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Vice President, Nuclear Operations
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June 20, 2006
RC-06-0117

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

Dear Sir / Madam:

**Subject: VIRGIL C. SUMMER NUCLEAR STATION (VCSNS)
DOCKET NO. 50/395
OPERATING LICENSE NO. NPF-12
REQUEST TO USE ALTERNATIVES TO ASME CODE
REQUIREMENTS IN VCSNS THIRD INSERVICE INSPECTION
INTERVAL (RR-III-03, RR-III-04)**

- References:
1. NRC Letter to SCE&G, Virgil C. Summer Nuclear Station - Second 10-Year Inservice Inspection, Request for Relief RR-II-20, RR-II-20 ADDENDA, and RR-II-21 (TAC NO. MC0108), February 3, 2004, [ML040340450]
 2. S. A. Byrne (SCE&G) Letter (RC-03-0229) to Document Control Desk (NRC), dated November 3, 2003, Response to Request for Additional Information Regarding Request to Use Alternatives to ASME Boiler and Pressure Vessel Code, Section XI, Relief Request Relief Request RR-II-20 (C-03-0262) [ML033100384]
 3. S. A. Byrne (SCE&G) Letter (RC-03-0199) to Document Control Desk (NRC), dated September 17, 2003, Resubmittal of Request to Use Alternatives to ASME Boiler and Pressure Vessel Code, Section XI (C-03-0262), RR-II-20 and RR-II-21 [ML032660945]
 4. S. A. Byrne (SCE&G) Letter (RC-03-0142) to Document Control Desk (NRC), dated July 11, 2003, Request to Use Alternatives to ASME Boiler and Pressure Vessel Code, Section XI RR-II-15, RR-II-16, RR-II-17, RR-II-18, RR-II-19, RR-II-20, RR-II-21 [ML031970665]

South Carolina Electric & Gas Company (SCE&G) hereby submits the attached requests for using alternatives to the examination requirements of the ASME Code. SCE&G has determined that the proposed alternatives will provide an acceptable level of quality and safety.

A detailed description of the proposed alternatives, including basis for relief, is included as attachments to this letter. SCE&G requests NRC review and approval of these requests by October 1, 2006 in order to apply to the VCSNS Examination Program during VCSNS refuel outage 16 currently scheduled for October 15, 2006.

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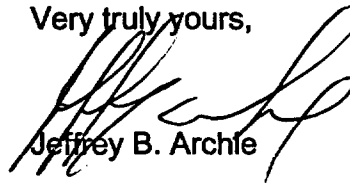
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Similar relief requests were previously submitted for the Second Inservice Inspection Interval (References 2, 3, and 4) and were approved by the NRC (Reference 1).

SCE&G is submitting the attached relief request in accordance with 10 CFR 50.55a(a)(3)(i).

Should you have any questions, please call Mr. Robert G. Sweet at (803) 345-4080.

Very truly yours,



Jeffrey B. Archie

JT/JBA/dr
Attachments

c: K. B. Marsh
S. A. Byrne
N. S. Carns
J. H. Hamilton, Jr. (w/o Attachments)
R. J. White
W. D. Travers
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NRC Resident Inspector
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RTS (C-06-1703)
File (810.19-2)
DMS (RC-06-0117)

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**South Carolina Electric & Gas Co. (SCE&G)
Virgil C. Summer Nuclear Station (VCSNS)
Relief Request**

RR-III-03

Subject:

Inspection and examination of Class 1 Reactor Vessel Hot Leg welds.

Components:

The Reactor Vessel Nozzle to Pipe weld. The Bravo Hot Leg Nozzle to Pipe weld will be examined by remote ultrasonic techniques. Use of ASME Code Case N-695 with alternate depth sizing qualification criteria is requested.

Code Requirement:

Examination Category R-A, item R1.15 (previously Category BF Item # B5.10) specifies volumetric examination of this weld. The volumetric examination is to be conducted in accordance with Appendix VIII, Supplement 10, in the 1998 Edition with 2000 Addenda.

Relief Request:

Relief is requested from the use of Appendix VIII, Supplement 10, in the 1998 Edition with 2000 Addenda.

