



South Texas Project Electric Generating Station P.O. Box 289 Wadsworth, Texas 77483

June 10, 2003  
NOC-AE-03001546  
10CFR50.55a

U. S. Nuclear Regulatory Commission  
Attention: Document Control Desk  
One White Flint North  
11555 Rockville Pike  
Rockville, MD 20852

South Texas Project  
Unit 1  
Docket No. STN 50-498  
Relief Request RR-ENG-2-30, Rev. 2

Reference: Letter, T. J. Jordan to Document Control Desk, "Revised Request for Approval of ASME Section XI Code Case N-516-2 for Underwater Welding of Core Barrel Locking Tab (Relief Request RR-ENG-2-30)," dated June 2, 2003 (NOC-AE-03001542)

The referenced letter submitted a revised request for NRC approval of Code Case N-516-2 for use on the reactor vessel core barrel and its Roto-Lock insert tabs, and provided responses to an informal NRC request for additional information. Incorrect wording was inadvertently included in the response to Question 15 in Attachment 1 to the referenced letter. That wording has been corrected and a change indicator bar has been added in the margin.

If there are any questions regarding this correction, please contact Michael S. Lashley at (361) 972-7523 or me at (361) 972-7162.

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Attachment: 10CFR50.55a Relief Request RR-ENG-2-30, Rev. 2

A047

cc:

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**10CFR50.55a Relief Request RR-ENG-2-30, Rev. 2****Proposed Alternative  
in Accordance with 10 CFR 50.55a(a)(3)(i)****--Alternative Provides Acceptable Level of Quality and Safety--****1. ASME Code Components Affected**

Unit 1 reactor vessel core barrel and its Roto-Lock insert locking tabs that secure the inserts and prevent their rotation.

**2. Applicable Code Edition and Addenda**

American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code, Section XI, 1989 Edition with no Addenda.

**3. Applicable Code Requirement**

IWA-4000 of Section XI does not address underwater welding. However, Code Case N-516-2, "Underwater Welding, Section XI, Division 1," includes alternative procedure, performance, and filler metal qualifications, and alternative examination requirements to those contained or referenced in IWA-4000 for use when the welding is performed underwater.

**4. Reason for the Request**

Approval for the use of Code Case N-516-2 is requested for underwater fillet welding of a Roto-Lock insert locking tab to the reactor vessel core barrel to secure the insert and prevent its rotation.

**5. Proposed Alternative and Basis for Use**

STP Nuclear Operating Company (STPNOC) requests relief from the requirements of IWA-4000 in accordance with 10CFR50.55a(a)(3)(i) in order to perform underwater welding for repairs. IWA-4000 of the Section XI code of record at the South Texas Project does not address underwater welding. STPNOC requests NRC approval of ASME Section XI Code Case N-516-2 for use at South Texas on the basis that it provides an acceptable level of quality and safety.

The NRC documented their conditional acceptance of Code Case N-516-2 in Draft Regulatory Guide DG-1091 (Proposed Revision 13 of Regulatory Guide 1.147) published in December 2001. However, neither proposed Revision 13 nor the proposed rulemaking to reference this revision in 10CFR50.55a has been issued.

STP Nuclear Operating Company requests approval for use of Code Case N-516-2 in order to deposit three each 0.180-inch fillet welds on one locking device. These welds were made using a weld procedure specification (WPS) qualified in accordance with Code Case N-516-2 and were visually examined. The WPS was qualified with tensile and bend tests in accordance with ASME Section IX, and with an additional chemical, ferrite, and tensile test performed in accordance with Code Case N-516-2.

