



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

February 5, 2014

Mr. Thomas D. Gatlin
Vice President, Nuclear Operations
South Carolina Electric & Gas Company
Virgil C. Summer Nuclear Station
Post Office Box 88, Mail Code 800
Jenkinsville, SC 29065

SUBJECT: VIRGIL C. SUMMER NUCLEAR STATION, UNIT 1 - ISSUANCE OF
AMENDMENT EXTENDING INTEGRATED LEAK RATE TEST INTERVAL
(TAC NO. MF1385)

Dear Mr. Gatlin:

The U.S. Nuclear Regulatory Commission has issued the enclosed Amendment No. 194 to Renewed Facility Operating License No. NPF-12 for the Virgil C. Summer Nuclear Station, Unit 1 (VCSNS), in response to your letter dated April 3, 2013, as supplemented by letter dated September 5, 2013. This amendment allows for the extension of the 130-month frequency of the VCSNS containment integrated leak rate test or Type A test, that is required by TS 6.8.4 g. to 15 years on a permanent basis.

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

Sincerely,

A handwritten signature in black ink, reading "Shawn Williams", followed by a long horizontal flourish line.

Shawn 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. 194 to NPF-12
2. Safety Evaluation

cc w/encls: Distribution via Listserv

2. Accordingly, the license is amended by changes 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. 194, and the Environmental Protection Plan contained in Appendix B, are hereby incorporated in the renewed 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



Robert J. Pascarelli, Chief
Plant Licensing Branch II-1
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Attachment:
Changes to Renewed Facility
Operating License No. NPF-12
and the Technical Specifications

Date of Issuance: February 5, 2014



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 1

AMENDMENT TO RENEWED FACILITY OPERATING LICENSE

Amendment No. 194
Renewed License No. NPF-12

1. The U.S. Nuclear Regulatory Commission (the Commission) has found that:
 - A. The application for amendment by South Carolina Electric & Gas Company (the licensee), dated April 3, 2013, as supplemented by letter dated September 5, 2013, 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;
 - 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.

ATTACHMENT TO LICENSE AMENDMENT NO. 194
TO RENEWED FACILITY OPERATING LICENSE NO. NPF-12
DOCKET NO. 50-395

Replace the following pages of the Renewed License and Appendix "A" Technical Specifications with the enclosed pages as indicated. The revised pages are identified by amendment number and contain marginal lines indicating the areas of change.

Remove Pages

License
License No. NPF-12
Page 3

TS
6-12b

Insert Pages

License
License No. NPF-12
Page 3

TS
6-12b

- (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 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 Part 30, 40 and 70 to receive, possess and use at any time 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 preoccupation 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 renewed license.

(2) Technical Specifications and Environmental Protection Plan

The Technical Specifications contained in Appendix A, as revised through Amendment No. 194 and the Environmental Protection Plan contained in Appendix B, are hereby incorporated in the renewed license. South Carolina Electric & Gas Company shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.

ADMINISTRATIVE CONTROLS

f. Radiological Environmental Monitoring Program

A program shall be provided to monitor the radiation and radionuclides in the environs of the plant. The program shall provide (1) representative measures of radioactivity in the highest potential exposure pathways, and (2) verification of the accuracy of the effluent monitoring program and modeling of environmental exposure pathways. The program shall (1) be contained in the ODCM, (2) conform to the guidance of Appendix I to 10 CFR Part 50, and (3) include the following:

- 1) Monitoring, sampling, analysis, and reporting of radiation and radionuclides in the environment in accordance with the methodology and parameters in the ODCM;
- 2) A Land Use Census to ensure that changes in the use of areas at and beyond the site boundary are identified and that modifications to the monitoring program are made if required by the results of the census; and
- 3) Participation in an Inter-laboratory Comparison Program to ensure that independent checks on the precision and accuracy of measurements of radioactive materials in environmental sample matrices are performed as part of the quality assurance program for environmental monitoring.

g. Containment Leakage Rate Testing Program

A program shall be established to implement leakage rate testing of the containment system as required by 10 CFR 50.54(o) and 10 CFR 50, Appendix J, Option B, as modified by approved exemptions. This program shall be in accordance with the guidelines contained in Regulatory Guide 1.163, "Performance-Based Containment Leak-Test Program," dated September 1995; NEI 94-01, "Industry Guideline for Performance-Based Option of 10 CFR 50, Appendix J," Revision 3-A, July 2012; ANSI/ANS-56.8-2002, "Containment System Leakage Testing Requirements"; as modified by approved exceptions that the next Type A test performed after the October 15, 2003 Type A test shall be performed no later than October 15, 2018.

The peak calculated containment internal pressure for the design basis loss of coolant accident, P_a , is 45.1 psig.

The maximum allowable containment leakage rate, L_a , at P_a , is 0.20 percent by weight of the containment air per 24 hours.

Leakage rate acceptance criteria are:

- 1) Containment overall leakage rate acceptance criterion is $\leq 1.0 L_a$. During the first unit startup following testing in accordance with this program, the leakage rate acceptance criteria are $\leq 0.60 L_a$ for the combined Type B and Type C tests, and $\leq 0.75 L_a$ for Type A tests;



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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 194 TO

RENEWED FACILITY OPERATING LICENSE NO. NPF-12

SOUTH CAROLINA ELECTRIC & GAS COMPANY

SOUTH CAROLINA PUBLIC SERVICE AUTHORITY

VIRGIL C. SUMMER NUCLEAR STATION, UNIT 1

DOCKET NO. 50-395

1.0 INTRODUCTION

By letter dated April 3, 2013 (Agencywide Documents Access Management System (ADAMS) Accession No. ML13095A109), South Carolina Electric & Gas Company (SCE&G, the licensee), submitted a license amendment request (LAR) to the U.S. Nuclear Regulatory Commission (NRC). The LAR was applicable to the Virgil C. Summer Nuclear Station (VCSNS), Unit 1, Technical Specification (TS) 6.8.4 g. to adopt the testing frequency from topical report (TR) Nuclear Energy Institute (NEI) 94-01, Revision 3-A, July 2012 "Industry Guideline for Implementing Performance-Based Option of 10 CFR Part 50, Appendix J" ADAMS Accession No. ML12221A202) and the ANSI/ANS-56.8-2002, "Containment System Leakage Testing Requirements." The licensee also supplemented its original submittal via a letter dated September 5, 2013 (ADAMS Accession No. ML13252A239), in response to NRC staff requests for additional information (RAI). The supplement did not expand the scope of the application as originally noticed, and did not change the staff's original proposed no significant hazards consideration determination as published in the *Federal Register* on 78 FR 38084.

The proposed change allows for the extension of the 130-month frequency of the VCSNS containment integrated leak rate test (ILRT) or "Type A Test," that is required by TS 6.8.4 g., to 15 years, on a permanent basis.

2.0 REGULATORY EVALUATION

The licensee requested a change to the renewed Facility Operating Licensee for VCSNS, Unit 1, in accordance with Title 10 of the *Code of Federal Regulations* (10 CFR) 50.90 "Application for amendment of license, construction permit, or early site permit" and 10 CFR 50.54(o). 10 CFR 50.54(o) requires that the primary reactor containments for water cooled power reactors shall be subject to the requirements set forth in 10 CFR Part 50, Appendix J, "Primary Reactor Containment Leakage Testing for Water-Cooled Power Reactors." Appendix J includes two options, Option A, "Prescriptive Requirements," and Option B, "Performance-Based Requirements." A licensee can choose either option for meeting the requirements of Appendix J.

