



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELIEF REQUEST RR-ENG-IWE-01 FROM ASME SECTION XI

REQUIREMENTS FOR CONTAINMENT INSPECTION

STP NUCLEAR OPERATING COMPANY

SOUTH TEXAS PROJECT, UNITS 1 AND 2

DOCKET NOS. 50-498 AND 50-499

1.0 INTRODUCTION

In the *Federal Register* dated August 8, 1996 (61 FR 41303), the Nuclear Regulatory Commission (NRC) amended its regulations to incorporate by reference the 1992 Edition with 1992 Addenda of Subsections IWE and IWL of Section XI of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel (B&PV) Code. Subsections IWE and IWL provide the requirements for inservice inspection (ISI) of Class CC (concrete containment), and Class MC (metallic containment) of light-water cooled power plants. The effective date for the amended rule was September 9, 1996, and it requires the licensees to incorporate the new requirements into their ISI plans and to complete the first containment inspection by September 9, 2001. However, a licensee may propose alternatives to, or submit a request for relief from, the requirements of the regulation pursuant to 10 CFR 50.55a(a)(3) or (g)(5), respectively.

By letter dated October 7, 1999, the licensee, STP Nuclear Operating Company, proposed one alternative to the requirements of Subsection IWE of Section XI of the ASME Code for its South Texas Project, Units 1 and 2. The NRC's findings with respect to authorizing or denying the proposed alternative are discussed in this evaluation.

2.0 LICENSEE'S REQUEST

Code Requirement

ASME B&PV Code Section XI, Table 1WE-2500-1 Examination Category E-D, requires VT-3 visual examination of seals and gaskets on airlocks, hatches, and other devices required to assure containment leak-tight integrity.

Licensee's Basis for Relief (as stated)

The design configuration of the connections incorporating the subject seals and gaskets precludes visual examination of the seals and gaskets without disassembling the connection. Disassembly of a connection poses the risk of equipment damage, while a VT-3 visual examination would not by itself ensure a leak-tight connection after reassembly of the connection.

The containment penetrations discussed below contain seals and gaskets subject to the VT-3 visual examination requirements:

Electrical Penetrations

Electrical penetrations use a header plate attached to a containment penetration nozzle flange with a double set of o-rings between the header plate and flange face. Modules through which electrical conductors pass are installed in the header plate.

One module type, manufactured by Westinghouse, uses multiple o-rings (four per assembly) to assure leak tight integrity. A second type, manufactured by Conax, uses compression fittings. Both types utilize sealant compounds internal to the module to insulate and seal the electrical connectors. The o-ring seals are completely inaccessible; however, there is an internal space between the o-rings to permit periodic leak rate testing. The Conax compression fittings are also inaccessible without disassembling the component. Each penetration is pressurized with dry nitrogen to maintain and monitor integrity and to prevent intrusion of moisture into the penetration.

Personnel, Equipment, and Emergency Escape Hatch Penetrations

The Personnel, Equipment, and Emergency Escape Hatches utilize double gasketed doors to ensure leak-tight integrity. These hatches also contain other gaskets and seals in such applications as:

- handwheel shafts,
- electrical penetrations,
- blank flanges,
- viewpoint gaskets, and
- pressure equalization connections.

Gaskets and seals in these applications are inaccessible without disassembling the component. Double gaskets and seals are used with provision made for Type B testing for leak tightness in accordance with 10 CFR [Part] 50 Appendix J.

If the connections are disassembled, leak-tight tests are required to be performed both before and after maintenance activities. For electrical penetrations, this involves:

- A pre-maintenance Appendix J test;
- De-termination of cables at electrical penetrations if enough cable slack is not available;
- Disassembly of the joint;
- Removal and examination of the seals and gaskets;
- Re-assembly of the joint;
- Re-termination of the cables if necessary;

- Post-maintenance testing of cables; and
- Post-maintenance Appendix J testing of the penetration.

The work required for the containment hatches is similar except for de-termination, re-termination, and testing of cables.