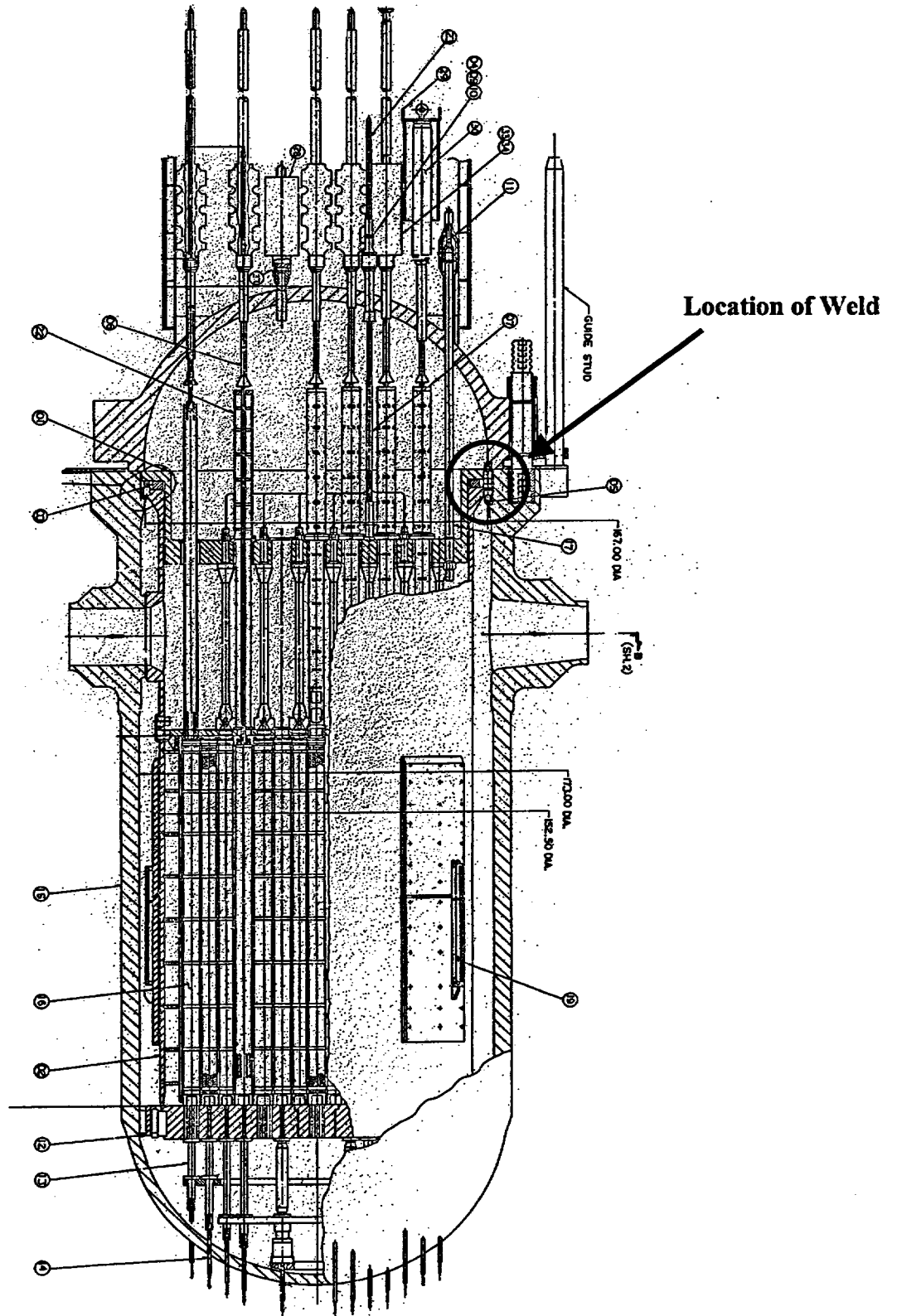
A confirmation weld was performed on 1/2-inch plate using the WPS and the same weld material as that to be used in the production weld. The confirmation weld was subject to the same inspection requirement as the production weld.

