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SCE&G®
A SCANA COMPANY

August 31, 2001
RC-01-0155

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

Attention: Mr. R. R. Assa

Gentlemen:

Subject: VIRGIL C. SUMMER NUCLEAR STATION (VCSNS)
DOCKET NO. 50/395
OPERATING LICENSE NO. NPF-12
RESPONSE TO NRC BULLETIN 2001-01
CIRCUMFERENTIAL CRACKING OF REACTOR PRESSURE VESSEL HEAD PENETRATION NOZZLES

Reference: *PWR Materials Reliability Program Response to NRC Bulletin 2001-01 (MRP-48)*, EPRI, Palo Alto, CA: 2001. TP-1006284

The U.S. Nuclear Regulatory Commission (NRC) issued NRC Bulletin 2001-01 to: (1) request that utilities provide information related to the structural integrity of the reactor pressure vessel head penetration (VHP) nozzles for their respective facilities, including the extent of VHP nozzle leakage and cracking that has been found to date, the inspections and repairs that have been undertaken to satisfy applicable regulatory requirements, and the basis for concluding that their plans for future inspections will ensure compliance with applicable regulatory requirements, and (2) require that all addressees provide to the NRC a written response in accordance with the provisions of 10 CFR 50.54(f).

South Carolina Electric & Gas Company (SCE&G) acting for itself and as agent for South Carolina Public Service Authority, hereby submits the attached in response to the bulletin. As VCSNS has been determined to be a plant with low susceptibility, this submittal addresses the 30 day response action required by Action Items 1 and 5 as presented in the bulletin.

A088

These statements and matters set forth herein are true and correct to the best of my knowledge, information, and belief.

Should you have questions, please call Mr. James Turkett at (803) 345-4047 or Mr. Charles Rice at (803) 345-4491.

Very truly yours,

Stephen A. Byrne

JT/CHR/SAB
Attachment

c: N. O. Lorick
N. S. Carns
T. G. Eppink (w/o Attachment)
R. J. White
L. A. Reyes
W. R. Higgins
D. M. Deardorff
C. H. Rice
NRC Resident Inspector
K. M. Sutton
NSRC
RTS (IEB 2001-01; O-C-01-1241)
File (815.02)
DMS (RC-01-0155)

STATE OF SOUTH CAROLINA :
: TO WIT :
COUNTY OF FAIRFIELD :

I hereby certify that on the 31ST day of August 2001, before me, the subscriber, a Notary Public of the State of South Carolina personally appeared Stephen A. Byrne, being duly sworn, and states that he is the Senior Vice President, Nuclear Operations for the South Carolina Electric & Gas Company, a corporation of the State of South Carolina, that he provides the foregoing response for the purposes therein set forth, that the statements made are true and correct to the best of his knowledge, information, and belief, and that he was authorized to provide the response on behalf of said Corporation.

WITNESS my Hand and Notarial Seal

Notary Public

My Commission Expires July 25, 2005
Date

NUCLEAR EXCELLENCE - A SUMMER TRADITION!

South Carolina Electric & Gas Company's V. C. Summer Nuclear Station (VCSNS) submits this response to NRC Bulletin 2001-01, *Circumferential Cracking of Reactor Pressure Vessel Head Penetration Nozzles* utilizing plant information provided in MRP-48, *PWR Materials Reliability Program Response to NRC Bulletin 2001-01.* MRP-48 provides the latest plant rankings for all 69 domestic operating PWRs based on the time-at-temperature model, provides the supplementary information requested by paragraphs 1.a and 1.b of NRC Bulletin 2001-01, and provides comments regarding applicable regulatory requirements. Items 1 and 5 will be addressed for this submittal, as VCSNS has been determined to be a plant of low susceptibility. Items 2, 3, and 4 are not applicable.

1. Requested Background Information

   a. Plant Specific PWSCC Susceptibility Ranking

   VCSNS has been ranked for the potential for primary water stress corrosion cracking (PWSCC) of the reactor pressure vessel (RPV) top head nozzles using the time-at-temperature model and plant-specific input data reported in MRP-48 [1]. As shown in Table 2-1 of MRP-48 [1], this evaluation indicates that it will take 117 effective full power years (EFPYs) of additional operation from March 1, 2001, to reach the same time at temperature that Oconee Nuclear Station Unit 3 (ONS3) had at the time that its leaking nozzles were discovered in February 2001.

