VIRGINIA ELECTRIC AND POWER COMPANY
RICHMOND, VIRGINIA 23261

February 24, 2003

United States Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, D.C. 20555

Serial No. 03-098
NLOS/ETS R1
Docket Nos. 50-280/281
License Nos. DPR-32/37

Gentlemen:

VIRGINIA ELECTRIC AND POWER COMPANY
SURRY POWER STATION UNITS 1 AND 2
ASME SECTION XI INSERVICE INSPECTION PROGRAM
RELIEF REQUEST IWE 9 CONTAINMENT TESTING

During the Fall 2002 refueling outage for North Anna Unit 2, Virginia Electric and Power Company (Dominion) performed inspections of the reactor vessel head (RVH) and vessel head penetration (VHP) nozzles in response to NRC Bulletin 2002-02. Based on the results of those inspections and the expected dose and difficulty in reconstruction and repair of the VHP nozzles, Dominion replaced the North Anna Unit 2 RVH during the refueling outage. Based on the similar design and operating history of the Surry Unit 1 and 2 RVHs and the availability of replacement RVHs, Dominion has decided to accelerate the schedule for replacement of the Surry Units 1 and 2 RVHs. The Surry Unit 1 and 2 RVHs will be replaced during the Spring and Fall 2003 refueling outages, respectively, rather than the Fall 2004 and Spring 2005 refueling outages as previously planned. In order to replace the RVHs, each containment concrete and metallic liner will be breached to facilitate moving the RVH into containment, since the existing equipment hatch is not large enough to accommodate the RVH. After each containment is repaired, leakage testing in accordance with ASME Section XI is required to return the containment and metallic liner to operable status.

Pursuant to 10CFR50.55a(a)(3)(i), Dominion requests an alternative to the containment metallic liner test requirement of ASME Section XI, paragraph IWE-5221 to reestablish the leak-tight integrity of the containment liner. Dominion proposes to perform an "as-left" local leak rate test on the new pressure boundary weld of the containment metallic liner in lieu of the Type A test specified by ASME Section XI, paragraph IWE-5221. This test will be performed subsequent to the containment pressure test, which will be performed at accident pressure (P_a) to verify concrete integrity.

The local leak rate test is considered a superior test to the specified Type A test for determining leakage at the repaired area. A Type A test is a less sensitive test than a local leak rate test and unnecessary for the planned repair activity when considering the nondestructive examination and the alternate testing proposed. The local leak rate test, in conjunction with the planned containment pressure test, will continue to provide an acceptable level of quality and safety. This alternative to the ASME Code requirements

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has been approved by the Station Nuclear Safety and Operating Committee.

A similar alternative was requested for North Anna Unit 2 in a letter dated November 14, 2002 (Serial No. 02-701) as supplemented on December 6, 2002 (Serial No. 02-701A) and approved by the NRC on January 14, 2003.

To support the RVHs replacement project and the scheduled restart of Surry Unit 1 in June of 2003, Dominion requests approval of the proposed alternative by May 15, 2003. Please contact Mr. Thomas Shaub at (804) 273-2763, if there are any questions about this submittal.

Very truly yours,

Eugene S. Grecheck
Vice President - Nuclear Support Services

Attachment

Commitments made in this letter: None

cc: U.S. Nuclear Regulatory Commission
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U. S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, D.C. 20555

Mr. R. A. Musser
NRC Senior Resident Inspector
Surry Power Station

Attachment

Alternative Test Requirements for Containment Repairs

Relief Requests RR-IWE9 For Surry Units 1 and 2

Virginia Electric and Power Company
(Dominion)
Surry Power Station Units 1 and 2

Virginia Electric & Power Company
Surry Power Station Units 1 and 2
First Containment Inspection Interval

Relief Request RR-IWE9

SYSTEM/COMPONENT(S) FOR WHICH AN ALTERNATIVE IS REQUESTED:

Containment metallic liner

CODE REQUIREMENT(S):

ASME Section XI 1992 Edition with the 1992 Addenda, Subsections IWE and IWL

CODE REQUIREMENT FROM WHICH AN ALTERNATIVE IS REQUESTED:

An alternative to the requirements of paragraphs IWL-5230 and IWE-5221 is requested. Paragraph IWL-5230 requires testing as delineated in paragraph IWE-5221.

Paragraph IWE-5221 states in part:

> "Except as noted in IWE-5222, repairs or modifications to the pressure retaining boundary or replacement of Class MC or Class CC components shall be subjected to a pneumatic leakage test in accordance with the provisions of Title 10, Part 50 of the Code of Federal Regulations, Appendix J, Paragraph IV.A, which states in part that "any major modification, replacement of a component which is part of the primary reactor containment boundary, or resealing a seal welded door, performed after the preoperational leakage rate test shall be followed by either a Type A, Type B, or Type C test as applicable for the area affected by the modification."

