UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

March 7, 2019

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

SUBJECT: VIRGIL C. SUMMER NUCLEAR STATION, UNIT NO. 1 – ISSUANCE OF AMENDMENT RE: REACTOR COOLANT SYSTEM OPERATIONAL LEAKAGE TECHNICAL SPECIFICATION SURVEILLANCE REQUIREMENT 4.4.6.2.2 (EPID L-2018-LLA-0267)

Dear Mr. Lippard:

The U.S. Nuclear Regulatory Commission (the Commission) has issued the enclosed Amendment No. 213 to Renewed Facility Operating License No. NPF-12 for the Virgil C. Summer Nuclear Station, Unit No. 1, in response to your application dated October 8, 2018, as supplemented on February 22, 2019.

The amendment revises the surveillance frequency of Technical Specification 3/4.4.6 Reactor Coolant System Leakage, Surveillance Requirement 4.4.6.2.2 a. to allow the reactor coolant system pressure isolation valve leakage test to be extended to a performance-based frequency not to exceed 3 refueling outages (to a maximum of 60 months) following two consecutive satisfactory tests.

A copy of the related Safety Evaluation is also enclosed. Notice of Issuance will be included in the Commission's biweekly *Federal Register* notice.

Sincerely,

Shawn Williams

Shawn A. Williams, Senior Project Manager
Plant Licensing Branch II-1
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-395

Enclosures:
1. Amendment No. 213 to NPF-12
2. Safety Evaluation

cc: Listserv

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

SOUTH CAROLINA ELECTRIC & GAS COMPANY

SOUTH CAROLINA PUBLIC SERVICE AUTHORITY

DOCKET NO. 50-395

VIRGIL C. SUMMER NUCLEAR STATION, UNIT NO. 1

AMENDMENT TO RENEWED FACILITY OPERATING LICENSE

Amendment No. 213
Renewed License No. NPF-12

1. The U.S. Nuclear Regulatory Commission (the Commission) has found that:

   A. The application for amendment to the Virgil C. Summer Nuclear Station, Unit No. 1 (the facility), Renewed Facility Operating License No. NPF-12 filed by the South Carolina Electric & Gas Company (the licensee), dated October 8, 2018, as supplemented by letter dated February 22, 2019, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations set forth in 10 CFR Chapter I;

   B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;

   C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations as set forth in 10 CFR Chapter I;

   D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and

   E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.

2. Accordingly, the license is hereby amended by a page change to the Technical Specifications as indicated in the attachment to this license amendment, and paragraph 2.C.(2) of Renewed Facility Operating License No. NPF-12 is hereby amended to read as follows:

(2) Technical Specifications and Environmental Protection Plan

The Technical Specifications contained in Appendix A, as revised through Amendment No. 213, and the Environmental Protection Plan contained in Appendix B, are hereby incorporated in the license. South Carolina Electric & Gas Company shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.

3. This amendment is effective as of its date of issuance and shall be implemented within 60 days of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

Michael T. Markley, Chief
Plant Licensing Branch II-1
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Attachment:
Changes to Renewed Facility Operating
License and Technical Specifications

Date of Issuance: March 7, 2019

VIRGIL C. SUMMER NUCLEAR STATION, UNIT NO. 1

ATTACHMENT TO LICENSE AMENDMENT NO. 213

RENEWED FACILITY OPERATING LICENSE NO. NPF-12

DOCKET NO. 50-395

Replace the following pages of the Renewed Facility Operating License and Appendix A, Technical Specifications (TSs), with the attached revised pages. The revised pages are identified by amendment number and contain marginal lines indicating the areas of change.

Remove	Insert
License Page 3	License Page 3
TS 3/4 4-20	3/4 4-20

(3) SCE&G, pursuant to the Act and 10 CFR Part 70, to receive, possess and use at any time special nuclear material as reactor fuel, in accordance with the limitations for storage and amounts required for reactor operation, as described in the Final Safety Analysis Report, as amended through Amendment No. 33;

(4) SCE&G, pursuant to the Act and 10 CFR Parts 30, 40 and 70, to receive, possess and use at any time any byproduct, source and special nuclear material as sealed neutron sources for reactor startup, sealed neutron sources for reactor instrumentation and radiation monitoring equipment calibration, and as fission detectors in amounts as required;

(5) SCE&G, pursuant to the Act and 10 CFR Parts 30, 40 and 70, to receive, possess and use in amounts as required any byproduct, source or special nuclear material without restriction to chemical or physical form, for sample analysis or instrument calibration or associated with radioactive apparatus or components; and

(6) SCE&G, pursuant to the Act and 10 CFR Parts 30, 40 and 70, to possess, but not separate, such byproduct and special nuclear materials as may be produced by the operation of the facility.