The testing requirements in Appendix J ensure that leakage through the primary reactor containment and related systems and components penetrating primary containment do not exceed allowable leakage rate (L_a (percent/24 hours))¹ values specified in the TSs or associated bases; and periodic surveillance of reactor containment penetrations and isolation valves is performed so that proper maintenance and repairs are made during the service life of the containment, and systems and components penetrating primary containment. The licensee has adopted and implemented Option B for meeting the requirements of Appendix J. Option B identifies the performance-based requirements and criteria for preoperational and subsequent periodic leakage-rate testing. These requirements are met by performance of Type A, Type B, and Type C tests.

Type A tests (also referred to as the ILRT) are tests intended to measure the primary reactor containment overall integrated leakage rate after the containment has been completed and is ready for operations and at periodic intervals thereafter. After the preoperational test, the ILRT is conducted at a periodic interval based on historical performance of the overall primary reactor containment system. Type B tests are tests intended to detect local leaks and to measure leakage across each pressure-containing or leakage-limiting boundary for the primary reactor containment penetrations. Type C tests are tests intended to measure containment isolation valve leakage rates. After the preoperational tests, Type B and Type C tests are required to be conducted prior to initial criticality, and periodically thereafter at intervals based on the safety significance and historical performance of each boundary and isolation valve to ensure integrity of the overall containment system and as a barrier to fission product release from reactor accidents.

NEI Report 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) describes an acceptable method for implementing the optional performance-based requirements of 10 CFR Part 50, Appendix J. The method in NEI 94-01 uses industry performance data, plant-specific performance data, and risk insights to determine the appropriate testing frequency. NEI 94-01, Revision 0, specifies an initial test interval of 48 months, but allows an extended interval of 10 years, based upon two consecutive successful tests. The most recent two Type A tests at VCSNS have been successful, so the current interval requirement is 10 years. NRC Regulatory Guide (RG) 1.163, "Performance-Based Containment Leak-Rate Testing Program," dated September 1995 (ADAMS Accession No. ML003740058) endorses, with certain exemptions, NEI Report 94-01, Revision 0.

Guidance for extending Type A Integrated Leak Rate Test (ILRT) surveillance intervals beyond ten years is provided in Nuclear Energy Institute Topical Report NEI 94-01, Revision 2-A, "Industry Guideline for Implementing Performance-Based Option of 10 CFR Part 50, Appendix J," October 2008. (ADAMS Accession No. ML072970206).² Guidance for extending Type C Local

¹ L_a (percent/24 hours) means the maximum allowable leakage rate at pressure P_a as specified for preoperational tests in the technical specifications or associated bases, and as specified for periodic tests in the operating license or combined license, including the technical specifications in any referenced design certification or manufactured reactor used at the facility.

² On June 25, 2008, the NRC issued a final safety evaluation report concluding that NEI 94-01, Revision 2, describes an acceptable approach for implementing the optional performance-based requirements of 10 CFR 50, Appendix J, and is acceptable for referencing by licensees proposing to amend their TS in regards

Leak Rate Test (LLRT) surveillance intervals beyond sixty months is given in Nuclear Energy Institute Topical Report NEI 94-01, Revision 3-A, "Industry Guideline for Implementing Performance-Based Option of 10 CFR Part 50, Appendix J," July 2012. (ADAMS Accession No ML12221A202).³

The Type A, Type B, and Type C test results must not exceed the L_a with margin, as specified in the TSs or associated bases. Option B also requires that a general visual inspection of the accessible interior and exterior surfaces of the containment system for structural deterioration, which may affect the containment leak-tight integrity, must be conducted prior to each Type A test and at a periodic interval between tests based on the performance of the containment system.

The licensee is requesting to extend the interval for the primary containment ILRT to no longer than 15 years from the last ILRT. The last ILRT was completed on October 15, 2003. The ILRT is currently required to be performed at a ten years and 10-months interval and is due no later than August 15, 2014, as required by TS 6.8.4 g. Using the proposed interval of no longer than 15 years, the next ILRT will be due no later than October 15, 2018. The proposed TS change does not involve any other changes to licensing commitments or acceptance criteria.

NEI 94-01, Revision 2-A, included provisions for extending the Type A interval beyond ten years. The NEI guidance was based on part on pertinent leakage rate testing experience information covering the periods 1995 to 2001 and 2001 to 2007.

As described in NRC's Aug. 29, 2013, Letter to NEI "Request Revision to Topical report NEI 94-01, Revision 3-A, Industry Guideline for Implementing Performance-Based Option of 10 CFR Part 50, Appendix J" (ADAMS Accession No. ML13192A394), Revision 3-A, inadvertently did not include the six limitations and conditions in NRC's June 25, 2008, final safety evaluation approving NEI 94-01, Revision 2. Although the six limitations and conditions were not included in NEI 94-01, Revision 3-A, they apply to a licensee's request to use NEI 94-01, Revision 3-A, requesting to extend the ILRT.

NEI 94-01, Revision 3-A, added guidance for extending the Type C LLRT interval to 75 months. However, because the LAR, Section 4.2, states, "The testing frequency for Type B and C tests is not affected by this requested amendment to permanently extend the Type A test interval from 130 months" the additional guidance in NEI 94-01, Revision 3-A does not apply to this LAR request. Thus, VCSNS will continue testing Type C components at a maximum interval of 60 months. VCSNS must submit a separate amendment request to change maximum Type C frequency from 60 to 75 months. RG 1.163, "Performance-Based Containment Leak-Test Program," dated September 1995 is still referenced in the new proposed TSs and holds VCSNS to a maximum test frequency of 60 months for Type B and C tests.

to containment leakage rate testing, subject to the limitations and conditions noted in Section 4.0 of the safety evaluation (SE) (ADAMS Accession No. ML081140105).

3 On June 8, 2012, the NRC issued a final safety evaluation report concluding that NEI 94-01, Revision 3, describes an acceptable approach for implementing the optional performance-based requirements of 10 CFR 50, Appendix J, and is acceptable for referencing by licensees proposing to amend their TS in regards to containment leakage rate testing, subject to the limitations and conditions noted in Section 4.0 of the SE (ADAMS Accession No. ML121030286).

10 CFR 50, Appendix J, Option B, Section V.B.3, requires that the regulatory guide or other implementation document used by a licensee to develop a performance-based leakage-testing program must be included, by general reference, in the plant TSs. Furthermore, the submittal for TS revisions must contain justification, including supporting analyses, if the licensee chooses to deviate from methods approved by the Commission and endorsed in a regulatory guide.

