J. Barnie Beasley, Jr., P.E.
Vice President

Southern Nuclear Operating Company, Inc.
40 Inverness Center Parkway
Post Office Box 1295
Birmingham, Alabama 35201

Tel 205 992 7110
Fax 205 992 0403

SOUTHERN COMPANY
Energy to Serve Your World℠

September 18, 2002

Docket No. 50-364

NEL-02-0188

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

Joseph M. Farley Nuclear Plant - Unit 2
ASME Section XI Relief Requests Number RR-51 and RR-52
Alternative Repair Technique and Inspection Requirement – Reactor Vessel Head

Ladies and Gentlemen:

In response to Bulletins 2002-01 and 2002-02, Southern Nuclear Operating Company (SNC) has committed to perform bare metal visual (BMV) and ultrasonic testing (UT) of the Unit 2 reactor vessel head penetration nozzles during the refueling outage beginning September 14, 2002. The enclosed Relief Requests RR-51 and RR-52 for Farley Nuclear Plant Unit 2 are submitted in accordance with the provisions of 10 CFR 50.55a as a contingency to provide an alternate repair method in the event that these inspections indicate any nozzle repairs are necessary. SNC will promptly inform the NRC if the need for such repairs arises. This matter has been discussed with Mr. Frank Rinaldi of your staff.

There are no commitments contained in this letter. If you have any questions, please advise.

Respectfully submitted,

J. B. Beasley, Jr.

DWD/sdl: U2CRDMrepairRR.doc

Enclosures:
1. Request for Relief No. RR-51, w/ Attachments A & B
2. Request for Relief No. RR-52

A047

cc: Southern Nuclear Operating Company
Mr. D. E. Grissette, Nuclear Plant General Manager - Farley

U. S. Nuclear Regulatory Commission, Washington, D. C.
Mr. F. Rinaldi, Licensing Project Manager - Farley

U. S. Nuclear Regulatory Commission, Region II
Mr. L. A. Reyes, Regional Administrator
Mr. T. P. Johnson, Senior Resident Inspector - Farley

ENCLOSURE 1

SOUTHERN NUCLEAR OPERATING COMPANY
FARLEY UNIT 2
UPDATED PROGRAM
REQUEST FOR RELIEF NO. RR-51

ENCLOSURE 1

SOUTHERN NUCLEAR OPERATING COMPANY
FARLEY UNIT 2
UPDATED PROGRAM
REQUEST FOR RELIEF NO. RR-51

I. System/Component(s) for Which Alternative is Requested: Reactor Vessel Closure Head (RVCH), Class 1 Pressure Retaining Partial Penetration Welds in Vessels, ASME Section XI, 1989 Edition, Examination Category B-E, Items B4.12 and B4.13.

II. Code Requirement: Farley Unit 2 is currently in the third inspection interval using the 1989 Edition of ASME Section XI with no Addenda. IWB-3143 requires that repairs comply with the requirements of IWA-4000 and IWB-4000. IWA-4120 (a) requires that "Repairs shall be performed in accordance with the Owner's Design Specification and the original Construction Code of the system. Later editions and Addenda of the Construction Code or of Section III, either in their entirety or portions thereof, and Code Cases may be used. If repair welding cannot be performed in accordance with these requirements, the applicable alternative requirements of IWA-4500 and the following may be used:
(1) IWB-4000 for Class 1 components;..."

III. Code Requirement for Which Alternative is Requested: Pursuant to 10 CFR 50.55a(a)(3)(i), the use of a technical alternative to the rules is requested from the 1989 Edition of ASME Section XI, IWA-4120(a), which requires repairs to be performed in accordance with the Owner's Design Specification and the original Construction Code of the system; or later editions and Addenda of the Construction Code or of Section III, either in their entirety or portions thereof, and Code Cases; or the applicable alternative requirements of IWA-4500 and IWB-4000.

IV. Basis for Alternative: Supplemental examinations of the RVCH nozzle partial penetration welds are planned in response to NRC Bulletins 2002-01 and 2002-02. In the event a flaw is found in a RVCH nozzle partial penetration weld, this technical alternative will be utilized for performance of repairs in conjunction with flaw evaluations performed in accordance with Request for Relief No. RR-52.

If repairs are required, remote operated, ambient temperature machine welding techniques are available to reduce personnel radiation exposure As Low As Reasonably Achievable (ALARA) and avoid exposure of the RVCH, control rod drive housings and partial penetration nozzle welds to the temperatures required for postweld heat treatment while providing equivalent levels of quality and margins of safety. Additionally, conformance with the requirements of the Construction Code, Section III or the alternative requirements of IWA-4500 would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety due to personnel radiation exposure associated with manual repair welding techniques, potential for distortion of the RVCH and/or control rod drive housings due to temperatures required for postweld heat treatment, and exposure of the RVCH penetration welds to heat treatment conditions for which they were not originally qualified. The following paragraphs provide a summary of the requirements that must be met and estimated personnel radiation exposure when repairs are performed according to the original Construction Code (ASME Section III), later editions and addenda of the Construction Code, the 1989 Edition of ASME Section XI, later editions and addenda of ASME Section XI, and the proposed technical alternative.

ENCLOSURE 1

SOUTHERN NUCLEAR OPERATING COMPANY
FARLEY UNIT 2
UPDATED PROGRAM
REQUEST FOR RELIEF NO. RR-51

1. Repairs Using Original Construction Code: The Construction Code of record for the Farley Unit 2 reactor vessel and closure head is the 1968 edition of ASME Section III with addenda through the Summer of 1970. Compliance with paragraph N-528 of the Construction Code for a repair not penetrating the original J-groove buttering (the material between the J-groove structural weld and the RV head base metal, as shown in Figures 1 or 2) would require the following repair steps:

   - Locally remove the flaw using manual grinding or machining techniques;
   - Examine the removal cavity by liquid penetrant method;
   - Manually weld the repair cavity;
   - Perform progressive liquid penetrant examinations at the lesser of 1/3 of the weld joint thickness or 1/2 inch weld deposit, and
   - Perform final liquid penetrant examination.

   Estimated personnel radiation exposure for repairing one nozzle by this method is 14 person-rem. However, for this type of repair, there is significant risk of additional personnel exposure if the indications requiring repair are found to be within 1/8 in. of the ferritic steel RVCH and require preheat, post weld heat treatment (PWHT), or temper bead repair methods as described below.

2. In addition to the repair steps described above, if the repair cavity encroaches upon the low alloy steel base metal, PWHT is required at 1100°F minimum. The PWHT requirements set forth therein would be difficult to achieve on a RVCH inside containment and would pose significant risk of distortion to the geometry of the head and penetrations, in addition to exposing the existing penetration-to-head welds to PWHT for which they were not previously qualified in accordance with ASME Section IX, QW-407.1. Estimated personnel radiation exposure for repairing one nozzle by this method is 32 person-rem.

3. Repairs Using Later Editions and Addenda of ASME Section III: Use of later editions and addenda of Section III, either in their entirety or portions thereof, and Code Cases is also permitted by IWA-4120(a). The later editions and addenda of ASME Section III permitted for use in 10CFR50.55a(b)(1) include editions through the 1995 Edition and addenda through the 1996 Addenda. These editions have preheat, welding, examination and PWHT requirements similar to those described above for the Construction Code, except that limited weld repairs to dissimilar metal welds may be made without PWHT in P-No. 3 (Section IX, QW-422) base material or weld filler metal F-No. 43 (Section IX, QW-432) when using the manual Shielded Metal Arc Welding (SMAW) temper bead repair method of NB-4622.11. For example, compliance with the 1995 Edition and addenda through the 1996 Addenda of ASME Section III for a repair with 1/8 in. or less of nonferritic weld buttering in the original J-groove, as shown in Figure 1 or 2, would require the following repair steps:

   - Locally remove the flaw using manual grinding or machining techniques;
   - Examine the removal cavity by liquid penetrant method;
   - Preheat the base metal to 350°F minimum;

- Manually weld the repair cavity with one layer of weld metal using 3/32 in. diameter electrodes;
- Remove the weld bead crown of the first layer by grinding;
- Manually deposit a second weld layer with 1/8 in. diameter electrodes;
- After at least 3/16 in. of weld metal has been deposited, the temperature must be held at 450°F-550°F for 4 hours minimum;
- Manually weld the remaining weld with no larger than 5/32 in. diameter electrodes;
- Perform progressive liquid penetrant examinations at the lesser of 1/2 of the weld joint thickness or 1/2 inch weld deposit; and
- Perform final liquid penetrant examination after the completed weld has been at ambient temperature for at least 48 hours.

Estimated personnel radiation exposure for repairing one nozzle by this method is 32 person-rem.