Alternate Test:

SCE&G proposes to use Code Case N-695 with a RMSE of 0.189 inches instead of the 0.125 inches specified for depth sizing in the Code Case. In the event that an indication is detected and requires depth sizing, the 0.064 inches difference between the required RMSE and the demonstrated RMSE ($0.189 - 0.125 = 0.064$) will be added to the measured through wall extent for comparison to the applicable acceptance standard. Should the contracted vendor demonstrate an improved depth sizing RMSE prior to the performance of these examinations, the difference of that improved RMSE will be substituted for the 0.189 inches.

The activities included in this relief request are subject to third party review by the Authorized Nuclear Inservice Inspector.

Basis for Relief:

ASME Code Case N-695, "Qualification Requirements for Dissimilar Metal Piping Welds, Section XI, Division 1," is shown as acceptable for use in Regulatory Guide (RG) 1.147, Revision 14, dated August, 2005. To date although examination vendors have qualified for detection and length sizing on these welds, these examination vendors have not met the established root mean square error (RMSE) requirement for depth sizing. The contracted vendor for SCE&G has demonstrated the ability to meet the depth sizing qualification requirement with a RMSE of 0.189 inches instead of the 0.125 inches established by the Code Case.

The addition of the difference in allowable depth sizing tolerance from that actually demonstrated to the flaw depths measured will compensate for the possible variance in measured depth.

Justification for Granting Relief:

The proposed alternative assures that this nozzle to pipe will be fully examined by procedures, personnel and equipment qualified by demonstration in all aspects except depth sizing. In order to compensate for the depth sizing, the addition of the difference between the qualified and demonstrated sizing tolerance will provide an acceptable level of safety and quality in accordance with 10 CFR 50:55a(a)(3)(i). The proposed alternative has been previously approved for VCSNS via NRC Letter dated February 3, 2004, (TAC NO. MC0108) [ML040340450].

Implementation Schedule:

This relief request will be implemented during the VCSNS third ISI interval, in the sixteenth and eighteenth refueling outages.

This is a new relief request based on Code Case N-695, approved in RG 1.147, Revision 14, and the examination vendors' most accurate demonstrated depth sizing performance.

**South Carolina Electric & Gas Co. (SCE&G)
Virgil C. Summer Nuclear Station (VCSNS)
Relief Request**

RR-III-04

Subject:

Inspection and examination of Class 1 Reactor Vessel Hot Leg welds.

Components:

The Reactor Vessel Nozzle to Pipe weld. The Bravo Hot Leg is located at 265 degrees, vessel angular reference. The Bravo Hot Leg Nozzle to Pipe dissimilar metal weld will be examined. This relief request addresses licensee plans for alternative action in the event surface roughness is encountered.

Code Requirement:

ASME Code, Section XI, Examination Category R-A, item R1.15 (previously Cat. BF Item # B5.10) specifies volumetric examination of this weld. The volumetric examination is to be conducted in accordance with Appendix VIII, Supplement 10, in the 1998 Edition with 2000 Addenda and/or the use of alternate requirements such as the use of Supplement 2 in conjunction with Supplement 10 (commonly referred to as proposed Supplement 14).

Relief Request:

Relief is requested from using only the ultrasonic method of Appendix VIII, Supplement 10 (or Supplement 2 in conjunction with Supplement 14), in the 1998 Edition with 2000 Addenda, when performing volumetric examination of the near surface, of this weld, in the presence of surface roughness with an ID surface examination.

Alternate Inspection

SCE&G proposes to use surface geometry software (profilometry) in conjunction with a focused immersion ultrasonic transducer positioned to permit accurate profiling data across the examination volume to assist the examiner in confirming locations where raw data indicates lack of transducer contact due to geometry. In addition to the profilometry, eddy current examination will be used to supplement the ultrasonic examination of the volume immediately under the ID surface where sufficient surface roughness exists to call into question the ultrasonic examination to detect axial flaws.

