



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

August 9, 2017

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 05000395/2017002 AND NOTICE OF  
VIOLATION

Dear Mr. Lippard:

On June 30, 2017, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at your Virgil C. Summer Nuclear Station, Unit 1. On July 17, 2017, 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 inspectors documented one NRC-identified finding of very low safety significance (Green) with a cited violation. 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>. We determined that this violation did not meet the criteria to be treated as a non-cited because compliance has not been restored. Specifically, the licensee failed to ensure that conditions adverse to fire protection were promptly corrected as noted in a previous NRC-identified Green NCV, 05000395/2013003-03, "Failure to Adequately Design, Install and Maintain Oil Collection Devices for Reactor Coolant Pump Motors." As of July 31, 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 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 Virgil C. Summer Nuclear Station, Unit 1.

Additionally, the inspectors documented one NRC-identified Severity Level IV violation with no associated finding. The NRC is treating this violation as non-cited violation (NCV) consistent with Section 2.3.2.a of the Enforcement Policy

If you contest the violation or significance of the NCV, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555 0001; with copies to the Regional Administrator, Region II; the Director, Office of Enforcement; 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 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 enclosures, and your response (if any) will be made available for public inspection and copying at <http://www.nrc.gov/reading-rm/adams.html> and at the NRC Public Document Room in accordance with 10 CFR 2.390, "Public Inspections, Exemptions, Requests for Withholding."

Sincerely,

*/RA/*

Anthony D. Masters, Chief  
Reactor Projects Branch 5  
Division of Reactor Projects

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

Enclosures:

1. Notice of Violation
2. IR 05000395/2017002  
w/Attachment: Supplemental Information

cc: Distribution via ListServ

SUBJECT: VIRGIL C. SUMMER NUCLEAR STATION, UNIT 1 – NRC INTEGRATED  
INSPECTION REPORT 05000395/2017002 AND NOTICE OF  
VIOLATION August 9, 2017

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DATE	8/2/2017	8/2/2017	8/4/2017	8/3/2017	8/3/2017	8/1/2017
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DATE	8/3/2017	8/9/2017				

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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 April 1 and June 30, 2017, a violation of NRC requirements was identified. In accordance with the NRC Enforcement Policy, the violation is listed below:

From August 6, 2013, through February 10, 2015, the Virgil C. Summer Nuclear Station, Unit No. 1, Renewed Facility Operating Licensee No. NPF-12, Condition 2.C.(18), Fire Protection System states, in part, that the licensee shall implement and maintain in effect all provisions of the approved Fire Protection Program as stated in the FSAR of which Section 9.5.1.1 states, "The fire protection systems are also addressed in the Fire Protection Evaluation Report (FPER), which is considered a part of this FSAR." Section 5, "Corrective Action," of the FPER states, "The identification of conditions adverse to quality, the cause of the condition, and the corrective action taken are documented and reported to appropriate levels of management. This is accomplished in accordance with the Operational QA Plan." The Quality Assurance Program Description, Revision 0, effective May 17, 2012, Section 2, "Non-safety-related SSCs Credited for Regulatory Events," states, SCE&G implements quality requirements for the Fire Protection System in accordance with Regulatory Position 1.7, "Quality Assurance," in Regulatory Guide 1.189, Rev. 2 "Fire Protection for Operating Nuclear Power Plants" as identified in FSAR Chapter 3, Appendix 3A."

From February 11, 2015, to the present date, the Virgil C. Summer Nuclear Station, Unit No. 1, Renewed Facility Operating Licensee No. NPF-12, Condition 2.C.(18) states, in part, that the South Carolina Electric & Gas Company (SCE&G) shall implement and maintain in effect all provisions of the approved fire protection program that comply with 10 CFR 50.48(a) and 10 CFR 50.48(c), as specified in the licensee amendment request (LAR) dated 11/15/11 (and supplements dated 1/26/12, 10/10/12, 2/1/13, 4/1/13, 10/14/13, 11/26/13, 1/9/14, 2/25/14, 5/2/14, 5/11/14, 8/14/14, 10/9/14, and 12/11/14) and as approved in the safety evaluation report dated 02/11/15.

Section 4.7.3 of the LAR states, in part, that VCSNS will implement a revised quality assurance program to ensure compliance with Section 2.7.3 of NFPA 805 and the revised fire protection quality assurance program is based on Regulatory Position 1.7, "Quality Assurance," in Regulatory Guide (RG) 1.189, Rev. 2, "Fire Protection for Operating Nuclear Power Plants."

Section 1.7.8 of RG 1.189 states, in part, that conditions adverse to fire protection, such as failures, malfunctions, deficiencies, deviations, defective components, uncontrolled combustibles materials, and non-conformances are promptly identified, reported, and corrected.

Contrary to the above, as of June 30, 2017, the licensee failed to ensure that conditions adverse to fire protection as noted in a previous NRC-identified Green NCV, 05000395/2013003-03, "Failure to Adequately Design, Install and Maintain Oil Collection Devices for Reactor Coolant Pump Motors," were corrected. Specifically, the licensee failed to implement corrective actions to restore compliance in a timely manner for (1) a failure to ensure an adequate design for the oil lift pump enclosure, and (2) a failure to have oil collection components for internally leaked oil dripping from the motor air discharge ductwork flange area. The licensee has entered this in their CAP as CR-17-03962.

Enclosure 1

This violation is associated with 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 for each violation: (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 addresses 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, United States 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 9th day of August, 2017

**U. S. NUCLEAR REGULATORY COMMISSION**

**REGION II**

Docket No. 50-395

License No. NPF-12

Report No. 05000395/2017002

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

Facility: Virgil C. Summer Nuclear Station, Unit 1

Location: Jenkinsville, SC 29065

Dates: April 1 through June 30, 2017

Inspectors: J. Reece, Senior Resident Inspector  
E. Coffman, Resident Inspector  
P. Heher, Acting Resident Inspector  
D. Golden, Security Inspector (In-office Review, Section 4OA5.2)  
A. Butcavage, Reactor Inspector (Section 1R08, 4OA5.2)  
B. Pursley, Health Physicist (Sections 2RS2, 4OA1, 4OA5.2)  
C. Dykes, Health Physicist (Sections 2RS1, 4OA1, 4OA5.2)  
J. Rivera, Health Physicist (Sections 2RS3, 2RS4)  
A. Nielsen, Senior Health Physicist (Sections 2RS5, 4OA5.2)  
R. Williams, Senior Reactor Inspector (Section 4OA5.2)  
P. Cooper, Reactor Inspector (Section 4OA5.2)  
B. Bishop, Project Engineer (Section 4OA5.2)

Approved by: Anthony D. Masters, Chief  
Reactor Projects Branch 5  
Division of Reactor Projects

## SUMMARY

IR 05000395/2017002; April 1, 2017 – June 30, 2017: Virgil C. Summer Nuclear Station, Unit 1; Problem Identification and Resolution and Other Activities.

The report covered a three-month period of inspection by resident and regional inspectors. One NRC-identified SL IV non-cited violation and one NRC-identified Green finding with a 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 are 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 inspectors identified a Green finding with a cited violation of Operating Licensee Condition 2.C.(18) for failure to ensure that conditions adverse to fire protection as noted in a previous NRC-identified Green NCV, 05000395/2013003-03, "Failure to Adequately Design, Install and Maintain Oil Collection Devices for Reactor Coolant Pump Motors," were corrected. Specifically, the licensee failed to implement corrective actions and restore compliance in a timely manner for (1) a failure to ensure an adequate design for the oil lift pump enclosure, and (2) a failure to have oil collection components for internally leaked oil dripping from the motor air discharge ductwork flange. The licensee entered the issue in their corrective action program as condition report CR-17-03962.

The inspectors determined that the failure to implement corrective actions for the oil collection system to restore compliance was a performance deficiency (PD). The inspectors used IMC 0612 and determined that the PD was more than minor and therefore a finding because it impacted 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 related attribute of protection against external factors such as fire. This finding has a credible impact on safety because the failure to adequately install, maintain and design the oil collection system presented a degradation of a fire confinement component which has a fire prevention function of not allowing an oil leak to reach hot surfaces. This finding had been evaluated and screened to a low safety significance (Green) and documented in the previous NRC-identified Green NCV, 05000395/2013003-03. 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 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 4OA2.3)

### Other Findings

- SLIV. The inspectors identified a severity level (SL) IV NCV of 10 CFR 50.9(a), "Completeness and accuracy of information," involving licensee document, RC-13-0142, dated October 14, 2013. This document was a response to a request for additional information involving a license amendment request (LAR) to adopt NFPA 805 and contained an approval request, L12, associated with oil misting from the reactor coolant pumps. The licensee entered this violation into their corrective action program as CR-17-03961.

The inspectors determined that the licensee's failure to provide complete and accurate information associated with approval request, L12, was a violation of 10 CFR 50.9(a). Because this violation of 10 CFR 50.9(a) impacted the NRC's ability to perform its regulatory function, the inspectors evaluated this violation using traditional enforcement (TE). Since the TE violation is associated with a previous Green reactor oversight process violation, and the misinformation was identified after the NRC relied on it for issuing a previous operating license amendment, the TE violation was determined to be a SL IV, NCV, consistent with the language of the NRC Enforcement Policy, Section 2.3.11, "Inaccurate and Incomplete Information." This violation involved TE; therefore a cross-cutting aspect was not assigned. (Section 4OA5.1)



## REPORT DETAILS

### Summary of Plant Status

Unit 1 began the inspection period at full rated thermal power (RTP) and continued until April 4, 2017, when the unit reduced power to approximately 87 percent for main steam relief valve testing. Unit 1 was removed from service for a refueling outage on April 8 and returned to full RTP on June 4, 2017, and operated at or near full RTP until June 29, 2017, when Unit 1 experienced a reactor trip. Unit 1 remained off-line and in Mode 3 for the remainder of the quarter.