4. Repairs Using 1989 Edition of ASME Section XI: The alternative requirements of IWA-4500 in the 1989 edition of ASME Section XI that are applicable to the RVCH penetration J-groove welds are contained in IWA-4530, Welding Dissimilar Materials by Half Bead Welding Technique. This alternate welding method must be performed with manual SMAW. Compliance with the 1989 edition of ASME Section XI for a repair with 1/8 in. or less of nonferritic weld buttering in the original J-groove, as shown in Figure 1 or 2, would require the following repair steps:

   - Locally remove the flaw using manual grinding or machining techniques;
   - Examine the removal cavity by liquid penetrant method;
   - Preheat the base metal to 300°F minimum;
   - Manually weld the repair cavity with one layer of weld metal using 3/32 in. diameter electrodes;
   - Manually remove approximately 1/2 the thickness of the first layer by grinding;
   - Manually deposit a second weld layer with 1/8 in. diameter electrodes;
   - After at least 3/16 in. of weld metal has been deposited, the temperature must be held at 450°F-550°F for 2 hours minimum;
   - Manually weld the remaining weld with 1/8 in. diameter electrodes;
   - Perform progressive liquid penetrant examination for each 1/4 in. of deposited weld after holding the weld temperature at 450°F-550°F for 2 hours minimum, and
   - Final liquid penetrant and ultrasonic examination must be performed after the completed weld has been at ambient temperature for at least 48 hours.

   Estimated personnel radiation exposure for repairing one nozzle by this method is 32 person-rem.

5. Repairs Using Later Editions and Addenda of ASME Section XI: Use of later editions and addenda of Section XI, either in their entirety or portions thereof, and Code Cases is also permitted by the 1989 Edition of ASME Section XI, IWA-4120(c). The later editions and addenda of ASME Section XI that are permitted for use in 10CFR50.55a(b)(2) contain

preheat, postweld heating and minimum weld layer requirements that would result in substantial personnel radiation exposure without a compensating increase in the level of quality and safety. The alternate welding methods for dissimilar materials in later editions and addenda of ASME Section XI up to and including the 1995 Edition through 1996 Addenda are similar to the 1989 edition, except that the automatic or machine Gas Tungsten Arc Welding (GTAW) process requiring a minimum of 6 temper bead weld layers was added in IWA-4633.2. Preheat and SMAW postweld heating requirements are similar to those in the 1989 edition. Estimated personnel radiation exposure for repairing one nozzle by the machine GTAW 6-layer temper bead method is 16 person-rem.

6. Repairs Using Technical Alternative: In contrast, a repair performed using the proposed technical alternative would be performed using the remote machine GTAW process in the following general manner:

   - Remove a portion of accessible guide sleeve below head surface by remote machining (except at spare penetrations and thermocouple penetrations);
   - Roll expand nozzle in penetration above planned cut line;
   - Remotely machine away nozzle lower end above the structural (J-groove) weld and machine weld preparation;
   - Examine the machined/ground surface by liquid penetrant method;
   - Manually chamfer grind original structural weld as needed to reduce postulated flaw to below critical size;
   - Weld the nozzle to the low alloy steel closure head using remote GTAW ambient temperature temper bead method described in Attachment A;
   - Remotely machine and/or grind the repair weld surface;
   - Remotely perform final liquid penetrant and ultrasonic examination after the completed weld has been at ambient temperature for at least 48 hours;
   - Remotely remediate inside surface of repair area using abrasive water jet, which applies a compressive residual stress to the surface.

   Estimated personnel radiation exposure for repairing one nozzle by this method is 14 person-rem.

V. <u>Alternative Requirements</u>: The proposed technical alternative is contained in Attachment A and is based on the Ambient Temperature Temper Bead Welding Technique, which is contained in ASME Section XI Code Case N-638. Several minor differences exist between the proposed technical alternative in Attachment A and Code Case N-638 due to the geometry and location of the new temper bead weld used to attach the nozzle to the closure head. These differences are discussed in Attachment B.

VI. <u>Justification for Granting Approval of Alternative</u>: Pursuant to 10 CFR 50.55a(a)(3)(i), SNC requests approval to use the alternative ambient temperature temper bead welding requirements contained in Attachment A for repairs to pressure retaining partial penetration nozzle welds in the RVCH. The technical alternative is based on the requirements contained in ASME Section XI Code Case N-638, which has been proposed by the NRC as an acceptable alternative to applicable parts of ASME Section XI in the NRC Draft Regulatory Guide DG-1091, Inservice

Inspection Code Case Acceptability, ASME Section XI, Division 1, dated December 2001. Differences between the proposed technical alternative in Attachment A and previously reviewed Code Case N-638 are discussed in Attachment B.

The proposed technical alternative has been demonstrated by successful completion of welding procedure qualifications to provide sound welds with acceptable material properties meeting ASME Sections III and IX. The ambient temperature machine GTAW temper bead welding method in the proposed technical alternative has been previously evaluated by the NRC for repairs to RPV closure head penetrations at Oconee 2, Crystal River 3, Surry 1, Three Mile Island 2, Millstone 2, Davis Besse, Oconee 1 and Oconee 3. NRC issued a Safety Evaluation authorizing the pertinent Oconee 1 relief requests on August 12, 2002.

Pursuant to 10 CFR 50.55a(a)(3)(i), the use of the alternative ambient temperature temper bead welding requirements contained in Attachment A provides an acceptable level of quality and safety.

VII. Implementation Schedule: This request for relief is applicable to the Third Ten-Year Interval (ending November 30, 2007) for repairs using the 1989 Edition of ASME Section XI.

VIII. Relief Request Status: This request for relief is awaiting NRC approval.

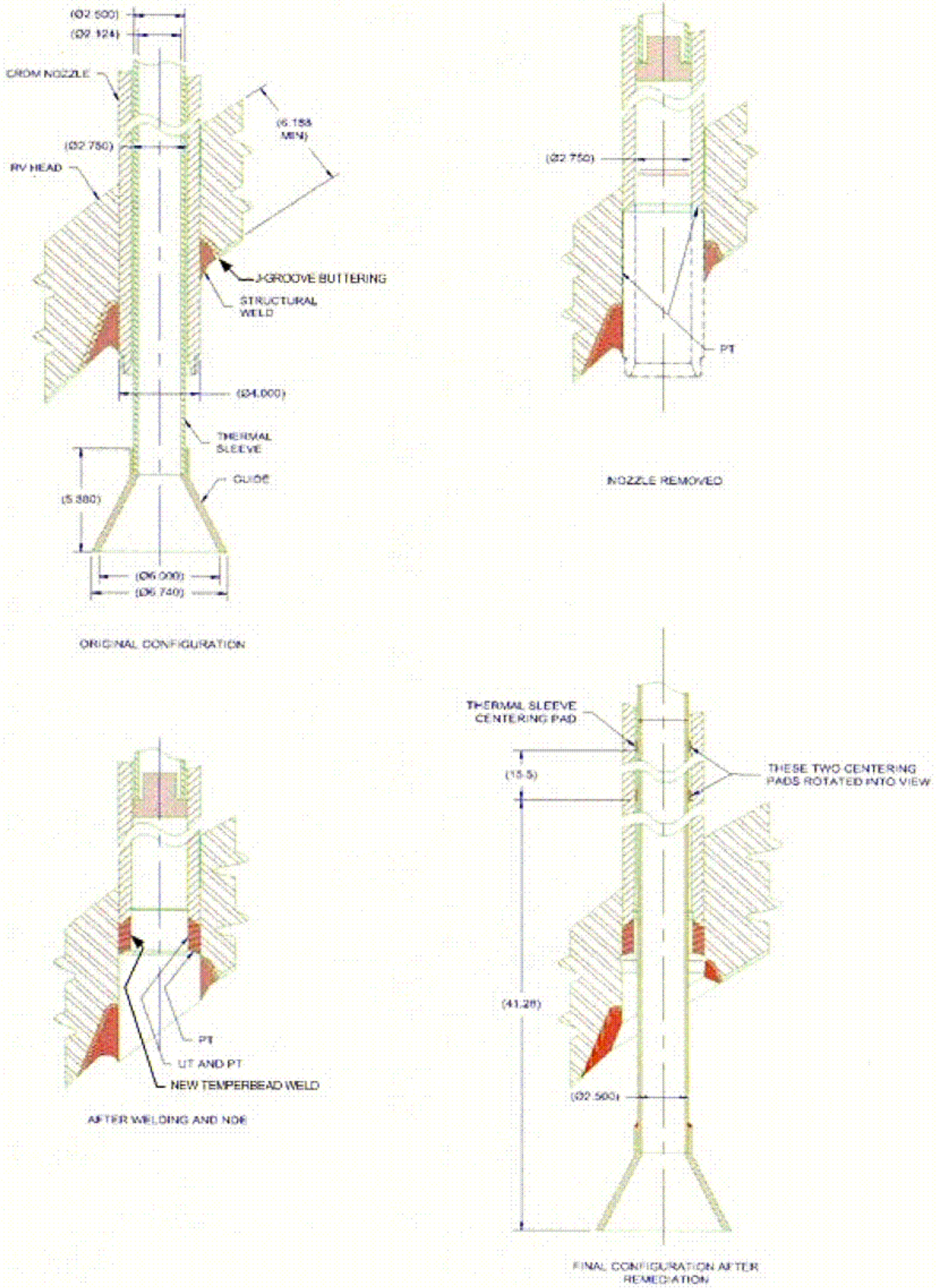


Figure 1, RVCH Control Rod Drive Penetration Nozzle Weld Original Configuration and Repair Details

