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

August 14, 2018

Mr. George A. Lippard III
Vice President, Nuclear Operations
South Carolina Electric & Gas Company
Virgil C. Summer Nuclear Station
Bradham Blvd & Hwy 215
P.O. Box 88, Mail Code 800
Jenkinsville, SC 29065

SUBJECT: VIRGIL C. SUMMER NUCLEAR STATION, UNIT 1 – NUCLEAR REGULATORY COMMISSION INTEGRATED INSPECTION REPORT 05000395/2018002

Dear Mr. Lippard:

On June 30, 2018, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at your Virgil C. Summer Nuclear Station, Unit 1. On August 6, 2018, the NRC inspectors discussed the results of this inspection with you and other members of your staff. The results of this inspection are documented in the enclosed report.

The NRC inspectors did not identify any finding or violation of more than minor significance.

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

Sincerely,

/RA/

Randall A. Musser, Chief
Reactor Projects Branch 3
Division of Reactor Projects

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

Enclosure:
IR 05000395/2018002

cc: Distribution via ListServ

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August 14, 2018

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REGION II

Docket No:	50-395
License No:	NPF-12
Report No:	05000395/2018002
Enterprise Identifier:	I-2018-002-0045
Licensee:	South Carolina Electric & Gas (SCE&G) Company
Facility:	Virgil C. Summer Nuclear Station, Unit 1
Location:	Jenkinsville, SC 29065
Dates:	April 1, 2018 through June 30, 2018
Inspectors:	J. Reece, Senior Resident Inspector E. Hilton, Resident Inspector
Approved by:	Randall A. Musser, Chief Reactor Projects Branch 3 Division of Reactor Projects

Enclosure

SUMMARY

The U.S. Nuclear Regulatory Commission (NRC) continued monitoring licensee's performance by conducting a baseline inspection at Virgil C. Summer Nuclear Station, Unit 1, in accordance with the Reactor Oversight Process. The Reactor Oversight Process is the NRC's program for overseeing the safe operation of commercial nuclear power reactors. Refer to https://www.nrc.gov/reactors/operating/oversight.html for more information. NRC and self- revealed findings, violations, and additional items are summarized in the table below.

List of Findings and Violations

No findings were identified.

Additional Tracking Items

Type	Tracking number	Title	Report Section	Status
Licensee Event Report (LER)	05000395/2018-001-00	Valid Actuation of Emergency Diesel Generator	71153	Closed
LER	05000395/2018-001-01	Valid Actuation of Emergency Diesel Generator	71153	Closed

PLANT STATUS

Unit 1 operated at or near rated thermal power for the entire inspection period.

INSPECTION SCOPES

Inspections were conducted using the appropriate portions of the inspection procedures (IPs) in effect at the beginning of the inspection unless otherwise noted. Currently approved IPs with their attached revision histories are located on the public website at http://www.nrc.gov/reading- rm/doc-collections/insp-manual/inspection-procedure/index.html. Samples were declared complete when the IP requirements most appropriate to the inspection activity were met consistent with Inspection Manual Chapter (IMC) 2515, "Light-Water Reactor Inspection Program - Operations Phase." The inspectors performed plant status activities described in IMC 2515 Appendix D, "Plant Status" and conducted routine reviews using IP 71152, "Problem Identification and Resolution." The inspectors reviewed selected procedures and records, observed activities, and interviewed personnel to assess licensee performance and compliance with Commission rules and regulations, license conditions, site procedures, and standards.

REACTOR SAFETY

71111.01 – Adverse Weather Protection

Summer Readiness (1 Sample)

The inspectors evaluated summer readiness of offsite and alternate alternating current (AC) power systems on April 4, 2018.

Seasonal Extreme Weather (1 Sample)

The inspectors evaluated readiness of the service water (SW) on May 21, 2018, and emergency diesel generators (EDG) on June 19, 2018, for seasonal extreme weather conditions prior to the onset of high temperatures associated with the summer and early fall seasons.