#### 1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, Barrier Integrity

#### 1R01 Adverse Weather Protection

##### .1 Seasonal Weather Susceptibilities

###### a. Inspection Scope

On April 3 and May 24, 2017, the inspectors reviewed the licensee's actions associated with operations administrative procedure, OAP-109.1, "Guidelines for Severe Weather," Revision (Rev.) 4G, implemented in response to elevated wind conditions from one tornado watch and one tornado warning, respectively. The inspectors additionally reviewed samples of protected area yard conditions to verify that no potential missile hazards existed for potential tornadic conditions.

###### b. Findings

No findings were identified.

##### .2 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 Corrective Action Program (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.

## 1R04 Equipment Alignment

### .1 Partial System Walkdowns

#### a. Inspection Scope

The inspectors conducted two 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.

- 'A' and 'B' motor driven emergency feedwater (MDEFW) components while turbine driven emergency feedwater (TDEFW) pump is out of service for planned maintenance
- 1DA ('A' train) emergency bus normal feed and 1DB ('B' train) emergency bus alternate feed while 1DB normal feed was out of service for unplanned work

#### b. Findings

No findings were identified.

### .2 Complete System Walkdown

#### a. Inspection Scope

The inspectors performed a detailed review and walkdown of the EFW system outside of containment 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 FSAR, design basis document, plant drawings, completed surveillance procedures, outstanding WO's, 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, WO's, 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 five areas (respective fire zones also noted):

- Containment / reactor building (fire zone RB01)
- Intermediate building 412' elevation (fire zones IB 25.01.01, 25.01.02, 25.01.03, 25.01.04, 25.01.05)
- Relay room solid state protection system (SSPS) instrumentation and vital inverters (fire zones CB06, CB10, CB12)
- Auxiliary building switchgear room 463' elevation (fire zone AB01.29)
- TDEFW pump room (fire zone IB25.02)

b. Findings

No findings were identified.

1R06 Flood Protection Measures

Annual Review of Electrical Manholes

a. Inspection Scope

The inspectors reviewed the 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.

1R08 Inservice Inspection Activities (71111.08)

a. Inspection Scope

Non-Destructive Examination Activities and Welding Activities

From April 17, 2017, through April 21, 2017, the inspectors conducted an onsite review of the implementation of the licensee's inservice inspection (ISI) program for Unit 1. The ISI program is designed to monitor degradation of pressure retaining components in vital system boundaries. The scope of this program includes components within the reactor coolant system boundary, risk-significant piping boundaries, and containment system boundaries.

The inspectors either directly observed or reviewed the following non-destructive examination (NDE) activities. These activities were mandated by the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code (Code of Record:

2007 Edition with 2008 Addenda). The inspectors evaluated the NDE activities for compliance with the requirements in Section XI and Section V of the ASME Code. The inspectors also evaluated if any identified indications or defects were dispositioned in accordance with either the ASME Code or an NRC-approved alternative requirement. Additionally, the inspectors reviewed the qualifications of the NDE technicians performing the examinations to determine if they were in compliance with ASME Code requirements.

- Penetrant Test (PT), Replacement Valve ILS02002-HR2-MS, Pipe to Flange Weld MW21, ASME Code Class 2 (observed)
- Penetrant Test (PT), Replacement Valve ILS02002-HR2-MS, Pipe to Flange Weld MW22, ASME Code Class 2 (observed)
- Visual Examination, Containment Liner L-180-270-Lower, Below Elevation 463', Work Order 1610237-004, ASME IWE (reviewed)
- Visual Examination, Containment Liner L-270-360 Lower, Below Elevation 463', Work Order 1610237-004, ASME IWE (reviewed)

The inspectors directly observed the following welding activities. The inspectors evaluated these activities for compliance with site procedures and the requirements in Section IX and Section XI of the ASME Code. Specifically, the inspectors reviewed the work orders, repair or replacement plans, weld data sheets, welding procedures, procedure qualification records, welder performance qualification records, and NDE reports.

- Valve ILS02002-HR2-MS, Pipe Spool Piece to Valve Weld MW21, ASME Code Class 2 (observed)
- Valve ILS02002-HR2-MS, Pipe Spool Piece to Valve Weld MW22, ASME Code Class 2 (observed)

The inspectors reviewed the following NDE records from the previous outage. These NDE records contained recordable indications that were analytically evaluated or dispositioned by additional rework and accepted for continued service. The inspectors evaluated these records to determine if the indications were dispositioned in accordance with the requirements in Section XI of the ASME Code or an NRC-approved alternative.

CR-15-05168, PT Reactor Vessel Head Penetrations 19, 22, 31, 43, 51, 52, ASME Code Class 1

#### PWR Vessel Upper Head Penetration Inspection Activities

The V.C. Summer Unit 1 original Reactor Vessel Closure Head (RVCH) was in the process of being replaced with a Replacement Reactor Vessel Closure Head (RRVCH) during this outage. As a result, no inspections were scheduled by the licensee during this outage for the original head. NRC inspectors performed field walk down inspections of the accessible areas of the original RVCH to verify no obvious signs of reactor coolant leakage were present on the accessible areas of the original RVCH dome and flange area. This inspection was completed in order to provide reasonable assurance that no pressure boundary leakage from previously repaired head penetrations had occurred during the past operating cycle.

NRC review of preservice inspection activities associated with the RRVCH were completed under a separate inspection and are available in other sections of this resident inspector second quarter report.

#### Boric Acid Corrosion Control Inspection Activities

The inspectors reviewed the licensee's boric acid corrosion control program (BACCP) activities to determine if they were implemented in accordance with program requirements, applicable regulatory requirements, and industry guidance. Specifically, the inspectors performed the following activities:

- Reviewed applicable procedures and the results of the licensee's most recent containment walkdown inspection.
- Interviewed the BACCP owner.
- Conducted an independent walkdown of accessible areas of the Unit 1 reactor building containment.
- Verified that degraded or non-conforming conditions, such as boric acid leaks, were properly identified and corrected in accordance with the licensee's BACCP and the CAP.
- Reviewed engineering evaluations of components with boric acid leakage which verified that minimum wall thickness of those components was maintained.

#### Steam Generator Tube Inspection Activities

The inspectors reviewed the Unit 1 steam generator maintenance program documents listed in the document review section. The inspectors verified that no steam generator tube inspection activities were required this refueling outage. This inspection schedule was verified with the requirements of the ASME Code, the licensee's Technical Specifications, and applicable industry guidance.

#### Identification and Resolution of Problems

The inspectors reviewed a sample of ISI-related issues entered into the corrective action program. The inspectors evaluated if the licensee had appropriately described the scope of the problem and had initiated corrective actions. The review also included the licensee's consideration and assessment of operating experience events applicable to the plant.

#### 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 exam scenario occurring on June 19, 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.

b. Findings

No findings were identified.

.2 Resident Quarterly Observation of Control Room Operations

a. Inspection Scope

During the inspection period, the inspectors conducted two 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.

- Pre-job brief for power reduction and start of power reduction to 87 percent;
- Removal of 'C' feedwater pump (FWP) from service and Unit 1 down power for start of Refueling Outage 23.

b. Findings

No findings were identified.

1R12 Maintenance Effectiveness

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 structure, system, and components (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.

- CR-17-00173, air supply solenoid for 'A' emergency diesel generator (EDG) cooler's backup flow switch supply leaking air during test
- CR-17-00198, 'A' EDG service water return header pipe element leak

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 four 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.

- Work week 14, yellow risk condition for TDEFW governor replacement
- Qualitative yellow risk for reduced reactor coolant system (RCS) inventory while in Mode 5
- Qualitative yellow risk condition for reduced RCS inventory in Mode 6
- Work week 22, yellow risk condition for 'B' train SSPS surveillance testing

b. Findings

No findings were identified.

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. 1C, "Operability Determination Process," and SAP-999, Rev. 15, "Corrective Action Program."

- CR-15-01669, 'A' EDG intercooler piping wear due to contact with check valve bonnet bolts
- CR-17-02004, safety-related guard pipe has excessive corrosion
- CR-17-02241, during 'B' EDG start for governor calibration, the exciter field failed to flash
- CR-17-01281, fire and steam propagation barrier door, DRPA/102, discovered propped open with scaffolding component

b. Findings

No findings were identified.

1R18 Plant Modifications

a. Inspection Scope

The inspectors reviewed one temporary 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 Updated Final Safety Analysis Report (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.

- WO1603940, Install 'B' spent fuel pump motor temporary power

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.

- WOs 1600044 and 1602819, replace and adjust TDEFW governor
- WO 1317165, replace 'B' residual heat removal (RHR) pump seal
- WO 1706595, replace 'B' EDG jacket water heater breaker
- WO 1705611, replace 'A' EDG jacket water heater contactor
- WO 1707360, repair 'B' EDG main air start valve, XVM10997A, excessive leak

b. Findings

No findings were identified.

