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SCE&G®
A SCANA COMPANY

January 29, 2003
RC-03-0027

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

Ladies and Gentlemen:

Subject: VIRGIL C. SUMMER NUCLEAR STATION (VCSNS)
DOCKET NO. 50/395
OPERATING LICENSE NO. NPF-12
RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION REGARDING REQUEST TO USE ALTERNATIVES TO ASME BOILER AND PRESSURE VESSEL CODE, SECTION XI, RELIEF REQUEST RR-II-08 (0-C-02-3202)

Reference:
1. SCE&G Letter to NRC (Document Control Desk), RC-02-0191, October 30, 2002, Request to Use Alternatives to ASME Boiler and Pressure Vessel Code, Section XI

2. NRC (K. R. Cotton) Letter to VCSNS January 22, 2003, Request for Additional Information ISI Relief Request RR-II-08 (TAC NO. MB6647)

South Carolina Electric & Gas Company (SCE&G) hereby submits the attached response to the referenced request for additional information (RAI) regarding relief request RR-II-08 submitted by Reference 1 on October 30, 2002.

Should you have any questions, please call Mr. Mel Browne at (803) 345-4141.

Very truly yours,

Stephen A. Byrne

JT/SAB/dr
Attachment

A047

c: N. O. Lorick
N. S. Cams
T. G. Eppink (w/o Attachment)
R. J. White
L. A. Reyes
K. R. Cotton
K. M. Sutton
General Managers
NRC Resident Inspector
A. R. Caban
NSRC
RTS (0-C-02-3202)
File (810.19-2)
DMS (RC-03-0027)

South Carolina Electric & Gas Company (SCE&G)
Virgil C. Summer Nuclear Station (VCSNS)
Response to NRC Request for Additional Information (RAI)
Regarding Inservice Inspection Relief Request
RR-II-08

1. **The submittal states that the relief is being requested in accordance with Title 10, Code of Federal Regulations (10 CFR), Sections 50.55a(a)(3)(i) and 50.55a(a)(3)(ii). Relief such as this has been authorized using 10 CFR 50.55a(a)(3)(ii), the American Society of Mechanical Engineers Boiler and Pressure Vessel Code since (the Code) requirements reflect hardship upon the licensee. To build a case for such hardship, please provide:**

   a. **A comparison of worker radiation dosage between the ultrasonic and visual examination techniques.**

Response 1.a:

The ultrasonic examination of the Steam Generator nozzle inner radius is performed in a radiation area of approximately 200 mr/hr. Each examination requires the following items to complete the task:

1. Mirror insulation removal, approximately 2 man-hours. This task is typically done in respirators.
2. Cleaning and or buffing of the surface, approximately 4 man-hours. This task is typically done in respirators.
3. Ultrasonic examination, approximately 2 man-hours.
4. Mirror insulation installation, approximately 2 man-hours.
5. Health Physics support, approximately ½ man hour (using remote surveillance).

This evolution of 10 ½ man-hours should be expected to cause an exposure of 2100 mr per nozzle. There are six nozzles to be inspected for a total of 12,600 mr for completion of all ultrasonic examinations each Interval.

Visual examination, VT-1, of the Steam Generator nozzle inner radius is performed by remotely utilizing either a robotic camera or utilization of the Eddy Current tooling end effectors for a robotic camera. Each visual examination requires approximately 1 man-hour to complete the task.

The least dose efficient method is expected to cause an exposure of 200 mr per nozzle. There are six nozzles to be inspected for a total of 1200 mr for completion of all visual examinations each Interval. The preferred method is the use of the Eddy Current tooling to perform this visual inspection. With the use of this tooling, the expected total dose associated with the Visual inspection should be ZERO mr.

b. The drawings (or pictorial discussion) showing the type and location of interferences with the Code-required ultrasonic examination. The drawing number was provided in the submittal but not the drawing itself. Identify the percent coverage that is able to be achieved on these nozzles using Code-required ultrasonic examinations.

Response 1.b:

The drawing and the Preservice data are attached for reference.

