their safety-related mitigating functions.

- Component cooling water system (CCW) heat exchanger 'B'
- Service water pump motor coolers 'B' and 'C'

The inspectors reviewed the results of routine thermal performance tests performed to monitor the effects of fouling and establish the inspection/cleaning frequency in order to verify that: (1) the test methodology, conditions, and acceptance criteria were consistent with accepted industry practices, and (2) the performance tests results were correctly applied to the evaluation of heat transfer capability under the design basis conditions. Additionally, the inspector reviewed records for recent inspection/cleaning activities, and post-cleaning testing, to verify these were adequate to maintain thermal performance in accordance with the system design basis.

The inspectors reviewed performance testing and inspection/cleaning methodologies for the selected heat exchangers to verify that the licensee's activities were adequate to detect degradation prior to loss of heat removal capabilities below design basis values, and consistent with the licensee's regulatory commitments in response to Generic Letter (GL) 89-13. The inspectors' review included periodic flow testing records at or near maximum design flow, to verify flow through each heat exchanger was consistent with the system design basis. The inspectors also reviewed system health reports to determine whether the licensee's chemical treatment programs for corrosion, and fouling control, were effective in preventing system degradation. Additionally, for the CCW heat exchanger 'B,' the inspectors reviewed recent eddy current (EC) examination reports to verify that tube integrity was being assessed, and that the number of tubes plugged were within the plugging limits in design basis calculations. The inspectors also conducted a walkdown of the selected heat exchangers to verify that visible conditions adverse to quality were identified and corrected.

The inspectors reviewed calculations and interviewed plant personnel to verify that the licensee had evaluated the potential for water hammer and established adequate controls and operational limits to prevent heat exchanger degradation due to excessive flow induced vibration during operation.

In addition to the heat exchangers, the inspectors reviewed a sample of ultimate heat sink (UHS) inspection attributes, as described in the next paragraphs, to verify the performance of the UHS, and its subcomponents, was adequate to ensure availability and accessibility to the in-plant cooling water systems.

The inspectors performed a system walkdown on the service water system to determine whether the licensee's assessment on structural integrity was adequate. In addition, the inspectors reviewed available licensee's testing and inspections results, licensee's disposition of any active thru wall pipe leaks, and the history of thru wall pipe leakage to identify any adverse trends since the last NRC inspection. For buried or inaccessible piping, the inspectors reviewed the licensee's pipe testing, inspection, or monitoring program to determine whether structural integrity was ensured and that any leakage or degradation was appropriately identified and dispositioned by the licensee.

Additionally, as part of the system walkdown, the inspectors reviewed and inspected the service water intake structure (including the traveling screens, strainers and component mounts) to determine whether the licensee's assessment on structural integrity and component functionality was adequate. In addition, the inspectors reviewed data to determine whether service water pump bay silt accumulation was monitored, trended, and maintained at an acceptable level by the licensee, and that water level instruments were functional and routinely monitored. The inspectors reviewed survey records of the service water pond to verify the licensee had established a program to identify shoreline degradation, silt accumulation, and determine whether sufficient reservoir capacity was available to perform its design basis function. During the walkdown, the inspectors verified that the riprap protection along the slopes of the service water pond was maintained to prevent adverse effects on the function of the UHS.

The inspectors reviewed the licensee's operation of service water system and UHS. This included a review of licensee's procedures for a loss of the service water system or UHS and the verification that instrumentation, which is relied upon for decision making, was available and functional. In addition, the inspectors reviewed data to determine whether macrofouling was adequately monitored, trended, and controlled by the licensee to prevent clogging. The inspectors also reviewed results to determine whether the licensee's biocide treatments for biotic control were adequately conducted and whether the results were adequately monitored, trended, and evaluated.

The inspectors reviewed the licensee's performance testing of service water system and UHS results. Specifically, the inspector focused on the review of a high-risk motor operated valve (SWS-MOV-CF-3116). This included a review of the licensee's performance test results and service water flow balance test results.

In addition, the inspectors reviewed condition reports related to the heat exchangers/coolers and heat sink performance issues to determine whether the licensee had an appropriate threshold for identifying issues and to evaluate the effectiveness of the corrective actions. The documents that were reviewed are included in the Attachment to this report.