C. This renewed license shall be deemed to contain, and is subject to, the conditions specified in the Commission's regulations set forth in 10 CFR Chapter I and is subject to all applicable provisions of the Act and to the rules, regulations, and orders of the Commission now or hereafter in effect; and is subject to the additional conditions specified or incorporated below:

(1) Maximum Power Level

SCE&G is authorized to operate the facility at reactor core power levels not in excess of 2900 megawatts thermal in accordance with the conditions specified herein and in Attachment 1 to this renewed license. The preoperational tests, startup tests and other items identified in Attachment 1 to this renewed license shall be completed as specified. Attachment 1 is hereby incorporated into this license.

(2) Technical Specifications and Environmental Protection Plan

The Technical Specifications contained in Appendix A, as revised through Amendment No. 213, and the Environmental Protection Plan contained in Appendix B, are hereby incorporated in the license. South Carolina Electric & Gas Company shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.

SURVEILLANCE REQUIREMENTS (Continued)

b. Monitoring the reactor building sump inventory at least once per 12 hours.

c. Measurement of the CONTROLLED LEAKAGE to the reactor coolant pump seals when the Reactor Coolant System pressure is 2235 ± 20 psig at least once per 31 days with the modulating valve fully open. The provisions of Specification 4.0.4 are not applicable for entry into MODE 3 or 4.

d. Performance of a Reactor Coolant System water inventory balance at least once per 72 hours.(1) This requirement is not applicable to primary-to-secondary leakage.

e. Monitoring the reactor head flange leakoff system at least once per 24 hours.

4.4.6.2.2 Each Reactor Coolant System Pressure Isolation Valve specified in Table 3.4-1 shall be demonstrated OPERABLE by verifying leakage to be within its limit.

a. During startup following each refueling outage, which may be extended to a performance-based frequency not to exceed 3 refueling outages (to a maximum of 60 months) following 2 consecutive satisfactory tests.

b. Prior to returning the valve to service following maintenance repair or replacement work on the valve.

c. Prior to entering MODE 2 following valve actuation due to automatic or manual action or flow through the valve for valves denoted on Table 3.4-1 by an asterisk*.

d. The provisions of Specification 4.0.4 are not applicable for entry into MODE 3 or 4.

4.4.6.2.3 Primary-to-secondary leakage shall be verified ≤ 150 gallons per day through any one steam generator at least once per 72 hours.(1)

(1) Not required to be performed/completed until 12 hours after establishment of steady state operation.

UNITED STATES
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WASHINGTON, D.C. 20555-0001

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 213 TO

RENEWED FACILITY OPERATING LICENSE NO. NPF-12

SOUTH CAROLINA ELECTRIC & GAS COMPANY

VIRGIL C. SUMMER NUCLEAR STATION, UNIT NO. 1

DOCKET NO. 50-395

1.0 INTRODUCTION

By letter dated October 8, 2018 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML18281A014), as supplemented by letter dated February 22, 2019 (ADAMS Accession No. ML19053A544), South Carolina Electric & Gas Company (SCE&G, the licensee) requested changes to the Technical Specifications (TSs) for Virgil C. Summer Nuclear Station (VCSNS), Unit No. 1.

The licensee requested to revise the surveillance frequency of TS 3/4.4.6, "Reactor Coolant System Leakage," Surveillance Requirement (SR) 4.4.6.2.2.a to allow the reactor coolant system (RCS) pressure isolation valve (PIV) leakage test to be extended to a performance-based frequency not to exceed 3 refueling outages (to a maximum of 60 months) following two consecutive satisfactory tests.