71111.04 - Equipment Alignment

Partial Walkdown (3 Samples)

The inspectors evaluated system configurations during partial walkdowns of the following systems/trains:

(1) 'A' residual heat removal (RHR) pump while 'B' was tagged out for maintenance; inspection was completed on April 16, 2018
(2) 'A' EDG during major maintenance on 'B' EDG; inspection was completed on May 10, 2018
(3) 'B' motor driven emergency feedwater (MDEFW) during scheduled maintenance on 'A' MDEFW; inspection was completed on June 26, 2018

Complete Walkdown (1 Sample)

The inspectors evaluated system configurations of the 'B' safety injection outside of containment system; inspection was completed on June 6, 2018.

71111.05AQ - Fire Protection Annual/Quarterly

Quarterly Inspection (6 Samples)

The inspectors evaluated fire protection program implementation in the following selected areas:

(1) Intermediate building 412 elevation (fire zones IB25.01.01, .01.02, .01.03, .01.04, and .01.05); inspection was completed on May 15, 2018
(2) Control building 412 elevation (fire zones CB02, CB05); inspection was completed on May 15, 2018
(3) Diesel generator rooms 'A' and 'B' (fire zones DG01.01, 01.02 and DG02.01, 02.02); inspection completed on June 19, 2018
(4) Battery and charger rooms 'A', 'B' and cable room (fire zones IB02, 03, 04, 05, 06, and IB27); inspection was completed on June 19, 2018
(5) Turbine driven emergency feedwater (EFW) pump room (fire zone IB25.02); inspection was completed on June 19, 2018
(6) Charging pump rooms 'A', 'B', 'C' (fire zones AB01.05, AB01.06, AB01.07); inspection was completed on June 19, 2018

71111.06 – Flood Protection Measures

Internal Flooding (1 Sample)

The inspectors evaluated internal flooding mitigation protections in the 412 elevation of the intermediate building; inspection was completed on June 1, 2018.

Underground Cables (2 Samples)

The inspectors evaluated cable submergence protection in:

(1) Electrical Manhole Hole (EMH)-1, Work Order (WO) 1717443; inspection completed on May 15, 2018
(2) EMH-2, WO 1717659; inspection completed on May 21, 2018

71111.11Q - Licensed Operator Requalification Program and Licensed Operator Performance

Operator Requalification (1 Sample)

The inspectors observed an operator requalification simulator training scenario occurring on June 1, 2018, and involving multiple failures leading to entry into abnormal operating procedures followed by emergency operating procedures in order to combat the problems.

Operator Performance (3 Samples)

The inspectors observed and evaluated:

(1) Waste monitor tank release; inspection was completed on May 25, 2018
(2) Mid-day status meeting, steam generator blowdown alarm response; observation was completed on June 6, 2018
(3) Dilution for reactor power; observation was completed on June 7, 2018

71111.12 - Maintenance Effectiveness

Routine Maintenance Effectiveness (2 Samples)

The inspectors evaluated the effectiveness of routine maintenance activities associated with the following equipment and/or safety significant functions:

(1) Maintenance Rule (a)(1) evaluation for chilled water function #1; inspection was completed on April 26, 2018
(2) Performed a Maintenance Rule scoping evaluation of function to isolate release pathways if main steam isolation valve's fail to close; inspection was completed on June 19, 2018

71111.13 - Maintenance Risk Assessments and Emergent Work Control (4 Samples)

The inspectors evaluated the risk assessments for the following planned and emergent work activities:

(1) Yellow risk condition during work week 16 for scheduled maintenance of 'B' solid state protection system (SSPS); inspection was completed on April 20, 2018
(2) Elevated risk condition for scheduled critical heavy lift adjacent to 'A' train offsite circuit during work week 17; inspection was completed on April 26, 2018
(3) Yellow risk condition for 'A' SSPS surveillance test; inspection completed on June 22, 2018
(4) Emergent work for repairs to alternate seal injection pump diesel generator; inspection completed on June 28, 2018

71111.15 - Operability Determinations and Functionality Assessments (6 Samples)