1R20 Refueling Outage and Other Outage Activities

a. Inspection Scope

On April 8, 2017, the unit was shut down to commence Refueling Outage RF-23. The outage was completed on June 1, 2017. The inspectors used IP 71111.20, "Refueling and Outage Activities," to complete the inspections described below. Documents reviewed are listed in the Attachment.

Prior to and during the outage, the inspectors reviewed the licensee's outage risk assessments and controls for the outage schedule to verify that the licensee had appropriately considered risk, industry experience and previous site specific problems, and to confirm that the licensee had mitigation / response strategies for losses of any key safety functions. In the area of licensee control of outage activities, the inspectors reviewed equipment removed from service to verify that defense-in-depth was maintained in accordance with applicable TS, and that configuration changes due to emergent work and unexpected conditions were controlled in accordance with the outage schedule and risk control plan.

The inspectors reviewed selected components which were removed from service to verify that tag outs were properly installed and that associated equipment was appropriately configured to support the function of the clearance.

During the outage, the inspectors reviewed and/or observed the following:

- RCS pressure, level, and temperature instruments to verify that those instruments were installed and configured to provide accurate indication prior to RCS draindown to lowered inventory conditions. The licensee did not drain to reduced inventory or mid-loop conditions.
- The status and configuration of electrical systems to verify that those systems met TS requirements and the licensee's outage risk control plan. The inspectors also evaluated if switchyard activities were controlled commensurate with their risk significance and if they were consistent with the licensee's outage risk control assessment assumptions.

- Spent fuel (SF) cooling operations to verify that outage work was not impacting the ability of the operations staff to operate the SF cooling system during and after core offload. The inspectors also reviewed the licensee's calculation results of SF and reactor vessel heat-up rates in case of a potential loss of cooling event.
- Heavy load lifts for the reactor vessel head removal and reinstallation to ensure the activities were conducted in a controlled and safe manner. Heavy load lift procedures were reviewed to determine whether past and current practices were within the licensing basis and consistent with guidance in NUREG-0612, "Control of Heavy Loads at Nuclear Power Plants."
- The control of containment penetrations and containment entries to verify that the licensee controlled those penetrations and activities in accordance with the appropriate TS and could achieve / maintain containment closure for required conditions.
- All accessible areas inside the reactor building prior to reactor startup to verify that debris had not been left which could affect the performance of the containment emergency core cooling system recirculation sumps.

The inspectors reviewed the following activities for conformance to applicable TS and licensee procedural requirements:

- Plant shutdown activities
- Decay heat removal system operations
- Inventory controls and measures to provide alternate means for inventory addition
- Electrical power availability controls
- Fitness for Duty area of fatigue management
- Reactivity controls
- Reactor vessel defueling and refueling operations
- Reactor heat up, mode changes, initial criticality, startup and power ascension activities

The inspectors reviewed various problems that occurred during the outage to verify that the licensee was identifying problems related to outage activities at an appropriate threshold and was entering them in the CAP.

b. Findings

No findings were identified.

1R22 Surveillance Testing

a. Inspection Scope

The inspectors observed and/or reviewed six surveillance test procedure (STP) samples 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.

In-Service Tests

- STP-222.008A, "Turbine Driven Emergency Feedwater Pump Full Flow Test," Rev. 8
- STP-223.002A, "Service Water Pump Test," Rev. 10
- STP-230.006A, "ECCS/Charging Pump Operability Testing," Rev. 8D and STP-230.006B, "ECCS Flow Balance," Rev. 6C

Reactor Coolant System

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

Routine

- STP-125.013B, "Diesel Generator 'B' Semi-Annual Operability Test," Rev. 1C

Containment Isolation Valve

- STP-215.003A, "Containment Isolation Valve Leakage Test for the CVCS, ND, RC, SF, SI, SP, and WL Systems," Rev. 7A

b. Findings

No findings were identified.

2. RADIATION SAFETY (RS)2RS1 Radiological Hazard Assessment and Exposure Controlsa. Inspection Scope

Seven inspection samples were completed by the inspectors.

Hazard Assessment and Instructions to Workers

During facility tours, the inspectors directly observed radiological postings and container labeling for areas established within the radiologically controlled area (RCA) of the auxiliary building, the reactor building (RB), outside areas, and radioactive waste (radwaste) processing and storage locations. The inspectors directly observed licensee measure radiation dose rates and perform radiation surveys for selected RCAs. The inspectors reviewed survey records for several plant areas including surveys for airborne radioactivity, gamma surveys with a range of dose rate gradients, surveys for alpha-emitters and other hard-to-detect radionuclides, and pre-job surveys for upcoming tasks. The inspectors also discussed changes to plant operations that could contribute to changing radiological conditions since the last inspection. The inspectors attended pre-job briefings and reviewed Radiation Work Permit (RWP) details to assess communication of radiological control requirements and current radiological conditions to workers.

Control of Radioactive Material

The inspectors observed surveys of material and personnel being released from the RCA using small article monitor, personnel contamination monitor, and portal monitor

instruments. The inspectors discussed equipment sensitivity, alarm setpoints, and release program guidance with licensee staff. The inspectors also reviewed records of leak tests on selected sealed sources and discussed nationally tracked source transactions with licensee staff.

#### Hazard Control

The inspectors evaluated access controls and barrier effectiveness for selected High Radiation Area (HRA), Locked High Radiation Area (LHRA), and Very High Radiation Area (VHRA) locations and discussed changes to procedural guidance for LHRA and VHRA controls with Radiation Protection (RP) supervisors. The inspectors reviewed implementation of controls for the storage of irradiated material within the spent fuel pool. Established radiological controls, including airborne controls and electronic dosimeter (ED) alarm setpoints, were evaluated for selected Eddy current work and 'A' Loop work for the Refueling Outage 23 (RF-23). In addition, the inspectors reviewed licensee controls for areas where dose rates could change significantly as a result of plant shutdown and refueling operations. The inspectors also reviewed the use of personnel dosimetry including extremity dosimetry and multi-badging in high dose rate gradients.

#### Radiation Worker Performance and RP Technician Proficiency

Occupational workers' adherence to selected RWPs and RP technician proficiency in providing job coverage were evaluated through direct observations and interviews with licensee staff. Jobs observed included maintenance activities in the RB in high radiation and contaminated areas. The inspectors also evaluated worker responses to dose and dose rate alarms during selected work activities.

#### Problem Identification and Resolution

The inspectors reviewed and assessed condition reports associated with radiological hazard assessment and control. The inspectors evaluated the licensee's ability to identify and resolve the issues in accordance with licensee procedures. The inspectors also reviewed recent self-assessment results.

#### Inspection Criteria

Radiation protection activities were evaluated against the requirements of UFSAR Section 12, Technical Specifications (TS) Sections 6.11 and 6.12, 10 CFR Parts 19 and 20, and approved licensee procedures. Licensee programs for monitoring materials and personnel released from the RCA were evaluated against 10 CFR Part 20 and IE Circular 81-07, "Control of Radioactively Contaminated Material." Documents and records reviewed are listed in the Attachment.

#### b. Findings

No findings were identified.

### 2RS2 Occupational As Low As Reasonably Achievable (ALARA) Planning and Controls

#### a. Inspection Scope

Five inspection samples were completed by the inspectors.

#### Work Planning and Exposure Tracking

The inspectors reviewed work activities and their collective exposure estimates for RF23. The inspectors reviewed ALARA planning packages for activities related to the following high collective exposure tasks: RVCH Replacement (RWP-117-04950), Refueling Activities (RWP-17-04200), RCP Work Activities (RWP-17-04600), and Scaffolding Activities (RWP-17-04003). For the selected tasks, the inspectors reviewed established dose goals and discussed assumptions regarding the bases for the current estimates with responsible ALARA planners. The inspectors evaluated the incorporation of exposure reduction initiatives and operating experience, including historical post-job reviews, into RWP requirements. Day-to-day collective dose data for the selected tasks were compared with established dose estimates and evaluated against procedural criteria (work-in-progress review limits) for additional ALARA review. Where applicable, the inspectors discussed changes to established estimates with ALARA planners and evaluated them against work scope changes or unanticipated elevated dose rates.

#### Source Term Reduction and Control

The inspectors reviewed the collective exposure three-year rolling average from 2013 – 2016. The inspectors evaluated historical dose rate trends for reactor coolant system piping and compared them to current RF23 trends. Source term reduction initiatives, including cobalt reduction and zinc injection, were reviewed and discussed with RP staff. The inspectors also reviewed temporary shielding packages for RF23.

#### Radiation Worker Performance

As part of Inspection Procedure (IP) 71124.01, the inspectors observed pre-job ALARA briefings and radiation worker performance for various HRA jobs in the auxiliary building and containment. While observing job tasks, the inspectors evaluated the use of remote technologies to reduce dose including teledosimetry and remote visual monitoring.

#### Problem Identification and Resolution

The inspectors reviewed and discussed selected condition reports associated with ALARA program implementation. The inspectors evaluated the licensee's ability to identify and resolve the issues. The inspectors also reviewed recent self-assessment results.

#### Inspection Criteria

ALARA program activities were evaluated against the requirements of UFSAR Section 12, 10 CFR Part 20, and approved licensee procedures. Documents reviewed are listed in the report Attachment.