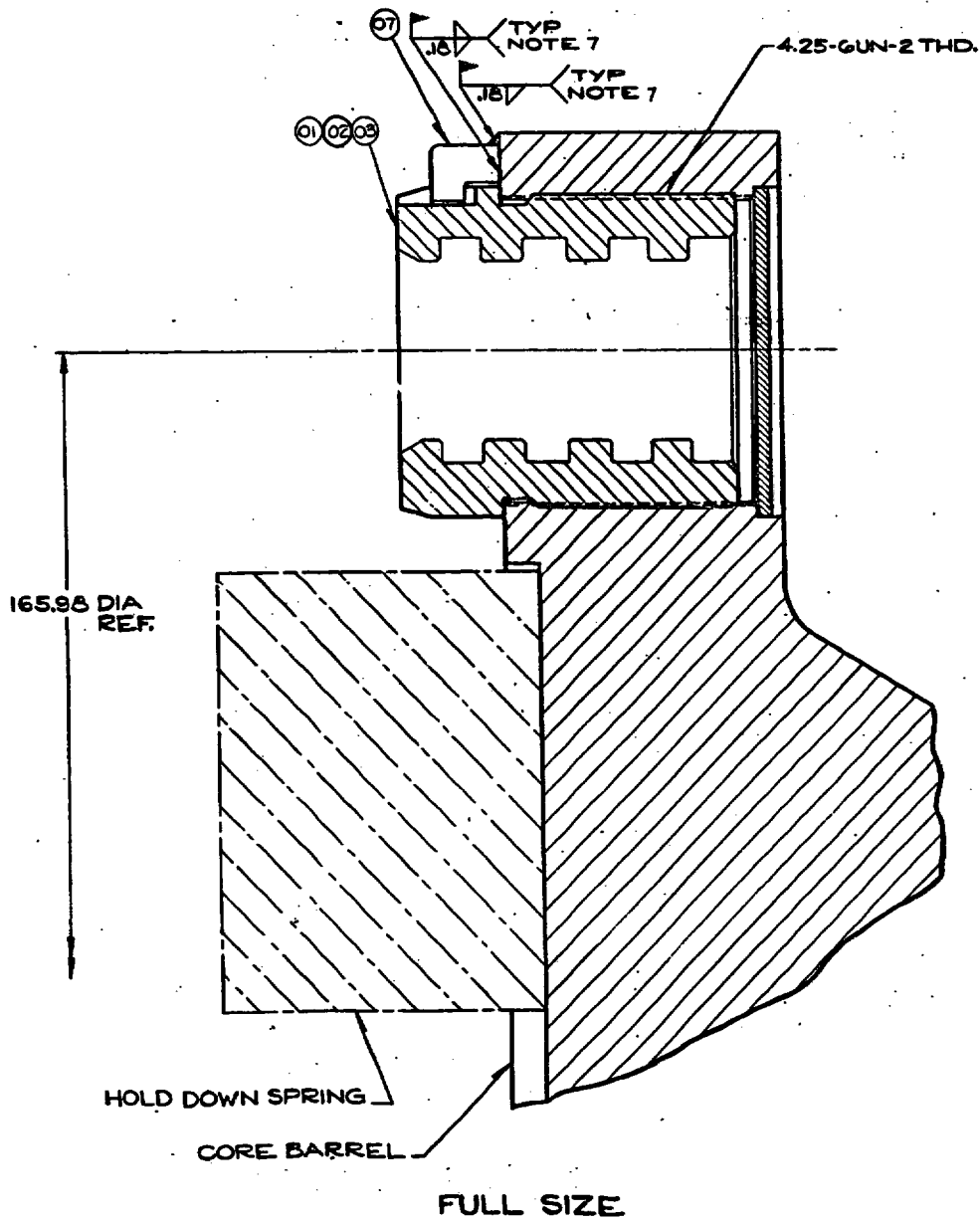
The subject fillet welds are to prevent the Roto-Lock insert from backing out and potentially becoming a loose part. They are not structural or pressure boundary welds. The requirements imposed on the welds is conservative with respect to the safety function of the welds.