C01

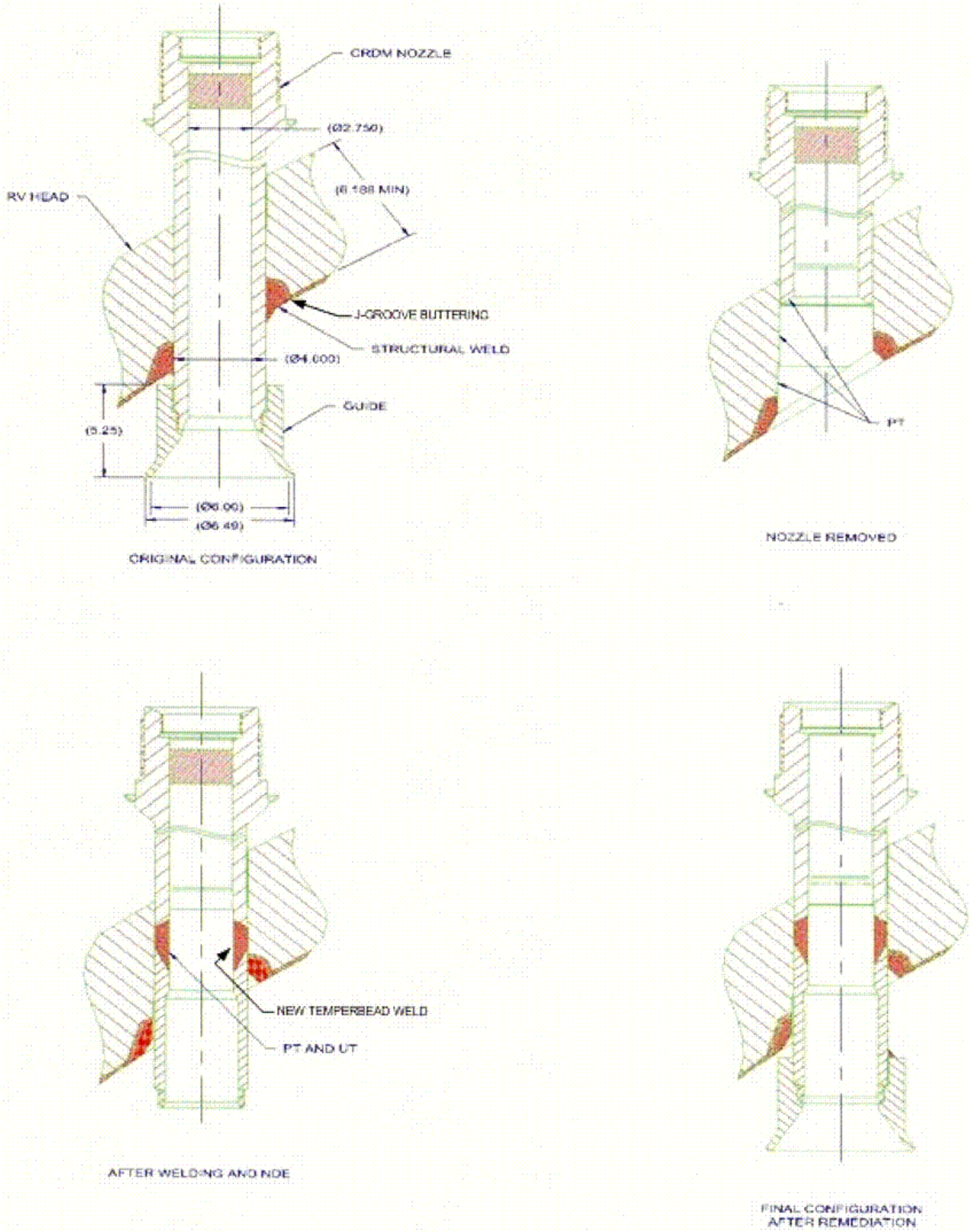


Figure 2, RVCH Thermocouple Penetration Nozzle Original Weld Configuration and Repair Details

C02

ENCLOSURE 1

ATTACHMENT A

to

SOUTHERN NUCLEAR OPERATING COMPANY
FARLEY UNIT 2
UPDATED PROGRAM
REQUEST FOR RELIEF NO. RR-51

Proposed Alternative Rules

For

Dissimilar Metal Welding Using Ambient Temperature

Machine GTAW Temper Bead Technique

Proposed Alternative Rules For Dissimilar Metal Welding Using Ambient Temperature Machine GTAW Temper Bead Technique

SCOPE

Repairs to P-No. 43 material to P-Nos. 3 material by the machine GTAW temper bead technique without the specified preheat or postweld heat treatment of the Construction Code, and without the nondestructive examination requirements of the Construction Code, shall be made according to the alternative rules of paragraphs 1.0 through 5.0 below and all other requirements of the 1989 Edition of ASME Section XI, IWA-4000.

1.0 GENERAL REQUIREMENTS:

(a) The maximum area of an individual weld based on the finished surface shall be 100 sq. in., and the depth of the weld shall not be greater than one-half of the ferritic base metal thickness.

(b) Repair/replacement activities on a dissimilar-metal weld in accordance with these requirements are limited to those along the fusion line of a nonferritic weld to ferritic base material on which 1/8 in. or less of nonferritic weld deposit exists above the original fusion line.

(c) If a defect penetrates into the ferritic base material, repair of the base material using a nonferritic weld filler material may be performed in accordance with these requirements, provided the depth of repair in the base material does not exceed 3/8 in.

(d) Prior to welding, the area to be welded and a band around the area of at least 1 ½ times the component thickness or 5 in., whichever is less shall be at least 50°F. Preheat temperature shall be monitored using contact pyrometers, on accessible areas of the closure head external surface(s).

(e) Welding materials shall meet the Owner's Requirements and the Construction Code and Cases specified in the ASME Section XI Repair/Replacement Plan. Welding materials shall be controlled so that they are identified as acceptable until consumed.

(f) Peening shall not be used, however, the weldment final surface may be abrasive water jet conditioned.

2.0 WELDING QUALIFICATIONS:

The welding procedures and the welding operators shall be qualified in accordance with ASME Section IX and the requirements of paras. 2.1 and 2.2.

2.1 PROCEDURE QUALIFICATIONS:

(a) The ferritic steel base material for the welding procedure qualification shall be P-No. 3 Group No. 3. The base material shall be postweld heat treated to at least the time and temperature that was applied to the materials being welded.

(b) Welding in a pressurized environment is not permitted.

(c) These alternative rules may be used for reactor vessel closure head repairs only and may not be used for repairs in the core belt line region of the reactor vessel.

(d) The root width and included angle of the cavity in the test assembly shall be no greater than the minimum specified for the repair.

(e) The maximum interpass temperature for the first three layers of the test assembly shall be 150°F.

(f) The ferritic steel P-No. 3 Group No. 3 base material test assembly cavity depth shall be at least one-half the depth of the weld to be installed during the repair/replacement activity, and at least 1 inch. The test assembly thickness shall be at least twice the test assembly cavity depth. The test assembly shall be large enough to permit removal of the required test specimens. The test assembly dimensions surrounding the cavity shall be at least the test assembly thickness, and at least 6 inches. The qualification test plate shall be prepared in accordance with Figure 1.

(g) Ferritic base material for the procedure qualification test shall meet the impact test requirements of the Construction Code and Owner's Requirements. If such requirements are not in the Construction Code and Owner's Requirements, the impact properties shall be determined by Charpy V-notch impact tests of the procedure qualification base material, at or below the lowest service temperature of the item to be repaired. The location and orientation of the test specimens shall be similar to those required in (i) below, but shall be in the base metal.

(h) Charpy V-notch tests of the austenitic weld metal of the procedure qualification are not required.