The ultrasonic examinations performed for the detection of corner flaws per IWB-2500-7(d) consists of two circumferential scans, one clockwise and one counterclockwise. Both exams are performed with a specially designed 28 degree longitudinal wave alternative style transducer. This examination technique has scan interferences from manufacturing pads and the internally fabricated primary head drain hole. The combination of these interferences has limited the maximum achievable coverage to **80.4 per-cent** of the examination volume.

c. A material description (cast carbon steel, cast stainless steel, cast nickel-based alloys, etc.) and dimensions (nozzle nominal inside diameter, nominal wall-thicknesses).

Response 1.c:

The material properties of the nozzle are:

- Material type - Cast nickel based alloy steel, SA-508 Cl 3a, with integrally cast nozzles
- Nozzle Inside diameter at the safe-end weld - 31.8 inches
- Nozzle nominal thickness at the safe-end weld - 3.2 inches

It should be noted that the nozzle has an approximate 9 degree taper toward the scan area for the inner radius. This makes the wall thickness at the area of the inner radius to be approximately 6 inches.

2. **The staff has been authorizing an enhanced VT-1 with demonstrated capabilities of resolving a 1-mil wire or equivalent flaw for the specified inner nozzle radii. This is in keeping with the current rule published in the *Federal Register*, 67 FR 60541, dated September 26, 2002, regarding 10 CFR 50.55a(a)(b)(2)(xxi). The proposed alternative is relying only on the Code-requirements for VT-1 of ensuring the detection of cracks.**

   a. **Discuss the demonstration used for comparing the effectiveness of the enhanced VT-1 and UT.**

Response 2.a:

SCE&G has not performed a physical comparative demonstration. It is believed that a direct visual inspection,VT-1, of the component surface would be at least equal to the ultrasonic examination of a cast high nickel based alloy in the thickness range of 6 inches. The visual examination resolution will be verified at the beginning of each component inspection to ensure the remote camera optics are capable of minor flaw detection. The use of a standard one-millimeter bare wire gauge at the inspection surface is typically used to qualify this type of system.

   b. **Explain the process used for selecting flaw types and sizes used for demonstrating effectiveness.**

Response 2.b:

SCE&G has not performed a physical comparative demonstration and no comparative flaws were utilized.

   c. **Provide a description of the flaws.**

Response 2.c:

SCE&G has not performed a physical comparative demonstration and no comparative flaws are represented.

d. Discuss the variations with respect to true values.

Response 2.d:

SCE&G has not performed a physical comparative demonstration and no comparative flaws are represented.

3. Discuss the percentage of Code-required surface coverage that will be examined with the alternate VT examination for each nozzle inner radius.

Response 3:

Essentially 100 per-cent of the component surface, as shown on Figure IWB-2500-7(d), will be inspected every time the component is opened for maintenance, repair, or eddy current examination.

4. Discuss the procedure for examination of the steam generator primary nozzle inner radius done during the first Inservice Inspection Interval for V. C. Summer Nuclear Station.

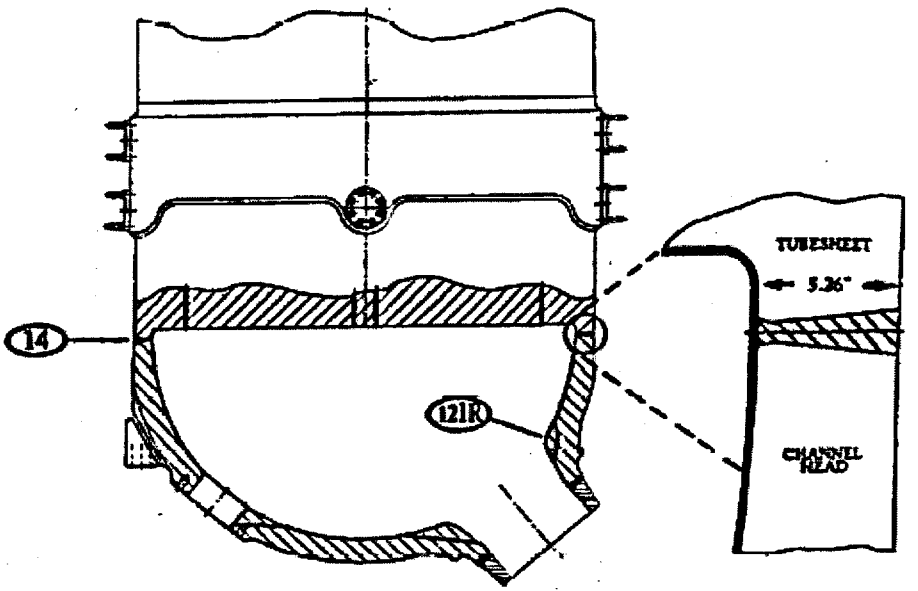
Response 4:

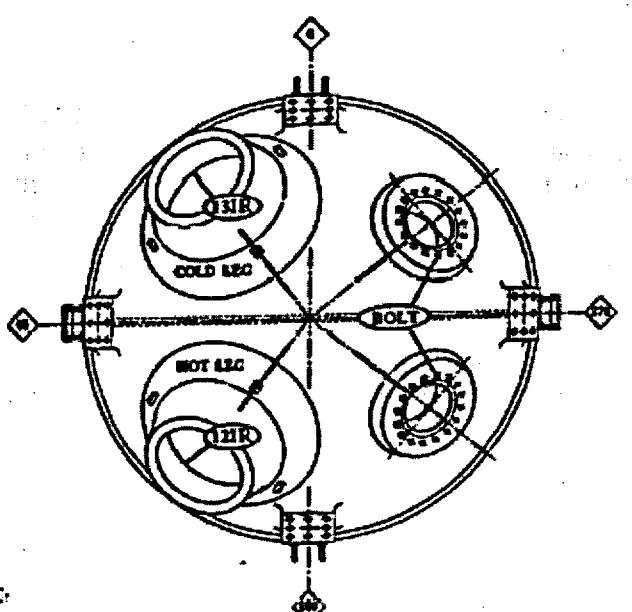
The Steam Generator primary nozzle inner radius was not required to be inspected during Interval I. The current Steam Generators were put into service in 1994 during the first refueling outage of Interval II.

SOUTH CAROLINA ELECTRIC and GAS COMPANY
VIRGIL C. SUMMER NUCLEAR STATION

ILLUSTRATIVE ONLY

CGE-1-3100





BOTTOM VIEW

WELD NUMBER EXAMPLE:
CGE-1-3100-14 A
CGE-1-3100-121R B
CGE-1-3100-BOLT C
SEE ISOMETRIC WELD & LOOP

CHANGES THIS REVISION:
WELD 1 DELETED PER MRF 90,001
NEW BOLTING PER MRF 90,001

REVISION	1	DATE
DRAWN	dcr	12-20
CHECKED		
APPROVED	dcr	12-28

WESTINGHOUSE NUCLEAR SERVICE DIVISION
INSPECTION SERVICES

ULTRASONIC INDICATION DATA

PLANT V. C. SUMMER UNIT #1 SKETCH 12150

SYST./COMP. PRIMARY NOZZLE INSIDE RADIUS, HOT & COLD LEG PROCEDURE SGE-ISI-247 REV.0

EXAMINER Gary A. Morris DATE 7-31-94

LINEARITY AND CAL. CHECK SAT/1145 CAL. BLOCK THICKNESS 4"

IDENT.	INDICATION LENGTH FROM	INDICATION LENGTH TO	MIN. 50% SWP.	MIN. 50% IN. TO REF.	MIN. 100% SWP.	MIN. 100% IN. TO REF.	PEAK SWP.	PEAK IN. TO REF.	PEAK + DAC. - AMPL.	MAX. 100% SWP.	MAX. 100% IN. TO REF.	MAX. 50% SWP.	MAX. 50% IN. TO REF.	BEAM ANGLE	BEAM DIR.	THICKNESS SURF. 2	THICKNESS WELD	THICKNESS SURF. 1	REMARKS
U-IR	(1)						4.8	@180°	100%					28°L	(2)	INNER RADIUS SECTION			
V-IR	(1)						4.8	@180°	100%					28°L	(2)	INNER RADIUS SECTION			

(1) THE WIDETH OF SCAN AREA AT VARYING SWEEP LOCATIONS, SEE GENERAL INDICATION SHEET.

(2) IN BOTH CIRCUMFERENTIAL DIRECTIONS.

