ENCLOSURE

VOGTLE ELECTRIC GENERATING PLANT, UNIT 1 AND UNIT 2
RESPONSE TO NRC BULLETIN 2001-01
CIRCUMFERENTIAL CRACKING OF REACTOR PRESSURE
VESSEL HEAD PENETRATION NOZZLES

The Vogtle Electric Generating Plant (VEGP) is participating in the Electric Power Research Institute Materials Reliability Program (MRP) associated with the Reactor Pressure Vessel (RPV) nozzle cracking issue. Materials Reliability Program Response to NRC Bulletin 2001-01 (MRP-48), which was submitted to the NRC by the Nuclear Energy Institute (NEI) on August 21, 2001, provides background information on all Pressurized Water Reactor (PWR) plants, rankings of the plants relative to Oconee Nuclear Station 3 (ONS3) based on the time-at-temperature model, previous inspections performed, a discussion of the regulatory requirements, and references to previous MRP submittals containing supporting information. Below is the VEGP response to the requested information contained in NRC Bulletin 2001-01. The Bulletin's "Requested Information" is shown in bold. Because VEGP has not experienced any cracking/leakage such as that having occurred at ONS3, a response is provided for Bulletin Item 1 only.

BULLETIN ITEM 1.a

"…provide the following information: the plant-specific susceptibility ranking for your plant(s) (including all data used to determine each ranking) using the PWSCC susceptibility model described in Appendix B to the MRP-44, Part 2, report."

RESPONSE TO BULLETIN ITEM 1.a

Both VEGP units have been analyzed for relative susceptibility to Outside Diameter (OD)-initiated or weld Primary Water Stress Corrosion Cracking (PWSCC) of the Reactor Pressure Vessel (RPV) head penetration nozzles. The evaluation using the time-at-temperature model and plant-specific input data reported in MRP-48 indicated that it will take one hundred four and one-half (104.5) and one hundred six (106.0) Effective Full Power Years (EFPYs) of additional operation at VEGP Unit 1 and Unit 2, respectively, from March 1, 2001, to reach the same time-at-temperature as ONS3. The evaluation used the time-at-temperature model and plant-specific input data reported in MRP-48. The following table includes the plant-specific data used to determine the rankings. The susceptibility rankings are consistent with the information provided the NRC by NEI in its submittal of MRP-48.

Parameter	Unit 1 Value	Unit 2 Value
EFPYs through February 2001	11.9	10.4

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(continued)

RESPONSE TO BULLETIN ITEM 1.a (continued)

Parameter	Unit 1 Value	Unit 2 Value
Head Temperature Range over Life (° Fahrenheit)	560	560
Current Head Temperature (° Fahrenheit)	560	560
EFPYs Normalized to 600° Fahrenheit	2.2	1.9
Remaining EFPYs to Reach ONS3 from March 1, 2001	104.5	106.0
Relative Susceptibility Ranking	50	52

Because the time to reach the same time-at-temperature at which leaking CRDM nozzles were discovered at ONS3 is greater than thirty (30) EFPYs, VEGP Unit 1 and Unit 2 fall into the NRC category of plants with low susceptibility.

BULLETIN ITEM 1.b

"…provide the following information: a description of the VHP nozzles in your plant(s), including the number, type, inside and outside diameter, materials of construction, and the minimum distance between VHP nozzles."

RESPONSE TO BULLETIN ITEM 1.b

There are seventy-eight (78) RPV closure head Control Rod Drive Mechanism (CRDM) nozzles and one (1) RPV closure head vent nozzle (pipe) for each VEGP unit. The following table provides the requested nozzle information.

Parameter	Data
NSSS Design	Westinghouse
Nozzle Material Supplier	Huntington
Nozzle Materials of Construction	Alloy 600

RESPONSE TO BULLETIN ITEM 1.b (continued)

Parameter	Data
Head Fabricator	Combustion Engineering
Design Diametral Nozzle Interference Fit (mils)	0.0 - 3.0
Number of CRDM Nozzles	78
Outside Diameter of CRDM Nozzles (inches)	4.000
Inside Diameter of CRDM Nozzles (inches)	2.750
Number and Size of J-Groove Head Vent Nozzles	1 - 1" Sch. 160
Minimum Horizontal Distance Between VHP Nozzles	11.973"

The RPV closure head arrangement is shown in Figure A-3 (Figure a) of the PWR Materials Reliability Project, Interim Alloy 600 Safety Assessments for US PWR Plants (MRP-44): Part 2: Reactor Vessel Top Head Penetrations.

Refer to Figure 1 for a depiction of the RPV.

BULLETIN ITEM 1.c

"…provide the following information: a description of the RPV head insulation type and configuration."

