



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

February 20, 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 – RELIEF REQUEST FROM THE REQUIREMENTS OF THE ASME CODE (RR-III-10) (TAC NO. MF1848)

Dear Mr. Gatlin:

By letter dated May 6, 2013, as supplemented by letters dated October 11, 2013, and January 22, 2014, South Carolina Electric & Gas Company (SCE&G), the licensee, submitted a relief request to the U.S. Nuclear Regulatory Commission (NRC). In the relief request, the licensee proposed an alternative to the American Society of Mechanical Engineers (ASME) Section XI Volumetric Examination Requirements for the Virgil C. Summer Nuclear Station, Unit 1 (VCSNS), third 10-year inservice inspection interval that ends on December 31, 2013.

Specifically, pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR):

- 10 CFR 50.55a(g)(6)(i), the licensee requested relief and to use alternative requirements (if necessary), for in-service inspection items on the basis that the code requirement is impractical.

The NRC has reviewed the subject request and concludes, as set forth in the enclosed safety evaluation, that the licensee has adequately addressed all of the regulatory requirements set forth in 10 CFR 50.55a(g)(6)(i).

If you have any questions, please contact the Project Manager, Shawn Williams, at 301-415-1009 or via e-mail at Shawn.Williams@nrc.gov.

Sincerely,

A handwritten signature in black ink, appearing to read "R. Pascarelli".

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

Docket No. 50-395

Enclosure: Safety Evaluation

cc w/encl: Distribution via Listserv

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELIEF REQUEST REGARDING

PRESSURIZER SURGE NOZZLE-TO VESSEL EXAMINATION

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 May 6, 2013 (Agencywide Documents Access and Management System (ADAMS) Accession Number ML13129A178), as supplemented by letters dated October 11, 2013 and January 22, 2014 (ADAMS Accession Nos. ML13289A183 and ML14027A326, respectively), South Carolina Electric & Gas Company (SCE&G), the licensee, proposed an alternative to relief from the requirements of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code (B&PV Code) for the “essentially 100 percent” volumetric examination coverage requirement for the pressurizer nozzle-to-vessel welds.

Specifically, pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR) Part 50, 10 CFR 50.55a(g)(6)(i), the licensee requested relief and to use alternative requirements for inservice inspection on the basis that the code requirement is impractical.

2.0 REGULATORY EVALUATION

Inservice inspection (ISI) of the ASME Code Class 1, 2, and 3 components is performed in accordance with Section XI of the ASME Boiler and Pressure Vessel Code (the Code) and applicable addenda, as required by 10 CFR 50.55a(g), except where specific relief has been granted by the Commission in accordance with 10 CFR 50.55a(g)(6)(i). The regulation at 10 CFR 50.55a(a)(3) states, in part, that alternatives to the requirements of paragraph (g) may be used, when authorized by the U.S. Nuclear Regulatory Commission (NRC), if the applicant demonstrates that: (i) the proposed alternatives would provide an acceptable level of quality and safety, or (ii) compliance with the specified requirements would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety.

Pursuant to 10 CFR 50.55a(g)(4), ASME Code Class 1, 2, and 3 components (including supports) shall meet the requirements, except the design and access provisions and the preservice examination requirements, set forth in the ASME Code, Section XI, “Rules for Inservice Inspection of Nuclear Power Plant Components,” to the extent practical within the limitations of design, geometry, and materials of construction of the components. The regulations require that inservice examination of components and system pressure tests conducted during the first 10-year ISI interval and subsequent ISI intervals comply with the requirements in the latest edition and addenda of Section XI of the ASME Code incorporated by reference in 10 CFR 50.55a(b) twelve months prior to the start of the 120-month interval,

Enclosure

subject to the limitations and modifications listed therein. The Code of Record for the Virgil C. Summer Nuclear Station, Unit 1 (VCSNS) third 10-year ISI interval is the 1998 Edition through the 2000 Addenda of the ASME B&PV Code. The third 10-year ISI interval for VCSNS ends on December 31, 2013.

With respect to examination coverage, "essentially 100 percent" is clarified by ASME Code Case N-460, "Alternative Examination Coverage for Class 1 and Class 2 Welds," to be greater than 90 percent coverage of the examination volume, or surface area, as applicable. ASME Code Case N-460 has been approved for use by the NRC in Regulatory Guide 1.147, Revision 16, "Inservice Inspection Code Case Acceptability, ASME Section XI, Division 1."