(i) Charpy V-notch tests of the ferritic heat-affected zone (HAZ) shall be performed at the same temperature as the base metal test of (g) above. Number, location, and orientation of test specimens shall be as follows:

(1) The specimens shall be removed from a location as near as practical to a depth of one-half the thickness of the deposited weld metal. The coupons for HAZ impact specimens shall be taken transverse to the axis of the weld and etched to define the HAZ. The notch of the Charpy V-notch specimens shall be cut approximately normal to the material surface in such a manner as to include as much HAZ as possible in the resulting fracture. When the material thickness permits, the axis of a specimen shall be inclined to allow the root of the notch to be aligned parallel to the fusion line.

(2) If the test material is in the form of a plate or a forging, the axis of the weld shall be oriented parallel to the principal direction of rolling or forging.

(3) The Charpy V-notch test shall be performed in accordance with SA-370. Specimens shall be in accordance with SA-370, Figure 11, Type A. The test shall consist of a set of three full-sized 10-mm x 10-mm specimens. The lateral expansion, percent shear, absorbed energy, test temperature, orientation and location of all test specimens shall be reported in the Procedure Qualification Record.

(j) The average values of the three HAZ impact tests shall be equal to or greater than the average values of the three unaffected base metal tests. In cases where this requirement is not met, the RT_{NDT} temperature adjustment specified in the 1989 Edition of ASME III, NB-4335.2 shall be specified in the applicable Welding Procedure Specification (WPS).

2.2 PERFORMANCE QUALIFICATION

Welding operators shall be qualified in accordance with the latest edition and addenda of ASME Section IX.

3.0 WELDING PROCEDURE REQUIREMENTS

The welding procedure shall include the following requirements:

(a) The weld metal shall be deposited by the automatic or machine GTAW process.

(b) Dissimilar metal welds shall be made using F-No. 43 weld metal (QW-432) for P-No. 43 to P-No. 3 weld joints.

(c) The ferritic steel area to be welded shall be buttered with a deposit of at least three layers to achieve at least 1/8 inch overlay thickness as shown in Figure 2, Steps 1 through 3, with the heat input for each layer controlled to within ±10% of that used in the procedure qualification test. Particular care shall be taken in placement of the weld layers at the weld toe area of the ferritic material to ensure that the HAZ is tempered. Subsequent layers shall be deposited with a heat input not exceeding that used for layers beyond the third layer in the procedure qualification.

(d) The maximum interpass temperature for field applications shall be 350°F regardless of the interpass temperature during qualification. In lieu of direct measurement of interpass temperature, a demonstration may be performed on a full-thickness mockup to verify the maximum interpass temperature will not be exceeded during the welding operation.

4.0 EXAMINATION

(a) Prior to welding, a surface examination shall be performed on the area to be welded.

(b) The final weld surface and adjacent HAZ shall be examined using surface and ultrasonic methods when the completed weld has been at ambient temperature for at least 48 hours.

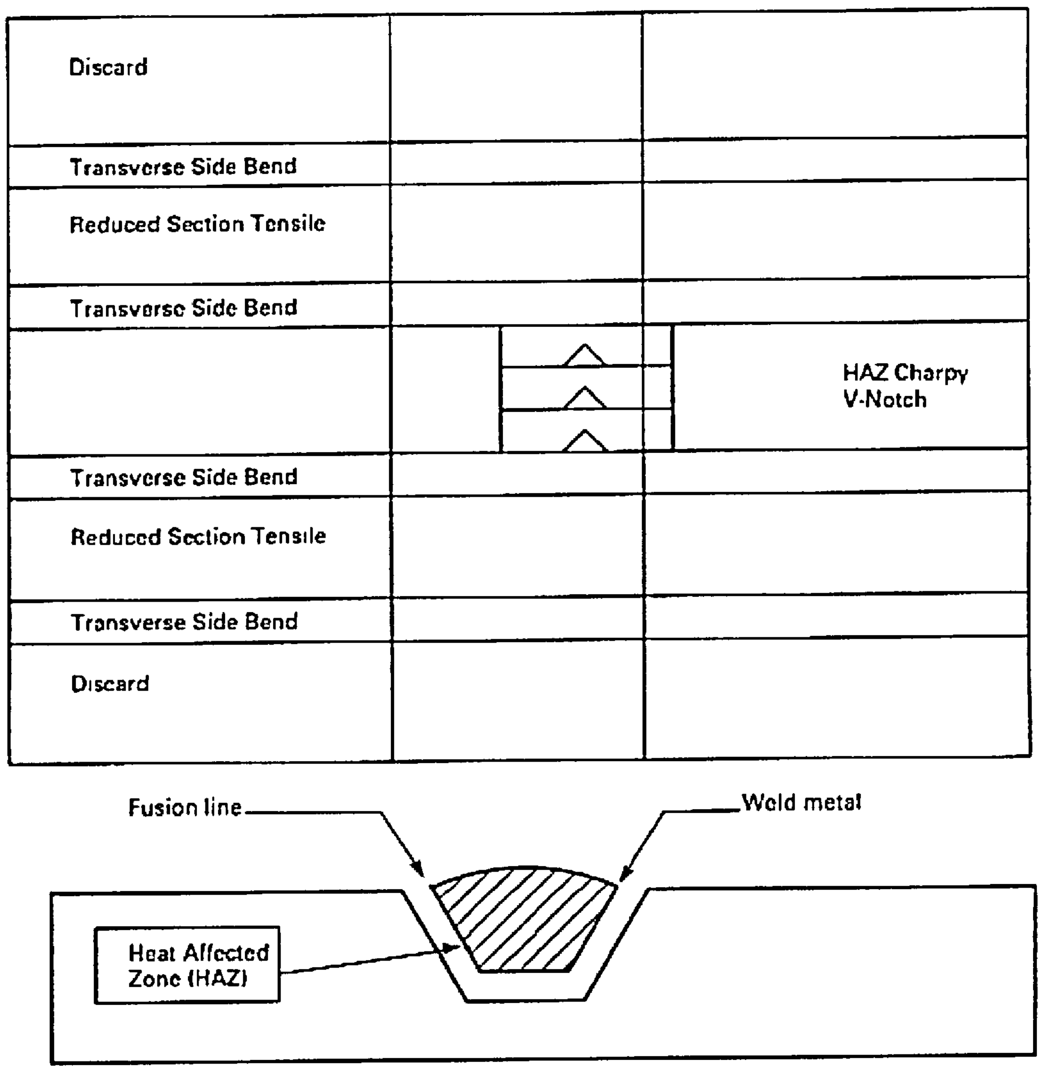
(c) Areas from which weld-attached thermocouples have been removed shall be ground and examined using a surface examination method.

(d) NDE personnel shall be qualified in accordance with the 1989 Edition of ASME Section XI, IWA-2300.

(e) Surface examination acceptance criteria shall be in accordance with the 1989 Edition of ASME Section III, NB-5350. Ultrasonic examination acceptance criteria shall be in accordance with the 1989 Edition of ASME Section III, NB-5330. Additional acceptance criteria may be specified by the Owner to account for differences in weld configurations.

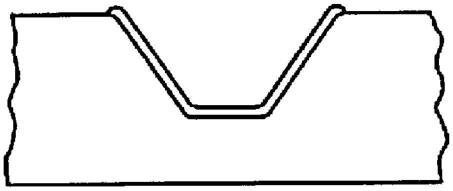
5.0 DOCUMENTATION

Use of these alternative rules shall be documented on Form NIS-2.

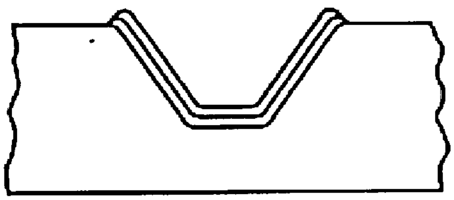


GENERAL NOTE: Base metal Charpy impact specimens are not shown. This figure illustrates a similar-metal weld.

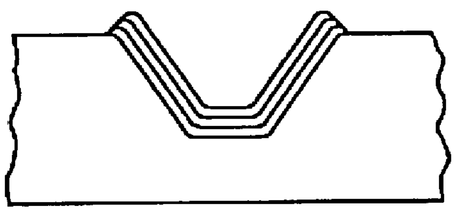
Figure 1, Qualification Test Plate



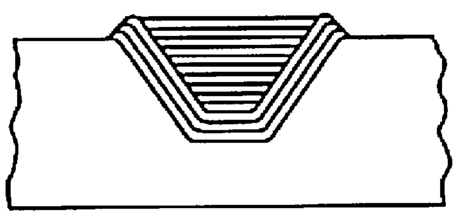
Step 1: Deposit layer one with first layer weld parameters used in qualification.