These inspection activities constituted five heat sink inspection samples as defined in IP 71111.07.

b. Findings

No findings were identified.

1R11 Licensed Operator Requalification Program

.1 Licensed Operator Requalification

a. Inspection Scope

The inspectors observed an operator requalification simulator training scenario occurring on May 2, 2016, and 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.

b. Findings

No findings were identified.

.2 Resident Quarterly Observation of Control Room Operations

a. Inspection Scope

During the inspection period, the inspectors conducted four observations of licensed reactor operator activities to ensure consistency with licensee procedures and regulatory requirements. For the four listed activities, 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.

- 'A' SSPS testing
- 'A' EDG post maintenance test pre-job brief
- 'B' SSPS testing
- Moveable rod insertion testing

b. Findings

No findings were identified.

1R12 Maintenance Effectiveness

a. Inspection Scope

The inspectors evaluated equipment issues described in the three CRs listed below to verify the licensee's effectiveness with the corresponding preventive or corrective maintenance associated with structure, system and components (SSCs). CR-16-01645 also was reviewed in detail regarding quality controls involving replacement components. 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 corrective actions were established and effective. 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. 6, "Maintenance Rule Program Implementation," and station administrative procedure (SAP)-0157, Rev. 1, "Maintenance Rule Program," to verify consistency with the MR program requirements.

- CR-16-01547, Cycle 22, 50.65(a)(3) assessment
- CR-16-01645, Digital rod position indicator (DRPI) corrective maintenance – emergent.
- CR-16-02361, Emergent work to repair significant fuel oil leak at #8 cylinder injector for 'B' EDG

b. Findings

No findings were identified.

1R13 Maintenance Risk Assessment and Emergent Work Control

a. Inspection Scope

The inspectors performed risk assessments, as appropriate, for the three scheduled work activities involving a yellow risk condition for the associated components 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.

- Work week 17, yellow risk condition for 'A' SSPS actuation testing
- Work week 19, red risk condition fire emergency procedure (FEP) component, 'B' EDG, inoperable
- Work week 25, yellow risk condition for 'A' SSPS actuation testing

b. Findings

Introduction: The inspectors identified a Green NCV of 10 CFR 50.65(a)(4), "Requirements for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants," involving the licensee's failure to develop and implement specific risk management actions (RMAs) for a yellow risk condition associated with SSPS surveillance testing.

Description: On April 29, 2016, work week 17, the inspectors determined that the licensee had not prepared RMAs specifically addressing an elevated or yellow risk condition for performance of 'A' train SSPS surveillance testing as noted by their EOOS (PRA) computer program. The inspectors performed additional follow-up reviews and determined that the licensee had implemented a model update for EOOS on March 31, 2016, which resulted in a yellow risk condition for SSPS testing as compared to the previous model in which risk remained green. The inspectors reviewed the associated WO 1605465 for the testing and noted it was evaluated for risk on March 14, 2016, prior to implementation on April 29, 2016, but the WO was not re-evaluated following the EOOS model update. The inspectors reviewed the following procedures involving risk management in accordance with 50.65(a)(4):

- Station Scheduling Procedure SSP-001, "Planning and Scheduling Maintenance Activities," Rev. 24C
- SAP-208, "Integrated Risk Assessment," Rev. 0D
- OAP-102.1, "Conduct of Operations Scheduling Unit," Rev. 8A
- Nuclear Licensing Procedure NL-126, "Probabilistic Risk Assessment Activities," Rev. 1F

The inspectors determined that there are no programmatic requirements to re-evaluate affected work orders following an EOOS model update within the above procedures. Consequently, a vulnerability exists with regards to future EOOS model updates and respective impact on adequate RMAs for maintenance activities, and the licensee initiated CR-16-02504 for an evaluation and corrective action.

The inspectors did note that the licensee had taken some risk actions based on the activity evaluated as a 'single point vulnerability.' However, the inspectors interviewed the licensee's PRA engineer who provided RMAs that were different and were not identified in the licensee's risk evaluation form, Attachment VII of SSP-001, for the SSPS surveillance test.

