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OPPD
Omaha Public Power District

444 South 16th Street Mall
Omaha NE 68102-2247

October 11, 2004
LIC-04-0093

U.S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, D.C. 20555-0001

Reference: Docket No. 50-285

SUBJECT: Fort Calhoun Station Unit No. 1 Relief Request: Alternative Test Requirements for Containment Repairs

During the 2006 refueling outage for Fort Calhoun Station (FCS), Omaha Public Power District (OPPD) will replace the steam generators, pressurizer, and reactor vessel head. Because these components are larger than the existing equipment hatch, OPPD will cut an access opening through the post tensioned containment concrete and metallic liner. Following the component replacement, OPPD will restore the containment concrete and metallic liner.

Pursuant to 10CFR50.55a(a)(3)(i), OPPD requests an alternative to the test requirement of ASME Section XI, paragraph IWE-5221 needed to demonstrate the leak-tight integrity of the repaired containment liner. OPPD proposes to perform an "as-left" local leak rate test on the new weld of the containment metallic liner in lieu of the Type A test specified by ASME XI, paragraph IWE-5221. This test will be performed subsequent to the containment pressure test specified in IWL-5200, which will be performed at accident pressure (Pa) to verify tendon and concrete integrity. The details of the 10 CFR 50.55a request are enclosed.

To support the component replacement outage starting in September 2006, OPPD requests approval of the proposed alternative by June 30, 2005.

No commitments are made to the NRC in this letter. If you have any questions or require additional information, please contact Mr. Thomas C. Matthews at (402) 533-6938.

Sincerely,

R. T. Ridenoure
Vice President

RTR/RLJ/rlj

Attachment: Alternative Test Requirements for Containment Repairs

Attachment

Alternative Test Requirements for Containment Repairs

Fort Calhoun Station
Relief Request IWE-0003

Omaha Public Power District
10 CFR 50.55a Request Number IWE-0003

Proposed Alternative
In Accordance with 10 CFR 50.55a(a)(3)(i)

--Alternative Provides Acceptable Level of Quality and Safety--

1. **ASME Code Component(s) Affected:**

Post Tensioned Containment Metallic Liner at Fort Calhoun Station (FCS) Unit No. 1

2. **Applicable Code Edition and Addenda:**

ASME Section XI 1998 Edition through 2000 Addenda

3. **Applicable Code Requirement:**

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:

"Except as noted in IWE-5222, repairs/replacement activities performed on the pressure retaining boundary 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." Appendix J 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.

4. **Reason for Request:**

During the 2006 refueling outage for Fort Calhoun Station (FCS), Omaha Public Power District (OPPD) will replace the steam generators, pressurizer, and reactor vessel head. Because these Nuclear Steam Supply System (NSSS) replacement components are larger than the existing equipment hatch, OPPD will cut an access opening through the post tensioned containment concrete and metallic liner. Following the component replacement, OPPD will restore the containment tendons, concrete, and metallic liner. As noted above, a pneumatic leakage test is required following these repairs.

A local leak rate test is considered superior for determining leakage at the repaired area as compared to the specified Type A test. A Type A test is 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 provide for an acceptable level of quality and safety.

5. Proposed Alternative and Basis for Use:

OPPD 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.

Background

During the 2006 refueling outage for Fort Calhoun Station (FCS), Omaha Public Power District (OPPD) will replace the steam generators, pressurizer, and reactor vessel head. To accomplish the Nuclear Steam Supply System (NSSS) component replacements, a portion of the FCS post tensioned containment concrete, tendons, tendon sheathing, reinforcing steel, and metallic liner will be removed. After the NSSS components are replaced, the metallic liner section that was removed will be reattached by welding. Subsequent to reattaching the liner, the tendon sheathing, tendons, reinforcing steel and concrete will be replaced. In addition, attachment welds are planned on the metallic liner to install channels for local leak rate testing, and for construction aids during liner repair and concrete placement. Repair and testing of the tendons, metallic liner section, reinforcing steel, and associated concrete placement will be controlled under an ASME Section XI repair program and OPPD's design control program. Replacement component requirements will meet or exceed the original design requirements found in plant specifications, or will be reconciled in accordance with ASME Section XI.

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

Post Tensioned Tendons

The tendons will be detensioned and replaced with new tendons that meet the original design requirements and will be tested in accordance with ASME Section XI, paragraph IWL-5500, as applicable. The replacement tendons will be tensioned, after the concrete has reached required strength, in accordance with ASME Section XI IWL requirements.

Concrete

The concrete will be replaced with concrete that meets the design strength requirements of the original design requirements and will be tested in accordance with ASME Section XI, paragraph IWL-4000 and IWL-5000, as applicable. Prior to the placement of the concrete, the outside of the tendon sheathing, 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 and tendon tensioning, the containment will be pressure tested at accident pressure (Pa) to demonstrate structural integrity of the containment structure in accordance with paragraphs IWL-5220 and 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.

