



July 27, 2012  
RC-12-0110

Document Control Desk  
U. S. Nuclear Regulatory Commission  
Washington, DC 20555

Dear Sir / Madam:

Subject: VIRGIL C. SUMMER NUCLEAR STATION (VCSNS) UNIT 1  
DOCKET NO. 50-395  
OPERATING LICENSE NO. NPF-12  
REQUEST FOR WELD RECATEGORIZATION AND USE OF  
ALTERNATIVES TO ASME CODE INSPECTION INTERVAL FOR  
VCSNS THIRD TEN YEAR INSERVICE INSPECTION (RR-III-08)

Reference: Letter from T. D. Gatlin, SCE&G, REQUEST FOR WELD  
RECATEGORIZATION FOR VCSNS STEAM GENERATOR NOZZLE TO  
SAFE END WELDS [PRELIMINARY SUBMITTAL – RR-III-08], dated  
June 21, 2012, ADAMS Accession No. ML12177A381

Pursuant to 10CFR50.55a(g)(6)(ii)(F)(2) and 10CFR50.55a(a)(3)(ii), South Carolina Electric & Gas Company (SCE&G), acting for itself and as an agent for South Carolina Public Service Authority (Santee Cooper), hereby submits the attached request for recategorization for the Steam Generator Nozzle dissimilar metal welds and relief from the inspection interval.

Due to the June 21, 2011 change to 10CFR50.55a [FR36232 Volume 76, Number 119], the primary steam generator (SG) nozzle to safe end welds are required to have a baseline inspection performed in the first outage following January 20, 2012. For VCSNS the applicable outage is RF-20 scheduled for fall 2012. The revised rule requires the use of ASME Boiler & Pressure Vessel Code (BPVC) Code Case N-770-1 with conditions specified in 10CFR50.55a(g)(6)(ii)(F). The proposed weld categorization change will reflect the actual weld profile rather than the default A-2 and B assignment under the new rule. VCSNS initiated its request for alternative categorization to inspection Item G of Code Case N-770-1 within the referenced letter. Enclosure 1 provides the results of the flaw evaluation for the proposed weld recategorization by addressing items 11 and 12 of question 29 provided within NRC document "Summary of Public Meeting Between the Nuclear Regulatory Commission Staff and Industry Representatives on Implementation of ASME Code Case N-770-1," [ML112240818] dated August 12, 2011. It is anticipated that the information required to support item 5 will be submitted to the NRC in August 2012.

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VCSNS is also requesting an alternative to the implementation date requirements of 10CFR50.55a(g)(6)(ii)(F)(3) by declaring hardship under 10CFR50.55a(a)(3)(ii). The bases for this declaration are provided in Enclosure 2. The one time deferral proposed herein extends the inservice inspection interval beyond the current third interval end date of December 31, 2013.

SCE&G is requesting NRC approval of the proposed alternatives by November 6, 2012 (prior to the weld being placed in service with the plant in an operating mode other than Mode 5 or 6) in accordance with 10CFR50.55a(g)(6)(ii)(F)(3).

This letter contains no commitments. Should you have any questions, please call Bruce L. Thompson at 803-931-5042.

Very truly yours,



Thomas D. Gatlin

JG/TDG/gr

Enclosure 1: Request For Weld Recategorization

Attachment 1: Westinghouse LTR-PAFM-12-86-NP

Enclosure 2: Relief Request RR-III-08

Attachment 1: Steam Generator Weld Profiles

c: K. B. Marsh  
S. A. Byrne  
J. B. Archie  
N. S. Carns  
J. H. Hamilton  
R. J. White  
W. M. Cherry  
V. M. McCree  
R. E. Martin  
NRC Resident Inspector  
K. M. Sutton  
NSRC  
RTS (CR-12-00556)  
File (810.19-2)  
PRSF (RC-12-0110)

**South Carolina Electric & Gas Co. (SCE&G)  
Virgil C. Summer Nuclear Station Unit 1 (VCSNS)  
Request For Weld Recategorization**

**1. ASME Code Component(s) Affected**

The affected components are the VCSNS, Steam Generator Nozzle (Hot and Cold Leg) to Safe End Welds which are Alloy 82/182 with an Alloy 152 inlay that was originally installed during fabrication. The VCSNS third 10-year inservice inspection (ISI) interval ends December 31, 2013.