Step 2: Deposit layer two with second layer weld parameters used in qualification. NOTE: Particular care shall be taken in application of the second layer at the weld toe to ensure that the weld metal and HAZ of the base metal are tempered.



Step 3: Deposit layer three with third layer weld parameters used in qualification. NOTE: Particular care shall be taken in application of the third layer at the weld toe to ensure that the weld metal and HAZ of the base metal are tempered.



Step 4: Subsequent layers to be deposited as qualified, with heat input less than or equal to that qualified in the test assembly. NOTE: Particular care shall be taken in application of the fill layers to preserve the temper of the weld metal and HAZ.

GENERAL NOTE: The illustration above is for similar-metal welding using a ferritic filler material. For dissimilar-metal welding, only the ferritic base metal is required to be welded using steps 1 through 3 of the temperbead welding technique.

Figure 2, Automatic Or Machine (GTAW) Temper Bead Welding

ENCLOSURE 1

ATTACHMENT B

to

SOUTHERN NUCLEAR OPERATING COMPANY
FARLEY UNIT 2
UPDATED PROGRAM
REQUEST FOR RELIEF NO. RR-51

Differences Between Proposed Alternative Rules

and

ASME Section XI Code Case N-638,

Dissimilar Metal Welding Using Ambient Temperature

Machine GTAW Temper Bead Technique

Differences Between Proposed Alternative Rules and ASME Section XI Code Case N-638, Dissimilar Metal Welding Using Ambient Temperature Machine GTAW Temper Bead Technique

Scope

N-638 Requirement:

Inquiry: May the automatic or machine GTAW temper bead technique be used without use of preheat or postweld heat treatment on Class 1 components?

Reply: It is the opinion of the Committee that repair to P-No. 1, 3, 12A, 12B, and 12C [1] *except SA-302 Grade B,* material and their associated welds and P-No. 8 or P-No. 43 material to P-Nos. 1, 3, 12A, 12B, and 12C [1] *except SA-302 Grade B,* material and may be made by the automatic or machine GTAW temper bead technique without the specified preheat or postweld heat treatment of the Construction Code, when it is impractical, for operational or radiological reasons, to drain the component, and without the nondestructive examination requirements of the Construction Code, provided the requirements of paras. 1.0 through 5.0, and all other requirements of IWA-4000 [2], are met.

---

[1] P-Nos. 12A, 12B, and 12C designations refer to specific material classifications originally identified in Section III and subsequently reclassified as P-No. 3 material in a later Edition of Section IX.
[2] IWA-4000 or IWA-7000, as applicable, in the 1989 Edition, with the 1990 Addenda, and earlier Editions and Addenda.

Wording in Proposed Alternative:

Repairs to P-No. 43 material to P-Nos. 3 material will be made by the machine GTAW temper bead technique without the specified preheat or postweld heat treatment of the Construction Code, and without the nondestructive examination requirements of the Construction Code, according to the alternative rules of paragraphs 1.0 through 5.0 below and all other requirements of IWA-4000.

Discussion:

This paragraph was changed to refer to the specific material P-Nos. to be welded for Farley 2 and refer to the nondestructive examination requirements of the Construction Code rather than Section XI. Details of the proposed repair are provided in Figures 1 and 2 of Farley 2 Relief Request RR-51 to illustrate the geometry and location of the new weld attaching the control rod drive nozzle to the closure head. The spare nozzle and thermocouple guide nozzle weld configurations are similar, except that there are no guide sleeves and at the spare nozzles the new lower nozzle guide is also attached by the new attachment weld.

1.0 GENERAL REQUIREMENTS

N-638 Requirement:

(f) Peening may be used, except on the initial and final layers.

Wording in Proposed Alternative:

(f) Peening shall not be used, however, the weldment final surface may be abrasive water jet conditioned.

Discussion:

This paragraph was changed to clarify that peening will not be used and that abrasive water jet surface conditioning of the final surface may be performed. Abrasive water jet conditioning is not a peening process and has been demonstrated to provide a compressive residual stress on the final surface that improves PWSCC resistance. This method was previously reviewed by the NRC Staff for use at Surry 1.

N-638 Requirement:

(d) Prior to welding the area to be welded and a band around the area of at least 1 ½ times the component thickness or 5 in., whichever is less shall be at least 50°F.

Wording in Proposed Alternative:

(d) Prior to welding the area to be welded and a band around the area of at least 1 ½ times the component thickness or 5 in., whichever is less shall be at least 50°F. Preheat temperature shall be monitored using contact pyrometers, on accessible areas of the closure head external surface(s).

Discussion:

The RVCH preheat temperature will be essentially the same as the reactor building ambient temperature. Therefore, RVCH preheat temperature monitoring in the weld region and using thermocouples is unnecessary and would result in additional personnel dose associated with thermocouple placement and removal. Consequently, preheat temperature verification by contact pyrometer on accessible areas of the RVCH is sufficient.

2.1 PROCEDURE QUALIFICATION

N-638 Requirement:

(a) The base materials for the welding procedure qualification shall be of the same P-Number and Group Number, as the materials to be welded. The materials shall be postweld heat treated to at least the time and temperature that was applied to the materials being welded.

Wording in Proposed Alternative:

(a) The ferritic steel base material for the welding procedure qualification shall be P-No. 3 Group No. 3. The base material shall be postweld heat treated to at least the time and temperature that was applied to the materials being welded.

Discussion:

The ferritic steel base metal P-Number and Group Number to be temper bead welded at FNP-2 were identified specifically in the proposed alternative rules. The low alloy steel RVCH base material to be welded is SA-533 Gr. B, Cl. 1 and is classified as P-No. 3 Group No. 3 according to ASME Section IX, QW-422. The nonferrous RVCH nozzles are SB-167, UNS N06600, are classified as P-No. 43 (Group Number is not applicable) and are exempt from notch-toughness testing and postweld heat treatment by the Construction Code. The welding procedure qualifications have been performed using P-No. 3 Group No. 3 and P-No. 43 base materials. The P-No. 3 Group No. 3 base materials used for welding procedure qualification were postweld heat treated to at least the time and temperature that was applied to the SA-533 Gr. B, Cl. 1 RVCH base material.

N-638 Requirement:

(b) Consideration shall be given to the effects of welding in a pressurized environment. If they exist, they shall be duplicated in the test assembly.

Wording in Proposed Alternative:

(b) Welding in a pressurized environment is not permitted.

Discussion:

This paragraph was changed to reflect that a pressurized environment does not exist for the proposed repair.

N-638 Requirement:

(c) Consideration shall be given to the effects of irradiation on the properties of material, including weld material for applications in the core belt line region of the reactor vessel. Special material requirements in the Design Specification shall also apply to the test assembly materials for these applications.

Wording in Proposed Alternative:

(c) These alternative rules may be used for reactor vessel closure head repairs only and may not be used for repairs in the core belt line region of the reactor vessel.

Discussion:

This paragraph was revised to reflect that repairs are limited to the reactor vessel closure head, which is outside of the core beltline region and the affected materials are not limiting with respect to effects of irradiation on the reactor vessel.

N-638 Requirement:

(f) The test assembly cavity depth shall be at least one-half the depth of the weld to be installed during the repair/replacement activity and at least 1 in. The test assembly thickness shall be at least twice the test assembly cavity depth. The test assembly shall be large enough to permit removal of the required test specimens. The test assembly dimensions surrounding the cavity shall be at least the test assembly thickness and at least 6 in. The qualification test plate shall be prepared in accordance with Figure 1.

Wording in Proposed Alternative:

(f) The ferritic steel P-No. 3 Group No. 3 base material test assembly cavity depth shall be at least one-half the depth of the weld to be installed during the repair/replacement activity, and at least 1 inch. The test assembly thickness shall be at least twice the test assembly cavity depth. The test assembly shall be large enough to permit removal of the required test specimens. The test assembly dimensions surrounding the cavity shall be at least the test assembly thickness, and at least 6 inches. The qualification test plate shall be prepared in accordance with Figure 1 *(of Attachment A)*.

Discussion:

Minor changes were made to the first sentence to clarify that the test assembly cavity depth is applicable to the P-No. 3 Group No. 3 base material, but does not apply to the austenitic P-No. 43 base material.

N-638 Requirement:

(h) Charpy V-notch tests of the ferritic weld metal of the procedure qualification shall meet the requirements as determined in (g) above.

Wording in Proposed Alternative:

(h) Charpy V-notch tests of the austenitic weld metal of the procedure qualification are not required.

Discussion:

The weld filler metal to be used for the repair is ERNiCrFe-7 bare wire meeting ASME Section II, Part C, SFA 5.11. The weld deposit is austenitic and Charpy V-notch testing is not required by paragraph N-541.3 of the Construction Code.