3.0 TECHNICAL EVALUATION

3.1 Containment Review

3.1.1 Licensee's Proposed Changes

In the licensee amendment request (LAR), the licensee stated that VCSNS TS 6.8.4 g., "Containment Leakage Rate Testing Program" currently states:

A program shall be established to implement leakage rate testing of the containment system as required by 10 CFR 50.54(o) and 10 CFR 50, Appendix J, Option B, as modified by approved exemptions. This program shall be in accordance with the guidelines contained in Regulatory Guide 1.163, "Performance-Based Containment Leak-Test Program," dated September 1995; NEI 94-01, "Industry Guideline for Performance-Based Option of 10 CFR 50, Appendix J," Revision 0; ANSI/ANS-56.8-1994, "Containment System Leakage Testing Requirements"; as modified by approved exceptions that the next Type A test performed after the October 15, 2003 Type A test shall be performed no later than August 15, 2014."

The proposed amendment would revise VCSNS TS 6.8.4 g., "Containment Leakage Rate Testing Program," to state,

A program shall be established to implement leakage rate testing of the containment system as required by 10 CFR 50.54(o) and 10 CFR 50, Appendix J, Option B, as modified by approved exemptions. This program shall be in accordance with the guidelines contained in Regulatory Guide 1.163, "Performance-Based Containment Leak-Test Program," dated September 1995; NEI 94-01, "Industry Guideline for Performance-Based Option of 10 CFR 50, Appendix J," Revision 3-A, July 2012; ANSI/ANS-56.8-2002, "Containment System Leakage Testing Requirements"; as modified by approved exceptions that the next Type A test performed after the October 15, 2003 Type A test shall be performed no later than October 15, 2018.

The proposed change would revise the aforementioned portion of TS 6.8.4 g. by replacing the reference:

NEI 94-01, "Industry Guideline for Performance-Based Option of 10 CFR 50, Appendix J," Revision 0; and

ANSI/ANS-56.8-1994, "Containment System Leakage Testing Requirements"

to:

NEI 94-01, "Industry Guideline for Performance-Based Option of 10 CFR 50, Appendix J," Revision 3-A, July 2012; and

ANSI/ANS-56.8-2002, "Containment System Leakage Testing Requirements"

The licensee proposed to extend the current performance-based Type A test interval to 15 years by adopting NEI 94-01, Revision 3-A, as the implementation document in the TS. This change would allow VCSNS to conduct the next Type A test by October 15, 2018, in lieu of the current due date of August 15, 2014. The licensee justified the proposed change by demonstrating adequate performance of the VCSNS reactor containment based on historical plant-specific containment leakage testing program results, reactor containment in-service inspection (CISI) program results, and supported by a plant-specific risk assessment, in a manner consistent with the guidance in NEI 94-01, Revision 3-A.

The NRC staff reviewed this LAR and supplemental information submittals from the point of deterministic considerations with regard to containment leak-tight integrity if the current ILRT interval is extended from 10 years to 15 years.

3.1.2 Staff's Evaluation

As a condition of its license, the primary reactor containment for VCSNS is subject to the requirements set forth in Appendix J to 10 CFR Part 50. In determining whether an amendment to VCSNS's license will be issued to the applicant, the Staff is guided by the considerations which govern the issuance of initial licenses to the extent applicable and appropriate. Accordingly, the Staff's review considered whether the applicant's proposed changes would support a finding by the Commission that there is reasonable assurance that the activities authorized by the revised technical specifications will be conducted in compliance with 10 CFR 50.54(o) and Appendix J to 10 CFR Part 50.

The staff's primary review method was to ensure the limitations and conditions were met as set forth in Staff's final SE report dated June 25, 2008, endorsing NEI 94-01, Revision 2. The June 25, 2008, SE was found acceptable for referencing by licensees proposing to extend their TS in regards to containment leakage rate testing from 10 to 15 years, subject to six limitations and conditions.

The two limitations and conditions identified in NEI 94-01, Revision 3-A, regarding extending Type C test to 75 months do not apply to this LAR because the licensee is not requesting an extension of the Type C test.

Condition 1

For calculating the Type A leakage rate, the licensee should use the definition in the NEI TR 94-01, Revision 2, in lieu of that in ANSI/ANS-56.8-2002.

Staff's Assessment

Staff's June 25, 2008, safety evaluation of NEI 94-01, Rev 2, Section 3.1.1.1, addressed why the licensee should use the definition found in the NEI TR 94-01, Revision 2, in lieu of that in ANSI/ANS-56.8-2002. It states:

Section 5.0 of NEI TR 94-01, Revision 2, uses a definition of "performance leakage rate" for Type A tests that is different from that of ANSI/ANS-56.8-2002. The definition contained in NEI TR 94-01, Revision 2, is more inclusive because it considers excessive leakage in the performance determination. In defining the minimum pathway leakage rate, NEI TR 94-01, Revision 2, includes the leakage rate for all Type B and Type C pathways that were in service, isolated, or not lined up in their test position prior to the performance of the Type A test. Additionally, the NEI TR 94-01, Revision 2, definition of performance leakage rate requires consideration of the leakage pathways that were isolated during performance of the test because of excessive leakage in the performance determination. The NRC staff finds this modification of the definition of "performance leakage rate" used for Type A tests to be acceptable.

The licensee addressed Condition 1 in its April 3, 2013, LAR. VCSNS uses the definition found in Section 5.0 of NEI 94-01, Revision 3-A, for calculating the Type A leakage rate (GTP-315 Step 4.1.4.A). NEI 94-01, Revision 3-A, contains the same definition as NEI 94-01, Revision 2-A. The licensee stated that the ILRT testing history of the containment structure leakage is acceptable, with margin, and no failed ILRTs.

Condition 2

The licensee submitted a schedule of containment inspections to be performed prior to and between Type A tests.

Staff's Assessment

The licensee adequately addressed Condition 2 in its April 3, 2013, LAR. The licensee provided a list of containment inspections to be performed prior to and between Type A tests in Section 4.2 of the LAR. The general visual inspections requirements noted in Table 2 of this SE, meet the criteria noted in NEI 94-01, Revision 3-A.

The licensee stated that VCSNS has established procedures for performing visual examinations of the accessible surfaces of the containment for detection of structural problems. RG 1.163, Regulatory Position C.3 specifies that these examinations should be conducted prior to initiating a Type A test and during two other outages before the next Type A test if the interval for the Type A test has been extended to ten years, in order to allow for early detection of evidence of structural deterioration. These visual examinations have been completed, with no significant defects noted to date.

The licensee also stated that the ASME Section XI Program requires that the steel containment vessel be examined in accordance with the requirements of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code (B&PV), Section XI, Subsection IWE, and associated modifications and limitations imposed by 10 CFR 50.55a(b)(2).

Condition 3

The licensee addresses the areas of the containment structure potentially subjected to degradation.

Condition 4

The licensee addresses any tests and inspections performed following major modifications to the containment structure, as applicable.

Staff's Assessment of Condition 3 and 4

In its April 3, 2013, LAR, Attachment V, the licensee provided a summary table of LLRT results of those containment penetrations (including their test schedule intervals) that have not demonstrated acceptable performance history in accordance with the Containment Leakage Rate Program. In order to assess the implementation of the Type B and Type C local leak rate testing program, the staff requested the licensee in RAI-1 (Reference 7.2) to identify and describe any identified areas that require performance of augmented inspections in accordance with Subsection IWE-1240, to the American Society of Mechanical Engineers Boiler & Pressure Vessel Code Section XI, which requires augmented examinations of surface areas likely to experience accelerated degradation and aging.