Licensee's Proposed Alternative Requirements (as stated)

Seals and gaskets for containment integrity are Type B tested for leak-tightness in accordance with 10 CFR [Part] 50, Appendix J. Appendix J Type B testing of the subject penetrations is performed at least once each inspection interval.

Licensee's Justification for Granting Relief (as stated)

Appendix J Type B testing provides adequate assurance of the leak-tightness of the connections. Type B tests include measurement of leakage from containment penetrations whose design incorporates resilient seals, gaskets, or sealant compounds, and electrical penetrations fitted with flexible metal seal assemblies. Consequently, VT-3 visual examinations are not necessary to ensure that containment penetrations are leak-tight.

For those penetrations that are routinely disassembled, a Type B test is required upon final assembly and prior to start-up. Because the Type B test will assure the leak-tight integrity of containment penetrations, performing a visual examination will not increase the level of quality or safety.

Visual examination of the seal or gasket is not necessary to identify degradation of the material. When penetrations containing seals and gaskets are Type B tested in accordance with 10 CFR [Part] 50, Appendix J, degradation of the seal or gasket material would be revealed by an increase in the leakage rate. Corrective measures would be applied and the component re-tested.

ASME Section XI, 1992 Edition, 1993 Addenda, recognizes that disassembly of joints to perform these examinations is not warranted. Note 1 in Examination Category E-D was modified in the 1995 Edition of ASME Section XI to state that sealed or gasketed connections need not be disassembled solely for performance of visual examinations. In addition, the requirement to examine seals and gaskets has been removed from Subsection IWE of the 1998 Edition of ASME Section XI.

3.0 EVALUATION

The licensee proposes to use, in lieu of performing the VT-3 examinations for containment penetration seals and gaskets, the current program for leakage testing containment penetrations in accordance with 10 CFR Part 50, Appendix J.

In its request, the licensee stated that because the seals and gaskets associated with these penetrations are not accessible for examination when the penetration is assembled, containment penetrations seals and gaskets must be disassembled and re-assembled for the

purpose of performing the VT-3 visual examination. These activities (a pre-maintenance Appendix J test, de-termination of cables at electrical penetrations if enough cable slack is not available, disassembly of the joints, removal and examination of the seals and gaskets, re-assembly of the joints, re-termination of the cables if necessary, post-maintenance testing of cables, and post-maintenance Appendix J testing of the penetration) associated with a VT-3 visual examination would introduce the possibility of component damage that would not otherwise occur. The periodical test of penetrations in accordance with 10 CFR Part 50, Appendix J, will detect local leakage at containment peak accident pressure and measure leakage across the leakage-limiting boundary of containment penetrations whose design incorporates resilient seals, gaskets, sealant compounds, and electrical penetrations fitted with flexible metal seal assemblies. If unacceptable leakage is identified during the test, corrective measures would be taken.

Also, the staff finds that ASME Section XI, 1992 Edition, 1993 Addenda recognizes that disassembly of joints for the sole purpose of performing visual examination is unwarranted. Requiring the licensee to disassemble components for the sole purpose of inspecting seals and gaskets would place a significant hardship on the licensee without a compensating increase in the level of quality and safety.

On the basis discussed above, the staff concludes that the alternative proposed by the licensee will provide reasonable assurance of the functionality and integrity of the containment penetration seals and gaskets during the testing required by 10 CFR Part 50, Appendix J. The proposed alternative is authorized pursuant to 10 CFR 50.55a(a)(3)(ii) on the basis that compliance with the specific requirements of the code would result in hardship without a compensating increase in the level of quality and safety.

4.0 CONCLUSION

Based on our review of the information provided in the request for relief (Relief Request RR-ENG-IWE-01), the staff concludes that compliance with the code requirements would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety, and that the licensee's proposed alternative provides reasonable assurance of containment pressure integrity. Therefore, the proposed alternative is authorized pursuant to 10 CFR 50.55a(a)(3)(ii).

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Date: December 2, 1999