Table 1

Examination Category	Inspection Item	Description
N-770-1	A-2	Weld CGE-1-4100A-31DM, Steam Generator "A" Hot Leg Nozzle
N-770-1	B	Weld CGE-1-4100A-32DM, Steam Generator "A" Cold Leg Nozzle
N-770-1	A-2	Weld CGE-1-4200A-28DM, Steam Generator "B" Hot Leg Nozzle
N-770-1	B	Weld CGE-1-4200A-29DM, Steam Generator "B" Cold Leg Nozzle
N-770-1	A-2	Weld CGE-1-4300A-29DM, Steam Generator "C" Hot Leg Nozzle
N-770-1	B	Weld CGE-1-4300A-30DM, Steam Generator "C" Cold Leg Nozzle

**2. Applicable Code Edition and Addenda**

ASME Code Section XI, Division 1, "Rules for Inservice Inspection of Nuclear Power Plant Components," 1998 Edition through 2000 Addenda.

**3. Applicable Code Requirement**

**Code Case N-770-1**, "Alternative Examination Requirements and Acceptance Standards for Class 1 PWR Piping and Vessel Nozzle Butt Welds Fabricated with UNS N06082 or UNS W86182 Weld Filler Material With or Without Application of Listed Mitigation Activities Section XI, Division 1."

**ASME Code Section XI, Division 1**, "Rules for Inspection and Testing of Components of Light Water Cooled Plants."

**Article IWB-2500**, "Examination and Pressure Test Requirements"

**Table IWB-2500-1**, "Examination Categories"

#### **4. Reason for Request**

Recategorization is being requested due to the imposed rulemaking change to 10CFR50.55a [FR36232 Volume 76, Number 119], issued June 21, 2011. The rulemaking change requires the use of ASME Boiler & Pressure Vessel Code (BPVC) Code Case N-770-1 with conditions specified in 10CFR50.55a(g)(6)(ii)(F) specifically for Class 1 Piping and Nozzle Dissimilar-Metal Butt Welds. As stated within 10CFR50.55a(g)(6)(ii)(F)(2):

"...all other butt welds that rely on Alloy 82/182 for structural integrity shall be categorized as Inspection Items A-1, A-2 or B until the NRC staff has reviewed the mitigation and authorized an alternative code case Inspection Item for the mitigated weld..."

#### **5. Proposed Alternative and Basis for Use**

VCSNS is requesting an alternative categorization to inspection items specific to the six replacement Steam Generator Nozzle (Hot and Cold Leg) to Safe End Welds which are Alloy 82/182 with an Alloy 152 inlay that was originally applied during fabrication. The replacement steam generators were manufactured in 1993 and installed during VCSNS outage RF8 in the fall of 1994. Based on the manufacturing process of the replacement steam generators and guidance from Code Case N-770-1, the VCSNS Steam Generator Nozzles' (Hot and Cold Leg) Safe End Welds should be categorized as Inspection Item G, "Uncracked Butt Weld Mitigated With An Inlay."

South Carolina Electric & Gas Company (SCE&G) is providing the remainder of the response to items 11 and 12 that were discussed within Question 29 from "Summary Of Public Meeting Between The Nuclear Regulatory Commission Staff And Industry Representatives On Implementation Of ASME Code Case N-770-1," [ML112240818] dated August 12, 2011. It is anticipated that the information required to support item 5 will be located and submitted to the NRC in August 2012. The other nine items and VCSNS response were provided within a letter from T. D. Gatlin, SCE&G, REQUEST FOR WELD RECATEGORIZATION FOR VCSNS STEAM GENERATOR NOZZLE TO SAFE END WELDS [PRELIMINARY SUBMITTAL – RR-III-08], dated June 21, 2012, ADAMS Accession No. ML12177A381.