REVIEW ANII

WESTINGHOUSE NUCLEAR SERVICE DIVISION
INSPECTION SERVICES

WELD ULTRASONIC EXAMINATION
PRESERVICE

PLANT	UNIT	SKETCH
V. C. SUMMER	#1	12150
SYST. / COMP.		PROCEDURE
PRIMARY NOZZLE INSIDE RADIUS, HOTLEG/COLDLEG		SGE-NSI-247 REV. 0
EXAMINER (LEVEL II)		DATE
[signature]		7-31-94

EQUIPMENT	TRANSDUCER	STRAIGHT BEAM SCAN DIRECTION 0		CIRCUMFERENTIAL SCANS									CALIBRATION CHECK
INST. S / N SONIC-136 136.005K	S / N			921609									INITIAL 0945
REP. RATE 1K	SIZE			.5" X 1"									
REJECT OFF	FREQ.			2.25 Mhz									
DAMPING 500 OHM	ANGLE			23° L									
	CALIBRATION REFLECTION LOCATION	SIGNAL AMPL.	SWEEP POSITION	SIGNAL AMPL.	SWEEP POSITION	DISTANCE FROM SCRIBE / REF. LINE TO PEAK	DISTANCE FROM SCRIBE / REF. LINE TO 50 % DAC LOCATIONS		SIGNAL AMPL.	SWEEP POSITION	DISTANCE FROM BORE / REF. LINE TO PEAK	DISTANCE FROM BORE / REF. LINE TO 50 % DAC LOCATIONS	FINAL TIME
FILTER 1	A			80%	2.0								1140
LIN. CHECK SAT	B			80%	5.0								
	C			40%	7.0								
S. U. CABLE 24" BNC TO BNC													
COUPLANT ECHO GELL-2000 094007													CAL. BLOCK 8148906
	SCAN GAIN			70dB									THICKNESS 12"
	CAL. GAIN			70dB									TEMPERATURE 75°F

IDENT.	TEMP.	BASE METAL SCAN	SCAN DIRECTION 2	5	7 / 8	0	EXAMINATION LIMITATIONS	SCAN SURFACE	RESULTS RI	NRI	RI	REMARKS
U-R	75°F				YES		SEE LIMITATION SHEET	SMOOTH	X			SEE INDICATION DATA SHEET FOR
V-R	75°F				YES		SEE LIMITATION SHEET	SMOOTH	X			GEOMETRIC INDICATIONS

REVIEW

APR

WESTINGHOUSE NUCLEAR SERVICE DIVISION
INSPECTION SERVICES

LIMITATION TO EXAMINATION

PLANT V.C. SUMMER UNIT #1 SKETCH 12150

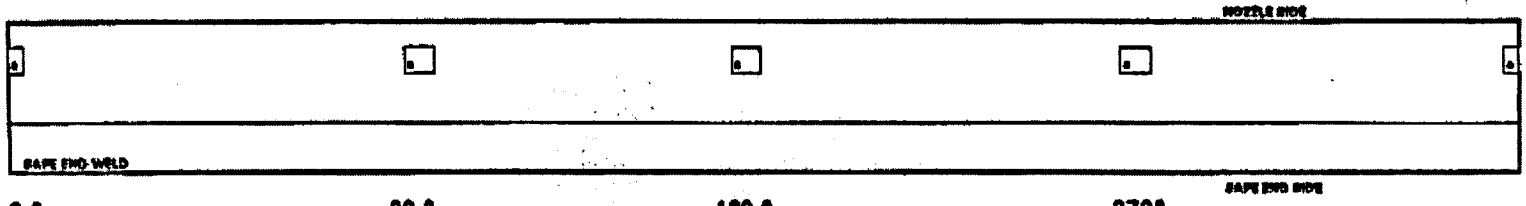
SYST./COMP. PRIMARY NOZZLE INSIDE RADIUS, HOTLEG/COLDLEG PROCEDURE SGE-ISI-247 REV. 0

EXAMINER Leroy A. Morris DATE 7-31-94

RELATED TO: UT X PT ___ MT ___ VT ___ IDENT. NO. U-IR / V-IR

PROVIDE GENERAL INFORMATION TO DESCRIBE APPROXIMATE SIZE, LOCATION AND TYPE OF LIMITATION.