In its September 5, 2013, response (Reference 7.3) the licensee indicated that in addition to the augmented examination for the Moisture Barrier Seal and the containment liner at the Moisture Barrier Seal, the following areas have been identified for detailed visual augmented examination which is performed in accordance with IWE-1240 (further discussed in the response to RAI-2):

The guard pipes that are located around the Residual Heat Removal (RHR) and Spray Piping at penetrations located in the basement of the Auxiliary Building have been exposed to groundwater intrusion at the seismic separation joint between the Reactor Building foundation mat and the Auxiliary Building concrete structure. The groundwater exposure has resulted in degradation of the coating and some corrosion of the exterior of the carbon steel guard pipes over the years. The degradation has been identified and managed under the non-conformance program. Ultrasonic examination has confirmed minimal loss of guard pipe thickness due to corrosion and that the design basis continues to be met. The surfaces have been reworked by prepping and recoating. Due to continued exposure to some groundwater intrusion, the guard pipe inspections remain as augmented examinations. The guard pipes are included in the Type C leak rate testing of the RHR and Spray Piping isolation valve enclosure canisters in the Auxiliary Building and therefore, are not directly impacted by the proposed extension for the Type A leak rate testing.

A location on the interior surface of the outer tendon access gallery reinforced concrete wall has in the past indicated some rust staining at a small shrinkage crack due to groundwater seepage at the crack. The gallery which provides access to the bottom end of the vertical pre-stress tendons is located directly beneath and is tied into the Reactor Building foundation mat. The corrosion was identified and evaluated under the plant nonconformance program and found to have no impact on the structural design of the

containment. However, due to the intermittent minor ingress of groundwater, the location remains as an augmented examination although minimal or no change has been observed in the past inspections. Due to the location of this particular augmented examination in the tendon access gallery wall, there is no impact on the overall leak tightness capability of containment that is confirmed by Type A leak rate testing.

Based on the evaluation above, the staff finds that the licensee has effectively addressed Conditions 3 & 4; the licensee has identified the areas of containment potentially subjected to degradation, as well as any test or inspections performed following major modifications to the containment. In addition the licensee has implemented an adequate Containment Leakage Rate Testing (ILRT & LLRT) program, CISI and supplemental inspections to periodically examine, monitor, and manage age-related and environmental degradation of the VCSNS primary containment.

Condition 5 is not applicable because the licensee is not requesting to extend the ILRT interval for more than 15 years.

Condition 6 is only applicable to plants licensed under 10 CFR Part 52. VCSNS is not licensed pursuant to 10 CFR Part 52.

The staff finds that the information provided by in the April 3, 2013, LAR and supplement dated September 5, 2013, addresses the six limitations and conditions in NEI 94-01, Revision 2-A.

The results of the past ILRTs and LLRTs programs demonstrate acceptable performance of the VCSNS primary containment and demonstrate that the leak-tight integrity of the primary containment is adequately managed. The leak-tight integrity of the VCSNS primary containment will continue to be periodically monitored and managed by the LLRT and CISI programs if the current ILRT interval is extended from 10.9 years to 15 years. Thus, the staff finds that there is reasonable assurance that the containment leak-tight integrity will continue to be maintained, without undue risk to public health and safety if the current ILRT interval at VCSNS is extended to 15 years. Therefore, the NRC staff finds it acceptable to extend the current ILRT VCSNS interval at VCSNS from 10.9 years to 15 years as proposed by the licensee, in accordance with NEI 94-01, Revision 3-A. The next Type A test may therefore be conducted no later than October 15, 2018, in lieu of the current due no later than August 15, 2014.

The details on how to perform Type A, Type B, and Type C containment leakage rate surveillance testing can be found in ANSI/ANS-56.8-2002, which is endorsed for use by the NRC in the SE on NEI 94-01, Revision 2-A and again in the SE on NEI 94-01, Revision 3-A. However, some differences exist between ANSI/ANS-56.8-2002 and NEI 94-01, Revision 3-A. Where differences exist, NEI 94-01, Revision 3-A takes precedence. The licensee does not request to make changes on how the Type A, Type B, and Type C containment leakage rate surveillance testing are performed, thus the reference to ANSI/ANS-56.8-2002 in the VCSNS TS is acceptable.

In Attachment 7 to the LAR, the licensee provided three regulatory commitments. The NRC staff did not rely on these regulatory commitments as the basis for the finding of public health and safety regarding the proposed amendment. Therefore, it is appropriate for the submitted regulatory commitments to be managed under the licensee's regulatory commitment management program.

3.1.3 Containment Review Conclusion

Based on the above evaluation, the NRC staff finds that there are no significant increases in risk or reductions in safety resulting from the requested test extension, beyond those already considered in the establishment of the intervals allowed by RG 1.163 and NEI 94-01, Revision 3-A. Further, the VCSNS has demonstrated acceptable performance of the VCSNS primary containment and demonstrate that the leak-tight integrity of the primary containment is adequately managed. Therefore, the staff concludes that the requested TS changes are acceptable.

3.2 Probabilistic Risk Assessment

3.2.1 Background

NEI 94-01, Revision 2-A, Section 9.2.3.1, "General Requirements for ILRT Interval Extensions beyond Ten Years," states that plant-specific confirmatory analyses are required when extending the Type A ILRT interval beyond ten years. NEI 94-01, Revision 2-A, Section 9.2.3.4, "Plant-Specific Confirmatory Analyses," states that the assessment should be performed using the approach and methodology described in Electric Power Research Institute (EPRI) Technical Report 1009325, Revision 2-A⁴, "Risk Impact Assessment of Extended Integrated Leak Rate Testing Intervals" (ADAMS Accession No. ML14024A045). The analysis is to be performed by the licensee and retained in the plant documentation and records as part of the basis for extending the ILRT interval.

In the June 25, 2008, final safety evaluation report for NEI 94-01, Revision 2, the NRC staff found the methodology in EPRI TR-1009325, Revision 2, acceptable for referencing by licensees proposing to amend their TS to permanently extend the ILRT interval to 15 years, provided certain conditions are satisfied. These conditions, set forth in Section 4.2 of the SER for EPRI TR-1009325, Revision 2, stipulate that:

1. The licensee submit documentation indicating that the technical adequacy of their Probabilistic Risk Assessment (PRA) is consistent with the requirements of Regulatory Guide (RG) 1.200, "An Approach for Determining the Technical Adequacy of Probabilistic Risk Assessment Results for Risk-Informed Activities," relevant to the ILRT extension application.
2. The licensee submits documentation indicating that the estimated risk increase associated with permanently extending the ILRT surveillance interval to 15 years is small and consistent with the clarification provided in Section 3.2.4.6⁵ of the SER for EPRI TR-1009325, Revision 2.
3. The methodology in EPRI TR-1009325, Revision 2, is acceptable provided the average leak rate for the pre-existing containment large leak accident case (i.e., accident case 3b)

⁴ It should be noted that EPRI TR-1009325, Revision 2-A, is also identified as EPRI TR-1018243.

⁵ The SER for EPRI TR-1009325, Revision 2, indicates that the clarification regarding small increases in risk is provided in Section 3.2.4.5; however, the clarification is actually provided in Section 3.2.4.6.

used by licensees is assigned a value of 100 times the maximum allowable leakage rate (L_a) instead of 35 L_a .