#### b. Findings

No findings were identified.

### 2RS3 In-Plant Airborne Radioactivity Control and Mitigation

#### a. Inspection Scope

Four inspection samples were completed by the inspectors.

### Engineering Controls

The inspectors reviewed the use of temporary and permanent engineering controls to mitigate airborne radioactivity during Refueling Outage RF23. The inspectors observed the use of portable air filtration units for work in contaminated areas of the RCA and reviewed filtration unit testing certificates. The inspectors evaluated the effectiveness of continuous air monitors to provide indication of increasing airborne levels and the placement of air samplers in work area "breathing zones," accounting for alpha emitting nuclides inclusion in setpoint determination.

### Respiratory Protection Equipment

The inspectors reviewed the use of respiratory protection devices to limit the intake of radioactive material. This included review of devices used for routine tasks and devices stored for use in emergency situations. The inspectors reviewed ALARA evaluations for the use of respiratory protection performed since the last inspection. Selected self-contained breathing apparatus (SCBA) units and negative pressure respirators (NPRs) staged for routine and emergency use in the main control room and other locations were inspected for material condition, SCBA bottle air pressure, number of units, and number of spare masks and availability of air bottles. The inspectors reviewed maintenance records for selected SCBA units for the past two years and evaluated SCBA and NPR compliance with National Institute for Occupational Safety and Health certification requirements. The inspectors also reviewed records of air quality testing for supplied-air devices and SCBA bottles.

The inspectors observed the SCBA requalification and respirator fit testing for select individuals. The inspectors discussed training for various types of respiratory protection devices with licensee staff, and evaluated the use of the devices including SCBA bottle change-out. The inspectors also reviewed the use of corrective lens inserts by control room operators. The inspectors reviewed respirator qualification records (including medical qualifications) for several main control room operators and emergency responder personnel. In addition, inspectors evaluated qualifications for individuals responsible for testing and repairing SCBA vital components.

### Problem Identification and Resolution

The inspectors reviewed and discussed selected CAP documents associated with airborne controls and respiratory protection activities. The inspectors evaluated the licensee's ability to identify and resolve the issues. The inspectors also reviewed recent self-assessment results.

### Inspection Criteria

Radiation protection program activities associated with airborne radioactivity monitoring and controls were evaluated against details and requirements documented in the UFSAR Chapters 11 and 12; TS Section 6.8; 10 CFR Part 20; RG 8.15, "Acceptable Programs for Respiratory Protection"; and approved licensee procedures. Documents reviewed are listed in the Attachment.

#### b. Findings

No findings were identified.

## 2RS4 Occupational Dose Assessment

### a. Inspection Scope

Five inspection samples were completed by the inspectors.

#### Source Term Characterization

The inspectors reviewed the plant radiation characterization (including gamma, beta, alpha, and neutron) being monitored and verified the use of scaling factors to account for hard-to-detect radionuclides in internal dose assessments.

#### External Dosimetry

The inspectors reviewed National Voluntary Laboratory Accreditation Program (NVLAP) certification data for the licensee's Thermoluminescent Dosimeter (TLD) processor for the current year for Ionizing Radiation Dosimetry. The inspectors observed and evaluated onsite storage of TLDs. Comparisons between ED and TLD results, including correction factors, were reviewed and discussed. The inspectors also evaluated licensee procedures for unusual dosimetry occurrences. ED alarm logs were reviewed as part of Inspection Procedure 71124.01.

#### Internal Dosimetry

The inspectors reviewed and discussed the in vivo bioassay program with the licensee. Inspectors reviewed procedures that addressed methods for determining internal or external contamination, releasing contaminated individuals, and the assignment of dose. The inspectors evaluated the licensee's program for in vitro monitoring. The inspectors also reviewed contamination logs and evaluated events with the potential for internal dose.

#### Special Dosimetric Situations

The inspectors reviewed a sample of records for declared pregnant workers (DPWs) since the last inspection (April 2014), and discussed guidance for monitoring and instructing DPWs. Inspectors reviewed the licensee's program for monitoring external dose in areas of expected dose rate gradients, including the use of multi-badging and extremity dosimetry. The inspectors evaluated the licensee's neutron dosimetry program. In addition, the inspectors reviewed the licensee's program for evaluation of shallow dose equivalent (SDE). The inspectors also reviewed contamination logs and evaluated events with the potential for SDE.

#### Problem Identification and Resolution

The inspectors reviewed and discussed selected condition reports associated with occupational dose assessment, including self-assessments. The inspectors evaluated the licensee's ability to identify and resolve issues.

#### Inspection Criteria

The licensee's occupational dose assessment activities were evaluated against the requirements of UFSAR Chapter 12; TS Section 6.8; 10 CFR Parts 19 and 20; and approved licensee procedures. Documents reviewed are listed in the report Attachment.

### b. Findings

No findings were identified.

## 2RS5 Radiation Monitoring Instrumentation

### a. Inspection Scope

Three inspection samples were completed by the inspectors.

#### Walkdowns and Observations

During tours of the auxiliary building and RCA exit points, the inspectors observed installed radiation detection equipment including the following instrument types:

- Area radiation monitors
- Continuous air monitors
- Personnel contamination monitors
- Small article monitors
- Portal Monitors

The inspectors observed the calibration status, physical location, and material condition of this equipment and evaluated the observations against TS and FSAR requirements. In addition, the inspectors observed functional testing of selected in-service portable instruments and discussed the bases for established frequencies and source ranges with RP staff personnel. The inspectors also observed periodic source checks of RCA exit point instruments and evaluated the sources used.

#### Calibration and Testing Program

The inspectors reviewed calibration data for selected RCA exit point instruments, portable instruments, count room instruments, and the whole body counter located in the Dosimetry area. The inspectors also reviewed calibration data, calibration methodology, and source certification records for the following radiation monitors:

- Containment High Range Area Radiation Monitor (RMG0007)
- Containment High Range Area Radiation Monitor (RMG0018)
- Area Radiation Monitor, Reactor Building In-core Instrument Area (RMG0014)
- Area Radiation Monitor, Fuel Handling Bridge (RMG0008)

The current output values for the Cesium-137 source used to perform calibrations on portable instruments and low-range area radiation monitors were reviewed by the inspectors. The inspectors reviewed the licensee's process for investigating instruments that are removed from service for calibration or response check failures and discussed specific instrument failures with plant staff. In addition, the inspectors reviewed 10 CFR Part 61 data to determine if sources used in the maintenance of the licensee's radiation detection instrumentation were representative of radiation hazards in the plant and scaled appropriately for "hard to detect" nuclides.

#### Problem Identification and Resolution

The inspectors reviewed and discussed selected condition reports associated with radiological instrumentation. The inspectors evaluated the licensee's ability to identify and resolve issues. The inspectors also reviewed recent self-assessment results.



Inspection Criteria

Operability and reliability of selected radiation detection instruments were reviewed against details documented in the following: 10 CFR Part 20; NUREG-0737, "Clarification of TMI Action Plan Requirements"; FSAR Chapter 12; TS Sections 3 and 6; and applicable licensee procedures. Documents reviewed are listed in the report Attachment.

b. Findings

No findings were identified.

4. OTHER ACTIVITIES40A1 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 1, 2016, through March 31, 2017. The inspectors used the performance indicator definitions and guidance contained in Nuclear Energy Institute (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.

- Reactor Coolant System (RCS) Leak Rate
- RCS Specific Activity

b. Findings

No findings were identified.

Cornerstone: Occupational Radiation Safety

a. Inspection Scope

The inspectors reviewed the Occupational Exposure Control Effectiveness PI results for the Occupational Radiation Safety Cornerstone from June 2016 through March 2017. For the assessment period, the inspectors reviewed electronic dosimeter alarm logs and CRs related to controls for exposure significant areas. Documents reviewed are listed in the Attachment.

b. Findings

No findings were identified.

## Cornerstone: Public Radiation Safety

### a. Inspection Scope

The inspectors reviewed the Radiological Control Effluent Release Occurrences PI results for the Public Radiation Safety Cornerstone from July 2016 through March 2017. For the assessment period, the inspectors reviewed cumulative and projected doses to the public contained in liquid and gaseous release permits and CRs related to Radiological Effluent Technical Specifications/ODCM issues. The inspectors also reviewed licensee procedural guidance for collecting and documenting PI data. Documents reviewed are listed in the Attachment.

### 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 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.

#### b. Findings

The inspectors identified a minor violation as discussed below. The inspectors have continued to monitor the licensee's actions in response to adverse conditions involving

fire doors. On April 21, 2017, the inspectors identified that the fire door located in the service water pump house (SWPH), DRSW/302, was found closed but would not self-close due to air differential pressure across the door opening. The inspectors also noted that due to maintenance activities within the SWPH, the outside door was maintained open, with appropriate compensatory actions, thereby creating an adverse ventilation alignment. The licensee initiated CR-17-02063 for corrective actions.

The inspectors performed a CAP review and noted the following CRs related to DRSW/302:

- CR-16-01878, NRC identified DRSW/302 not fully closed when entering SWPH
- CR-16-01976, NRC identified DRSW/302 not fully closed; when partially opening the door approximately 2 feet, the door may or may not go fully closed.