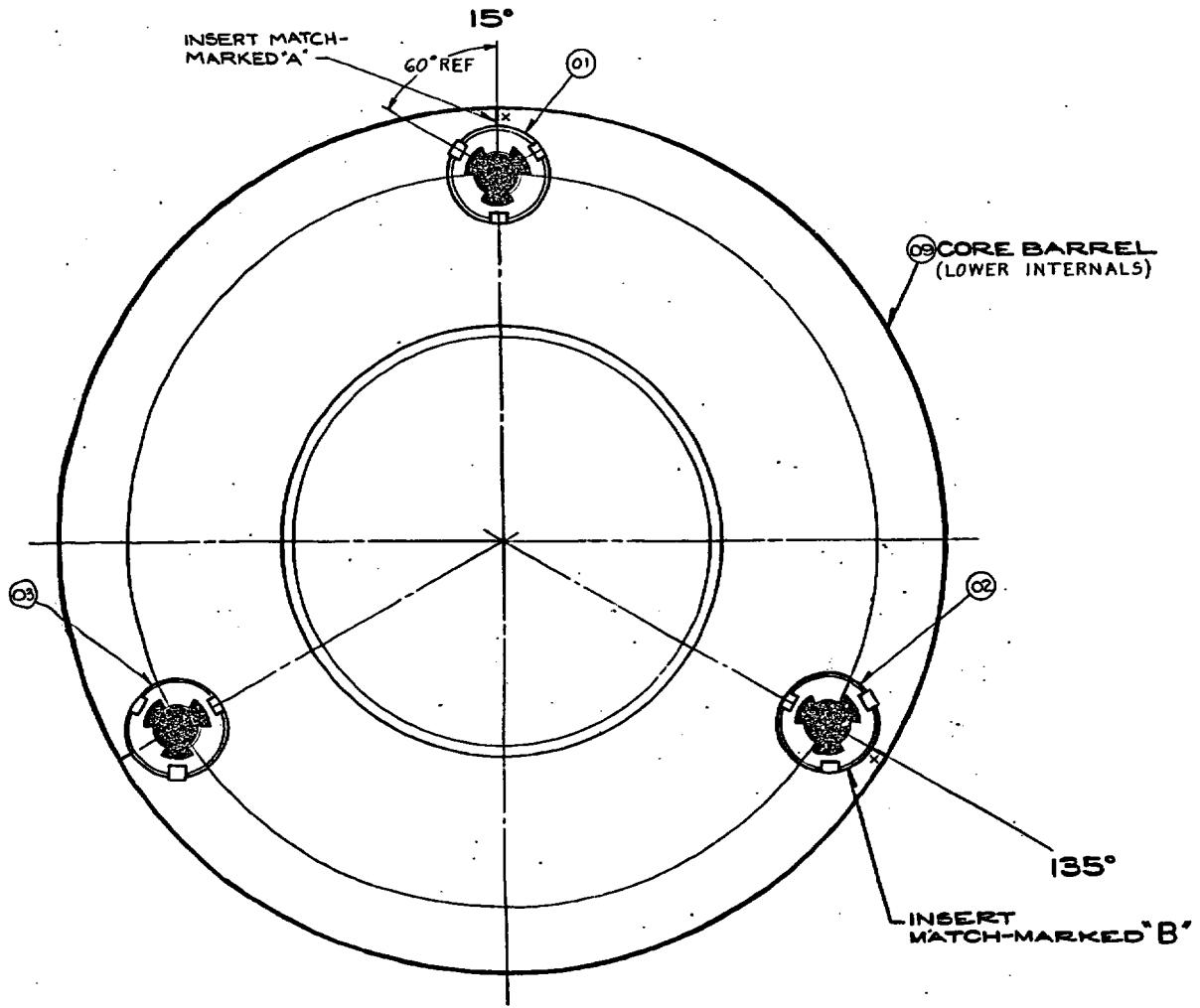
These additional requirements, combined with the alternative requirements of Code Case N-516-2, provide an acceptable level of quality and safety for underwater welding.

6. Duration of Proposed Alternative

This relief request will be implemented during the current forced outage for repairing bottom mounted instrument guide tubes.