The inspectors evaluated the following operability determinations and functionality assessments in review of Condition Reports (CR):

(1) CR-18-00801, NRC identified damaged gasket on steam propagation barrier door DRIB/408; inspection was completed on April 18, 2018
(2) CR-18-01499, Review of previous operability evaluation revised to update American Society Mechanical Engineers (ASME) code stress allowables; inspection was completed on May 22, 2018
(3) CR-18-00340, NRC identified elevated temperatures on emergency feedwater (EFW) piping; inspection was completed on April 24, 2018
(4) CR-18-01060, XVR03145B-SW failed setpoint verification test; inspection was completed on June 25, 2018
(5) CR-18-00783, Provide ES-120 operability determination for Diverse and Flexible Coping Strategies (FLEX) spent fuel pool level indicator not qualified to design low temperature; inspection was completed on June 28, 2018

(6) CR-18-02364, Provide ES-120 operability determination for pinhole leak in 'B' train SW piping; inspection was completed on June 28, 2018

71111.19 - Post Maintenance Testing (6 Samples)

The inspectors evaluated the following post maintenance tests:

(1) WO 1717004, Replace 'B' charging pump outboard seal; inspection was completed on April 13, 2018
(2) WO 1702670, Replace 'B' EDG lube oil heat exchanger; inspection was completed on May 10, 2018
(3) WO 1800393, Retest 'B' steam generator (SG) power operated relief valve (PORV); inspection was completed on May 31, 2018
(4) WO 1807327, 'A' EDG jacket water heat exchanger has a leak; inspection was completed on June 20, 2018
(5) WO 1808214, Disassemble and inspect air start valve, XVM-10997B, on 'B' EDG; inspection was completed on June 26, 2018
(6) WO 1708296, Repair relief valve, XVR03145B-SW, that failed setpoint verification testing; inspection was completed on June 27, 2018

71111.22 - Surveillance Testing

The inspectors evaluated the following surveillance tests:

Routine (1 Sample)

(1) STP 125.013B, "Diesel Generator 'B' Semiannual Operability Test," Revision 1C; inspection was completed on June 6, 2018

In-service (4 Samples)

(1) STP 212.002, "Reactor Building Spray Pump Test," Revision 7A; inspection was completed on May 1, 2018
(2) STP 223.002A, "Service Water Pump Test," Revision 10C; inspection was completed on May 30, 2018
(3) STP 121.002A, "Steam Generator PORV Operability Test," Revision 0C; inspection was completed on June 1, 2018
(4) STP-401.003, "ASME Code Class II and III Relief Valve Testing," Revision 16C; inspection was completed on June 21, 2018

71114.06 - Drill Evaluation

Emergency Planning Drill (1 Sample)

On May 23, 2018, the inspectors evaluated the performance of an emergency preparedness (EP) drill that involved reactor coolant system (RCS) loose parts leading to fuel damage, a RCS leak in containment, failure of a containment isolation valve to close and subsequent containment isolation valve packing leakage which required entry into increasing emergency action levels starting with a Notification of Unusual Event and ending in a General Emergency.

OTHER ACTIVITIES – BASELINE

71151 - Performance Indicator Verification (2 Samples)

The inspectors verified licensee performance indicators submittals listed below for the period from January 1, 2017, through December 31, 2017. Inspection was completed on June 1, 2018.

(1) Reactor Coolant System (RCS) Leak Rate
(2) RCS Specific Activity

71152 - Problem Identification and Resolution

Semiannual Trend Review (1 Sample)

The inspectors reviewed the licensee's corrective action program for trends that might be indicative of a more significant safety issue. Specifically, the inspectors reviewed CR-18-00670, common cause analysis of a trend involving recent transmission issues related to VC Summer. Inspections were completed on June 29, 2018.