BASIS FOR RELIEF:

To facilitate the Surry Power Station Units 1 and 2 reactor head replacements, the containments' concrete and metallic liners will be breached. This work must be performed because the existing equipment hatch is not large enough to accommodate the reactor heads. The purpose of this relief request is to propose that a local leak rate test be performed on the new pressure boundary welds of the metallic liners as an alternative to a Type A test, which is specified in the Code.

Background

During the Fall 2002 refueling outage for North Anna Unit 2, Virginia Electric and Power Company (Dominion) performed inspections of the reactor vessel head (RVH) and vessel head penetration (VHP) nozzles in response to NRC Bulletin 2002-02. Based on the results of those inspections and the expected dose and difficulty in reconstruction and repair of the VHP nozzles, Dominion replaced the Unit 2 RVH during the refueling outage. Based on the similar design and operating history of the Surry Unit 1 and 2 RVHs and the availability of replacement RVHs, Dominion has decided to accelerate the schedule for replacement of the Surry Units 1 and 2 RVHs. The Surry Unit 1 and 2 RVHs will be replaced during the Spring and Fall 2003 refueling outages, respectively, rather than the Fall 2004 and Spring 2005 refueling outages as previously planned. In order to replace the RVHs, each containment concrete and metallic liner will be breached to facilitate moving the RVH into containment, since the existing equipment hatch is not large enough to accommodate the RVH. After the containment is repaired, leakage testing in accordance with ASME Section XI is required to return the containment and metallic liner to operable status.

To accomplish the head replacement, a portion of the Surry Units 1 and 2 containment concrete, reinforcing steel, and metallic liner will be removed. After the reactor heads are moved through the containment access, the metallic liner section that was removed will be reattached by welding. Subsequent to reattaching the liner, the reinforcing steel and concrete will be replaced. In addition, attachment welds are planned on the metallic liner to create channels for local leak rate testing, and for construction aids during liner repair and concrete placement. Repair and testing of the metallic liner section, reinforcing steel, and associated concrete placement will be controlled under an ASME Section XI repair program and Dominion's design control program. Program requirements will meet or exceed our original owner's requirements found in plant specifications, or will be reconciled in accordance with ASME Section XI.

The details of the concrete, reinforcing steel, and liner repair and testing are provided below.

Concrete

The concrete will be replaced with concrete that meets the design strength requirements of the original owner's requirements and will be tested in accordance with ASME Section XI, paragraph IWL-5000, as applicable. Prior to the placement of the concrete, the outside of the metallic liner, the reinforcing steel and the surfaces of the existing concrete will be visually examined to assure proper surface preparation. After placement of the concrete, the containment will be pressure tested at accident pressure (P_a) to reestablish structural integrity of the containment structure in accordance with paragraphs IWL-5220 and IWL-5250, and the required concrete visual examinations (VT-1C) will be performed prior to testing, at test pressure, and following depressurization. Qualified individuals will perform these tests and examinations.

The Responsible Engineer will perform a 100% VT-1C examination of the exterior surface of the new concrete prior to, during and following pressurization. Each examination is expected to take two to three hours. A 100% VT-1C examination will be performed of the exterior surface of the new concrete prior to pressurization of the containment. Then, the containment will be pressurized to the test pressure at a rate not to exceed 10 psi/hr. The test pressure is P_a (44.1 to 45 psi). Once the test pressure is reached, it will be held for a minimum of one hour (this is consistent with the original pre-operational Structural Acceptance Test), and then the second 100% VT-1C examination of the exterior surface of the new concrete will be performed. During the "at pressure" examination, air will be added to the containment as required to maintain the pressure within specification. Once the "at pressure" examination is completed, the containment will be depressurized at a rate not to exceed 10 psi/hr until atmospheric conditions are achieved. After a one-hour wait, the final 100% VT-1C examination will be performed on the exterior surface of the new concrete.

Reinforcing Steel

Consistent with ASME Section XI requirements, the reinforcing steel exposed when the concrete is removed will receive a VT-1 visual examination by qualified personnel, and the Responsible Engineer will determine if the original reinforcing steel is acceptable for re-use. Reinforcing steel will be repaired or replaced to meet the original owner's requirements or ASME Section III, Division 2. The exposed reinforcing steel will be 100% VT-1 visual inspected. Qualified individuals will perform these inspections and examinations.

Compliance with the original owner's requirements or ASME, Section III, Division 2, and the associated inspections and tests of the concrete and reinforcing steel are adequate to ensure that the structural integrity of the containment is restored.