The inspectors noted that 10 CFR 50.65(a)(4) requires in part that before performing maintenance activities the licensee assess and manage the increase in risk. Managing the increase in risk involves an evaluation from a PRA perspective to develop risk management actions appropriate to the circumstances. While the inspectors noted that the licensee did indeed assess risk for 'A' train SSPS surveillance test resulting in the yellow risk condition, the inspectors concluded, however, that the licensee failed to manage the increase in risk associated with the test which was indicative of the lack of programmatic requirements for assessing and managing risk subsequent to EOOS model updates.

Analysis: The inspectors identified a performance deficiency (PD) for the failure to manage the increase in risk associated with 'A' train SSPS surveillance testing which was indicative of the lack of programmatic requirements for assessing and managing risk subsequent to EOOS model updates. The inspectors IMC 0612, Appendix B, "Issue Screening," dated September 7, 2012, and determined that the PD was more than minor and therefore a finding because (1) it was associated with the Mitigating Systems Cornerstone and adversely affected the cornerstone objective to ensure in part the availability of systems that respond to initiating events to prevent undesirable consequences, and (2) if left uncorrected the PD would have the potential to lead to a more significant safety concern. Specifically, the failure to manage the increase in risk jeopardizes the availability of remaining safety systems to combat the consequences of an initiating event. The inspectors reviewed IMC 0609, Appendix K, "Maintenance Risk Assessment and Risk Management Significance Determination Process," dated May 19, 2005, and determined that the finding was of very low safety significance, Green, because the ICDP for the SSPS surveillance test was less than 1E-6. The inspectors reviewed IMC 0310, "Aspects Within Cross Cutting Areas," dated December 4, 2014, and determined that this finding had a cross-cutting aspect in the area of Work Management (H.5), because the licensee did not develop specific RMAs for a yellow risk condition which was indicative of the lack of programmatic requirements for assessing and managing risk subsequent to EOOS model updates.

Enforcement: 10 CFR 50.65(a)(4) requires, in part, that before performing maintenance activities the licensee shall manage the increase in risk that may result from the proposed maintenance activities. Contrary to the above, on April 29, 2016, the licensee failed to manage the increase in risk associated with 'A' train SSPS surveillance testing which was indicative of the lack of programmatic requirements for assessing and managing risk subsequent to EOOS model updates. Because this finding is of very low safety significance and has been entered into the licensee's corrective action program as condition report CR-16-02504, this violation is being treated as an NCV, consistent with Section 2.3.2 of the NRC Enforcement Policy: NCV 05000395/2016002-01, Failure to Adequately Manage Risk of Maintenance Activities Following Risk Model Updates.

1R15 Operability Determinations and Functionality Assessments

a. Inspection Scope

The inspectors reviewed the four 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. 1B, "Operability Determination Process," and SAP-999, Rev. 13C, "Corrective Action Program."

- CR-10-00005, Multiple occurrences of right side DRPI screen failure to display
- CR-16-01493, Past operability determination for 'B' EDG exciter diode voltage indication

- CR-16-03002, Operability impact on SW piping due to excavation
- CR-16-02041, Operability determination for RMA0014 erratic indication

b. Findings

No findings were identified.

1R19 Post Maintenance Testing

a. Inspection Scope

For the five 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. 5F.

- WO 1501216, Replace oil flex lines on 'A' charging pump
- WO 1601215, 'B' service water (SW) pump/motor retest
- WO 1514723, Remove 'A' SW motor lube oil cooling water piping for inspections
- WO 1608542, Repair excessive fuel oil leak on 'B' EDG #8 cylinder fuel injector
- WO 1607924, Replace ground relay on 'A' EDG

b. Findings

No findings were identified.

1R22 Surveillance Testing

a. Inspection Scope

The inspectors observed and/or reviewed the six surveillance test procedures (STPs) 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.

Reactor Coolant System (RCS) Leakage Detection

- STP-114.002, "Operational Leakage Calculation," Rev. 12G

In-Service Tests

- STP-205.004, “RHR Pump and Valve Operability Test,” Rev. 9B
- STP-220.002, “Turbine Driven Emergency Feedwater Pump and Valve Test,” Rev. 8B
- STP-223.002A, “Service Water Pump Test,” Rev. 10C

Other

- STP-360.048, “Reactor Building Purge Exhaust System Atmospheric Radiation Monitor RM-A14 Operational Test,” Rev. 8
- Preventive Test Procedure (PTP)-102.0001, “Main Turbine Tests,” Rev. 17A

b. Findings

No findings were identified.