Annual Follow-up of Selected Issues (2 Samples)

The inspectors reviewed the licensee's implementation of its corrective action program related to the following issues:

(1) Multiple CRs for XVC-1009 A, B, C EFW check valves; inspection was completed on February 23, 2018. Observations are documented in the Inspection Results of this report.
(2) CR-17-04978, 'A' train reactor building cooling unit condensate drain flow alarm did not clear during functional test; inspection was completed on June 21, 2018. Observations are documented in the Inspection Results of this report.

71153 - Follow-up of Events and Notices of Enforcement Discretion

Licensee Event Reports (2 Samples)

The inspectors evaluated and closed the following LERs which can be accessed at the following website: https://lersearch.inl.gov/LERSearchCriteria.aspx

(1) LER 2018-001-00: Valid Actuation of Emergency Diesel Generator
(2) LER 2018-001-01: Valid Actuation of Emergency Diesel Generator

INSPECTION RESULTS

Observations for review of EFW check valves	71152, Annual Follow-up

Inspectors reviewed multiple CR's related to XVC-1009 A, B, C EFW check valves and specifically focused on the following performance attributes; consideration of extent of condition, cause, and previous occurrences, prioritization commensurate with the safety significance, and actions taken to correct the problem.

The inspectors had identified damaged EFW pipe supports on July 8, 2014, documented in CR-14-03806. The pipe supports were damaged during an EFW piping water hammer event that occurred in May, 2014, due to seat leakage through XVC01009C-EF, an outside containment isolation valve and check valve for the EFW piping supplying the 'C' steam generator (SG). The associated Green, non-cited violation (NCV) 05000395/2014-008-01, "Degraded Emergency Feedwater System Piping Supports," was documented in NRC Problem Identification and Resolution Inspection Report, 05000395/2014-008 (Agency Document and Management System (ADAMS) Accession No. ML14276A466).

The inspectors continued to maintain a concern of check valve seat leakage based on a history of CR's initiated for elevated piping temperatures which are listed below:

- CR-09-05503, XVC01009B appears to be leaking past its seat
- CR-12-06113, XVC01009C is leaking by seat based on unusually warm piping
- CR-14-03039, XVC01009C seat leakage resulted in water hammer event
- CR-14-03849, XVC01009 B has seat leakage; downstream piping is ~158 degF (degrees Fahrenheit)
- CR-14-03959, XVC01009 C has a seat leak based on 'C' SG level deviation alarm
- CR-15-01672, XVC01009 C has a seat leak; elevated temperatures on associated piping
- CR-15-06066, XVC01009A has malfunctioned; is open but should be closed for plant conditions
- CR-15-06266, XVC01009A, during plant startup, respective piping had a rising temperature
- CR-16-00972, XVC01009B, during rounds operator found piping abnormally hot
- CR-16-02295, XVC01009B, during rounds piping found at ~213 degF
- CR-17-03218, XVC01009B, inlet piping is above ambient and at ~152 degF
- CR-18-00340, XVC01009C, inspectors identified elevated piping temperatures

During the 2015, refueling outage inspectors identified additional EFW pipe support and coating damage on the 'C' EFW piping inside containment. In response the licensee initiated CR-15-04915 and CR-15-04916. Inspectors specifically assessed the licensee's corrective actions related to the challenges to the operability of the sump screen and concluded the licensee's actions were adequate.

In 2016, the licensee initiated CR-16-04961 to evaluate the system health risk and the associated corrective actions of the emergency feedwater back leakage. Part of this action requested engineering to evaluate if full restoration to original design of the EFW piping in containment was required.

The inspectors reviewed the original design of minor change notice (MCN) 9003H, made to modification request form (MRF) 9003, which replaced all three SG's and was implemented in 1994. Inspectors compared these changes to the original design information and noted that the previous EFW piping configuration in containment included two check valves (XVC01038A/B/C and XVC01039A/B/C) in series that were installed in the EFW piping in close proximity to each SG. The original design function of the check valves was to prevent SG blowdown and adverse containment conditions in the event of an EFW pipe break.

Inspectors questioned the implementation of original MCN 9003H and requested that an NRC Subject Matter Expert (SME) review the MCN. The SME subsequently concluded that the licensee had an adequate basis to implement the modification.