3.0 TECHNICAL EVALUATION

Code Requirement

ASME Code, Section XI, 1998 Edition through the 2000 Addenda, Table IWB-2500-1, Category B-D, "Full Penetration Welded Nozzles in Vessels – Inspection Program B," Item No. B3.110, "Nozzle-to-Vessel Welds" (Pressurizer) requires volumetric examination of 100 percent of the weld and adjacent base material as depicted in Figure IWB-2500-7. Figure IWB-2500-7(b) depicts the nozzle geometry applicable to the VCSNS pressurizer surge nozzle.

Subarticle IWA-2230, "Volumetric Examination," of Section XI of the ASME Code identifies volumetric examination techniques that may be employed for the examinations specified in Table IWB-2500-1. The licensee elected to use ultrasonic examination techniques for examination of the subject nozzle weld. For ultrasonic examination techniques, Paragraph IWA-2232, "Ultrasonic Examination," of Section XI of the ASME Code specifies that ultrasonic examination shall be conducted in accordance with Appendix I, "Ultrasonic Examinations," to Section XI of the ASME Code. Subsubarticle I-2120, "Other Vessels," of Appendix I to Section XI of the ASME Code specifies that ultrasonic examination of all other vessels greater than 2 inches in thickness shall be conducted in accordance with Article 4 of Section V of the ASME Code, as supplemented by Table I-2000-1. Therefore, the licensee's examination was classified as "non-PDI" in RR-III-10 indicating that the requirements of Appendix VIII, "Performance Demonstration for Ultrasonic Examination Systems," to Section XI of the ASME Code were not utilized. In the May 6, 2013 submittal, the licensee cited that Wesdyne International performed the pressurizer surge nozzle inspection with Procedure No. SDI-STD-1 010 Revision 3, "Manual Ultrasonic Procedure for the Examination of Pressure Vessel Welds > [Greater Than] 2" [Inches] in Thickness, Including Non-PDI Reactor Vessels and Heads" dated August 9, 2012. The ultrasonic test (UT) examination data for the pressurizer surge nozzle examination was included as Attachment 2 to the licensee's May 6, 2013 submittal.

Component Identification

ASME Code, Section XI, Table IWB-2500-1, Examination Category B-D, "Full Penetration Welded Nozzles in Vessels – Inspection Program B," Item No. B3.110, "Nozzle-to-Vessel Welds" (Pressurizer).

Component: Pressurizer Surge Nozzle.
Weld: Nozzle-to-Vessel Weld No.1-2100A-8.

Licensee's Code Relief Request (as stated)

Relief is requested from the "essentially 100 percent" volumetric examination coverage requirement for the identified Pressurizer Nozzle-to-Vessel Welds, ASME Section XI, Category B-D, Item No. B3.110.

Licensee's Basis for Requesting Relief (as stated)

In accordance with 10CFR50.55a(g)(5)(iii), relief is requested for the Pressurizer Surge Nozzle-to-Vessel Weld, ASME Section XI Category B-D, Item Number B3.110 from the "essentially 100 percent" volumetric examination coverage requirement. During refuel 20, VCSNS was limited in the amount of code coverage obtainable. VCSNS was successful in coverage of 75.5 percent with no recordable indications. The essentially 100 percent code coverage (90 percent minimum) requirement is considered impractical due to the pressurizer shell to surge nozzle weld configuration. Ultrasonic examination of the pressurizer surge nozzle to vessel weld is limited in coverage due to the configuration and interference with the pressurizer heater penetration ring and insulation. VCSNS is declaring that the examination was performed to the extent practical using qualified equipment and personnel.

Licensee's Proposed Alternative Examination (as stated)

SCE&G proposes that the examinations completed during the last refueling [sic] [outage], at the reduced coverage, be accepted as meeting the Code requirements to the extent practical. Alternative components could not be substituted for examination due to the mandatory selection requirements of the Code. The limited volumetric examination should detect any general patterns of degradation that may occur in the areas covered, therefore providing reasonable assurance of the continued structural integrity of the subject weld.

Staff Evaluation:

ASME Code, Section XI, 1998 Edition through the 2000 Addenda, Table IWB-2500-1, Category B-D, Item No. B3.110 requires volumetric examination of 100 percent of the nozzle-to-vessel weld and adjacent base material of the pressurizer.