Metallic Liner

The section of the metallic liner that was removed will be rewelded in place by qualified personnel in accordance with the original owner's requirements. Consistent with the owner's requirements, examinations will be performed on the metallic liner repair welds. As a minimum, 100% surface (liquid penetrant or magnetic particle) and spot volumetric (radiography at 50-foot intervals at locations specified by the inspector) will be performed on the pressure boundary containment metallic liner repair welds. In addition, ASME Section XI requires both a General Visual and a VT-3 visual examination of the new metallic liner pressure boundary welds. The metallic liner repair weld will be tested by a local leakage/pressure test using a channel over the new welds after completion of the required containment pressure test. Qualified personnel will conduct all examinations.

Attachment welds on the metallic liner are required to attach the leak chase

channels to the liner. These leak chase channels will be used to perform a local leak rate test of the liner's repair weld. The local leak rate test will confirm the leak-tight integrity of the repair weld and the channel attachment welds.

Additional attachment welds on the metallic liner are required to attach construction aids to the liner. These construction aids include pads that will be permanently welded to the liner to support lifting rings and lugs. These lifting rings and lugs will be used to move the liner plate by crane from and to the opening. Other construction aids include fit-up devices (dogs) that will be tack welded to the liner and used to align the liner plate in the opening for rewelding. These fit-up devices will be removed after use, and the tack welds will be ground away. After the tack welds are removed, these areas will be examined by Magnetic Particle testing. Dominion plans to test those attachment welds that are not removed from the liner during the next scheduled leakage test of the pressure retaining boundary, as allowed by ASME Section XI, paragraph IWE-5222 and NEI 94-01, "Industry Guideline for Implementing Performance-Based Option of 10 CFR 50, Appendix J."

The attachment welds for both leak testing and construction aids will be completed and inspected in accordance with the Section XI repair program.

Justification for Alternative

ASME Section XI, paragraph IWE-5221, by reference to paragraph IWE-5000 in paragraph IWL-5230, requires that an appropriate 10 CFR 50 Appendix J test be performed following a repair or modification of the pressure retaining boundary. Specifically, the Code requires a Type A, Type B, or Type C test, as appropriate, for the repaired or modified pressure boundary component.

Appendix J, Option B provides guidelines for meeting the safety objectives of the Appendix J requirements. Section 9.2.4 of NEI 94-01, states that "repairs and modifications that affect the containment leakage rate require leak rate testing (Type A testing or local leak rate testing) prior to returning the containment to operation."

A local leak rate test provides the most accurate and direct method of assuring the leak tight integrity of the repair weld. The local leak rate test is considered a superior test for determining leakage at the repaired area as compared to the specified Type A test. The local leak rate test will directly measure the leakage at the repair area, while a Type A test measures total containment leakage. This test is being performed to reestablish the leak-tight integrity of the containment liner due to the repair weld. No other work has been performed to warrant a test of the entire containment. Also, Dominion's acceptance criterion for leakage of the repair weld will be zero leakage. This acceptance criterion is a more stringent criterion than that of a Type A test. Therefore, if there is any leakage of the liner at the repair weld, it would be identified by the local leak rate test and corrected.

The metallic liner repair weld will initially be vacuum box tested, and the channel attachment welds will be snoop tested with soap bubbles, as required, while the channels are being pressurized for the local leak rate test.

After the containment pressure test is completed, an "as-left" local leak rate test will be performed. When the pre-operational test of the original leak chase channels and liner welds was conducted, the pressure decay method was used to perform the test. This method, which meets the requirements of ANS 56.8, has been selected to evaluate the "as-left" conditions. Details of the testing methodology are provided in our supplemental information for the North Anna Unit 2 alternative, IWE9, which was sent to the NRC in a letter dated December 6, 2002.

Additionally, the containment pressure test, performed at P_a, to establish the structural integrity of the reinforced concrete, will structurally test the metallic liner repair weld. This pressure test and the subsequent local leak rate test will establish the "as-left" leak tightness of the metallic liner repair weld. Therefore, the required concrete pressure test at P_a and the local leak rate test of the liner repair weld satisfy or exceed the intent of a Type A test to establish containment integrity after a repair activity.

Dominion has determined that a local leak rate test is the most appropriate test to perform on the metallic liner to meet the testing requirements of the Code. A Type A test is a less sensitive test than a local leak rate test and unnecessary for the planned repair activity when considering the nondestructive examination and the alternate testing proposed. Dominion considers that the local leak rate test, in conjunction with the planned containment pressure test, will continue to provide for an acceptable level of quality and safety.

ALTERNATIVE REQUIREMENTS:

In accordance with 10 CFR 50.55a(a)(3)(i), Dominion requests an alternative to the containment metallic liner test requirement of ASME Section XI, paragraph IWE-5221 to reestablish the leak-tight integrity of the containment metallic liner. Dominion proposes to perform an "as-left" local leak rate test on the containment metallic liner pressure boundary repair weld in lieu of the Type A test specified by ASME Section XI, paragraph IWE-5221 for this type of repair activity. The local leak rate test will be performed after the containment pressure test has been completed.