RESPONSE TO BULLETIN ITEM 1.c

The RPV closure head insulation used at VEGP Unit 1 and Unit 2 is reflective (mirror) stepped insulation fabricated by Transco, Inc. It is 3" in thickness and is removable. Refer to Figure 2 for a depiction of the RPV closure head insulation. Typically, the insulation remains in place since it is part of the integrated head package used on each of the VEGP units. The RPV closure head insulation may be accessed through manways located in the shroud assembly that is also part of the integrated RPV closure head package. Refer to the response to Bulletin Item 1.e for a general description of the integrated RPV closure head package. Figures 4 and 5 are photographs of the VEGP integrated head package.

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VOGTLE ELECTRIC GENERATING PLANT, UNIT 1 AND UNIT 2
RESPONSE TO NRC BULLETIN 2001-01
CIRCUMFERENTIAL CRACKING OF REACTOR PRESSURE VESSEL HEAD PENETRATION NOZZLES

(continued)

BULLETIN ITEM 1.d

"…provide the following information: a description of the VHP nozzle and RPV head inspections (type, scope, qualification requirements, and acceptance criteria) that have been performed at your plant(s) in the past 4 years, and the findings. Include a description of any limitations (insulation or other impediments) to accessibility of the bare metal of the RPV head for visual examinations."

RESPONSE TO BULLETIN ITEM 1.d

The following examinations and/or tests will be addressed in response to Bulletin Item 1.d:

1. CRDM Housing Welds
2. RPV Closure Head Interior
3. Pressure Tests

CRDM Housing Welds

The most recent examination of the CRDM housing welds at VEGP was performed in excess of four years ago during maintenance/refueling outages 1R5 (Fall 1994) and 2R5 (Fall 1996) for Unit 1 and Unit 2, respectively. During those outages, the American Society of Mechanical Engineers (ASME) Section XI Code-required percentage of these Category B-O, Item B14.10 welds were examined using surface means (liquid penetrant), thereby fulfilling the examination requirements for the first ten-year inservice inspection interval. Ten percent (10%) of the peripheral CRDM housings were required to be examined and include the following welds:

Unit 1	Unit 2
1-1201-V6-001-W184	2-1201-V6-001-W184
1-1201-V6-001-W188	2-1201-V6-001-W185

These welds were examined to the requirements of the 1983 Edition of ASME Section XI with Addenda through Summer 1983 by Southern Nuclear Operating Company (SNC) using its nondestructive examination procedure PT-V-605. The examinations were

RESPONSE TO BULLETIN ITEM 1.d (continued)

performed by nondestructive examination (NDE) personnel certified to the requirements of the American Society of Nondestructive Testing (ASNT) document SNT-TC-1A for liquid penetrant examination. No Recordable Indications (NRI) were identified. Relevant indications are required to be recorded and include: (1) mechanical discontinuities, (2) linear indications in which the length is equal to or greater than three times the width, and (3) rounded indications that are circular or elliptical with the length less than three times the width. Refer to Figure 3 for a depiction of the CRDM housing weld.

The examination results for these CRDM housing welds were previously reported to the NRC as part of the Inservice Inspection Summary Reports submitted by SNC letters LCV-0524 dated January 10, 1995 (Unit 1,1R5), and LCV-0932 dated January 8, 1997 (Unit 2, 2R5).

There are not any impediments to examining the peripheral CRDM housing welds identified above other than insulation removal is required in order to access these welds.

RPV Closure Head Interior

A general visual examination of the RPV closure head interior is performed each maintenance/refueling outage as an augmented scope of examinations as previously addressed in the VEGP FSAR. Within the past four years, the interior surface of each unit's RPV closure head has been visually examined three times. These examinations were performed during the following maintenance/refueling outages:

Unit 1	Unit 2
1R7 (Fall 1997)	2R6 (Spring 1998)
1R8 (Spring 1999)	2R7 (Fall 1999)
1R9 (Fall 2000)	2R8 (Spring 2001)

A remote, general visual examination (VT-3) is performed on the interior of the RPV closure head by SNC using its NDE procedure VT-V-735. This ASME Section XI Code, Category B-N-1, Item B13.10-required examination is performed to the 1989 Edition of

the ASME Section XI Code. The RPV closure head interior for each VEGP unit is identified as follows:

Unit 1	Unit 2
1-1201-V6-001-IO2	2-1201-V6-001-IO2

The examination of the RPV closure head interior is performed remotely with the aid of a camera during each maintenance/refueling outage while the RPV closure head is located on its storage stand. Each of the examinations performed during the maintenance/refueling outages identified above was performed by NDE personnel certified to the requirements of ASNT document SNT-TC-1A for visual examination. The purpose of the examination is to determine the general mechanical and structural condition of the RPV closure head interior surface and includes, but is not limited to, visual examination for loose or missing parts, debris, erosion, corrosion, etc. Relevant indications would include, but is not limited to, items such as arc strikes, weld spatter, and any crack or linear indication. Each examination performed has been satisfactory.