4. A LAR is required in instances where containment over-pressure is relied upon for emergency core cooling system (ECCS) performance.

3.2.2 Plant-Specific Risk Evaluation

The licensee performed a risk impact assessment for extending the Type A containment ILRT interval from 10.9 years to 15 years. The risk assessment was provided in the April 3, 2013 LAR, Attachment VI. Additional information was provided by the licensee in its letter dated September 5, 2013, in response to NRC RAIs.

In the April 3, 2013, letter, Attachment I, Section 4.5.1, the licensee stated that the plant-specific risk assessment follows the guidance in NEI 94-01, Revision 2-A; the methodology described in EPRI TR-1009325, Revision 2-A; the NRC regulatory guidance outlined in RG 1.174, "An Approach for Using Probabilistic Risk Assessment in Risk-Informed Decisions on Plant-Specific Changes to the Licensing Basis;" and the methodology used for Calvert Cliffs to assess the risk from undetected leaks due to corrosion. The relevance of Calvert Cliffs is that they used a methodology for determining the change in risk due to the potential of liner corrosion. The methodology is applicable to V.C. Summer because it is included as an improvement in EPRI TR-1009325, Revision 2-A (see the fourth improvement in Section 4.1 of EPRI TR-1009325, Revision 2-A).

The licensee addressed each of the four conditions for the use of EPRI TR-1009325, Revision 2, which are listed in Section 4.2 of the NRC SER. A summary of how each condition has been met is provided in the sections below.

3.2.2.1 Technical Adequacy of the PRA

The first condition stipulates that the licensee submits documentation indicating that the technical adequacy of their PRA is consistent with the requirements of RG 1.200 relevant to the ILRT extension application.

In Regulatory Issue Summary 2007-06, "Regulatory Guide 1.200 Implementation," the NRC clarified that for all risk-informed applications received after December 2007, the NRC staff will use Revision 1 of RG 1.200 (ADAMS Accession No. ML070240001) to assess technical adequacy of the PRA used to support risk-informed applications. Revision 2 of RG 1.200 (ADAMS Accession No. ML090410014) will be used for all risk-informed application received after March 2010. In Section 3.2.4.1 of the SER for EPRI TR-1009325, Revision 2, the NRC staff states that Capability Category I of American Society of Mechanical Engineers (ASME) PRA standard shall be applied as the standard for assessing PRA quality for IRLT extension applications, since approximate values of core damage frequency (CDF) and large early release frequency (LERF) and their distribution among release categories are sufficient to support the evaluation of changes to ILRT frequencies. The licensee stated that in a 2007 focused review all supporting requirements from the ASME PRA standard (i.e., ASME RA-Sb-2005) were judged to be Capability Category II or better, with the exception of thirteen supporting requirements that were rated at Capability Category I based on the licensee's simplified NUREG/CR-6595, "An Approach for Estimating the Frequencies of Various Containment Failure Modes and Bypass

Events,” compliant LERF model. The licensee stated in a response to an RAI that in November 2011 it performed a self-assessment to identify gaps between the VCSNS PRA model and the requirements delineated in RG 1.200, Revision 2, and the ASME/American Nuclear Society (ANS) PRA internal events PRA standard (ASME/ANS RA-Sa-2009). The licensee identified two gaps that impact the containment model and potentially have a significant impact on CDF. The two gaps were related to ECCS sump blockage and inter-system loss-of-coolant accident in which the latest guidance for these scenarios was not used at VCSNS. The licensee stated that the revised models for the scenarios were used in the analysis for the submittal. Therefore, the gaps do not impact the results of this application.

In response to another RAI, the licensee stated that its recently developed simplified Level 2 PRA used for this application is an extension of the previous Level 2 containment bypass model that has been peer reviewed. The recently developed simplified Level 2 PRA expands the VCSNS model beyond a single large early release bin (which has been peer reviewed) to include additional bins for small early release, late release, and sequences where the containment remains intact. The licensee stated that the expansion does not change the sequences binned as LERF and, therefore, a peer review is not required to support this application.

The NRC staff agrees with this determination because ILRT extension applications use LERF as the risk metric.

In Section 6.3 of Attachment VI to the LAR, the licensee performed a bounding analysis for the external events contributions and the results complied with the guidelines for risk increase in RG 1.174.

Given that the licensee has evaluated its PRA against Revision 1 of RG 1.200 and the ASME PRA standard, performed gap assessment for Revision 2 of RG 1.200, evaluated the findings developed during the reviews of its PRA for applicability to the ILRT extension, and addressed the findings, the NRC staff concludes that the PRA model used by the licensee is of sufficient technical adequacy to support the evaluation of changes to ILRT frequencies. Accordingly, the first condition is met.

3.2.2.2 Estimated Risk Increase

The second condition stipulates that the licensee submit documentation indicating that the estimated risk increase associated with permanently extending the ILRT interval to 15 years is small, and consistent with the guidance in RG 1.174 and the clarification provided in Section 3.2.4.6 of the NRC SE for NEI 94-01, Revision 2-A. The associated metrics include LERF, population dose, and conditional containment failure probability (CCFP).

The licensee reported the results of the plant-specific risk assessment. The reported risk impacts are based on a change in test frequency from three tests in 10 years (the test frequency under 10 CFR 50 Appendix J, Option A) to one test in 15 years. The reported increases in LERF (4.08×10^{-8} per year for internal events and 9.69×10^{-7} per year for internal and external events combined) are small and consistent with the RG 1.174 acceptance guidelines, and the increases in population dose (8.76×10^{-3} person-rem per year) and CCFP (1.06 %) are below the values associated with a small increase, as provided in EPRI TR-1009325, Revision 2-A.

Based on the risk assessment results, the NRC staff concludes that the increase in LERF is small and consistent with the acceptance guidelines of RG 1.174, the increase in the total integrated plant risk for the proposed change is small and supportive of the proposed change, and the defense-in-depth philosophy is maintained based on the small magnitude of the change in the CCFP. Accordingly, the second condition is met.

3.2.2.3 Leak Rate for the Large Pre-Existing Containment Leak Rate Case

The third condition stipulates that in order to make the methodology in EPRI TR-1009325, Revision 2, acceptable, the average leak rate for the pre-existing containment large leak rate accident case (i.e., accident case 3b) used by the licensees shall be 100 L_a instead of 35 L_a .

As noted by the licensee in Section 4.5.1 of Attachment I to the LAR, the methodology in EPRI TR-1009325, Revision 2-A, incorporates the use of 100 L_a as the average leak rate for the pre-existing containment large leak rate accident case, and this value has been used in the VCSNS plant-specific risk assessment. Accordingly, the third condition is met.

3.2.2.4 Applicability if Containment Over-Pressure is Credited for ECCS Performance

The fourth condition stipulates that in instances where containment over-pressure is relied upon for ECCS performance, a LAR is required to be submitted. In Section 4.5.1 of Attachment I to the LAR, the licensee stated that VCSNS does not credit containment overpressure for the mitigation of design basis accidents. Accordingly, the fourth condition is met.

3.2.3 Probabilistic Risk Assessment Conclusion

Based on the above, the NRC staff concludes that the proposed LAR for a permanent, 15-year extension of the Type A containment ILRT for VCSNS is acceptable. In accordance with the revised TS 6.8.4 g., the next Type A containment ILRT for VCSNS shall be performed no later than October 15, 2018.