4. OTHER ACTIVITIES

4OA1 Performance Indicator (PI) Verification

Cornerstone: Reactor Safety Barrier Integrity

a. Inspection Scope

The inspectors verified the accuracy of the licensee’s PI submittals listed below for the period April, 2015, through March, 2016. The inspectors used the performance indicator definitions and guidance contained in Nuclear Energy Institute (NEI) 99-02, Rev. 6, “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, operator logs, plant status reports, CRs, and performance indicator data sheets to verify that the licensee had properly reported the PI data. Also, the inspectors discussed the PI data with the licensee personnel associated with the performance indicator data collection and evaluation.

- RCS Specific Activity
- RCS Identified Leak Rate

b. Findings

No findings were identified.

4OA2 Problem Identification and Resolution

.1 Review of Items Entered into the Corrective Action Program

a. Inspection Scope

As required by inspection procedure 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 Semi-Annual Review to Identify Trends

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 the first half of 2016. Documents reviewed included licensee monthly and quarterly corrective action trend reports, engineering system health reports, maintenance rule documents, department self-assessment activities, and quality assurance audit reports.

b. Findings

No findings were identified. However, the inspectors noted there were six CR's relating to the Fuel Handling Bridge Area Gamma Monitor RMG0008 failing low generated during the first half of 2016. RMG0008 is required by technical specifications (TS) 3.3.3.1, but TS allows the licensee to take at least one sample each 24 hours during periods where RMG0008 is inoperable.

The licensee was aware previous failures of RMG0008, and noted additional RMG0008 failures dating back to 2014 in CR-16-01078. Under CR-16-01078, the licensee initiated a trouble shooting plan and raised the artificial background setting to 0.3 mR/h. However, RMG0008 failed low again as noted in CR-16-02975 dated June 12, 2016, and the licensee subsequently raised the artificial background setting again to 0.5 mR/h under WO 1605183-001. The inspectors noted that both settings were within the vendor's recommended setting. No new failed low alarms have occurred for RMG0008 since raising the artificial background setting to 0.5 mR/h. Inspectors continue to monitor this issue.

.3 Annual Sample Review of CR-15-06825

a. Inspection Scope

The inspectors reviewed CR-15-06825, tampering with fire protection sprinkler system testing, in detail to evaluate the effectiveness of the licensee's corrective actions for important safety issues. 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 causes/apparent causes, and

identified appropriate and timely corrective actions. Also, the inspectors verified the issues were processed in accordance with procedure, SAP-999, "Corrective Action Program," Rev. 13C.

b. Findings

A licensee-identified violation is documented in Section 4OA7 of this report. On December 17, 2015, the licensee initiated CR-15-06825 following the discovery of apparent tampering with testing of a fire protection sprinkler system installed by engineering change request, ECR 50810A, as part of the licensee's process to transition to Nation Fire Protection Association, NFPA-805. Specifically, a member of the licensee's project management organization (PMO) found that pressure had been increased during a pressure drop test as part of the post modification testing process based on observation of the pressure test gauge before the test was completed and after the test was complete. The PMO individual questioned the responsible contract personnel and subsequently obtained security door logs with which the contractor personnel were confronted. Due to existing air leaks in the newly installed sprinkler system, contractor personnel subsequently admitted they added air to the system in order to pass the pressure drop test. The inspectors reviewed the licensee's immediate actions which included removal of the contractors' badging to prevent access to the plant. Additional licensee actions against the contractor company were also taken.

The inspectors subsequently reviewed the long-term corrective actions taken by the licensee who, following a causal evaluation, concluded that the contractors' actions were deliberate and willful. Specifically, the inspectors were aware that previous violations involving deliberate or willful actions were documented in the licensee's CAP as:

- CR-12-03100: Three electrical contractors deliberately used older procedures to avoid a required quality control inspection. The NRC subsequently documented a Severity Level IV Notice of Violation in Inspection Report, 05000395/2013009.
- CR-11-01037: A contractor deliberately falsified a document regarding his criminal record.
- CR-13-03999: A licensee technician deliberately documented completion of a test which was not actually performed.