Item	Description
5	<b><i>qualifications of the weld procedure specifications, welders and welding operators</i></b>
<p>[VCSNS Response]</p> <p>The replacement steam generators were fabricated at the Westinghouse Pensacola plant, using qualified nuclear component welders with many years of experience. The weld procedures and qualifications were performed in accordance with the requirements of ASME Code Section III NCA-4134.17(1986 edition) and Westinghouse's Appendix B Program. Since the construction of the VCSNS replacement steam generators, Westinghouse has closed the fabrication facility and has not yet located the supporting documentation for this item. It is anticipated that the information will be located and submitted to the NRC in August 2012.</p>	
11	<b><i>flaw evaluation to show adequate thickness against stress corrosion cracking.</i></b>
<p>[VCSNS Response]</p> <p>Westinghouse LTR-PAFM-12-86-NP, Flaw Tolerance Evaluation to Support Re-categorization of V. C. Summer Unit 1 Steam Generator Nozzle to Safe End Dissimilar Metal Weld Inspection Requirements has been provided as Attachment 1 of this enclosure.</p> <p>Based on the Pressurized Water Stress Corrosion Cracking (PWSCC) crack growth analysis results, the service life required to grow through the Alloy 152 weld inlay is more than 10 effective full power years. This service life is more than the required examination interval of 10 years for Inspection Item G, "Uncracked butt weld mitigated with an inlay" in accordance with Code Case N-770-1.</p>	
12	<b><i>for primary water stress corrosion crack growth rates for Alloy 52/152 weld materials, at this time, NRC recommends using the Alloy 182 crack growth rate curve provided in MRP-115, with an improvement factor (IF) of 100 for Alloy 52 welds and an IF of 10 for Alloy 152 welds.</i></b>
<p>[VCSNS Response]</p> <p>Westinghouse LTR-PAFM-12-86-NP, Flaw Tolerance Evaluation to Support Re-categorization of V. C. Summer Unit 1 Steam Generator Nozzle to Safe End Dissimilar Metal Weld Inspection Requirements has been provided as Attachment 1 of this enclosure.</p> <p>For PWSCC, the crack growth model for Alloy 152 weld inlay material is based on that given in MRP-115 for Alloy 182 weld material with an improvement factor of 100. This improvement factor, although higher than the recommended in the public question response shown in Appendix A, is a more accurate improvement factor for Alloy 152 weld based on the reported data documented in NUREG/CR-7103 as well as those from GE Global Research.</p>	

## **6. Duration of Proposed Alternative**

This request for an alternative categorization for Steam Generator Nozzles (Hot and Cold Leg) to Safe End Welds will be a permanent change to the program for the duration of the operating license and license renewal. The Facility Operating License (NPF-12) was issued August 6, 1982 and was superseded by Renewed Facility Operating License issued on April 23, 2004. VCSNS is in the last period of its third 10 year inservice inspection (ISI) interval that will end December 31, 2013.

Per 10CFR50.55a(g)(6)(ii)(F)(3), the baseline examination shall be completed by the end of the next refueling outage after January 20, 2012. VCSNS is also requesting relief under this letter as documented within Enclosure 2, RR-III-08 to delay the baseline examination to 2014 (RF21). The one time deferral proposed herein extends the inservice inspection interval beyond the current third interval end date.

## **7. Precedents**

None.

## **8. References**

Proprietary documents may be viewed at the Westinghouse Rockville, MD. office.

1. 10CFR50-55a, Codes and Standards
2. FR36232 Volume 76, Number 119, issued June 21, rulemaking change to 10CFR50.55a
3. Public Meeting Summary ASME N-770-1 [ML112240818]
4. Virgil C. Summer Nuclear Station – Relief Request (RR-II-07) Associated with the Risk-Informed Inservice Inspection (RI-ISI) Program (TAC NO. MB6523) [ML031320443]
5. ASME CODE CASE N-770-1
6. ASME Boiler and Pressure Vessel Code, Section XI, 1998 Edition through 2000 Addenda, American Society of Mechanical Engineers, New York
7. EPRI 1010087 MRP-139
8. VCSNS Drawings [PROPRIETARY]
  - a. 1MS-07-400-0001, Machining and Assembly - Channel Head Welding (6145E22)
  - b. 1MS-07-400-0003, Primary Nozzle - Channel Head Welding (6145E22)
  - c. 1MS-07-400-0004, Nozzle Safe End Weld - Channel Head Welding (6145E22)

- d. 1MS-07-400-0005, Safe End Final Machining - Channel Head Welding (6145E22)
  - e. 1MS-07-400-0007, General Notes - Channel Head Welding (6145E22)
- 9. Westinghouse LTR-SGDA-12-27 [PROPRIETARY], V. C. Summer Unit 1 Replacement Steam Generators – Manufacturing Records for Channel Head Primary Inlet/Outlet Nozzle to Safe End Welds, Dated June 18, 2012
- 10. Westinghouse LTR-PAFM-12-86-NP, Flaw Tolerance Evaluation to Support Re-categorization of V. C. Summer Unit 1 Steam Generator Nozzle to Safe End Dissimilar Metal Weld Inspection Requirements, Dated July 2012