3.3 Mechanical & Civil Engineering

3.3.1 Description of the Reactor Containment Building

The VCSNS reactor containment building is post-tensioned by tendons in the cylinder and the dome. The reactor containment building consists of a cylindrical wall, a shallow dome roof and a foundation mat that bears on fill concrete that extends to competent rock. At the underside of the reactor containment building foundation mat, a tendon access gallery is formed into the top of the fill concrete. A retaining wall, extending approximately one quarter (1/4) of the way around the reactor building, protects the below grade portions of the reactor building wall from the subgrade and groundwater. Adjacent buildings surround the remaining three-quarters (3/4) of the reactor building.

The interior of the reactor containment is lined with steel plates welded together to form a leak tight barrier. Since the base slab liner plate is covered with concrete, access for personnel and equipment is provided by steel penetrations that are attached to the liner plate and anchored into the concrete structure. The primary containment wall contains penetrations for different purposes,

such as fuel transfer, piping as well as electrical. A large diameter equipment hatch provides for transfer of material and equipment. Additionally, two double-door personnel access locks provide access to personnel that are entering or leaving the reactor containment. The hatch and lock doors are supplied with two compression seals with provisions for leak testing. Also, one transfer tube is provided for fuel movement between the refueling canal and the spent fuel pool.

3.3.3 Historical plant-specific containment leakage testing program results

The licensee stated that the VCSNS ILRT testing history of the containment structure leakage is acceptable, with margin, and no failed ILRTs. The TS acceptance criterion for L_a at P_a , is 0.2 percent by weight of the containment air per 24 hours. Per TS 6.8.4 g the value of P_a for VCSNS is 45.1 psig.

The results in Table 1 show that the two most recent tests performed in 1993 and 2003 were successful with containment performance leakage rates less than the L_a at P_a of 0.2 percent by weight of the containment air per 24 hours.

TABLE 1
VCSNS ILRT RESULTS

Completion Date	Type A 95% Upper Confidence Level (UCL)	Type B & C Pathways	Containment Leakage Rate (ILRT)
April 1993	0.1298% wt/day	0.0070% wt/day	0.1368% wt/day
October 2003	0.0581% wt/day	0.0173% wt/day	0.0749% wt/day

3.3.4 Containment In-Service Inspection (CISI) Results

In the LAR, the licensee stated that VCSNS has established procedures for performing visual examinations of the accessible surfaces of the containment for detection of structural problems. RG 1.163, "Performance Based Containment Leak-Test Program," dated September 1995, Regulatory Position C.3 specifies that these examinations should be conducted prior to initiating a Type A test and during two other outages before the next Type A test if the interval for the Type A test has been extended to ten years, in order to allow for early detection of evidence of structural deterioration. These visual examinations have been completed, with no significant defects noted to date.

The licensee also stated that the ASME B&PV Section XI Program requires that the steel containment vessel be examined in accordance with the requirements of the ASME B&PV, Section XI, Subsection IWE, and associated modifications and limitations imposed by 10 CFR 50.55a(b)(2). The licensee further stated that the 8th Period (30th year) IWL surveillance, including the tendon pre-stress system and containment concrete inspections, were completed during RF-19 in March-April 2011. The inspections were done in accordance with ASME B&PV, Section XI and the results of the inspections confirmed that there was no abnormal degradation of the containment and that the vertical, horizontal, and dome tendon groups were conservatively projected to maintain more than the required minimum average tendon force for the particular group until the next regularly scheduled surveillance. The VCSNS program to perform these surveillance examinations at a 5-year or less inspection interval continues to be an acceptable

and appropriate program to monitor and maintain these structures to ensure their capability to perform the safety-related, design basis, containment function.

Table 2 provides an approximate schedule for the containment surface examinations assuming the Type A test frequency is extended to 15 years.

Table 2
Containment Inservice Inspection Periods (IWE/IWL)

Calendar Year/Refueling Outage	Type A Test (ILRT)	General Visual Examination of Accessible Exterior Surface	General Visual Examination of Accessible Interior (Liner) Surface
S2011/RFO 19		X (Note 1)	
F2012/RFO 20			X (Note 3)
S2014/RFO 21			
F2015/RFO 22		X (Note 1)	X (Note 3)
S2017/RFO 23			
F2018/RFO 24	X	X (Note 2)	X (Note 3)
S2020/RFO 25		X (Note 1)	
F2021/RFO 26			X (Note 3)
S2023/RFO 27			
F2024/RFO 28		X (Note 1)	X (Note 3)
S2026/RFO 29			
F2027/RFO 30			X (Note 3)
S2029/RFO 31		X (Note 1)	
F2030/RFO 32			X (Note 3)
S2032/RFO 33			
F2033/RFO 34	X	X (Note 1) X (Note 2)	X (Note 3)
S2035/RFO 35			
F2036/RFO 36			X (Note 3)
S2038/RFO 37		X (Note 1)	
F2039/RFO 38			X (Note 3)
S2041/RFO 39			
F2042/RFO 40		X (Note 1)	X (Note 3)
S2044/RFO 41			
F2045/RFO 42			X (Note 3)
S2047/RFO 43		X (Note 1)	
F2048/RFO 44	X	X (Note 2)	X (Note 3)

NOTES:

1. IWL pre-stress tendon surveillance and IWL concrete exterior inspection are done on a 54-month interval corresponding to every third refueling outage.
2. General containment visual inspections are conducted in accordance with General Test Procedure per 10 CFR 50 App. J prior to performing the Type A ILRT.
3. STP 207.002, "Inspection of Containment," or an equivalent inspection, is performed every other refueling outage (36 month frequency). This inspection verifies the structural integrity of the exposed accessible interior and exterior surfaces of the containment by a visual examination

The LAR, Attachment V, included a summary table of LLRT results for those containment penetrations (including their test schedule intervals) that have not demonstrated acceptable performance history in accordance with the Containment Leakage Rate Program with a discussion of the causes and corrective actions taken.

In the RAI response letter dated September 5, 2013, the licensee stated:

- (a) Per VCSNS procedure GTP-315, "Containment Leakage Rate Testing Program," and the individual surveillance test procedures, the licensee can evaluate leakage values that exceed the acceptance criteria and accept leakage up to 36,456 standard cubic centimeters (sccm), as long as the total summation of the leakage from all penetrations remains below $0.6 L_a$. This is in accordance with Section 10.2 of NEI 94-01, Revision 0 and Revision 3a. Also, in accordance with Section 10.2.3.4 of NEI 94-01, Revision 0, the testing frequency was set at the initial test interval, a cause determination was performed, and corrective actions were identified with appropriate steps to eliminate recurrence.
- (b) The components identified in the tables (Reference 7.3) were not returned to the extended test interval until the corrective actions and two successful tests were completed. Some components remained on the base interval, awaiting either corrective action and/or two consecutive successful tests. The causes and corrective actions for each failure have been included in the table (Reference 7.3, Attachment I). Each LLRT failure listed in the table (Reference 7.3, Attachment I) resulted in the component being placed on the base frequency: less than or equal to 30 months (equivalently 18 months, or 1 refueling outage).
- (c) RG 1.163 specifies that NEI 94-01 Revision 0 should be used to establish test intervals. In accordance with NEI 94-01 Revision 0, Section 10.2.3.4, each failure listed in Reference 7.1 resulted in the component being reset to the base interval: less than or equal to 30 months (equivalently 18 months, or 1 refueling outage), unless the component was already on the base interval. The components that have successfully completed two consecutive periodic "As-found" Type C tests, as required in NEI 94-01, Revision 0, Section 10.2.3.2, have been placed on the extended interval of less than or equal to 60 months (equivalently 54 months, or 3 refueling outages), which is the maximum allowed under RG 1.163 item C.2. The Performance Factors of NEI 94-01, Revision 0, Section 11.3.1 are taken into account prior to extending the testing intervals. A revised copy of Attachment IV (Reference 7.1) has been included (Reference 7.3, Attachment II). This updated table (Reference 7.3, Attachment II) now shows the current interval for each penetration in the Appendix J Program.

