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

November 6, 2003

MEMORANDUM TO: Michael E. Mayfield, Director
Division of Engineering Technology
Office of Nuclear Regulatory Research

THRU: Nilesh C. Chokshi, Chief
Materials Engineering Branch
Division of Engineering Technology
Office of Nuclear Regulatory Research

FROM: James A. Davis, Senior Materials Engineer
Materials Engineering Branch
Division of Engineering Technology
Office of Nuclear Regulatory Research

SUBJECT: TRIP REPORT ON THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS (ASME) BOILER AND PRESSURE VESSEL CODE WEEK IN SCOTTSDALE, AZ, AUGUST 25-29, 2003

I attended the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code Week in Scottsdale, AZ during the week of August 25-29, 2003. I attended the Task Group Temper Bead Welding Meeting and the Working Group Welding and Special Repair Processes Meeting as the NRC representative, and the Subgroup Repair and Replacement Activities as the alternate.

There were two areas where extended discussions were held that require follow-up by the NRC Staff. The first area involves the new Code Case N-666, "Weld Overlay of Defects in Socket Welds." Dixon Kerr presented his understanding of the NRC Staff's objection to this new Code Case and would like the Staff to develop a position on the proposed resolution on these issues. The issues Mr. Kerr presented were:

1) Hydrogen embrittlement in ferritic steels due to welding on wet surfaces;

2) Incorporation of "crud" such as boric acid into the weld and the effect of this crud on structural integrity of the weld;

3) How will the Owner demonstrate that they can make an acceptable weld qualification for cracked or leaking socket welds;

4) This Code Case does not have criteria for determining the rate or extent of degradation of the repair on surrounding base metal and the root cause may not be mitigated and reinspection requirements are not provided to verify structural integrity;

5) How does the Owner evaluate the potential for separation of the pipe since the extent of cracking is unknown;

6) The Code Case states that it is not applicable to systems that contain petroleum products such as lubricating oil or fuel or other substances that create a fire or explosion hazard. Is PWR water at 2200 psi and 600°F an explosion hazard?;

7) If allowed as a permanent repair, do the operational and residual stress effects increase the likelihood of other failure mechanisms such as low cycle fatigue or stress corrosion cracking of austenitic materials or reduced toughness of ferritic materials;

8) Why are there two different acceptance criteria in the code case; and

9) The Japanese testing of weld joints with defects indicates a substantial reduction in weld joint fatigue strength (Higuchi, et. al.).

Mr. Kerr thinks he has adequately addressed items 2 through 8 with the staff. He proposes conducting a demonstration repair on a socket weld at around 600°F and 2200 psi if the Staff agrees that demonstration will address concern 1. He says he will have to do some more work on Item 9.

Code Cases N-561, N-561-1, "Alternative Requirements for Wall Thickness Restoration of Class 2 and High Energy Class 3 Carbon Steel Piping, Section XI, Division 1," and N-562, and N-562-1, "Wall Thickness Restoration of Class 3 Moderate Energy Carbon Steel Piping, Section XI, Division 1," have been rejected by the Staff because, according to Mr. Kerr, "Neither the ASME Code nor the Code Cases have criteria for determining the rate or extent of degradation of the repair on the surrounding base metal. Reinspection requirements are not provided to verify structural integrity since the root cause may not be mitigated." Mr. Kerr has requested that the Staff develop an official position on these code cases and communicate the position back to him. I will set up meetings to discuss these issues and arrange to communicate back to Mr. Kerr and the appropriate Working Group Welding and Special Repair Processes members.

The voting sheets for the meetings are attached.

Attachment: As stated

Distribution: K. Manoly W. Bateman E. Imbro W. Norris E. Sullivan.
E. Andruszkiewicz K. Wichman MEB r/f DET r/f

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DATE	11/20/03	1 /03	11/6 /03

OFFICIAL RECORD COPY

Task Group Temper Bead Repair

Member: Davis **Committee:** XI-TGTBR

Date: 08/25/2003 **Location:** Scottsdale

N-XI-RRM-03-01 RRA 02-08 N/A N/A N/A

Item Description: Revision to Code Case N-638-1 (to N-638-2): Similar and Dissimilar Metal Welding Using Ambient Temperature GTAW Temper Bead Technique

ASME Priority: None Assigned

Action: Revision to Code Case

Action Description: Revise CC N-638-1 changing "for operational or radiological reasons, to drain the component," to "to drain the component or impractical for radiological reasons."