The results of the general visual examination of the interior surface of Unit 1 and Unit 2 RPV closure heads were previously reported to the NRC as part of the Inservice Inspection Summary Reports submitted by the following SNC letters: LCV-1136 dated January 16, 1998 (Unit 1, 1R7), LCV-1356 dated June 21, 1999 (Unit 1, 1R8), LCV-1498 dated January 12, 2001 (Unit 1, 1R9), LCV-1222 dated July 13, 1998 (Unit 2, 2R6), LCV-1409 dated January 21, 2000 (Unit 2, 2R7), and LCV-1545 dated July 23, 2001 (Unit 2, 2R8).

There are not any impediments to performing the remote general visual examination of the interior surface of the RPV closure head.

Pressure Tests

Table IWB-2500-1, Examination Category B-P, found in ASME Section XI requires that a system leakage test (IWB-5221) be performed each maintenance/refueling outage. This system leakage test, LT-1, is performed prior to plant startup following the maintenance/refueling outage. This type test has been performed during each maintenance/refueling outage within the past four years and includes the following

RESPONSE TO BULLETIN ITEM 1.d (continued)

outages:

Unit 1	Unit 2
1R7 (Fall 1997)	2R6 (Spring 1998)
1R8 (Spring 1999)	2R7 (Fall 1999)
1R9 (Fall 2000)	2R8 (Spring 2001)

It should be noted that a system hydrostatic test was performed in lieu of the system leakage test during the Unit 2 2R6 outage. This test, HT-1, which was performed at normal operating temperature and pressure pursuant to ASME Section XI Code Case N-498-1 included the test boundary normally associated with the system leakage test, but was expanded to include the Class 1 pressure boundary extremity (i.e., second isolation valve) and also included selected adjacent Class 2 components that are typically isolated from the Class 1 boundary by check valves. During such tests which are conducted using approved plant procedures, the system is visually examined (VT-2) by plant personnel qualified to the requirements of ASNT document SNT-TC-1A for visual examination. The results of each pressure test conducted were satisfactory. The visual examinations revealed some minor boron residue and moisture at some mechanical connections, but none was observed in the area of the RPV closure head. Examination personnel accessed the CRDM area via manways in the shroud assembly, which is part of the integrated head package discussed in the response to Bulletin Item 1.e.

The results of these pressure tests were previously reported to the NRC as part of the Inservice Inspection Summary Reports submitted by the following SNC letters: LCV-1136 dated January 16, 1998 (Unit 1, 1R7), LCV-1356 dated June 21, 1999 (Unit 1, 1R8), LCV-1498 dated January 12, 2001 (Unit 1, 1R9), LCV-1222 dated July 13, 1998 (Unit 2, 2R6), LCV-1409 dated January 21, 2000 (Unit 2, 2R7), and LCV-1545 dated July 23, 2001 (Unit 2, 2R8).

Other RPV closure head welds, i.e., the RPV closure head torus-to-flange weld, the RPV closure head dome-to-torus weld, and the RPV closure head meridional welds, have been nondestructively examined typically within the past four years. These welds are believed to be outside the scope of NRC Bulletin 2001-01. As a result, they have not been

RESPONSE TO BULLETIN ITEM 1.d (continued)

included in this response. Details on the examination of these particular RPV closure head welds are available for NRC review upon request at the VEGP plant site.

Examination and/or test packages, including NDE procedures, are also available for NRC review upon request at the VEGP plant site should more detailed information be desired.

BULLETIN ITEM 1.e

"…provide the following information: a description of the missile shield, the CRDM housings and their support/restraint system, and all components, structures, and cabling from the top of the RPV head up to the missile shield. Include the elevations of these items relative to the bottom of the missile shield."

RESPONSE TO BULLETIN ITEM 1.e

As noted in the response to Bulletin Item 1.c, Unit 1 and Unit 2 use an integrated RPV closure head package. The integrated RPV closure head package is a system that combines the head lifting rig, seismic platform, lift columns, reactor vessel missile shield, CRDM, Digital Rod Position Indication (DRPI) coils, forced-air cooling system, and electrical and instrumentation cable routing into a single, efficient design package. This system provides for the following during maintenance/refueling outages:

1. Eliminates the removal of CRDM fans and cooling ducts.
2. Eliminates removal of the CRDM missile shield.
3. Simplifies the disconnecting of the CRDM cables.
4. Eliminates the removal of cable tray and CRDM missile shield support braces.
5. Simplifies the detensioning and removal of the RPV closure head studs.
6. Eliminates the installation of the RPV closure head lift rig.

The overall height of the integrated RPV closure head package is approximately 41'-2" from the mating flange, i.e., the RPV flange, to the top of the lifting rig, inclusive of the shroud assembly. From the RPV flange to the bottom surface of the missile shield is approximately 29' - 2".

RESPONSE TO BULLETIN ITEM 1.e (continued)

Refer to Figures 4 and 5 for a depiction of the integrated RPV closure head package.

(add figures 1 -5 here as pages E-10 through E14 after text approved!!!!!!)