3.3.5 NRC Staff's Evaluation

NEI 94-01, Revision 0 and Revision 3a, Section 10.2, allow the licensee to evaluate leakage values that exceed the acceptance criteria and accept leakage up to 36,456 (sccm), as long as the total summation of the leakage from all penetrations remains below 0.6 of L_a . Also the components identified in the tables (LAR, Attachment V) should not be returned to the extended test interval until the corrective actions and two successful tests are completed. Some components at VCSNS remain on the base interval, awaiting either corrective action and/or two consecutive successful tests.

Limitations and Conditions

The Reference 7.4, "The Executive Summary" Section, notes that the TR meets the limitations and conditions of the NRC SEs for both Revision 2 and Revision 3 of NEI 94-01. Revision 2-A of NEI 94-01 was issued in 2008, and included provisions for extending the ILRT, Type A interval, to 15 years, subject to the limitations and conditions provided in the SE for Revision 2. Revision 3-A was issued in July 2012, and included guidance for extending the Type C LLRT interval to 75 months. Type C testing ensures that individual containment isolation valves are essentially leak tight. In addition, aggregate Type C leakage rates support the leakage tightness of the primary containment by minimizing potential leakage paths.

The NRC staff reviewed the information contained in Table 3 and provided an assessment for each item, as indicated:

Table 3
Limitation/Condition of Section 4.1, NEI 94-01, Revision 2-A

Number	Description	SCE&G Response	Staff Position
1	For calculating the Type A leakage rate, the licensee should use the definition in the NEI TR 94-01, Revision 2, in lieu of that in ANSI/ANS-56.8-2002).	VCSNS uses the definition found in Section 5.0 of NEI 94-01, Revision 3-A (contains the same definition as in Revision 2-A).	Adequately addressed Condition 1 based on the SCE&G response in the LAR.
2	The licensee should submit a schedule of containment inspections to be performed prior to and between Type A tests.	Schedule of inspections are shown in Table 4.2-1, "Containment Inservice Inspection Periods (IWE/IWL)" of the LAR.	The general visual inspections requirements noted in Table 2 meet the criteria noted in Reference 7.4
3	The licensee needs to address the areas of the containment structure potentially subjected to degradation.	General visual examination of accessible interior and exterior surfaces of the containment system for structural problems is conducted in accordance with the VCSNS CISI Plan which implements the requirements of the ASME B&PV, Section XI, Subsections IWE and IWL.	Based on NRC staff review of licensee's information provided in the Note at the end of this Table, the staff finds that the licensee met this limitation/condition.
4	The licensee needs to address any test and inspections performed following major modifications to the	VCSNS replaced the steam generators in RF8 (1994). No modifications to the containment structure were required.	Acceptable, since there were no modifications to the containment structure since original construction.

	containment structure, as applicable.		
5	The normal Type A test interval should be less than 15 years. If a licensee has to utilize the provisions of Section 9.1 of NEI 94-01, Revision 2-A, related to extending the ILRT interval beyond 15 years, the licensee should demonstrate to the NRC staff that it is an unforeseen emergent condition.	VCSNS acknowledges and accepts this NRC staff position, as communicated to the nuclear industry in Regulatory Issue Summary (RIS) 2008-27 dated December 8, 2008.	This issue was adequately addressed to the NRC based on the SCE&G response in the Reference 7.1.
6	For plants licensed under 10 CFR Part 52, applications requesting a permanent extension of the ILRT surveillance interval to 15 years should be deferred until after the construction and testing of CTMTs for that design have been completed and applicants have confirmed the applicability of NEI 94-01, Revision 2-A, and EPRI Report No. 1009325, Rev. 2, including the use of past containment ILRT data.	Not applicable. VCSNS, Unit 1 is not licensed pursuant to 10 CFR Part 52.	Not applicable. VCSNS, Unit 1 is not licensed pursuant to 10 CFR Part 52.

Note: In Reference 7.2, the NRC staff asked the licensee to discuss any operating experience and evaluation results, regarding the potential for, or presence of, corrosive conditions at the junction of the metal liner and interior concrete floor of the containment, including the potential for stagnant water to have collected behind a degraded floor seal area that could promote pitting corrosion. The licensee's response to Reference 7.2 is noted below:

In Reference 7.3, the licensee stated that the CISI Plan for VCSNS addresses the 10 CFR 50.55a final rule dated October 1, 2004, and the ASME B&PV, Section XI. Since 2005, the implementing plant surveillance procedure includes an Augmented Inspection (every refueling outage on 18-month cycle) of the Moisture Barrier Seal and adjacent coated containment liner surface at the

perimeter joint detail where the basement concrete floor slab in the Reactor Building meets the containment liner plate. The required inspection consists of 100 percent, Detail Visual, VT-1 examination. Table 4.2-1 in Reference 7.1 (Table 3 of this SER) provides an approximate schedule for the containment surface examinations assuming the Type A test frequency is extended to 15 years.

The licensee also stated in Reference 7.1 that the Moisture Barrier Seal has been inspected and maintained through the VCSNS Corrective Actions Program. Through these inspections, the Moisture Barrier Seal has been reworked to ensure there is no potential for water to pass through this seal. Limiting the water passage decreases the potential to have collected water behind or below a degraded floor Moisture Barrier Seal area which could promote pitting corrosion of the liner plate. Past inspections have documented some local deterioration of the Moisture Barrier Seal, such as local debonding from the liner that was reworked at the time to restore the Moisture Barrier Seal to the required design. Rework included, where applicable, locally removing the Moisture Barrier Seal material and backing sufficiently for visual examination, to ensure that liner corrosion was not occurring down into the joint below the sealant detail. Augmented inspections will be performed on an 18-month refueling interval to maintain the sealant joint and liner coatings.

The NRC staff finds the information provided by the licensee to be acceptable, because, these 100 percent, Detail Visual, VT-1 examinations and the VCSNS Corrective Actions Program minimize the potential for water to penetrate through the Moisture Barrier Seal, collect behind a degraded floor seal area, and prevent pitting corrosion of the liner below the seal.

Based on the above review, the NRC staff finds that the licensee has adequately addressed and satisfied the six limitations/conditions in Section 4.1 of the NRC SER for TR NEI 94-01, Revision 2-A. Therefore, the staff finds it acceptable for VCSNS to adopt TR NEI 94-01, Revision 3-A, as the implementation document in its TS 6.8.4 g., "Containment Leakage Rate Testing Program," for extending the ILRT (or Type A test) to 15 years on a permanent basis.