N-638 Requirement:

(j) The average values of the three HAZ impact tests shall be equal to or greater than the average values of the three unaffected base metal tests.

Wording in Proposed Alternative:

(j) The average values of the three HAZ impact tests shall be equal to or greater than the average values of the three unaffected base metal tests. In cases where this requirement is not met, the RT_{NDT} temperature adjustment specified in the 1989 Edition of ASME Section III, NB-4335.2 shall be specified in the applicable Welding Procedure Specification (WPS).

Discussion:

The requirements as specified in ASME Section III, NB-4335.2 are considered adequate. The WPS applicable to the Farley 2 RVCH repair welding specifies a 5°F RT_{NDT} temperature increase in the RVCH base material. SNC has evaluated the 5°F increase and concluded it will not provide an additional restriction to plant operation.

3.0 WELDING PROCEDURE REQUIREMENTS

N-638 Requirement:

(b) Dissimilar metal welds shall be made using A-No. 8 weld metal (QW-442) for P-No. 8 to P-No. 1, 3, or 12 (A, B, or C) weld joints or F-No. 43 weld metal (QW-432) for P-No. 8 or 43 to P-No. 1, 3, or 12 (A, B, or C) weld joints.

Wording in Proposed Alternative:

(b) Dissimilar metal welds shall be made using F-No. 43 weld metal (QW-432) for P-No. 43 to P-No. 3 weld joints.

Discussion:

This paragraph was changed to refer to the specific material P-Nos. and F-No. to be welded for Farley 2.

N-638 Requirement:

(c) The area to be welded shall be buttered with a deposit of at least three layers to achieve at least $^1/_8$ in., overlay thickness as shown in Figure 2, Steps 1 through 3, with the heat input for each layer controlled to within ±10% of that used in the procedure qualification test. Particular care shall be taken in placement of the weld layers at the weld toe area of the ferritic material to ensure that the HAZ and ferritic weld metal are tempered. Subsequent layers shall be deposited with a heat input not exceeding that used for layers beyond the third layer in the procedure qualification. For similar-metal welding, the completed weld shall have at least one layer of weld reinforcement deposited. This reinforcement shall be removed by mechanical means, so that the finished surface is essentially flush with the surface surrounding the weld (Figure 3). *(Note: Figure 3 of N-638 is not relevant and therefore not reproduced in this document.)*

Wording in Proposed Alternative:

(c) The ferritic steel area to be welded shall be buttered with a deposit of at least three layers to achieve at least $^1/_8$ in. overlay thickness as shown in Figure 2 (*of Attachment A*), Steps 1 through 3, with the heat input for each layer controlled to within ±10% of that used in the procedure qualification test. Particular care shall be taken in placement of the weld layers at the weld toe area of the ferritic material to ensure that the HAZ is tempered. Subsequent layers shall be deposited with a heat input not exceeding that used for layers beyond the third layer in the procedure qualification.

Discussion:

The words "ferritic steel" were added in the first sentence to clarify that only the low alloy steel base metal is required to be buttered with the temper bead welding technique. The words "and ferritic weld metal" were deleted in the second sentence since the weld deposit is austenitic and does not require tempering. The last two sentences were deleted since similar-metal welding will not be performed under the proposed alternative rules.

N-638 Requirement:

(d) The maximum interpass temperature for field applications shall be 350°F regardless of the interpass temperature during qualification.

Wording in Proposed Alternative:

(d) The maximum interpass temperature for field applications shall be 350°F regardless of the interpass temperature during qualification. In lieu of direct measurement of interpass temperature, a demonstration may be performed on a full-thickness mockup to verify the maximum interpass temperature will not be exceeded during the welding operation.

Discussion:

Although the method of monitoring interpass temperature is not specified by N-638, it is addressed in the alternative rules for clarity. The location of the new weld inside the closure head penetration is inaccessible for mounting thermocouples near the weld, or for direct measurement by temperature indicating crayons or contact pyrometers. These methods would interfere with the remote machine welding equipment operation and are therefore not practical for use. A demonstration has been performed on a full-size mockup to verify that interpass temperatures will not rise above 350°F during the welding operation due to the time required for rotating the weld head back to a start position, indexing the head for the next bead, and visual checks of the weld bead during weld head movement and the very large heat sink provided by the RVCH. The results of this demonstration have previously been reviewed by the NRC staff for Surry 1.

4.0 EXAMINATION

N-638 Requirement:

(b) The final weld surface and the band around the area defined in para. 1.0(d) shall be examined using surface and ultrasonic methods when the completed weld has been at ambient temperature for at least 48 hours. The ultrasonic examination shall be in accordance with Appendix I.[3]

[3] Refer to the 1989 Edition with the 1989 Addenda and later Editions and Addenda.

Wording in Proposed Alternative:

(b) The final weld surface and adjacent HAZ shall be examined using surface and ultrasonic methods when the completed weld has been at ambient temperature for at least 48 hours.

Discussion:

The purpose for the examination of the band is to assure all flaws associated with the weld repair area have been removed or addressed. However, the band around the area defined in paragraph 1.0(d) cannot be examined due to the physical configuration of the partial penetration weld. The final examination of the new weld repair and immediate surrounding area within the band will be sufficient to verify that defects have not been induced in the low alloy reactor vessel head material due to the welding process. Liquid penetrant (PT) coverage is shown in Figures 1 and 2 of this attachment. Ultrasonic examination (UT) will be performed scanning from the ID surface of the weld, excluding the transition taper portion at the bottom of the CRDM nozzle welds and adjacent portion of the CRDM nozzle bore. The UT is qualified to detect flaws in the repair weld and base metal interface in the repair region, to the maximum practical extent. The examination extent is consistent with the Construction Code requirements.

N-638 Requirement:

(e) Surface examination acceptance criteria shall be in accordance with NB-5340 or NB-5350, as applicable. Ultrasonic examination acceptance criteria shall be in accordance with IWB-3000. Additional acceptance criteria may be specified by the Owner to account for differences in weld configurations.

Wording in Proposed Alternative:

(e) Surface examination acceptance criteria shall be in accordance with the 1989 Edition of ASME Section III, NB-5350. Ultrasonic examination acceptance criteria shall be in accordance with the 1989 Edition of ASME Section III, NB-5330. Additional acceptance criteria may be specified by the Owner to account for differences in weld configurations.

Discussion:

Ultrasonic examination will be performed in accordance with ASME Section III. Therefore, reference to ASME Section XI, IWB-3000 as addressed by Code Case N-638, is not required.

Additionally, based on previous industry experience, it is expected that ultrasonic examination may identify a solidification anomaly in the weld deposit at the interface between the SA-533 closure head base material, the SB-167 nozzle tube and the ERNiCrFe-7 weld metal. The qualification of the new repair weld geometry has revealed that the root at the intersection of the nozzle and penetration in the closure head sometimes exhibits a solidification anomaly. This type of anomaly has been observed in other welds of this nature including the original partial penetration weld.

A crack-like 0.1 inch indication will be assumed to be present in the intersection area up to the full circumference around the root fusion line. This will be a very conservative assumption that the assumed flaw is larger both linearly and circumferentially than any observed flaw during qualification testing. The acceptability of this assumed indication will be demonstrated using Section XI methodology. The evaluation will demonstrate that the conservatively assumed flaws would remain stable for the projected life of the repair.

This anomaly is generally volumetric in nature and can sometimes extend into the plane of the nozzle. When this occurs the ultrasonic techniques will detect the anomaly with the angle beams used for examination. The flaw evaluation methodology and ultrasonic examination techniques used to detect this anomaly are the same as those previously evaluated by the NRC staff for Surry 1.