A 100% VT-1C examination of the exterior surface of the new concrete will be conducted prior to, during, and following pressurization. Each examination is expected to be completed in about one 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 through the ILRT penetration from external air compressors, at a rate not to exceed 5 psi/hr up to 55 psi, then 2 psi/hr to Pa. The test pressure is Pa (60 psig). Once the test pressure is reached, it will be held for a minimum of one hour 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 of approximately 5 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 is acceptable for re-use. Reinforcing steel will be repaired or replaced to meet the original design 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 design 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 design requirements. Consistent with the design 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 examiner) will be performed on the 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.

Prior to the containment structural integrity pressure test, the removed section of the metallic liner will be vacuum box tested, and the channel attachment welds will be snoop tested with soap bubbles. These tests will be performed prior to the local leak rate test.

After the containment pressure test is completed, an "as-left" local leak rate test of the welds will be performed. The local leak rate test will meet the requirements of ANS 56.8. After the local leak rate testes are completed, the leak chase pipe plug will not be installed, this will enable testing of the liner welds during future IRLTs.

Additional attachment welds on the metallic liner are required to attach the liner structural stiffeners, as well as construction aids to the liner. The liner structural stiffeners include angles and tee sections that are permanently welded to the outside of the liner. The construction aids may include pads that could be permanently welded to the liner to support lifting rings and lugs. These lifting rings and lugs would be used to move the liner plate by crane from and to the temporary construction opening. Other construction aids may include devices (dogs) that will be welded to the liner and used to align the liner plate in the opening for rewelding. These fit-up devices would be removed after use, and the welds would be ground away. After the welds are removed, these areas would be nondestructively examined.

The sketch below illustrates the typical leak check channel configuaration.

The attachment welds for leak testing will be performed and inspected in accordance with the ASME 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.

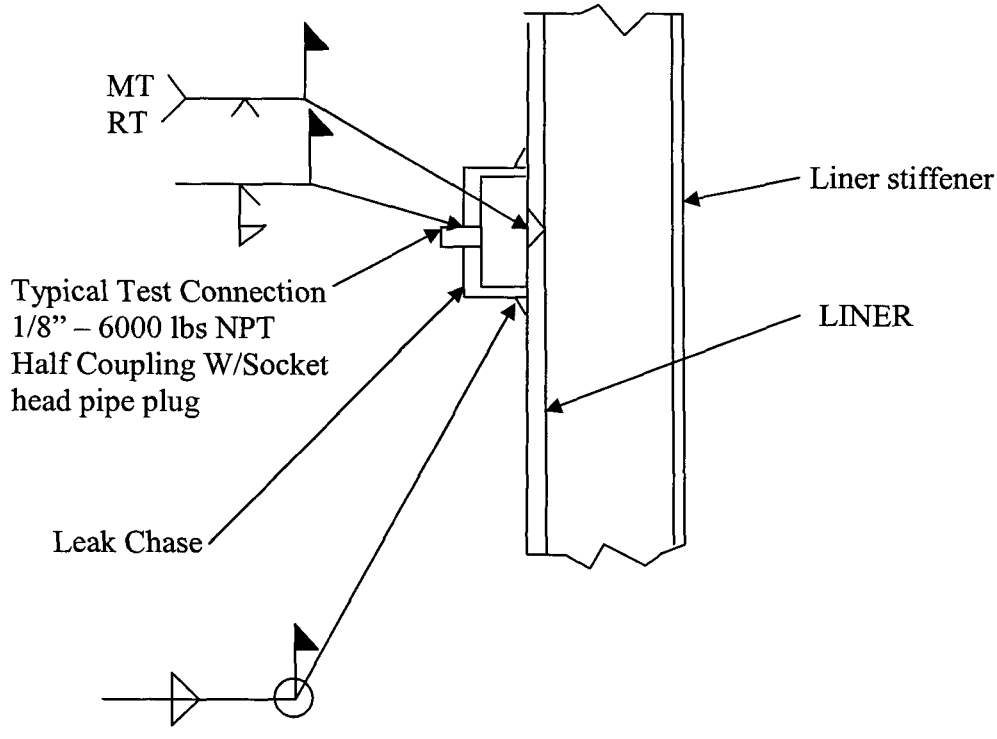
Specifically, the Code requires a Type A, Type B, or Type C test, as appropriate, for the repaired or modified pressure boundary component.

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 will be performed to warrant a leak rate test of the entire containment. Also, OPPD's acceptance criterion for leakage of the repair weld will be less than 100 standard cubic centimeters per minute. 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.

Additionally, the containment pressure test, performed at Pa, to demonstrate the structural integrity of the post-tensioned containment 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 Pa 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.

OPPD has determined that 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. OPPD 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.



SKETCH: DETAIL FOR LINER PLATE WELDING

6. Duration of Proposed Alternative:

The proposed alternative testing is for use only during the 2006 refueling outage for FCS.

7. Precedents

1. The local leak test as an alternate to a Containment ILRT following Containment Liner Plate repair was approved and implemented at North Anna Units 1 and 2, Docket Nos. 50-338/339 and Surry Units 1 and 2, Docket Nos. 50-280/281 (TAC Nos. MB7320, MB6706, MB7797 and MB7798).