For Information Only



0 ° 90 ° 180 ° 270°

ZERO DEGREE IS LOCATED AT TOP CENTER OF OF SAFE END

a = 4" X 3.5" SET UP PAD

SEE GENERAL INDICATION DATA SHEET FOR SIDE VIEW OF SET UP PAD

110

WESTINGHOUSE NUCLEAR SERVICE DIVISION
INSPECTION SERVICES

GENERAL - INDICATION DATA

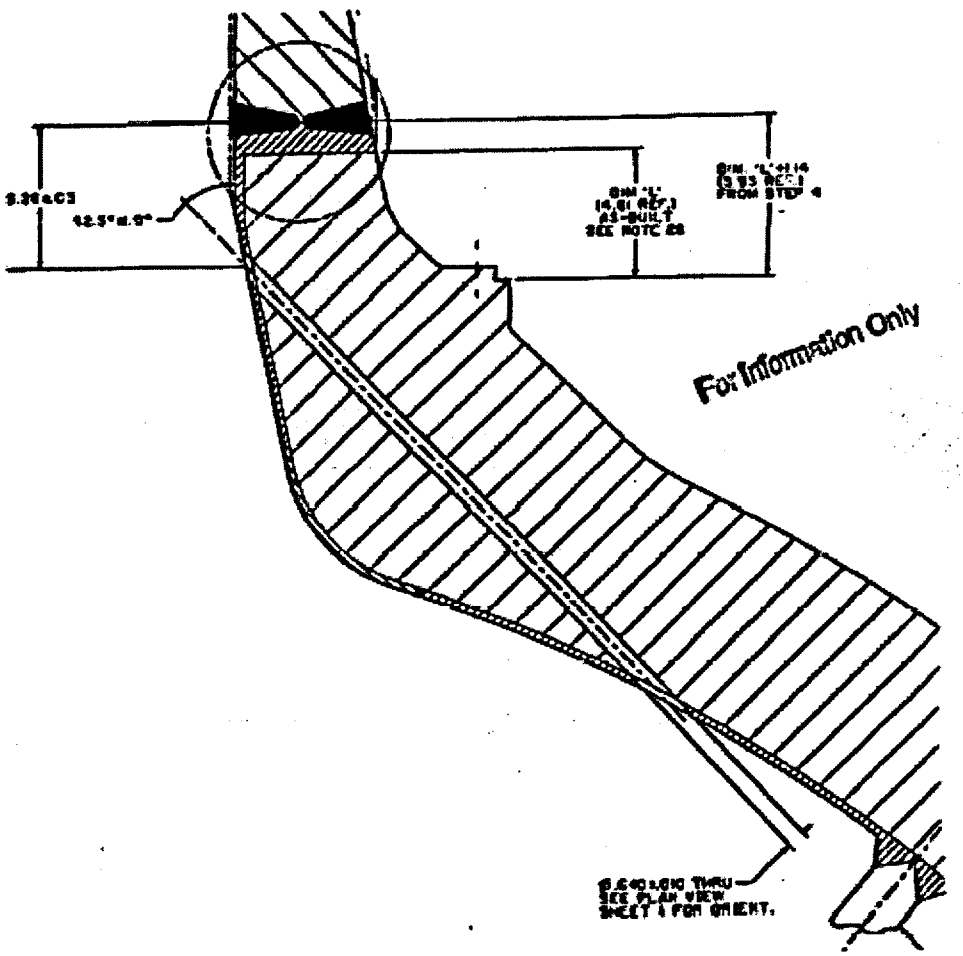
PLANT V. C. SUMMER UNIT #1 SKETCH 12150

SYST./COMP. PRIMARY NOZZLE INSIDE RADIUS HOT/COLDLEG PROCEDURE SGE-ISI-247 REV. 0

EXAMINER [signature] DATE 7-31-94

DETECTED BY UT X PT ____ MT ____ VT ____ IDENT. NO. U-IR & V-IR

PROVIDE SUFFICIENT INFORMATION TO DESCRIBE SIZE, LOCATION AND TYPE OF INDICATION. DESCRIBE EXTRA OR SPECIAL EQUIPMENT IF USED FOR SIZING OR REPORTING. IF NECESSARY INCLUDE SKETCH SHOWING GENERAL CONFIGURATION OF ITEM OR AREA.



NOTE: REFERENCE DRAWING 6145E22 SHEET 5 OF 7. SHOWING DRAIN HOLE IN HOT AND COLD LEGS RESPONSABLE FOR GEOMETRIC REFLECTOR.

REVIEW	AIR