The inspectors found that the licensee's corrective actions consisted of an update to an existing PowerPoint training package for human performance basics. The package consists of 56 slides and the last objective regarding willful misconduct involves six slides. The update involved the addition of two slides for definitions of willful misconduct and careless disregard. Additionally, two slides were modified for emphasis and to add the most recent example as noted above to the list of three previous examples. The inspectors noted that this topic involving willfulness was located at the end of the 56 slide package and mirrored comments made by the contractors during their interviews performed by the licensee. The inspectors provided their observations to the licensee who added an action in CR-15-06825 to enhance the training in order to place more emphasis on the topic of willful misconduct.

4OA6 Meetings, Including Exit

On July 21, 2016, the resident inspectors presented the integrated inspection report results to Mr. G. 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 violations of very low safety significance (Green) were identified by the licensee and are violations of NRC requirements which meet the criteria of Section 2.3.2 of the NRC Enforcement Policy for characterization as an NCV:

- V.C. Summer Operating License condition 2.c(18)c.2 states in part that the licensee shall implement the modifications to its facility, as described in Attachment S, Table S-1, "Plant Modifications Committed," of SCE&G letter RC-14-0196, dated December 11, 2014, by the end of the calendar year 2015. RC-14-0196, Table S-1 identifies ECR50810 which is identified as a quality related modification. ECR-50810A which is a revision of ECR50810 states in part that installation, modification and testing of sprinkler piping, preaction valves and appurtenances shall be performed in accordance with NFPA 13 (2013 Edition). NFPA 13-2013 Section 25.2.2, “Dry Pipe and Double Interlock Preaction System(s) Air Test,” states, in part, that an air pressure leakage test shall be conducted for 24 hours and that any leakage that results in a loss of pressure in excess of 1.5 psi for the 24 hours shall be corrected. Contrary to the above, on December 16, 2015, contract employees working for the licensee failed to correct a leak in excess of 1.5 psi on the preaction sprinkler piping being installed. Specifically, contract employees deliberately added air pressure to newly installed sprinkler piping during the 24 hour NFPA 13-2013 leak test with the intent to mask a test failure and preclude repairing the leak. A review of IMC 0609, Appendix A, determined the finding was of very low safety significance (Green) because the finding was not a design deficiency and it did not result in a loss of function because the licensee identified and corrected the problem before placing the new sprinkler header in service. The licensee has documented this problem in their CAP as CR-15-06825.

ATTACHMENT: SUPPLEMENTAL INFORMATION

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Licensee Personnel

A. Barbee, Director, Nuclear Training
C. Calvert, Manager, Design Engineering
M. Coleman, Manager, Health Physics and Safety Services
N. Constance, Manager, Nuclear Training
G. Douglass, Manager, Nuclear Protection Services
D. Edwards, Supervisor, Operations
J. Garza, Supervisor, Nuclear Licensing
T. Gatlin, Vice President, Nuclear Support Services
L. Harris, Manager, Quality Systems
R. Haselden, General Manager, Organizational / Development Effectiveness
R. Justice, General Manager, Nuclear Plant Operations
G. Lippard, Vice President, Nuclear Operations
R. Mike, Manager, Chemistry Services
M. Moore, Supervisor, Nuclear Licensing
R. Ray, Manager, Maintenance Services
D. Shue, Manager, Nuclear Operations
C. Slavens, Service Water System Engineer
W. Stuart, General Manager, Engineering Services
W. Taylor, Nuclear Licensing Engineer
B. Thompson, Manager, Nuclear Licensing
J. Wasieczko, Manager, Organization Development and Performance
D. Weir, Manager, Plant Support Engineering
H. White, 89-13 Program, Plant Support Engineering
R. Williamson, Manager, Emergency Services
S. Zarandi, General Manager, Nuclear Support Services

LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

Opened
None

Closed
None

Opened and Closed

05000395/2016002-01	NCV	Failure to Adequately Manage Risk of Maintenance Activities Following Risk Model Updates (Section 1R13)