The supplemental letter dated February 22, 2019, provided additional information that clarified the application, did not expand the scope of the application as originally noticed, and did not change the U.S. Nuclear Regulatory Commission (NRC, or the Commission) staff's original proposed no significant hazards consideration determination as published in the Federal Register on November 20, 2018 (83 FR 58615).

2.0 Regulatory Evaluation

2.1 System Description

PIVs are two normally closed valves in series within the reactor coolant pressure boundary, which separate the high-pressure RCS from attached lower pressure systems, such as the residual heat removal system (RHR) and the safety injection system (SI). Failure or excessive PIV leakage could lead to overpressure of the low-pressure piping or components that could lead to a system rupture potentially resulting in a loss of coolant accident (LOCA) outside of containment and release of fission products to the environment.

PIVs have to be leak tested in accordance with the American Society of Mechanical Engineers (ASME) *Code for Operation and Maintenance of Nuclear Power Plants* (OM Code) requirements per 10 CFR 50.55a. The testing is performed by applying test pressure to the RCS side of the disk by using the RCS as the pressure source or the charging system via the emergency core cooling system (ECCS) test header and the associated flow meters.

2.2 Proposed Change

TS 4.4.6.2.2 specifies the SRs for the 35 PIVs identified in TS Table 3.4-1, "Reactor Coolant System Pressure Isolation Valves." The license amendment request (LAR) proposes to revise TS SR 4.4.6.2.2.a and associated TS bases to allow the TS leakage verification requirement to be extended to a performance-based frequency not to exceed 3 refueling outages (to a maximum of 60 months) following two consecutive satisfactory tests.

TS SR 4.4.6.2.2 states:

> Each Reactor Coolant System Pressure Isolation Valve specified in Table 3.4-1 shall be demonstrated OPERABLE by verifying leakage to be within its limit.

The current TS SR 4.4.6.2.2.a. states:

a. During startup following each refueling outage.

Revised TS SR 4.4.6.2.2.a would state:

a. During startup following each refueling outage, which may be extended to a performance-based frequency not to exceed 3 refueling outages (to a maximum of 60 months) following 2 consecutive satisfactory tests.

2.3 Applicable Regulatory Requirements and Guidance

The NRC staff based its review of the proposed changes on the following requirements in 10 CFR Part 50:

Appendix A, General Design Criteria (GDC) 1, "Quality standards and records" states, in part:

> Structures, systems, and components important to safety shall be designed, fabricated, erected, and tested to quality standards commensurate with the importance of the safety functions to be performed. Where generally recognized codes and standards are used, they shall be identified and evaluated to determine their applicability, adequacy, and sufficiency and shall be supplemented or modified as necessary to assure a quality product in keeping with the required safety function. A quality assurance program shall be established and implemented in order to provide adequate assurance that these structures, systems, and components will satisfactorily perform their safety functions.

Appendix A, GDC 14, "Reactor coolant pressure boundary" states:

> The reactor coolant pressure boundary shall be designed, fabricated, erected, and tested so as to have an extremely low probability of abnormal leakage, of rapidly propagating failure, and of gross rupture.

Appendix A, GDC 32, "Inspection of reactor coolant pressure boundary" states:

> Components which are part of the reactor coolant pressure boundary shall be designed to permit (1) periodic inspection and testing of important areas and features to assess their structural and leaktight integrity, and (2) an appropriate material surveillance program for the reactor pressure vessel.

Appendix A, GDC 54, "Piping systems penetrating containment" states:

> Piping systems penetrating primary reactor containment shall be provided with leak detection, isolation, and containment capabilities having redundancy, reliability, and performance capabilities which reflect the importance to safety of isolating these piping systems. Such piping systems shall be designed with a capability to test periodically the operability of the isolation valves and associated apparatus and to determine if valve leakage is within acceptable limits.

10 CFR 50.36(c)(2)(ii)(C), "Criterion 3" states:

> A structure, system, or component that is part of the primary success path and which functions or actuates to mitigate a design basis accident or transient that either assumes the failure of or presents a challenge to the integrity of a fission product barrier.

10 CFR 50.36(c)(3), "Surveillance requirements" states:

> Surveillance requirements are requirements relating to test, calibration, or inspection to assure that the necessary quality of systems and components is maintained, that facility operation will be within safety limits, and that the limiting conditions for operation will be met.