The inspectors concluded that the licensee's current plans were adequate to determine the appropriate corrective action for check valve back leakage. However, the inspectors noted the challenges experienced by the licensee subsequent to the implementation of the modification. Inspectors also noted the weakness related to assessing the extent of condition regarding damage caused by the unintended seat leakage problems that were a result of the modification.

Observations for Review of CR-17-04978, 'A' train reactor building cooling unit (RBCU) condensate drain flow alarm did not clear during functional test.	71152, Annual Follow-up

Inspectors reviewed multiple CR's related to the RBCU condensate drain, and specifically focused on the following performance attributes; identification of corrective actions were appropriately focused to correct the problem, as well as actions taken resulted in the correction of the identified problem, and completion of corrective action in a timely manner commensurate with the safety significance.

On November 7, 2017, the licensee initiated CR-17-05839 to document characterization of reactor building cooling units (RBCU) 1A/2A drain high flow alarms to a 'plant issue' based on recent problems and inoperability of the alarms documented in CR-17-04978 and CR-17-05151. The alarm inoperability was due to the accumulation of debris or trash analyzed as "mostly inert material (corrosion products), some microbiological growth, and some oil droplets."

Inspectors reviewed the licensee's initiation of a request to bypass the control room annunciator alarm on January 17, 2018, in WO 1801452-001, which was directed by corrective action (CA) 003 in CR-17-04978. Inspectors subsequently reviewed related historical CAP data and determined, based upon currently available information that this event was similar in nature to events that occurred in 2007 and 2011.

The inspectors reviewed CR-07-02167 and CR-07-03332 and noted that the licensee initiated self-imposed administrative corrective actions to preclude repetition (CAPR). Specifically, CA 009 in CR-07-02167 stated to provide long term CA's for the RBCU flow switch problem to the plant health committee (PHC). Additional regulatory response for RBCU alarms out of service coincident with other Technical Specification (TS) required monitoring systems can be found in NRC Integrated Inspection Report, 05000395/2007005 (ADAMS Accession No. ML080240280). The inspectors also reviewed engineering change request (ECR) 50756

which modified the RBCU drain piping using WO 1106194. This WO, which was completed on May 20, 2011, during refueling outage 19, installed a clean-out port on the drain section.

The inspectors noted that the licensee's corrective action program (CAP) procedure, SAP-999, in effect in 2007, stated that the definition for a CAPR was an action to prevent recurrence of a condition by addressing the root cause. Although the definition also stated, "These corrective actions are designated to mitigate the issue or provide sufficient barriers such that the issue *should* not recur." Revision 17 of SAP-999, contained the same statement. The inspectors challenged the licensee's definition of a CAPR versus the 10 CFR Part 50, Appendix B, Criterion XVI requirement to preclude repetition. The licensee made the determination to modify their definition of a CAPR to be consistent with the Criterion XVI description.

Because this action was not a regulatory requirement and instead was a self-imposed administrative requirement, which was not accurately defined, and was beyond what was technically required, this issue did not rise to the level of a finding. Corrective actions to revise the definition will be implemented in Revision 18 of SAP-999.

The inspectors concluded that the licensee's current plans were adequate to determine the appropriate corrective actions to address the problem.

Observations for CR-18-00670 trend involving recent transmission issues and LER's 2018-001 Valid Actuation of EDG.	71152 Semiannual Trend and 71153 Follow-up of Events

Inspectors reviewed CR-18-00670, CR-18-00268 and associated LER's 2018-001-00 and 01 for the following performance attributes: Consideration of common cause, identification of corrective actions to correct the problem, and identification of negative trends that could potentially impact nuclear safety. Inspectors also reviewed additional CAP documents that were referenced in CR-18-00670 and are listed in the documents reviewed.

The inspectors reviewed the licensee's corrective actions which included training to ensure personnel were aware of the expectations and associated standing procedural requirements. Additional corrective actions were initiated to revise documents to improve scheduling, ensure appropriate placards at boundaries that enclose important switchyard components, and to establish procedures for emergent work at the Parr Substation.