LIST OF DOCUMENTS REVIEWED

Section 1R01: Adverse Weather Protection

Procedures

- OAP-109.1, Guidelines for Severe Weather, Rev 4D
- AOP-301, Response to Electrical Grid Issues, Rev 0D
- EE-01, Design Interface with Transmission Planning, Power Delivery, and Relay Applications, Rev 0F
- EOP-6.0, Loss of All ESF AC Power, Rev 32
- Memorandum Of Agreement - NRC and NERC
- Nuclear - Electric Transmission Interface Agreement, Rev 8
- OAP-100.4, Communication, Rev 3
- OAP-102.1, Conduct of Operations Scheduling Unit, Rev 8A
- PTP-160.025 Loading and Unloading of the Alternate AC Power Supply, Rev 0
- QA Audit of Nuclear-Transmission Services Interface Agreement
- SAP-703, Control of Switchyard-Transformer Yard Activities, Rev 1I
- SOP-301, Main Generator System, Rev 16
- SOP-304, 115kV-7.2kV Operations, Rev 13H
- STP-125.021 Periodic Testing of the Alternate AC Power Supply, Rev 4
- Transmission Nuclear Interface Task Team Practices Doumentation, version 2.0
- VCS Unit 1 - Power Delivery Northern Operations Interface Agreement, Rev 4, March 12, 2013
- VCS-1 Impacting Facilities Diagram and List, August 20, 2015
- VCSNS AAC Power Source Interface Agreement, August 21, 2008

Work Orders

- WO 1404584, Periodic testing of the Alternate AC power supply

Section 1R04: Equipment Alignment

Procedures

- SOP-112, Safety Injection System, Rev 18H
- Drawing E-302-691, Saftey Injection, Sheet 1, Rev 16
- Drawing E-302-692, Saftey Injection, Sheet 2, Rev 14
- Drawing E-302-693, Saftey Injection, Sheet 3, Rev 22
- Drawing E-302-675, CVCS, Sheet 3, Rev 36
- AB-10, Operations Training Emergency Cooling System Course Handout, Rev 19

1R06 Flood Protection Measures

Annual Review of Electrical Manholes

- 1600150, EMH-1 inspection
- 1600151, EMH-2 inspection
- CMP-700.013, Inspection of Electrical Manholes, Rev 2D

1R07 Heat Sink Performance

Corrective Actions

- CR-13-00497, Pinhole Leak Service Water, 1/30/13
- CR-14-02007, CC Hx B Tubes Blocked, 4/17/14
- CR-14-03531, Slow Leak on Service Water Outlet Piping, 6/24/14

- CR-14-04956, Pinhole Leak on Service Water, 9/10/14
- CR-14-05215, Degraded Thermal Performance B CCW HX, 9/25/14
- CR-15-01175, B CC Hx is approaching Administrative Limits, 3/12/15

Calculations
- DC03650-004, Service Water Pumphouse/Intake Structure Survey Monitoring Data Review, Rev. 21
- DC05600-098, Evaluation of Acceptance Criteria on Water Hammer Phenomena in CCW, EFW, and SW Piping, Rev. 1

Procedures
- CP-913, Service Water Biocide Treatment Equipment Operation, Rev. 12
- CP-923, Service Water Chemical Addition, Rev. 6
- ES-505, Service Water System Corrosion Monitoring and Control Program, Rev. 3
- ES-560.211, Service Water System Heat Exchanger Performance, Rev. 12
- MMP-255.001, General Heat Exchanger Cleaning and Tube Plugging, Rev. 16
- PSEG-35, Heat Exchanger Inspection, Rev. 0
- PTP-213.002, Service Water System Heat Exchanger Data Collection, Rev. 5
- SAP-1255, Service Water Reliability Optimization Program, Rev. 2
- SAP-1258, Buried Piping Integrity Program, Rev. 0
- STP-123.003B, Train B Service Water System Valve Operability Test, Rev. 6
- STP-223.002A, Service Water Pump Test, Rev. 10