SCHEMATIC  
NOT TO SCALE

**Response to Informal Request for Additional Information for  
South Texas Project Underwater Welding (RR-ENG-2-30)**

1. Will ASME Section IX guided bend tests per QW-160 be performed on the welding procedure qualification tests?

**Response: ASME Section IX guided bend tests per QW-160 have been performed.**

2. Is this welding wet or dry hyper baric, dry chamber, dry spot, etc.?

**Response: This specific application is for wet welding.**

3. What is the specific item to be welded using underwater welding?

**Response: Code Case N-516-2 was used for making three underwater fillet welds to attach one Roto-Lock insert locking tab to the core barrel to secure the Roto-Lock insert and prevent its rotation.**

4. What material is the item to be welded using underwater welding made of? (ASME SA Number, type, and grade; heat treatment condition)

**Response: The locking tab is A-240 Tp 304L. The core barrel is SA-182 F304H.**

5. What is the specific filler material to be used for the welding? (filler metal classification)

**Response: The filler metal is SFA 5.4 E316L-17.**

6. What welding process or processes are to be used?

**Response: The shielded metal arc welding (SMAW) process was used.**

7. What process or processes are to be used for cutting or metal removal?

**Response: Cutting was done with a rotary file.**

8. Will any additional NDE be done on this weld?

**Response: No.**



9. What NDE will be done on this weld?

**Response: Remote visual examination by a certified South Texas inspector was performed.**

10. Will any Examination be done on this item on an ongoing basis? (Every outage or every other outage, etc.)

**Response: No examination will be done on this item on an ongoing basis.**

11. What is the fluence level in the area to be welded?

**Response: The total neutron fluence at the vessel flange area is expected to be no higher than  $1.2E+17$  n/cm<sup>2</sup> after 40 calendar years of plant operation.**

12. Will the mock-up material have the same fluence level applied to it?

**Response: No, the mockup material did not have the same fluence level applied to it. The application is not Class 1 and is non-structural and non-pressure retaining. Additionally, the locking tab and core barrel are not ferritic materials and, therefore, not subject to neutron embrittlement.**

13. The high neutron fluence welding mock-up testing, procedure, data and results shall be attached to the relief request.

**Response: This is not applicable to this specific application.**

14. What is the licensee's basis that the proposed alternative provides an acceptable level of quality and safety?

**Response: Refer to Section 5 in the relief request.**

15. Provide information on the depth of the water at which the repair will be performed.

**Response: The Procedure Qualification Record for the tensile test was performed at a depth of 35 feet. This qualifies the welding procedure to a depth range of from 2 to 45 feet. The weld filler material weld pad was welded at a depth of 20 feet, which qualifies the filler material to a depth of from 0 to 30 feet. The replacement weld was performed at a depth of 29 feet. The combination of the tests performed meet the qualification requirements of Code Case N-516-2 for welding at a depth of 29 feet.**

16. Confirmation tests for welders shall be performed prior to the commencement of production work. The confirmation test requirements specified in AWS D 3.6 shall be followed.

**Response: A confirmation weld was performed on 1/2-inch plate using the same WPS and weld material as that to be used in the production weld. The confirmation weld was subject to the same inspection requirement as the production weld.**

17. The licensee should provide test results of filler metal qualifications per paragraph 4.0 of code case 516-2. The minimum required ferrite number of the weld metal shall be specified in the relief request.

**Response: STP determined that the requirements of the code case have been met. The results are summarized below.**

**Procedure qualification results are as follows:**

- 2 root and 2 face bends - acceptable
  - 2 tensile tests (88,000 PSI and 88,500 PSI)
  - Chemistry test results certified that the weld pad was welded with a 3/32" diameter E316L-17 electrode of Lot #19479H. The weld pad was welded at a water depth of 20'. Chemistry conforms to the chemical requirements of ASME SFA 5.4, AWS Classification E316L-XX.
    - Carbon .035
    - Chromium 17.52
    - Nickel 12.43
    - Molybdenum 2.84
    - Manganese .64
    - Silicon .69
    - Phosphorus .038
    - Sulfur .009
    - Copper .16
  - Six (6) delta-ferrite readings were taken on the weld pad and resulted in an average of 9.1FN. This complies with site requirements for a minimum of 5FN and a maximum of 25FN. The six readings were 10.0, 8.5, 9.5, 11.0, 8.5 and 7.5.
18. The items above shall be included in or attached to the relief request.

**Response: This attachment fulfills the requirement.**