NRC Vote: Approve

Vote Details: The motion was to move forward with comments.

Committee Votes: 12 Approved 0 Disapproved 1 Abstained

Item Status: Passed

Further Actions: Prepare a clean copy and move this item to WGWSRP

RG Input: N/A

Applicable NRC Pillar: (Subgroup only)

- **Maintain Safety**
- **Reduce Unnecessary Regulatory Burden**
- **Increase Efficiency and Effectiveness**
- **Increase Public Confidence**

Member: Davis **Committee:** XI-WGWSRP

Date: 08/26/2003 **Location:** Scottsdale

N-XI-RRM-01-02	RRM 00-02	RRM 00-02	N/A	N/A

Item Description: Clarify the use of Terms Welding and Brazing in Section XI

ASME Priority:

Action: Revision to Code Paragraph

Action Description: There has been no action on this item for the last two meetings. This revision is suppost to go to WGDR for review.

NRC Vote: No Action

Vote Details:

Committee Votes: **0 Approved** **0 Disapproved** **0 Abstained**

Item Status: No Action

Further Actions: This revision will have to be updated to be consistent with the 2003 Addenda language.

RG Input:

Applicable NRC Pillar: (Subgroup only)

Maintain Safety
Reduce Unnecessary Regulatory Burden
Increase Efficiency and Effectiveness
Increase Public Confidence

Member: Davis **Committee:** XI-WGWSRP

Date: 08/26/2003 **Location:** Scottsdale

N-XI-RRM-01-04 RRM 00-04 RRM 00-04 N/A N/A

Item Description: Revise IWA-4600 to Address Limitations on Size of Repairs

ASME Priority: None Assigned

Action: Revision to Code Case

Action Description: Revise Code Cases N-432 and N-638 into a single Code Case that also eliminates the 100 sq. in. limit on the size of temperbead repair. This Code Case incorporates the alternative requirements to IWA-4000 of the ASME Code for temperbead welding on P-No. 1, 3, 12A, 12B, and 12C with preheat and postweld Bake (N-432) and for temperbead welding on P-No. 1, 3, 12A, 12B, and 12C except SA-302, Grade B without preheat or post weld bake (N-638) in to a single code case.

NRC Vote: No Action

Vote Details: A straw vote was taken to change the title by replacing repair with repair/replacement activities.

Committee Votes: 10 Approved 0 Disapproved 0 Abstained

Item Status: Passed

Further Actions: This will go to WG Flaw Evaluation and WG Welding and Special Repair Processes for consideration.

RG Input:

Applicable NRC Pillar: (Subgroup only)

Maintain Safety
Reduce Unnecessary Regulatory Burden
Increase Efficiency and Effectiveness
Increase Public Confidence

Member: Davis **Committee:** XI-WGWSRP

Date: 08/26/2003 **Location:** Scottsdale

N-XI-RRM-01-16 RRM 92-18 RRM 92-18 N/A N/A

Item Description: Incorporation of CC N-504-2 Weld Overlays Repair of Austenitic SS Piping

ASME Priority: None Assigned

Action: Revision to Code Paragraph

Action Description: Incorporation of CC N-504 into Section XI.

NRC Vote: No Action

Vote Details: There were numerous editorial changes made to the CC and, due to the large number of changes, a vote on accepting the changes was deferred until the next meeting, when a clean copy will be reviewed by the committee.

Committee Votes: 0 Approved 0 Disapproved 0 Abstained

Item Status: No Action

Further Actions: Prepare a clean copy for the December meeting.

RG Input: N/A

Applicable NRC Pillar: (Subgroup only)

Maintain Safety
Reduce Unnecessary Regulatory Burden
Increase Efficiency and Effectiveness
Increase Public Confidence

Member: Davis **Committee:** XI-WGWSRP

Date: 08/26/2003 **Location:** Scottsdale

N-XI-RRM-01-29 RRM 97-11 RRM 97-11 N/A N/A

Item Description: Establish Section XI NDE Methods and Acceptance Standards for Acceptance of R/R Activities

ASME Priority: None Assigned

Action: New Code Case

Action Description: Evaluate whether Section XI acceptance standards could be used, either in addition to, or in lieu of the Construction Code acceptance standards.