Work Orders
- WO#0907893, Service Water HX Performance, A SW Pump Motor Bearing Cooler, 7/29/10
- WO#1006462, Eason Dive Inspection for Clams/Corrosion, 5/12/11
- WO#1206546, Service Water HX Performance, A SW Pump Motor Bearing Cooler, 1/9/13
- WO#1207626, A SW Motor Lube Oil Visual Inspection, 7/31/12
- WO#1214367, A SW Motor Lube Oil Visual Inspection, 4/30/13
- WO#1303421, Eddy Current Inspection CCW B Hx, 4/18/14
- WO#1303422, CCWHx-B Visual Inspection, 4/15/14
- WO#1306266, C SW Motor Lube Oil Visual Inspection, 9/30/13
- WO#1306838, CCWHx-B analysis, 8/19/13
- WO#1310681, CCWHx-B analysis, 11/21/13
- WO#1310762, A SW Motor Lube Oil Visual Inspection, 9/24/13
- WO#1313352, CCWHx-B analysis, 9/15/13
- WO#1313354, CCWHx-B analysis, 10/23/13
- WO#1313356, CCWHx-B analysis, 12/18/13
- WO#1313358, CCWHx-B analysis, 1/16/14
- WO#1313360, CCWHx-B analysis, 3/12/14
- WO#1402459, CCWHx-B analysis, 6/27/14
- WO#1407285, CCWHx-B analysis, 9/24/14
- WO#1408939, CCWHx-B analysis, 12/18/14
- WO#1409598, CCWHx-B Visual Inspection, 10/31/15
- WO#1414928, CCWHx-B analysis, 3/11/15
- WO#1503188, CCWHx-B analysis, 5/7/15

- WO#1504144, CCWHx-B analysis, 8/26/15
- WO#1504279, Service Water Hx Performance, B SW Pump Motor Bearing Cooler, 9/16/15
- WO#1504280, Service Water Hx Performance, C SW Pump Motor Bearing Cooler, 9/16/15
- WO#1504572, C SW Motor Lube Oil Visual Inspection, 7/13/15
- WO#1504585, CCWHx-B analysis, 5/9/15
- WO#1506522, CCWHx-B analysis, 7/2/15
- WO#1509959, CCWHx-B analysis, 2/10/16
- WO#1509959, Service Water Hx Performance, B Component Cooling Water, 2/11/16
- WO#1514752, Service Water Hx Performance, B Component Cooling Water, 5/5/16
- WO#1605147, C SW Motor Lube Oil Visual Inspection, 6/2/16
- WO#1514752, CCWHx-B analysis, 5/5/16
- WO#1601215, SW Train B Valve Operability Test, 4/29/16
- WO#1602723, SW Train B Valve Operability Test, 4/28/16
- WO#1605531, SW Train B Valve Operability Test, 5/13/16

Miscellaneous
- Component Cooling Water System, Enhanced Design Basis Document, Rev. 13
- EPRI, Service Water Heat Exchanger Testing Guidelines, May 2015
- EPRI, Supplemental Guidance for Testing and Monitoring Service Water Heat Exchangers, October 2003
- FERC, Dam Sam Safety Inspection Report, 4/2/15
- Letter From O.S.Bradhma, SCE&G to US NRC, Response to Generic Letter 89-13, 1/31/90
- NU-02NN751220, SW Bathymetric Study, 9/30/13
- PD 041469.02, Eddy Current Inspection CC HX B, April 2014
- PR37-36, iTi Eddy Current CCW-2B, 11/9/09
- Service Water System, Design Basis Document, Rev. 12

Section 1R15: Operability Evaluations

Procedures
- STP-360.047, Reactor Building Purge Exhaust System Atmospheric Radiation Monitor RM-A14 Calibration, Revision 8
- STP-360.048, Reactor Building Purge Exhaust System Atmospheric Radiation Monitor RM-A14 Operational Test, Revision 8

Section 1R22: Surveillance Testing

Procedures
- STP-360.047, Reactor Building Purge Exhaust System Atmospheric Radiation Monitor RM-A14 Calibration, Revision 8

Section 4OA2: Problem Identification and Resolution

Condition Reports for instances where RMG0008 failed low
- CR-16-00173, CR-16-00731, CR-16-00831, CR-16-01078, CR-16-01290, CR-16-01898 and CR-16-02975

Work Orders
- WO 1604742-001, Make adjustments and repair RMG0008 as needed.