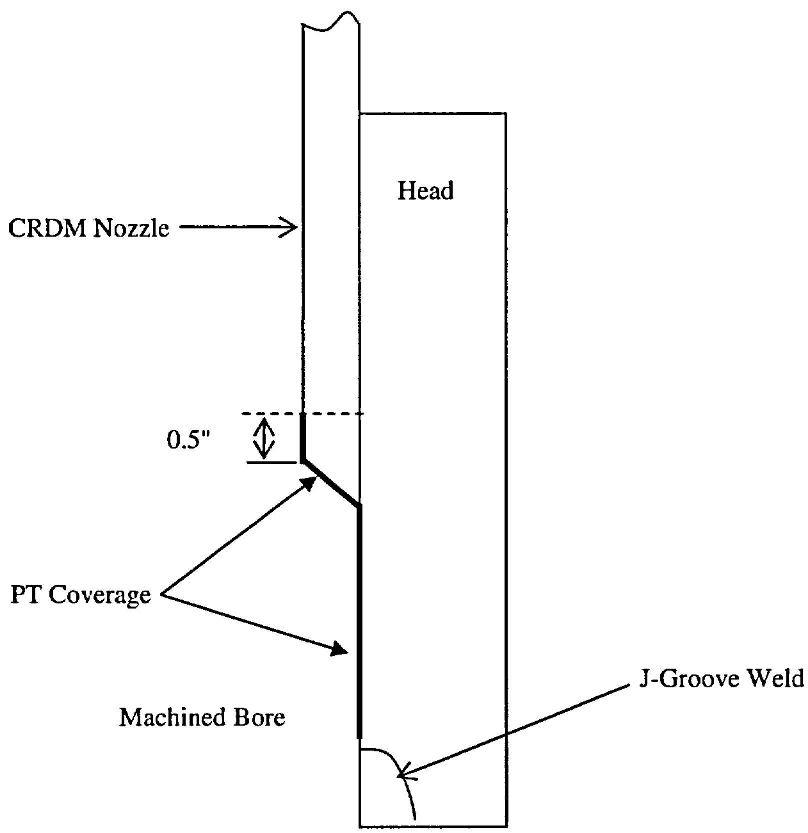


Figure 1

Liquid Penetrant (PT) Examination Coverage After Nozzle Machining, Prior to Temper Bead Welding

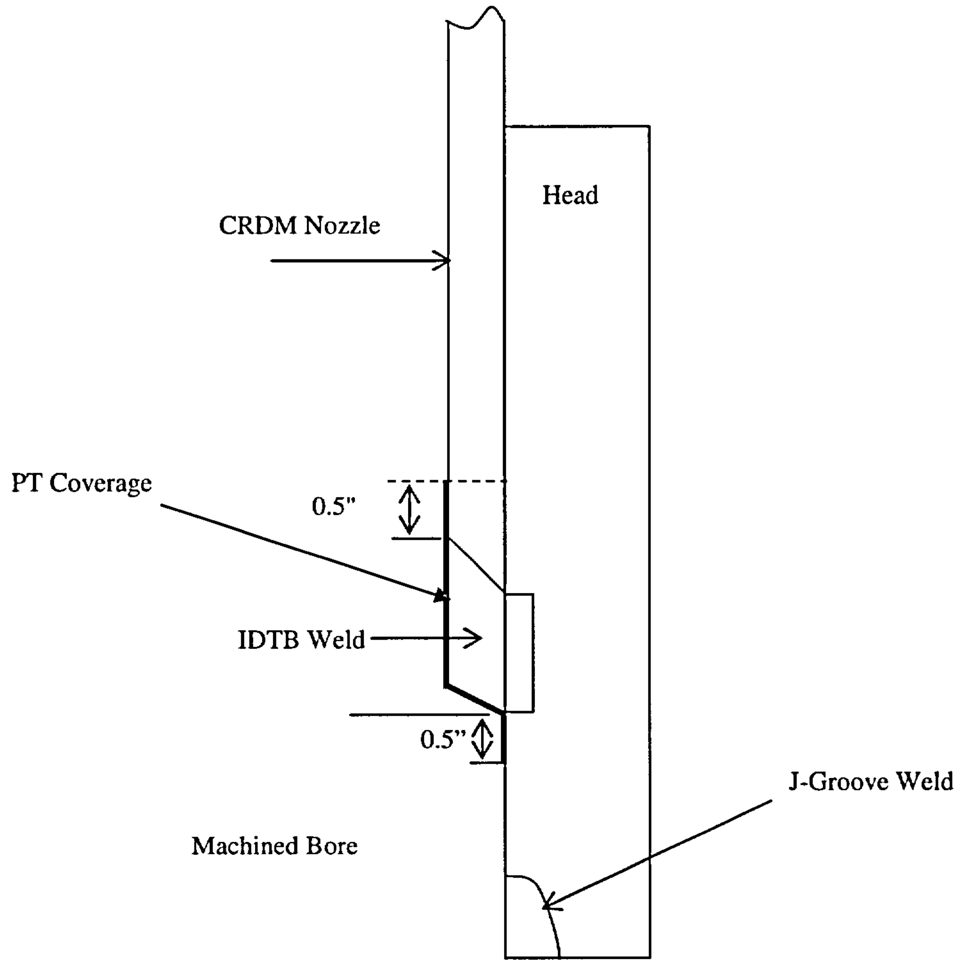


Figure 2

Liquid Penetrant (PT) Examination Coverage after Temper Bead Welding

ENCLOSURE 2

SOUTHERN NUCLEAR OPERATING COMPANY
FARLEY UNIT 2
UPDATED PROGRAM
REQUEST FOR RELIEF NO. RR-52

ENCLOSURE 2

SOUTHERN NUCLEAR OPERATING COMPANY
FARLEY UNIT 2
UPDATED PROGRAM
REQUEST FOR RELIEF NO. RR-52

I. System/Component(s) for Which Alternative is Requested: Reactor Vessel Closure Head (RVCH), Class 1 Pressure Retaining Partial Penetration Welds in Vessels, ASME Section XI, 1989 Edition, Examination Category B-E, Items B4.12 and B4.13.

II. Code Requirement: Farley Unit 2 is currently in the third inspection interval using the 1989 Edition of ASME Section XI with no Addenda. IWB-2500, Examination Category B-E, "Pressure Retaining Partial Penetration Welds in Vessels," Items B4.12 and B4.13, are applicable to the inservice examination of the RVCH nozzle partial penetration welds. IWA-3300, IWB-3142.4, and IWB-3420 would be applicable to any flaws discovered during inservice inspection. IWB-3132.4 would be applicable to supplemental volumetric or surface examinations.

III. Code Requirement for Which Alternative is Requested: Pursuant to 10 CFR 50.55a(a)(3)(i), the use of a technical alternative is requested in lieu of the rules in the 1989 Edition of ASME Section XI, IWA-3300(b), IWB-3132.4, IWB-3142.4 and IWB-3420 requirements which require flaw characterization. Supplemental examinations of the RVCH nozzle partial penetration welds are planned in response to NRC Bulletins 2002-01 and 2002-02. In the event a flaw is found in a RVCH nozzle partial penetration weld, this technical alternative will be utilized in conjunction with the repair addressed in Request for Relief No. RR-51.

Subarticle IWA-3300 contains criteria for characterizing flaws. If a nozzle must be partially removed to perform a repair, none of the nondestructive examination (NDE) techniques that can be performed on the remnant of the RVCH nozzle J-groove weld remaining on the RVCH are capable of characterizing flaws in accordance with any of the paragraphs or subparagraphs of IWA-3300. In lieu of those requirements, a conservative worst-case stress corrosion cracking (SCC) flaw will be assumed to exist in the original J-groove weld and extend to the weld-to-base metal interface. A fatigue crack growth analysis will be performed based on the conservative assumption that the PWSCC flaw could propagate into low-alloy steel.

Subparagraphs IWB-3132.4 and IWB-3142.4 allow for analytical evaluation to demonstrate that a component is acceptable for continued service. They also require that components found acceptable for continued service by analytical evaluation be subject to successive examinations. Analytical evaluation of the worst-case flaw referred to above will be performed to demonstrate the acceptability of continued operation. However, because any subsequent volumetric or surface examination would not provide meaningful results, successive examinations will not be performed. A VT-2 examination as required for IWB-2500, Examination Category B-E will continue to be performed.

Paragraph IWB-3420 requires the characterization of flaws in accordance with the rules of IWA-3300. As previously stated, characterization in accordance with those rules is not possible. As an alternative, a conservative, worst-case SCC flaw will be assumed to exist and will be evaluated to establish the minimum remaining service life of the reactor vessel head.

IV. Basis for Alternative: If inspection of the RVCH penetrations reveals flaws affecting the J-groove attachment welds, it will not be possible to characterize these flaws by NDE or to perform any meaningful successive examinations.

The original nozzle-to-RVCH weld configuration is extremely difficult to examine by ultrasonic examination (UT) due to the compound curvature and fillet radius as can be seen in Figures 1 and 2 of Request for Relief No. RR-51. These conditions preclude ultrasonic coupling and control of the sound beam in order to perform flaw sizing with reasonable confidence in the measured flaw dimension. Therefore, the technology does not presently exist to characterize flaw geometries that may exist therein. Not only is the configuration not conducive to UT but the dissimilar metal interface between the Alloy 182 weld and the low-alloy steel RVCH would increase the UT difficulty. Furthermore, due to limited accessibility from the RVCH outer surface and the proximity of adjacent nozzle penetrations, it is not possible to scan from this surface on the RVCH base material to detect flaws in the vicinity of the original weld. Additionally, surface examination methods such as liquid penetrant, magnetic particle and eddy current examination provide no meaningful information regarding flaw depth or orientation that could be used to characterize the flaw. It will therefore be assumed, for analysis purposes, that a flaw(s) may exist in this weld that extends from the exposed weld surface to the weld-to-RVCH base material interface. Based on extensive industry experience and the repair vendor direct experience, there are no known cases where SCC flaws initiating in an Alloy 82 or 182 weld have propagated into the ferritic base material.