   Using the criteria stated in NRC Bulletin 2001-01, VCSNS falls into the NRC category of plants considered to have a low susceptibility (i.e., greater than 30 EFPY from the ONS3 condition) to PWSCC of the RPV top head nozzles.

   b. Description of VHP Nozzles

   VCSNS has a total of 66 RPV head nozzles; 65 of which are CRDM style nozzles and one is the reactor head vent nozzle. Of the 65 CRDM style nozzles, 48 are used for CRDM assemblies, and the remainder are used for instrumentation or are capped as spares. The requested nozzle information is provided in Table 2-3 of MRP-48 [1].

   c. Description of RPV Head Insulation

   As reported in Table 2-1 of MRP-48 [1], VCSNS has reflective stepped RPV head insulation. The insulation is held in place with a system of buckles and keepers. The majority of the insulation is surrounded by the CRDM ventilation shroud, which in turn is surrounded by the permanently installed reactor vessel head radiation shield. These two structures make removal of the insulation difficult. A ring of insulation support steel which incorporates a convection seal is located midway up the dome of the reactor vessel head.

This convection seal could provide further difficulties in accessing a small number of outer periphery CRDM nozzles.

d. Description of RPV Head and Nozzle Inspections Within Past Four Years
As reported in Table 2-1 of MRP-48 [1], VCSNS has not performed RPV head and nozzle inspections within the past four years, except for visual inspections in accordance with Generic Letter 88-05.

In addition, the interior surface of the reactor vessel head, including the CRDM J-groove welds undergoes a VT-3 inspection of the weld clad in accordance with ASME Boiler and Pressure Vessel Code, Section XI. The last inspection was performed April 25, 1999 and found no recordable indications. The next VT-3 inspection of the interior surface of the RPV head is currently planned for the Fall 2003 refueling outage.

e. Description of Equipment and Cables on Top of Vessel Head
The general arrangement of the equipment located above the RPV head is shown in VCSNS FSAR Figures 1.2-9 and 1.2-10.

The missile shield is comprised of three identical sections. Each section is 4'-6" wide by 28'-0" long by 24 inches thick, and consists of a steel shell filled with reinforced concrete. The bottom plate of each section is a 1" thick carbon steel plate.

The important details of the CRDM housings are contained in Table 2-3 of MRP-48 [1]. The CRDM seismic support platform consists of individual members restraining each CRDM. The individual support members are ultimately connected to 13.5-foot diameter carbon steel support ring that is anchored to the concrete reactor building operating deck by a system of rigid struts. The centerline of the CRDM seismic support platform is approximately three feet below the bottom surface of the missile shield.

The CRDM power and control cables, associated cable trays and plug boards are located on the CRDM seismic support platform.

The reactor vessel head supports the CRDM ventilation shroud. The shroud is approximately six feet tall, with the top of the shroud being approximately 16 feet below the bottom surface of the missile shield. Two 32-inch diameter ventilation ducts connect the CRDM ventilation system to the CRDM ventilation shroud. The centerline elevation of these ducts is approximately 20 feet below the bottom surface of the missile shield.

The permanent reactor vessel head radiation shield is also supported by the reactor vessel head, and surrounds the CRDM ventilation shroud. The head shield is approximately seven feet tall, with the top of the shield being approximately 17 feet below the bottom surface of the missile shield.

The reactor head vent piping is one-inch, schedule 160 stainless steel piping that is routed from the alloy 600 reactor head penetration nozzle (21 feet below the bottom surface of the missile shield), along the refueling cavity wall, and exiting the refueling cavity at an elevation approximately 1.5 feet below the bottom surface of the missile shield. The head vent penetration nozzle is described in Table 2-3 of MRP-48 [1].

The upper tap for the reactor vessel level instrumentation system is connected to one of the CRDM housings approximately 20.5 feet below the bottom surface of the missile shields. This one-inch, schedule 160 stainless steel pipe transitions to 3/8" stainless steel tubing and exits the refueling cavity at an elevation approximately three feet below the bottom surface of the missile shield.

5. Reporting of Future Inspection Results

VCSNS will provide the information requested in Item 5 of NRC Bulletin 2001-01 within 30 days after plant restart following the next refueling outage, which is currently scheduled to begin in April 2002.

Reference

1. *PWR Materials Reliability Program Response to NRC Bulletin 2001-01 (MRP-48),* EPRI, Palo Alto, CA: 2001. 1006284.