The inspectors noted that the licensee rechecked DRSW/302 under CR-16-01878, but documented they were unable to repeat the failure. The inspectors also noted that the licensee initiated WO 1607786 for CR-16-01976 to adjust the door closure mechanism. However, the inspectors noted the licensee closed CR-17-02063 with no evaluation or corrective actions. The inspectors notified the licensee who reopened CR-17-02063 to add Action 1 to develop the appropriate corrective actions. The inspectors determined the failure to establish corrective action for DRSW/302 was a minor violation of the Virgil C. Summer Nuclear Station, Unit No. 1, Renewed Facility Operating Licensee No. NPF-12, Condition 2.C.(18) which states, in part, that the South Carolina Electric & Gas Company (SCE&G) shall implement and maintain in effect all provisions of the approved fire protection program that comply with 10 CFR 50.48(a) and 10 CFR 50.48(c), as specified in the LAR dated 11/15/11 (and supplements dated 1/26/12, 10/10/12, 2/1/13, 4/1/13, 10/14/13, 11/26/13, 1/9/14, 2/25/14, 5/2/14, 5/11/14, 8/14/14, 10/9/14, and 12/11/14) and as approved in the safety evaluation report dated 02/11/15. Section 4.7.3 of the LAR states, in part, that Virgil C. Summer Nuclear Station (VCSNS) will implement a revised quality assurance program to ensure compliance with Section 2.7.3 of NFPA 805 and the revised fire protection quality assurance program is based on Regulatory Position 1.7, "Quality Assurance," in Regulatory Guide (RG) 1.189, Rev. 2, "Fire Protection for Operating Nuclear Power Plants." Section 1.7.8 of RG 1.189 states, in part, that conditions adverse to fire protection, such as failures, malfunctions, deficiencies, deviations, defective components, uncontrolled combustibles materials, and non-conformances are promptly identified, reported, and corrected.

The inspectors continue to monitor the licensee's actions to improve their performance relative to doors important to fire protection and nuclear safety.

.3 Annual Sample: Review of the licensee corrective actions for previous NRC-identified Green NCV, 5000395/2013003-03.

a. Inspection Scope

The inspectors reviewed licensee corrective actions for previously issued NRC-identified Green NCV 05000395/2013003-03 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. 15.

b. Findings

Introduction: The inspectors identified a Green finding with cited violation of Operating Licensee Condition 2.C.(18) for failure to ensure that conditions adverse to fire protection as noted in a previous NRC-identified Green NCV, 05000395/2013003-03, "Failure to Adequately Design, Install and Maintain Oil Collection Devices for Reactor Coolant Pump Motors," were promptly corrected. The licensee entered the problem into their CAP as CR-17-03962.

Description: On August 6, 2013, the NRC issued Integrated Inspection Report 05000395/2013003, which discussed a NRC-identified Green NCV, 05000395/2013003-03, of Operating Licensee Condition 2.C.(18). The inspectors noted that the NCV discussed three specific performance deficiencies (PD) associated with reactor coolant pump (RCP) motor oil enclosures:

1. A split in the seal boot for the 'B' RCP motor oil external heat exchanger enclosure,
2. A failure to ensure an adequate design for the oil lift pump enclosure, and
3. A failure to have oil collection components for internally leaked oil dripping from the motor air discharge ductwork flange.

The inspectors reviewed the associated licensee CAP documents, condition reports CR-12-05736, CR-12-05756, CR-13-00735, and CR-13-03611 including the apparent cause evaluation (ACE) associated with this Green NCV and discussed with licensee staff. Based on review of these CRs and ACE, the inspectors noted that corrective actions for item 1 were completed. However, corrective actions for items 2 and 3 above have not been completed to fully restore the oil collection system in compliance with their Renewed Facility Operating Licensee No. NPF-12, Condition 2.C.(18), Fire Protection System as discussed below:

- During the time the oil collection system was degraded, the licensee implemented procedure-directed compensatory measures to station an operator at a RCP motor during oil lift pump startup occurring just prior to starting the respective RCP. The inspectors noted, however, that during emergency conditions a restart of a RCP would not have an operator present.
- Some interim corrective actions were completed to address some portions of the design problems for the oil lift pump enclosures (item 2 above) during the recent refueling outage completed on June 2, 2017, but full compliance was not yet met due to openings around the shaft of the oil lift pump motor which would allow leakage to escape the enclosure.
- Corrective actions to address item 3 above were not planned and therefore have not been performed.

The inspectors reviewed the licensee's operating license and quality assurance program and determined conditions adverse to fire protection are required to be identified and corrected per Section 1.7.8 of RG 1.189. The inspectors determined that overall, the licensee failed to implement corrective actions to restore compliance in a timely manner

for (1) an adequate design for the oil lift pump enclosures on all three reactor coolant pump (RCP) motors, and (2) oil collection components for internally leaked oil dripping from the motor air discharge ductwork flange area.

Analysis: The inspectors determined that the failure to implement corrective actions for the oil collection system to restore compliance was a performance deficiency (PD). The inspectors used IMC 0612 and determined that the PD was more than minor and therefore a finding because it impacted 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 related attribute of protection against external factors such as fire. This finding has a credible impact on safety because the failure to adequately install, maintain, and design the oil collection system presented a degradation of a fire confinement component which has a fire prevention function of not allowing an oil leak to reach hot surfaces. This finding had been evaluated and screened to a low safety significance (Green) and documented in the previous NRC-identified Green NCV, 05000395/2013003-03. 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 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: From August 6, 2013, through February 10, 2015, the Virgil C. Summer Nuclear Station, Unit No. 1, Renewed Facility Operating Licensee No. NPF-12, Condition 2.C.(18), Fire Protection System, states in part that the licensee shall implement and maintain in effect all provisions of the approved Fire Protection Program as stated in the FSAR of which Section 9.5.1.1 states, "The fire protection systems are also addressed in the Fire Protection Evaluation Report (FPER), which is considered a part of this FSAR." Section 5, "Corrective Action," of the FPER states, "The identification of conditions adverse to quality, the cause of the condition, and the corrective action taken are documented and reported to appropriate levels of management. This is accomplished in accordance with the Operational QA Plan." The Quality Assurance Program Description, Revision 0, effective May 17, 2012, Section 2, "Non-safety-related SSCs Credited for Regulatory Events," states, SCE&G implements quality requirements for the Fire Protection System in accordance with Regulatory Position 1.7, "Quality Assurance," in Regulatory Guide 1.189, Rev. 2 "Fire Protection for Operating Nuclear Power Plants" as identified in FSAR Chapter 3, Appendix 3A."

From February 11, 2015, to the present date, the Virgil C. Summer Nuclear Station, Unit No. 1, Renewed Facility Operating Licensee No. NPF-12, Condition 2.C.(18) states, in part, that the South Carolina Electric & Gas Company (SCE&G) shall implement and maintain in effect all provisions of the approved fire protection program that comply with 10 CFR 50.48(a) and 10 CFR 50.48(c), as specified in the licensee amendment request (LAR) dated 11/15/11 (and supplements dated 1/26/12, 10/10/12, 2/1/13, 4/1/13, 10/14/13, 11/26/13, 1/9/14, 2/25/14, 5/2/14, 5/11/14, 8/14/14, 10/9/14, and 12/11/14) and as approved in the safety evaluation report dated 02/11/15.

Section 4.7.3 of the LAR states, in part, that VCSNS will implement a revised quality assurance program to ensure compliance with Section 2.7.3 of NFPA 805 and the revised fire protection quality assurance program is based on Regulatory Position 1.7, "Quality Assurance," in Regulatory Guide (RG) 1.189, Rev. 2, "Fire Protection for Operating Nuclear Power Plants."

Section 1.7.8 of RG 1.189 states, in part, that conditions adverse to fire protection, such as failures, malfunctions, deficiencies, deviations, defective components, uncontrolled combustible materials, and non-conformances are promptly identified, reported, and corrected.

Contrary to the above, as of June 30, 2017, the licensee failed to ensure that conditions adverse to fire protection as noted in a previous NRC-identified Green NCV, 05000395/2013003-03, "Failure to Adequately Design, Install and Maintain Oil Collection Devices for Reactor Coolant Pump Motors," were corrected. Specifically, the licensee failed to implement corrective actions to restore compliance in a timely manner for (1) a failure to ensure an adequate design for the oil lift pump enclosure, and (2) a failure to have oil collection components for internally leaked oil dripping from the motor air discharge ductwork flange. The licensee has entered this in their CAP as CR-17-03962.

Because the licensee failed to restore compliance within a reasonable period of time or demonstrate objective evidence of plans to restore compliance, this 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. A Notice of Violation is included with this report: VIO 05000395/2017002-01, "Failure to Implement Corrective Actions to Restore Compliance for Previous NRC-identified Green NCV 05000395/2013003-03."

#### 4OA3 Followup of Events and Notices of Enforcement Discretion

##### Unit 1 Automatic Reactor Trip on Low Feedwater Flow to 'B' Steam Generator

###### a. Inspection Scope

On June 29, 2017, the inspectors responded to a Unit 1 automatic reactor trip resulting from low feedwater flow to the 'B' steam generator due to a failed close feedwater regulation valve. 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 NRC event notification requirements as required by 10 CFR 50.72.

###### b. Findings

No findings were identified.