10 CFR 50.55a(f)(4), "Inservice testing standard requirements for operating plants" states, in part:

> Throughout the service life of a boiling or pressurized water-cooled nuclear power facility, pumps and valves that are within the scope of the ASME OM Code must meet the inservice test requirements (except design and access provisions) set forth in the ASME OM Code and addenda...

10 CFR 50.55a(f)(5)(ii), "Conflicting IST [inservice testing] Code requirements with technical specifications" states, in part:

> If a revised inservice test program for a facility conflicts with the technical specifications for the facility, the licensee must apply to the Commission for amendment of the technical specifications to conform the technical specifications to the revised program.

10 CFR 50, Appendix J, "Primary Reactor Containment Leakage Testing for Water-Cooled Power Reactors," Option B, "Performance-Based Requirements."

Regulatory Guide (RG) 1.163, "Performance Based Containment Leak Test Program" (ADAMS Accession No. ML003740058).

Nuclear Energy Institute (NEI) Topical Report (TR) 94-01, Revision 0, "Industry Guideline for Implementing Performance-Based Option of 10 CFR Part 50, Appendix J" dated July 26, 1995 (ADAMS Accession No. ML11327A025).

NUREG-1493, Revision 0, "Performance-Based Containment Leak-Test Program," dated September 1995.

3.0 Technical Evaluation

Licensee Proposal

In lieu of the current TS SR 4.4.6.2.2.a to perform a leakage test during startup following each refueling outage for the 35 RCS PIVs specified in TS Table 3.4-1, the licensee proposes to perform PIV testing on a performance-based interval ranging from each refueling outage not to exceed 3 refueling outages (to a maximum of 60 months) following 2 consecutive satisfactory tests. The licensee proposes that the PIVs would initially be tested at the current required interval schedule, which is during startup following each refueling outage. When the performance of a PIV has demonstrated leakage less than its TS allowable leakage limit for two consecutive refueling outages, the licensee proposes to define this as "good performance," and proposes the PIV may have its leak test interval extended not to exceed 3 refueling outages (to a maximum of 60 months). Any PIV leakage test failure would require the PIV to return to the initial interval of every refueling outage until leakage test good performance is again met. The specific interval for each PIV would be a function of its performance.

To support its technical justification, the licensee provided Table 3-1, "Historical Leak Rate Test Performance for Residual Heat Removal PIVs," and Table 3-2, "Historical Leak Rate Test Performance for SI Check Valve PIVs." These tables provide the past four leakage rate test results for each of the 35 PIVs required in TS Table 3.4-1.

The licensee stated that the primary reason for requesting performance-based PIV test intervals is to eliminate unnecessary thermal transients in the RCS cold leg safety injection piping. The licensee explained that leakage testing of the RCS PIVs cause the inlet check valves to open allowing cooler volume control tank temperature water into the SI piping, creating a thermal transient. The proposed extended test intervals would reduce the impact of the thermal transient. The licensee stated that an additional reason for requesting the performance-based PIV test intervals is dose reduction. The licensee stated that overall completion of leak test requirements averages a dose of 300mRem.

NRC Staff Evaluation

The licensee proposes to functionally test and verify the leakage rate of the 35 PIVs identified in TS Table 3.4-1 on a performance-based testing interval ranging from each refueling outage not to exceed 3 refueling outages (to a maximum of 60 months). The licensee states that the proposed approach is "analogous" to that used when establishing performance-based intervals for containment isolation valves (CIVs) in accordance with 10 CFR 50, Appendix J, Option B, "Performance-Based Requirements." The licensee noted the significant differences between the CIVs and the RCS PIVs leakage test. The RCS PIVs will be tested using water as a test medium and using TS allowable leakage limits. The CIVs will be tested using air as the test medium and using administrative limits. Because both tests achieve the same result with air being a more sensitive leak test method, the NRC staff finds the licensee's approach analogous

and, therefore, acceptable to apply the risk insights from the Appendix J, Option B, performance-based approach for CIVs to the licensee's similar proposal for PIVs.