Based on the discussion above, it can be seen that it is not possible to characterize flaws in the J-groove weld by NDE and to show the flaws do not extend into the ferritic head base material. Nevertheless, the evaluations discussed below will provide an acceptable level of quality and safety without performing flaw characterization as required in the 1989 Edition of ASME Section XI, IWA-3300 (b), IWB-3132.4, IWB-3142.4 and IWB-3420.

V. Alternative Requirements: Pursuant to 10 CFR 50.55a(a)(3)(i), Southern Nuclear Operating Company (SNC) requests approval to perform analytical evaluations according to the 1989 Edition of ASME Section XI, IWB-3610 to determine if flaws are acceptable for continued operation. It is proposed that this be accomplished without characterization of the flaw according to IWA-3300(b), IWB-3132.4, IWB-3142.4 and IWB-3420. As an alternative to characterizing any flaws discovered per the requirements of IWA-3300, a worst-case flaw will be assumed to exist and analyses will be performed based on that flaw, as discussed in detail below.

ASME Section XI analytical evaluation in accordance with IWB-3610 will be performed to demonstrate the flaws are acceptable for a number of years. The mechanism assumed to be driving crack growth is fatigue. The evaluation will assume a radial (with respect to the penetration centerline) crack exists with a length equal to the partial penetration weld preparation depth (throat). The depth of the assumed flaw will be based on the amount of the original partial penetration weld width that actually remains attached to the RVCH after repair activities, including some grinding to improve the contour in the area, are complete.

In addition, an analysis of the new pressure boundary welds will be performed using a three-dimensional model of a nozzle located at the most severe hillside orientation. The software program ANSYS (general purpose finite element program that is used industry-wide) will be used for this analysis. The ANSYS computer code is independently verified as executing properly, by the solution of verification problems using ANSYS and then comparison of the results to independently determined values.

The analytical model will include the RVCH, nozzle, repair weld, and remnant portions of the original Alloy 182 welds. The model is analyzed for thermal transient conditions as contained in the Farley Unit 2 design specifications. The resulting maximum thermal gradients will be applied to the model along with the coincident internal pressure values. The ANSYS program will then calculate the stresses throughout the model (including the repair welds). The stresses will be post-processed by ANSYS routines to categorize stresses consistent with the criteria of the 1989 Edition of ASME Section III.

The calculated stress values are compared to the 1989 Edition of ASME Section III, NB-3000 criteria for:

Design Conditions
Normal, Operating, and Upset Conditions
Emergency Conditions
Faulted Conditions
Testing Conditions

A very conservative Stress Concentration Factor (SCF) of 4.0 will be assumed for the new pressure boundary weld.

A primary stress analysis for design conditions will be performed. A maximum Primary General Membrane Stress Intensity (Pm) will be calculated and shown to be less than the maximum allowed by the ASME Code.

The maximum cumulative fatigue usage factor will be calculated for the point at the intersection of the bottom of the repair weld and the penetration bore and the crevice between the nozzle outside surface and the RVCH bore. Allowable years of future plant operation will be based on the maximum allowed ASME Code usage factor criterion of 1.0. It is anticipated that the limiting location for this value is the point at the intersection of the bottom of the repair weld and the penetration bore. At the bottom of the crevice between the nozzle outside surface and the RVCH bore, the calculated fatigue usage factor for the remaining years of future operation will not be limiting to the fatigue life of the repair.

Additionally, a fracture mechanics evaluation will be performed to determine if degraded J-groove weld material could be left in the vessel with no examination to size any flaws that might remain following the repair. Since the hoop stresses in the J-groove weld are generally about two times the axial stress at the same location, the preferential direction for cracking is axial, or radial relative to the nozzle. It will be postulated that a radial crack in the Alloy 182 weld metal would propagate due to primary water stress corrosion cracking (PWSCC), through the weld and butter, to the interface with the low-alloy steel RVCH. It is fully expected that such a crack would then blunt and arrest at the butter-to-head interface. Ductile crack growth through the Alloy 182 material would tend to relieve the residual stresses in the weld as the crack grew to its final size and blunted. Although residual stresses in the RVCH material are low, it will be assumed that a small flaw could initiate in the low-alloy steel material and grow by fatigue. It will be postulated that a small flaw in the RVCH would combine with a large stress corrosion crack in the weld to form a radial corner flaw that would propagate into the low-alloy steel RVCH by fatigue crack growth, under cyclic loading conditions associated with heatup and cooldown, plant loading and unloading, and rapid transients.

Residual stresses will not be included in the flaw evaluations since it has been demonstrated by analysis that these stresses are compressive in the low-alloy steel base metal. Any residual stresses that remained in the area of the weld following the boring operation would be relieved by such a deep crack, and therefore need not be considered.

Flaw evaluations will be performed for a postulated radial corner crack on the RVCH penetration nozzle where stresses are the highest and the radial distance from the inside corner to the low-alloy steel base metal (crack depth) is the greatest. Hoop stresses will be used since they are perpendicular to the plane of the crack. Fatigue crack growth calculated for the remaining operational life will be small (less than ½"), and the final flaw size will be shown to meet the fracture toughness requirements of the ASME Code using an upper shelf value of 200 ksi√in for ferritic materials.

VI. Justification for Granting Approval of Alternative: Pursuant to 10 CFR 50.55a(a)(3)(i), if inspection of the RVCH penetrations reveals flaws affecting the J-groove attachment welds, the proposed alternative would provide an acceptable level of quality and safety. Additionally, it would not be possible to characterize these flaws by NDE and any successive examinations would not provide meaningful results. SNC will perform analytical evaluations according to the 1989 Edition of ASME Section XI, IWB-3610 and without characterization of the flaw according to IWA-3300(b), IWB-3132.4, IWB-3142.4 and IWB-3420. The analytical evaluation will assume a worst-case flaw exists in the original J-groove weld and will determine acceptability for continued operation.

The worst-case assumption on flaw size is based on maximum crack growth by PWSCC. Although a crack propagating through the J-groove weld by PWSCC would eventually grow to the low-alloy steel RVCH, continued growth by PWSCC into the low-alloy steel is not expected to occur. SCC of carbon and low-alloy steels is not a problem under BWR or PWR conditions. SCC of steels containing up to 5% chromium is most frequently observed in caustic and nitrate solutions and in media containing hydrogen sulfide. Based on this information, SCC is not expected to be a concern for low-alloy steel exposed to primary water. Instead, an interdendritic crack propagating from the J-groove weld area is expected to blunt and cease propagation. This has been shown to be the case for interdendritic SCC of stainless steel cladding cracks in charging pumps and by recent events with PWSCC of Alloy 600 weld materials at Oconee 1 and VC Summer.

Based on extensive industry experience and the repair vendor's direct experience, there are no known cases where flaws initiating in an Alloy 82 or 182 weld have propagated into the ferritic base material. The surface examinations performed in association with flaw removal during recent repairs at Oconee 1 and 3 on closure head CRDM penetrations, Catawba 2 on the steam generator channel head drain connection penetration, ANO-1 on the hot leg level tap penetrations and the VC Summer Hot Leg pipe to primary outlet nozzle repair (reference MRP-44: Part I: Alloy 82/182 Pipe Butt Welds, EPRI, 2001, TP-1001491) all support the assumption that the flaws would blunt at the interface of the Alloy 182 weld to ferritic base material. Based on industry experience and operational stress levels there is no reason for service-related cracks to propagate into the ferritic material from the Alloy 182 weld.

SOUTHERN NUCLEAR OPERATING COMPANY
FARLEY UNIT 2
UPDATED PROGRAM
REQUEST FOR RELIEF NO. RR-52

The evaluations performed in support of this relief provide an acceptable level of quality and safety without performing the flaw characterization required in the 1989 Edition of ASME Section XI, IWA-3300, IWB-3132.4, IWB-3142.4 and IWB-3420. It is concluded, therefore, that the alternative to flaw characterization and subsequent examinations discussed above and used in lieu of existing Code requirements will provide an acceptable level of quality and safety.

VII. Implementation Schedule: This request for relief is applicable to the Third Ten-Year Interval (ending November 30, 2007) for repairs using the 1989 Edition of ASME Section XI.

VIII. Request for Relief Status: This request for relief is awaiting NRC approval.