Inspectors concluded the licensee adequately identified the negative trend and initiated actions to correct the problems that were identified for both the common cause analysis and the LER's related to the valid actuation of emergency diesel generator.

EXIT MEETINGS AND DEBRIEFS

The inspectors verified no proprietary information was retained or documented in this report.

The inspectors confirmed that proprietary information was controlled to protect from public disclosure.

On August 6, 2018, the inspectors presented the quarterly resident inspector inspection results to Mr. George Lippard and other members of the licensee staff.

DOCUMENTS REVIEWED

71111.01 – Adverse Weather Protection

Readiness of Offsite and Alternate AC Power:
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. 8E
SAP-703, Control of Switchyard/Transformer Yard Activities, Rev. 2
SOP-301, Main Generator System, Rev. 16B
SOP-304, 115kV/7.2kV Operations, Rev.14A
STP-125.021 Periodic Testing of the Alternate AC Power Supply, Rev. 5
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

Hot Weather Readiness:
OAP-109.1, Guidelines for Severe Weather, Rev. 5

71111.04 - Equipment Alignment
E-302-641, Residual Heat Removal, Rev. 21
SOP-115, Residual Heat Removal, Rev. 22D
SOP-306, Emergency Diesel Generator, Rev. 19E
SOP-211, Emergency Feedwater System, Rev. 14G
D-302-085, Emergency Feedwater System Flow Diagram, Rev. 41
FSAR 8.3.1.1.2, Onsite Standby Power Supplies
SOP-304, 115kV, 7.2 kV Operations, Rev. 14A

71111.06 – Flood Protection Measures
Design Calculation DC03290-005, “Effect of FW Line Break on Flood Levels in IB, AB and Penetration Access Area,” Rev. 2H
Design Calculation DC03490-003, “Intermediate Building Flooding Evaluation,” Rev. 0
Design Basis Document, “Drains, Sumps, and Leak Detection ND (ND),” Rev. 2D
Design Basis Document, “Feedwater System (FW),” Rev. 15

71111.05AQ - Fire Protection Annual/Quarterly
VC Summer Unit 1 Fire Pre-Plans
PTP-114.002, Fire Extinguisher Checks, Rev. 18A
STP-728.027, Diesel Generator Building Fire Barrier Inspection, Rev. 5D
STP-728.040, Auxiliary Building Fire Barrier Inspection, Elevations 400’, 397’, 388’, and 374’, Rev. 4C
STP-728.046, Control Building Elevation 412’ and 400’ Fire Barrier Inspection, Rev. 5K
STP-728.050, Intermediate Building Elevation 412’ Fire Barrier Inspection, Rev. 4F

71111.12 - Maintenance Effectiveness
ES-514, Maintenance Rule Program Implementation, Rev. 7
SAP-0157, Maintenance Rule Program, Rev. 2

71111.13 - Maintenance Risk Assessments and Emergent Work Control
SSP-001, Planning and Scheduling Maintenance Activities, Rev. 24H
OAP-100.6, Control Room Conduct and Control of Shift Activities, Rev. 4L
OAP-102.1, Conduct of Operations Scheduling Unit, Rev. 8E

71152: Problem Identification and Resolution
CR-18-00670, common cause analysis
SR-17-0010: R switch opened on 115kV without notifying VCS (SR is situation report in the transmission department)
SR-17-0011: Switching PRCB 8892
SR-17-0012: Switching XTF 4 and XTF 5
SR-17-0016: Switching error for VCS1 – Pineland 230kV line
SR-17-0018: Switching disconnect switch 8903 XTF-1
SR-18-0004: PRCB 1802 – 115kV safeguard line trip
CR-17-02234: Flight patrol during outage
CR-17-02469: Nuclear Learning Center loss of power
CR-17-02967: Switching operation XDS8893
CR-18-00268: Loss of 115kV safeguard line (LER's 2018-001-00, 01 discussed in this report)
CR-18-00366: XTF6 control cabinet clipboard incident