Guidance for implementation of acceptable leakage rate test methods, procedures, and analyses is provided in RG 1.163, "Performance-Based Containment Leak-Test Program." RG 1.163 endorses NEI TR 94-01, Revision 0, "Industry Guideline for Implementing Performance-Based Option of 10 CFR 50, Appendix J" with the limitation that Type-C components test interval cannot extend greater than 60 months. NEI TR 94-01 describes the risk-informed basis for the extended leak test intervals under Appendix J, Option B. NEI TR 94-01 summarizes the results from NUREG-1493. NUREG-1493 provides the technical basis to extend the leakage rate testing requirements contained in Appendix J, Option B. NUREG-1493, Appendix A, states that "If the component does not fail within two operating cycles, further failures appear to be governed by the random failure rate of the component." NUREG-1493 concluded that "performance-based alternatives to local leakage rate testing requirements are feasible without significant risk impacts." NEI TR 94-01 presents the results of a comprehensive risk analysis and concludes that "the risk impact associated with increasing [leak rate] test intervals is negligible (less than 0.1 percent of total risk)." Based on the above, the NRC staff finds the risk associated with the licensee proposal as negligible.

In the LAR, the licensee provided tables of the historical leak rate performance for the 35 PIVs required in TS Table 3.4-1. The NRC staff reviewed the tables. The tables show that all 35 PIVs had a leakage rate less than its allowable leakage limit over the past 4 consecutive refueling outages. Thus, all 35 PIVs have maintained a history of good performance. The NRC staff finds that these results provide additional assurance that the integrity of the PIVs is being maintained. The NRC staff acknowledges that performance of the PIV leakage test can cause unwanted thermal system transients and increases the radiation exposure to test personnel.

In addition to this license amendment request, an alternative request to the IST requirements is needed for the facility to meet the requirement of 10 CFR 50.55a (f)(5)(ii). By letter dated October 8, 2018 (ADAMS Accession No. ML18282A046), the licensee submitted alternative request RR-4-14 to the NRC proposing to initiate the same test approach and frequency interval thus aligning the proposed TS surveillance requirement with the IST program. That alternative was authorized by NRC letter dated December 17, 2018 (ADAMS Accession No. ML18345A060).

The licensee provided revised TS Bases pages to be implemented with the associated TS changes. These pages were provided for information only and will be revised in accordance with the VCSNS TS Bases Control Program.

NRC Staff Conclusion

Based on the historical good performance of the 35 PIVs identified in TS Table 3.4.1 and the low risk impact associated with extending the leak rate test intervals, discussed above, the NRC staff concludes that there is reasonable assurance that the applicable requirements and guidance specified in Section 2.0 of this SER will continue to be met. Therefore, the NRC staff finds the proposed change acceptable.

4.0 STATE CONSULTATION

In accordance with the Commission's regulations, the State of South Carolina official was notified of the proposed issuance of the amendment on January 25, 2019. On January 31, 2019, the State official confirmed that the State of South Carolina had no comments.

5.0 ENVIRONMENTAL CONSIDERATION

The amendment changes a requirement with respect to the installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20 and changes surveillance requirements. The NRC staff has determined that the amendment involves no significant increase in the amounts, and no significant change in the types, of any effluents that may be released offsite, and that there is no significant increase in individual or cumulative occupational radiation exposure. The Commission has previously issued a proposed finding that the amendment involves no significant hazards consideration, and there has been no public comment on such finding as published in the *Federal Register* on November 20, 2018 (83 FR 58615). Accordingly, the amendment meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the issuance of the amendment.

6.0 CONCLUSION

The Commission has concluded, based on the considerations discussed above, that: (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) there is reasonable assurance that such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of the amendment will not be inimical to the common defense and security or to the health and safety of the public.

Principle Contributor: Michael Farnan, NRR

Date: March 7, 2019

SUBJECT: VIRGIL C. SUMMER NUCLEAR STATION, UNIT NO. 1 – ISSUANCE OF AMENDMENT RE: REACTOR COOLANT SYSTEM OPERATIONAL LEAKAGE TECHNICAL SPECIFICATION SURVEILLANCE REQUIREMENT 4.4.6.2.2 (EPID L-2018-LLA-0267) DATED MARCH 7, 2019

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