The pressurizer surge nozzle is located in the bottom head of the pressurizer in an area that is inaccessible for examination from inside of the pressurizer. Therefore, the examination was performed only from the outside surface. In addition, the design configuration of VCSNS pressurizer surge nozzle-to-vessel weld precludes a UT examination of essentially 100 percent of the required volume. The examination limitations are caused by the proximity of the nozzle-to-vessel weld to the nozzle forging on one side, and the pressurizer heater penetrations on the other side, as depicted in the figure on page 6 of Attachment 2 of the licensee's May 6, 2013 submittal. Information on the examination scan coverage limitations were supplemented in the licensee's October 11, 2013, response to the staff's RAI Question No. 4, where the licensee provided an additional sketch (Attachment I of that submittal). In order to meet the ASME Code examination coverage requirements, the nozzle and/or pressurizer would have to be modified to facilitate access for UT search units. Because of these limitations, the component design configuration limited UT examination coverage of the weld to 75.5 percent. The licensee provided supplemental information to support the examination coverage amount in their October

11, 2013, response to the staff's RAI Question No. 6, and in their January 22, 2014, response to the staff's to follow-up RAI 6.c (Figures 1 and 2 of the Attachment to that submittal).

In RAI Question No. 1, the staff noted their inability to locate a prior submittal from SCE&G requesting relief from essentially 100% inspection coverage for the VCSNS pressurizer surge nozzle since the current design configuration for the VCSNS surge nozzle has been present since the original plant design. The licensee's response indicated that relief was not requested during the first or second 10-year ISI intervals because of a previous interpretation of coverage requirements defined in Section XI of the ASME Code. The licensee noted that such interpretation was common at the time and eventually led to the NRC issuing Information Notice (IN) 98-42, "Implementation of 10 CFR 50.55a(g) Inservice Inspection Requirements" for clarification. The staff finds this response acceptable.

As indicated in the licensee's response to the staff's RAI Question No. 2, three previous examinations of the pressurizer surge nozzle weld were completed: one preservice examination and one examination in each of the first two 10-year ISI intervals. No indications were discovered during those three examinations. The percentage of examination coverage obtained in the first and second 10-year ISI intervals was the same as the coverage reported for the third 10-year ISI interval.

In addition, as indicated in the licensee's response to the staff's RAI Questions No. 3 and 5, the pressurizer surge nozzle receives a visual (VT-2) examination in conjunction with the Class 1 System Leakage Test and the Boric Acid Corrosion Inspection conducted during each refueling outage. Consequently, the pressurizer surge nozzle has undergone several VT-2 examinations during past refueling outages. The results of several of these examinations were included as Attachment II to the licensee's October 11, 2013 letter, which were satisfactory with no observed indications of leakage in any part of the pressurizer lower head area. The VT-2 visual examinations of the nozzle area, which will continue to be performed during each refueling outage in conjunction with the Class 1 System Leakage Test and the Boric Acid Corrosion Inspection, will provide reasonable assurance of the leak tightness of the nozzle-to-vessel weld because the system leakage test will provide for detection of through-wall flaws so that appropriate actions can be taken in accordance with the ASME Code, Section XI prior to operation to ensure the structural integrity of the pressurizer surge nozzle and its ability to perform its intended function.

Based on foregoing, the staff determined that the ASME Code requirements are impractical for the pressurizer surge nozzle-to-vessel weld. The staff determined, based on the volumetric coverage obtained for the nozzle-to-vessel weld, that it is reasonable to conclude that if significant service-induced degradation had occurred in the nozzle-to-vessel weld, evidence of degradation would have been detected in the portion that was examined. Furthermore, the staff determined that all examinations performed on the pressurizer surge nozzle provide reasonable assurance of structural integrity of the nozzle-to-vessel weld of the pressurizer surge nozzle for VCSNS.

4.0 CONCLUSION

As set forth above, the NRC staff has determined that granting relief pursuant to 10 CFR 50.55a(g)(6)(i) is authorized by law and will not endanger life or property, or the common defense and security, and is otherwise in the public interest given due consideration to

the burden upon the licensee that could result if the requirements were imposed on the facility. Furthermore, the staff concluded that the examinations performed to the extent practical provide reasonable assurance of structural integrity of the pressurizer surge nozzle. Accordingly, the NRC staff concludes that the licensee has adequately addressed all of the regulatory requirements set forth in 10 CFR 50.55a(g)(6)(i). Therefore, the NRC staff grants relief for the subject examinations of the pressurizer surge nozzle contained in RR No. RR-III-10 for the VCSNS third 10-year ISI interval.

All other ASME Code, Section XI requirements for which relief was not specifically requested and approved in the subject request for relief remain applicable, including third-party review by the Authorized Nuclear Inservice Inspector.

Principle Contributors:

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Sincerely,
/RA/
Robert Pascarelli, Chief
Plant Licensing Branch II-1
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-395

Enclosure: Safety Evaluation
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