#### 4OA5 Other Activities

##### .1 TE SL IV Non-Cited Violation for Incomplete and Inaccurate Information in Licensee Document RC-13-0142

Introduction: The inspectors identified a SL IV NCV of 10 CFR 50.9(a), "Completeness and accuracy of information," involving licensee document, RC-13-0142, dated October 14, 2013, and addressed to the NRC. This document was a response to a request for additional information involving a LAR to adopt NFPA 805 and contained an approval request, L12, associated with oil misting from the RCPs. The licensee entered the problem into their CAP as CR-17-03961.

Description: On March 24, 2016, the inspectors identified that approval request, L12, within RC-13-0142, contained inaccurate and incomplete information regarding the licensee's RCP motor oil collection system. Specifically, the inspectors noted the following:

- L12 stated in part that approval is requested for the potential of oil misting due to normal oil consumption. However, the inspectors had previously documented the following in NRC Integrated Inspection Report, 05000395/2013003: "The inspectors identified white silicone caulk at some flange connections associated with the RCP motor air discharge ductwork. Oil drips were observed at these locations, and the caulking was obviously applied in an attempt to prevent leakage. The inspectors noted that there were no provisions to capture the oil leakage. The inspectors had previously processed a problem involving RCP motor internal oil leakage, resulting entrainment in motor cooling air flow, and discharge from the motor in a North Anna Integrated Inspection Report 05000338/2009004, 05000339/2009004. The inspectors concluded that the licensee's design was also faulty in that no provisions were provided to capture accumulated oil from internal leakage escaping the motor via the air discharge ductwork flange." The inspectors concluded that the licensee had and continues to have existing internal oil leakage which when entrained in air becomes an oil mist that can collect on surfaces such as ductwork.
- L12 also stated in part that the VCSNS oil collection system "is designed and was reviewed" in accordance with 10 CFR 50, Appendix R, Section III.O to collect leakage from credible pressurized and nonpressurized leakage sites. The inspectors noted that the licensee substituted the word 'credible' for the regulatory requirement of 'potential'. Additionally, the inspectors noted that the licensee was issued a Green NCV in NRC Integrated Inspection Report 05000395/2013003 for two specific design deficiencies with their oil collection system, (1) a failure to have oil collection components for internally leaked oil dripping from the motor air discharge ductwork flange, and (2) a failure to ensure an adequate design for the oil lift pump enclosure. The inspectors noted the above report was issued on August 6, 2013, and the licensee issued RC-13-0142 to the NRC a few months later in October as noted above. The inspectors determined that the design problems were not resolved prior to issuance of RC-13-0142.

The inspectors noted that an unresolved item, URI 05000395/2012005-01, discussing the design inadequacies, was initially documented in NRC Integrated Inspection Report 05000395/2012005 issued on February 7, 2013, and was later closed to the aforementioned NCV. The inspectors also noted the licensee in response to the URI had initiated CR-13-00735 on February 14, 2013, of which Action 5 was initiated on July 1, 2013, to "initiate an ECR [engineering change request or modification] scope to make design changes to the RCP oil collection enclosures for each RCP motor." Consequently, the inspectors determined the inaccurate and incomplete information was material because the NRC would have required the licensee to add the required modifications to correct the design deficiencies to the licensee's list of modifications to

complete as a requirement for transition to NFPA 805 as stated in the Renewed Facility Operating Licensee No. NPF-12, Condition 2.C(18), item c.2. The delay in processing this NCV from March, 2016, to the present was pending completion of an evaluation, case number 2-2016-026, by the Office of Investigations which concluded and was documented in a letter to the licensee dated May 8, 2017.

Analysis: The inspectors determined that the licensee's failure to provide complete and accurate information associated with approval request, L12, was a violation of 10 CFR 50.9(a). Because this violation of 10 CFR 50.9(a) impacted the NRC's ability to perform its regulatory function, the inspectors evaluated this violation using TE. Since the TE violation is associated with a previous Green reactor oversight process violation, and the misinformation was identified after the NRC relied on it for issuing a previous operating license amendment, the TE violation was determined to be a SL IV NCV, consistent with the language of the NRC Enforcement Policy, Section 2.3.11, "Inaccurate and Incomplete Information." This violation involved TE; therefore a cross-cutting aspect was not assigned.

Enforcement: 10 CFR 50.9(a), "Completeness and accuracy of information," requires, in part, that "information provided to the Commission by a license shall be complete and accurate in all material aspects." Contrary to the above, on October 13, 2013, under LAR-06-00055, "Licensee Amendment Request to Adopt NFPA 805 Performance-based Standard for Fire Protection for Light Water Reactor Electric Generating Plants (2001 Edition)," the licensee failed to provide complete and accurate information regarding an approval revision, L12. Specifically, incomplete and inaccurate statements were submitted regarding the design of the RCP motor oil collection system and actual, ongoing oil leakage, which was material because licensing decisions were made in the approval of a revision to the operating license. The TE violation was entered into the licensee's corrective action program as CR-17-03961 and was screened as a SL IV NCV, consistent with Section 2.3.2 of the NRC Enforcement Policy: SLIV 05000395/2017002-01, Failure to Provide NRC Staff Complete and Accurate Information.

## .2 Reactor Vessel Head Replacement (71007)

### a. Inspection Scope

The inspectors performed the activities identified below to complete inspection procedure 71007 for the new replacement reactor vessel (RV) head on Unit 1. Documents reviewed are listed in the Attachment including Sections 2RS1, 2RS2, 2RS3, 2RS4, and 2RS5 for health physics related inspections.

- Verified that selected design changes and modifications to SSCs described in the FSAR for transporting the new and old RV heads in and out of the plant respectively were reviewed in accordance with 10 CFR 50.59.
- Reviewed key design aspects and modifications for the replacement RV head and other modifications associated with RV head replacement. In addition, the following additional design reviews were performed:



- Reviewed the required documents, supplemental examinations records, analyses, and ASME Code documentation reconciliation to ensure that the original ASME Code N-stamp documentation remains valid, and that the replacement head will comply with the appropriate NRC rules and industry requirements.
- Verified there was a contract requirement to maintain part identification and traceability during processing of the replacement head.
- Determined if the licensee had confirmed that the replacement RPV head conforms to design drawings and that there were no fabrication deviations from design or that any deviations were entered into the supplier's deviation notice process and addressed in accordance with specification and contract requirements.
- Reviewed the applicable engineering design, modification, and analysis associated with RV head lifting and rigging including: (1) crane, and rigging equipment, and full load testing (2) RV head component drop analysis, (3) safe load paths, and (4) lay-down areas.
- Reviewed radiation protection program controls, planning, and preparation in the following areas utilizing applicable portions of baseline inspection procedures IP 71124.01, 71124.02, 71124.03, 71124.04, and 71124.06 as guidance:
  - As Low As Reasonably Achievable (ALARA) planning.
  - Job dose estimates and dose tracking.
  - Exposure controls including temporary shielding.
  - Airborne and Contamination controls.
  - Radioactive material controls and management.
  - Radiological work plans and controls.
  - Emergency contingencies.
  - Project staffing and training plans.
  - Evaluation of radiological source term including presence of hard-to-detect radionuclides including transuranics.
- Reviewed RVHRP activities with respect to security considerations associated with vital and protected area barriers that may be affected during replacement activities.
- Verified that material heat treatment which was used to enhance the mechanical properties of RV head material carbon, low alloy, and, high alloy chromium (Series 4XX) steels was conducted in accordance with the ASME Code and approved vendor procedures or instructions and was consistent with the applicable ASME Code, Section III requirements.
- Verified that adequate heat treatment procedures were available to assure that applicable code and/or contract requirements were met for the following:
  - Furnace atmosphere.
  - Furnace temperature distribution, calibration of measuring and recording devices.
  - Thermocouple installation on parts (Numbers, locations, method of attachment).
  - Heating and cooling rates.
  - Quenching methods including quenching medium, maximum transfer time.
  - Record and documentation requirements.
- Verified that the manufacturing or process control plan includes provisions for monitoring the nondestructive examination (NDE) to ascertain that the NDE was performed in accordance with applicable code, material specification, and contract requirements.
- Verified that weld overlay welding operations to establish a layer of stainless steel cladding on inside of RV head were done per specifications and design drawings.