Profilometry will be used to determine any surface areas that may exhibit surface roughness sufficient to limit the ability of the ultrasonic technique to be used effectively as qualified. Eddy current will be used in areas identified by the profilometry to assure that any exiting near surface axial flaws that could be missed by the ultrasonic technique are detected. The following eddy current technique parameters will be utilized:

- Up to two plus point probes applied circumferentially on the ID surface in scan increments of 0.80 inches (for axial flaws) and 0.25 inches axially.
- Automated systems for data collection and analysis.

The target flaw size for the eddy current procedure is 0.28 inches long, which is well within the ASME Code linear flaw acceptance standard of 0.45 inches long for austenitic materials (as defined for the outside surface in the ASME Code Tables).

The Bravo Hot Leg Nozzle to Pipe Weld will be examined. The ultrasonic examinations, supplemented by eddy current examinations and profilometry will be conducted to the maximum extent possible and are subject to third party review by the Authorized Nuclear Inservice Inspector.

Basis for Relief:

The contracted vendor for SCE&G has qualified, via performance demonstration, for the detection of circumferential flaws, per Appendix VIII Supplements 10 and 14, for this weld when examined from the ID surface. This vendor is similarly qualified for the detection of axial flaws provided the surface is machined or ground smooth with no exposed weld root reinforcement or counter bore. Surface roughness that may be present could call into question the ultrasonic qualifications demonstrated for the detection of axial flaws in the volume immediately near the ID surface.

The vendor has developed an eddy current examination technique to augment the ultrasonic examination and provide increased sensitivity at the ID near surface. This technique has been successfully deployed at VCSNS in the primary nozzle examinations performed in 2000, 2002 and 2003.

The technique was refined from its original use in 2000 by applying the process to VCSNS Alpha Hot Leg Nozzle to Pipe weld that was removed from service for non-destructive and destructive testing. This section contained a number of Primary Water Stress Corrosion Cracking flaws as well as numerous non-relevant indications that were the result of surface geometry and metallurgical interfaces.

The use of these actual flaws and geometric conditions to refine the eddy current technique allowed the vendor to develop a reliable flaw screening criteria and supported the successful application in the 2002 and 2003 outage examinations.

Since these applications this technique has been successfully blind tested, for the Swedish authority SQC Kvalificeringscentrum AB (SQC NDT Qualification Center) under the program " Qualification of Equipment, Procedure and Personnel for Detection, Characterization and Sizing of Defects in Areas in Nozzles to Safe End Welds at Ringhals Unit 3 and 4," Hakan Soderstrand, 7-10-03. The important qualification parameters for eddy current in the SQC blind tests were as follows:

1. Defect types: fatigue and stress corrosion cracks
2. Tilt: +/- 10 degrees; Skew: +/- 10 degrees
3. Detection target size: IDSCC 6mm (0.25 inches) long
4. Flaw location: within 10mm (13/32 inches)
5. Length of the planar flaw within a 70% confidence level: +/- 9mm (3/8 inches)
6. False call rate: less than or equal to 20% for the personnel qualifications
(Reference the SQC Qualification Report No. 019A/03)

This technique has also been used to supplement examinations of portions of the relevant near surface volumes during the last 10 or more domestic pressurized water reactor nozzle to pipe examinations conducted by this vendor.

Justification for Granting Relief:

Use of profilometry and eddy current examination techniques via procedures and personnel qualified through the SQC blind tests to supplement the Appendix VIII qualified ultrasonic procedures and personnel for this weld provides additional assurance that surface breaking flaws that may be present will be detected regardless of orientation or potential surface roughness, thus resulting in an equivalent or better level of quality and safety than that currently qualified to meet ASME Code requirements in accordance with 10 CFR 50:55 a(a)(3)(i). The proposed alternative has been previously approved for VCSNS via NRC Letter dated February 3, 2004, (TAC NO. MC0108) [ML040340450].

Implementation Schedule:

This relief request will be implemented during the VCSNS third ISI interval, in the sixteenth and eighteenth refueling outages.

This is a new relief request based on alternative examination technology to compensate for potential limitations of the ultrasonic technique alone, for the detection of near surface axial flaws in the presence of potential surface roughness.