The NRC staff determined that, consistent with the guidance in NEI 94-01, Revision 3-A, the performance history for Type A tests noted in Table 1, supports extending the current ILRT interval to 15 years.

Based on the information provided in Table 2 noted previously and additional information provided in this SE, the NRC staff also determined that the licensee's Containment Leakage Rate Testing (ILRT and LLRT) programs, CISI and supplemental inspections to periodically examine, monitor, and manage age-related and environmental degradation of the VCSNS primary containment support extending the ILRT (Type A) test out to a maximum of 15 years.

The results of the past ILRTs, LLRTs and the CISI programs demonstrate acceptable performance of the VCSNS primary containment and demonstrate that the structural and leak-tight integrity of the primary containment structure is adequately managed. The structural and leak-tight integrity of the VCSNS primary containment will continue to be periodically monitored and managed by the LLRT and CISI programs, if the current ILRT interval is extended from 10.9 years to 15 years. Thus, the staff finds that there is reasonable assurance that the containment structural and leak-tight integrity will continue to be maintained, without undue risk to public health and safety, if the current ILRT interval at VCSNS is extended to 15 years. The NRC staff find it acceptable to extend the current ILRT VCSNS interval at VCSNS from 10.9 years to 15

years as proposed by the licensee, in accordance with NEI 94-01, Revision 3-A. The next Type A test may be conducted no later than October 15, 2018, in lieu of the current due date no later than August 15, 2014.

3.3.3 Mechanical & Civil Engineering Review Conclusion

The NRC staff determined that the licensee provided an adequate technical justification for approval of the licensee's submittal of April 3, 2013, based on the supplemental information and the regulatory and technical evaluations noted above. The NRC staff finds that there is reasonable assurance that the structural and leak-tight integrity of the VCSNS, primary containment will continue to be monitored and maintained with the performance-based Type A test interval extended to up to 15 years, on a permanent basis. Therefore, the staff concludes that (1) the proposed license amendment to change TS 6.8.4 g to extend ILRT frequency to 15 years is acceptable and (2) the licensee can adopt NEI 94-01, Revision 3-A, as the implementation document and extend the current performance-based Type A test interval to up to 15 years, allowing the next Type A test to be conducted no later than October 15, 2018, subject to the guide lines of RG 1.163, "Performance-Based Containment Leak-Test Program", dated September 1995. However, the NRC staff also finds that the Type B and Type C LLRTs intervals (i.e. maximum of 60 months) remain the same, as noted in the license amendment request.

4.0 STATE CONSULTATION

In accordance with the Commission's regulations, the South Carolina State official was notified of the proposed issuance of the amendments. The State official had no comments.

5.0 ENVIRONMENTAL CONSIDERATION

The amendment changes a requirement with respect to installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20. 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 (78 FR 38084, June 25, 2013). 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 amendments will not be inimical to the common defense and security or to the health and safety of the public.

7.0 REFERENCES

- 7.1 Gatlin, T. D., Letter dated April 3, 2013, South Carolina Electric & Gas Company – Virgil C. Summer Nuclear Station, Unit 1, to USNRC regarding the “Technical Specification Change to Extend Integrated Leak Rate Test Frequency to 15 Years,” (ADAMS Accession No. ML13095A109).
- 7.2 Martin, R. E., NRC Senior Project Manager, Letter dated August 6, 2013 to Thomas D. Gatlin, "Request for Additional Information Concerning Integrated Leak Rate Testing (TAC NO. MF1385)," (ADAMS Accession No. ML13204A145).
- 7.3 Gatlin, T. D., Letter dated September 5, 2013, South Carolina Electric & Gas Company – Virgil C. Summer Nuclear Station, Unit 1, to USNRC- Response to the USNRC staff's request for additional information related to the Technical Specification Change to Extend Integrated Leak Rate Test Frequency to 15 Years, (ADAMS Accession No. ML13252A239).
- 7.4 Nuclear Energy Institute Topical Report NEI 94-01, Revision 3-A, “Industry Guideline for Implementing Performance-Based Option of 10 CFR Part 50, Appendix J,” July 2012. (ADAMS Accession No. ML12221A202)
- 7.5 Nuclear Energy Institute Topical Report NEI 94-01, Revision 2-A, “Industry Guideline for Implementing Performance-Based Option of 10 CFR Part 50, Appendix J,” November 19, 2008. (ADAMS Accession No. ML100620847)
- 7.6 NRC Final Safety Evaluation Report, “Final Safety Evaluation for Nuclear Energy Institute (NEI) Topical Report 94-01, Revision 2, ‘Industry Guideline for Implementing Performance-Based Option of 10 CFR Part 50, Appendix J,’ and Electric Power Research Institute (EPRI) Report No. 1009325, Revision 2, August 2007, ‘Risk Impact Assessment of Extended Integrated Leak-Rate Test Intervals,” US Nuclear Regulatory Commission, Washington, DC, June 25, 2008 (ADAMS Accession No. ML081140105).
- 7.7 NRC Final Safety Evaluation Report, “Final Safety Evaluation of Nuclear Energy Institute (NEI) Topical Report 94-01, Revision 3, ‘Industry Guideline for Implementing Performance-Based Option of 10 CFR Part 50, Appendix J,’ US Nuclear Regulatory Commission, Washington, DC, June 8, 2012 (ADAMS Accession No. ML121030286).

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Virgil C. Summer Nuclear Station
Post Office Box 88, Mail Code 800
Jenkinsville, SC 29065

SUBJECT: VIRGIL C. SUMMER NUCLEAR STATION, UNIT 1 - ISSUANCE OF
AMENDMENT EXTENDING INTEGRATED LEAK RATE TEST INTERVAL
(TAC NO. MF1385)

Dear Mr. Gatlin:

The U.S. Nuclear Regulatory Commission has issued the enclosed Amendment No. 194 to Renewed Facility Operating License No. NPF-12 for the Virgil C. Summer Nuclear Station, Unit 1 (VCSNS), in response to your letter dated April 3, 2013, as supplemented by letter dated September 5, 2013. This amendment allows for the extension of the 130-month frequency of the VCSNS containment integrated leak rate test or Type A test, that is required by TS 6.8.4 g. to 15 years on a permanent basis.

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

Sincerely,
/RA/

Shawn 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. 194 to NPF-12
2. Safety Evaluation

cc w/encls: Distribution via Listserv

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RidsAcrs_AcnwMailCTR Resource
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DHoang

ADAMS Accession No. ML13326A204

*By memo dated

OFFICE	LPL2-1/PM	LPL2-1/LA	DRA/APLA/BC*	DSS/SCVB/BC*	DE/EMCB
NAME	SWilliams	SFiguroa	HHamzehee *	RDennig*	AMcMurtray*
DATE	2/5/14	12/24/13	11/14/13	12/2/13	12/11/13
OFFICE	DSS/STSB	OGC	LPL2-1/BC	LPL2-1/PM	
NAME	RElliot	DRoth	RPascarelli	SWilliams	
DATE	1/3/14	2/4/14	2/4/14	2/5/14	

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