- The inspectors selected a sample of dome to flange welds and CRDM flange-to-nozzles welds, and reviewed the following:
  - Certified Mill Test Reports (CMTRs) of the dome, flange, weld material rods, and CRDM nozzles.
  - CMTRs for the welding material for the RPV head cladding.
  - Cladding weld records, weld rod material control requisitions, traceability of weld material rods, weld procedure qualification, welder qualifications, and non-conformance reports.
  - CRDM nozzle cladding welding inspection records, weld rod material control requisitions, traceability of weld material rods, weld procedure qualification, welder qualifications, and non-conformance reports.
  - CRDM-to-nozzle welds records-welding and weld inspections, weld rod material control requisitions, traceability of weld material rods, weld procedure qualification, welder qualifications, and non-conformance reports.
  - NDE procedures, NDE records of the welds, NDE personnel qualifications, certification of the NDE solvents that they did not contain deleterious substances such as mercury, lead, and corrosive chemicals.
- Verified that repair procedures were established and that these procedures were consistent with applicable ASME Code, material specification, and contract requirements. Specifically, verified that:
  - Repair welding was conducted in accordance with procedures qualified to Section IX of the ASME Code (Reference 6).
  - All welders were qualified in accordance with Section IX of the Code.
  - Records of the repair were maintained in accordance with applicable code and contract requirements.
- Verified that requirements were established for the preparation of certified material test reports and that the records of all required examinations and tests were traceable by travelers to procedures and revisions to which they were performed.
- Verified that the Design Specification is reconciled or updated and a Design Report was prepared for the reconciliation of the replacement head. Verified both Design Specification and Report were certified by professional engineers competent in ASME Code requirements.
- Verified that machining was carried out under a controlled system of operation (travelers, check lists) consistent with the manufacturers overall QA program.
- Verified that drawing / document control system was in use in manufacturing process and was consistent with the manufacturers QA program. Reviewed documentation demonstrating that only the specified drawing and document revisions were available on the shop floor and were being used for fabrication, machining, and inspection.
- Examined selected manufacturing and inspection records of finished machined RV head and verify compliance with applicable documentation requirements.
- Reviewed activities associated with lifting and rigging including: preparations and procedures for rigging and heavy lifting including any required crane and rigging inspections, testing, equipment modifications, lay-down area preparations, and training of crane and rigging personnel. Verified that the capability of the lifting equipment, including fixtures and rigging, to handle the load had been established by analysis and testing.
- Inspected the following activities throughout the process as appropriate:
  - Establishment of operating conditions including defueling, RCS drain down, and system isolation and safety tagging / blocking.
  - Implementation of radiation protection controls.

- Inspected controls for excluding foreign materials in the reactor vessel.
- Verify that reinstalled (reused) components were suitable for use.
- Installation, use, and removal of temporary services directly related to the activities identified in this procedure.
- Reviewed radiological safety plans for temporary storage or disposal of the old RV head.
- Conducted RV head post-installation verification and testing inspections in accordance with the inspection plan. Performed selective inspections, consistent with the safety significance and inspection resources, of the following areas:
  - The licensee's post-installation inspections and verifications program and its implementation.
  - The conduct of RCS leakage testing and review the test results.
  - The procedures for equipment performance testing required to confirm the design and to establish baseline measurements and the conduct of testing.
  - Pre-service inspection of new welds.

b. Findings

No findings were identified.

4OA6 Meetings, Including Exit

On July 17, 2017, the resident inspectors presented the integrated inspection report results to Mr. G. Lippard III 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.

ATTACHMENT: SUPPLEMENTAL INFORMATION

## **SUPPLEMENTAL INFORMATION**

### **KEY POINTS OF CONTACT**

#### Licensee Personnel

A. Barbee, Director, Nuclear Training  
B. Bennett, Nuclear Licensing  
B. Brown, Design Engineering  
C. Calvert, Manager, Design Engineering  
E. Colie, Plant Support Engineering  
N. Constance, Manager, Nuclear Training  
G. Douglass, Manager, Nuclear Protection Services  
D. Edwards, Supervisor, Operations  
K. Ellison, Manager, Health Physics & Safety  
R. Garrison, SCE&G Contractor  
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  
A. Ledbetter, Manager, Planning / Outage  
G. Lippard, Vice President, Nuclear Operations  
G. Meyer, Design Engineering  
R. Mike, Manager, Chemistry Services  
M. Moore, Supervisor, Nuclear Licensing  
R. Perry, Nuclear Licensing  
D. Petersen, Welding Coordinator  
R. Ray, Manager, Maintenance Services  
S. Reese, Licensing Specialist  
D. Shue, Manager, Nuclear Operations  
W. Stuart, General Manager, Engineering Services  
T. Tharp, Supervisor, Emergency Services  
B. Thompson, Manager, Nuclear Licensing  
J. Wasieczko, Manager, Organization Development and Performance  
D. Weir, Manager, Plant Support Engineering  
G. Williams, Plant Support Engineering, Programs Supervisor  
R. Williamson, Manager, Emergency Services  
K. Wise, Design Engineering  
S. Zarandi, General Manager, Nuclear Support Services

## LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

### Opened

05000395/2017002-01	VIO	Failure to Implement Corrective Actions to Restore Compliance for Previous NRC-identified Green NCV 05000395/2013003-03 (4OA2.3)
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### Opened and Closed

05000395/2017002-02	SLIV NCV	Failure to Provide NRC Staff Complete and Accurate Information (4OA5.1)
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## LIST OF DOCUMENTS REVIEWED

### **Section 1R01: Adverse Weather Protection (Alternate AC)**

AOP-301, Response to Electrical Grid Issues, Rev 1  
EE-01, Design Interface with Transmission Planning, Power Delivery, and Relay Applications, Rev. 0F  
EOP-6.0, Loss of All ESF AC Power, Rev 35  
MOA - NRC and NERC  
Nuclear - Electric Transmission Interface Agreement, Rev 8  
OAP-100.4, Communication, Rev 3A  
OAP-102.1, Conduct of Operations Scheduling Unit, Rev 8B  
PTP-160.025 Loading and Unloading of the Alternate AC Power Supply, Rev 0  
SAP-703, Control of Switchyard-Transformer Yard Activities, Rev 11  
SOP-301, Main Generator System, Rev 16B  
SOP-304, 115kV-7.2kV Operations, Rev 14  
STP-125.021 Periodic Testing of the Alternate AC Power Supply, Rev 4  
VCS Unit 1 - Power Delivery Northern Operations Interface Agreement, Rev 4, 03-12-13  
VCS-1 Impacting Facilities Diagram and List, 08-20-15  
VCSNS AAC Power Source Interface Agreement, 8-21-08

### **Section 1R06: Flood Protection Measures (Manholes)**

CMP-700.013, Inspection of Electrical Manholes, Rev. 3  
WO1618157, Inspect 'B' train side of EMH-1  
WO1618336, Inspect EMH-2

### **Section 1R08: Inservice Inspection Activities**

#### Procedures:

ISE-4, V.C. Summer, Containment Inservice Inspection Program Plan, 3<sup>rd</sup> Inspection Interval, Rev. 3A  
PTP-151.001A, Inspection for Boric Acid Corrosion, Rev. 3  
STP-803.006, V.C. Summer, Surveillance Test Procedure, IWE and IWL Visual Examination, Rev. 3

#### Drawings:

6144E84, V.C. Summer Nuclear Station Replacement Steam Generator, Rev. 3

#### Self-Assessments:

SA14-MN-01S, Welding/Special Process, 11/3/14

#### Work Orders/Work Requests:

1514870-002, Spool Piece Fabrication for Replacement of ASME Class 2 Valve, Equipment ID, ILS02002-HR2-MS, 4/19/17  
1610237-001, IWE Examination, Perform General Visual of Surface Steel Liner 270-360 Degrees below Elevation 463', 4/13/17  
1610237-001, IWE Examination, Perform General Visual of Surface Steel Liner 270-360 Degrees below Elevation 463', 4/13/17  
1610237-007, IWE Examination, Perform General Visual of Surface on Components, XRP-0201, XRP0202, XRP0203, XRP0204, XRP0205, XRP0206, XRP0207, XRP0208, XRP0209, XRP0210, XRP0211, XRP0211, XRP0212, XRP0213, XRP0214, XRP0215, XRP0216, XRP0217, XRP0218, XRP0600 and 100 percent of Steel Liner from 0 Degrees to 180 Degrees to meet ASME Section XI IWE/IWL requirement. Location Reactor Building 436', (East Side- Outside Bio-Wall), 4/9/17

1610237-008, IWE Examination, Perform General Visual of Surface on Components, XRP-0301, XRP0303, XRP0304, XRP0309, XRP0401, XRP0407, XRP0703, XRP0801 and 100 percent of Steel Liner, 180 Degrees to 360 Degrees above Elevation 463', 4/17/17  
 1610238-001, Perform VT-1 Examination of Containment Moisture Barrier, Augmented Inspection, 4/14/17  
 1610238-002, Perform General Visual of Surface on XR0219 and 100 percent of Steel Liner from 0 Degrees to 180 Degrees to Meet ASME Section XI IWE Requirement, 4/13/17  
 1705564, Install New Pipe Plug in RB Leak Chase Zone 79 Threaded Half Coupling Test Connection at Elevation 412, Completed 5/11/17  
 1706298, Implement Requested Action 1: by Dale Krause, install leak chase plug in the in-core pit, at connection 6, 6/28/17

Condition Reports:

CR-11-02834, Reactor Building Bottom Liner Leak Chase (Historical CR), 5/20/2011  
 CR-16-02142, RCP-"A" Seal Supply Throttle Valve, 4/29/16  
 CR-16-02147, Gravity Boration Piping Vent Valve Leakage, 4/26/16  
 CR-17-00443, Boric Acid Transfer Pump "A" Recirculation Isolation Valve, 1/27/17  
 CR-17-01762, Reactor Coolant System, Sand Box Area Boric Acid Indications, 4/11/17  
 CR-17-02023, (NRC Identified) Reactor Building, Liner Test Connections, 4/20/17  
 CR-17-02816, Pipe Plug Pressure Test Connection No.6, 5/17/17

NDE Examiner Qualifications:

Curtiss-Wright, Personnel Certification Statement, Magnetic Particle Testing (MT), Penetrant Testing (PT), Visual Examination Testing (VT) 1, 2 and 3, L. Weidner, Expires 10/26/16  
 Curtiss-Wright, Certificate of Visual Acuity, L Weidner, 2/17/17  
 Sonic Systems International, Certificate of Qualification, MT, PT, UT, VT-1, 2, 3, R. Alger 2/14/17

Miscellaneous Documents:

Engineering Information Request (EIR) 82307, Evaluate and Document the Potential Causes and Extent of Condition for Eight Control Rod Drive Mechanisms Actuating Coil Stacks, Rev. 2  
 SG-SGMP-14-1, V.C. Summer Unit-1, 1RF21 (April 2014) Steam Generator Degradation Assessment, Rev. 2  
 SG-SGMP-14-15, V.C. Summer Unit-1, Steam Generator Cycle Condition Monitoring and Cycles 22, 23 and 24 Operational Assessment, Rev. 0  
 STP-803-006, Attachment 1, IWE Examination Report, Steel Liner 180-270 Degrees, Below Elev. 463', Work Order 1610237-004, 4/15/17  
 STP-803-006, Attachment 1, IWE Examination Report, Steel Liner 270-360 Degrees, Below Elev. 463', Work Order 1610237-004, 4/15/17  
 SW43317, Engineers Technical Record, RF-23 Review of RF-21 Steam Generator Degradation Assessment and Operational Assessment, 3/22/17  
 Technical Work Record, CR-17-02816 Engineering Review Interim Justification, 6/27/17  
 VCS-QSP-501, Attachment 1, Work Order 1514870-002, Liquid Penetrant Inspection Report, Welds MW 21 and MW 22, 4/20/17  
 VCS-QSP-501, Attachment 1, Work Order 14176983-001, Liquid Penetrant Inspection Report, J-Groove Weld Reactor Vessel Head penetration #51, 10/20/15  
 Wesdyne Letter, WDI-LTR-QA-08-12, Quality Assurance Verification of Lower Case Character Cards for VT-1 and VT-3 Examinations, 2/22/08

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

GOP-1, Recovery from Refueling and Return to Mode 5, Rev. 16  
 GOP-2, Plant Startup and Heatup (Mode 5 to Mode 3), Rev. 17F, G  
 GOP-3, Reactor Startup from Hot Standby to Startup (Mode 3 to Mode 2), Rev. 13G  
 GOP-5, Reactor Shutdown from Startup to Hot Standby (Mode 2 to Mode 3), Rev. 12A  
 GOP-6, Plant Shutdown from Hot Standby to Cold Shutdown (Mode 3 to Mode 5), Rev. 14A  
 GOP-7, Core Refueling (Mode 5 to Mode 6 Defuel and Refuel to Mode 6), Rev. 11F  
 OAP-108.4, Operations Outage Control of Containment Penetrations, Rev. 2C, D  
 SOP-101, Reactor Coolant System, Rev. 30D – I  
 SOP-102, Chemical and Volume Control System, Rev. 24E, F  
 SOP-115, Residual Heat Removal, Rev. 22B, C, D  
 SOP-123, Spent Fuel Cooling System, Rev. 16E – H  
 SOP-211, Emergency Feedwater System, Rev. 14F, G  
 SSP-002, Planning and Scheduling of Outage Activities, Rev. 6G  
 SSP-004, Outage Safety Review Guidelines, Rev. 5

**Tagouts**

17-0018, 'A' train CCW work  
 17-0040, 'B' train RHR work  
 17-0110, Emergency feedwater system work  
 17-0131, Temporary power to 'B' spent fuel pool pump  
 17-0542, 'A' train EDG work

**Miscellaneous Documents**

CR-17-03077, Issues identified during NRC containment closeout for RF-23  
 Fitness for Duty CAP records: CR's-17-01146, 01339, 01706, 01836, 02180, 02604, 02842, 02973  
 Special Order 17-02, Use of EIR 82348 for fire protection guidance during RF-23  
 RF-23, Outage Activity Challenge Book, Rev. 0,1 (refueling outage risk review)  
 RF-23 Pre-Outage Schedule Review Report

**Section 2RS1: Radiological Hazard Assessment and Exposure Controls****Procedures, Guidance Documents and Manuals**

VCS-HPP-0151, Use of Radiation Work Permit, Revision 0  
 VCS-HPP-0160.001, Controls and Posting of Radiation Control Zones, Revision 0  
 VCS-HPP-0157, Personnel Monitoring for Contamination, Revision 0  
 VCS-HPP-0158.002, Release of Equipment and Material, Revision 0  
 VCS-HPP-0406, Decontamination of Areas and Equipment, Revision 0  
 VCS-HPP-0405, Personnel Decontamination and Skin Dose Determination, Revision 0

**Records and Data**

Survey VCS1-M-20170409-24, RHR Trending Survey outage crud burst, 04/09/2017  
 Survey VCS1-M-20170418-11, XVd07144-wf Valve Breach, 04/18/17  
 Survey VCS1-M-20170418-13, XVC07159 Valve Removal, 04/17/17  
 Survey VCS1-M-20170418-32, Valve Breach #7144, 04/18/17  
 Survey VCS1-M-20170418-35, RB 412 A Loop LCV00459/460 Diaphragm C/O, 4/18/17  
 Survey VCS1-M-20170410-29, AB374-16, 17: A & B RHR Pumps, 04/10/2017  
 Survey VCS1-M-20170413-33, AB374-16, 17: A & B RHR Pumps, 04/13/2017  
 Survey VCS1-M-20170418-37, AB374-16, 17: A & B RHR Pumps, 04/18/2017  
 Survey VCS1-M-20170411-35, AB397-02, AB 397-02, 04/11/2017  
 Survey VCS1-M-20170418-31, AB397-02, Verify Dose Rates for Valve Work, 04/18/2017  
 Survey VCS1-M-20170303-35, LHRA Entry AB 436-32, 03/03/2017



Survey VCS1-M-20170420-36, Incore Detector Drive Box "C" Cable Sweep, 04/20/2017  
 Survey VCS1-M-20170419-10, Shielding Survey TSR 17-030, 04/19/2017  
 Survey VCS1-M-20170109-9, AB 526 Filter Cubicles, 01/09/2017  
 Survey VCS1-M-20161130-13, RB 463 Personnel Hatch Door Seal Test, 11/30/201  
 VCS-HPP-0303 Attachment II: Air Sample Results, Sample # 1008, 4/18/17  
 VCS-HPP-0303 Attachment II: Air Sample Results, Sample # 1007, 4/18/17  
 VCS-HPP-0303 Attachment II: Air Sample Results, Sample # 1015, 4/18/17  
 VCS-HPP-0303 Attachment II: Air Sample Results, Sample # 1006, 4/18/17  
 VCS-HPP-0303 Attachment II: Air Sample Results, Sample # 1019, 4/18/17  
 VCS-HPP-0303 Attachment II: Air Sample Results, Sample # 0955, 0958, 0965, 0972,  
 0998, 4/17/17  
 VCS-HPP-0303 Attachment II: Air Sample Results, Sample # 0935, 0936, 4/16/17  
 VCS-HPP-0303 Attachment II: Air Sample Results, Sample # 1094, 4/18/17  
 VCS-HPP-0401.003 Attachment II: ALARA Pre-Job Briefing Form, RWP 17-0431 Retorque  
 LCV00459/460-CS packing during stroke, 04/19/17  
 VCS-Hpp-0404 Attachment IV: Action Level 1- Personnel Contamination Occurrence  
 Tracking Log >100 NCPM up to 5000 NCPM, RWP 17-04009 04/08/17; RWP 4300  
 04/15/2017; RWP 17-4201 04/13/2017  
 VCS-HPP-0704 Enclosure D: Source Inventory, 04/07/17  
 Calibration Certificates for Sources: #86CS25, #6604GM  
 Radiation Exposure Report for ISFSI, 01/2015- 12/2016  
 Operator Turnover Log 04/20/17-04/21/17  
 RWP 17-04301: LCV00459-CS, LCV00460-CS & XVG08085 Activities, Rev .01  
 RWP 17-04101: QC Activities for RF-43, Rev. 01  
 RWP 17-04950: RVCH Replacement Project, Rev. 03  
 ED Dose Alarm Record 04/20/2016-04/20/2017

#### CAP Documents

CR-16-05130  
 CR-17-01059  
 CR-17-01295  
 CR-17-01724  
 CR-16-05564  
 CR-17-02845

#### **Section 2RS2: ALARA**

##### Procedures, Guidance Documents, and Manuals

HPP-0151, Use of the Radiation Work Permit, Rev. 0  
 HPP-0401.001, Planning and Maintaining RWPS, Rev. 0  
 HPP-0401.002, Creating, Revising and Terminating RWPs Utilizing Sentinel, Rev. 0  
 HPP-0401.003, Performing RWP Pre Job Briefings, Rev. 0  
 HPP-0403, Radiological Controls for Nuclear Work Activities, Rev. 13  
 HPP-0419, Electronic Dosimeter Alarm Set Point Determination and Alarm Response Actions,  
 Rev. 0  
 SAP-0121, ALARA Committee, Rev. 10  
 SAP-0500, Health Physics Manual, Rev. 1  
 Corporate ALARA Plan, Rev. 12  
 VCS-HPP-0416.002, Radiological Controls for Use of Portable HEPA Ventilation Equipment,  
 Rev. 0

Records and Data

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