NRC Vote: No Action

Vote Details:

Committee Votes: 0 Approved 0 Disapproved 0 Abstained

Item Status: No Action

Further Actions: Prepare a white paper and draft code case for the February meeting in Tampa.

RG Input:

Applicable NRC Pillar: (Subgroup only)

Maintain Safety
Reduce Unnecessary Regulatory Burden
Increase Efficiency and Effectiveness
Increase Public Confidence

Member: Davis **Committee:** XI-WGWSRP

Date: 08/26/2003 **Location:** Scottsdale

N-XI-RRM-01-44	RRM 99-13	RRM 99-13	N/A	N/A

Item Description: ASME Section IX Adoption of Temper Bead Rules

ASME Priority: None Assigned

Action: New Code Case

Action Description: Subcommittee IX is considering temberbead qualification rules in Section IX. Section XI will have to prepare a Code Case to merge the existing Section XI requirements with the new Section IX requirements. Section XI will also have to initiate a Code change.

NRC Vote: No Action

Vote Details: The first draft of the Code Case was presented and discussed and a number of modifications were made. A clean copy will be presented for discussion at the December Meeting in Lake Buena Vista, Florida

Committee Votes: 0 Approved 0 Disapproved 0 Abstained

Item Status: No Action

Further Actions: Prepare a clean copy of the code case for the December Meeting.

RG Input:

Applicable NRC Pillar: (Subgroup only)

- **Maintain Safety**
- **Reduce Unnecessary Regulatory Burden**
- **Increase Efficiency and Effectiveness**
- **Increase Public Confidence**

Member: Davis **Committee:** XI-WGWSRP

Date: 08/26/2003 **Location:** Scottsdale

N-XI-RRM-02-01 RRM 02-02 N/A N/A N/A

Item Description: Clarify Requirements of IWA-4631(b)

ASME Priority: None Assigned

Action: Revision to Code Paragraph

Action Description: The distance of the repair cavity surface above or below the originial dissimilar material fusion line is discussed. This change is to clarify the wording.

NRC Vote: Approve

Vote Details: Straw vote to table until a future meeting.

Committee Votes: 13 Approved 0 Disapproved 0 Abstained

Item Status: Passed

Further Actions: Table for several meetings.

RG Input:

Applicable NRC Pillar: (Subgroup only)

Maintain Safety
Reduce Unnecessary Regulatory Burden
Increase Efficiency and Effectiveness
Increase Public Confidence

Member: Davis **Committee:** XI-WGWSRP

Date: 08/26/2003 **Location:** Scottsdale

N-XI-RRM-02-03 RRM 02-05 N/A N/A N/A

Item Description: Revise Code Case N-504-2 to Address Weld Overlay on Nickel-based Materials

ASME Priority:

Action: New Code Case

Action Description: New CC to address nickel overlays on various base materials.

NRC Vote: No Action

Vote Details: A charter needs to be prepared for this new group and CC.

Committee Votes: 0 Approved 0 Disapproved 0 Abstained

Item Status: No Action

Further Actions: Prepare the charter. Prepare the draft CC.

RG Input: N/A

Applicable NRC Pillar: (Subgroup only)

Maintain Safety
Reduce Unnecessary Regulatory Burden
Increase Efficiency and Effectiveness
Increase Public Confidence

Member: Davis **Committee:** XI-WGWSRP

Date: 08/26/2003 **Location:** Scottsdale

N-XI-RRM-02-22 RRM 02-13 N/A N/A N/A

Item Description: Electrochemical Deposition of Class 1 Carbon Steel Pipes

ASME Priority: None Assigned

Action: New Code Case

Action Description: This Code Case permits the use of electrochemical deposition of nanocrystalling nickel on small diameter pipe that has suffered flow accelerated corrosion.

NRC Vote: No Action

Vote Details:

Committee Votes: 0 Approved 0 Disapproved 0 Abstained

Item Status: No Action

Further Actions: M, Lau stated in the 12/10/02 meeting that more research is needed before the code case can proceed. A decision will be made during the December meeting whether to proceed or drop this item.

RG Input:

Applicable NRC Pillar: (Subgroup only)

Maintain Safety
Reduce Unnecessary Regulatory Burden
Increase Efficiency and Effectiveness
Increase Public Confidence

Member: Davis **Committee:** XI-WGWSRP

Date: 08/26/2003 **Location:** Scottsdale

N-XI-RRM-03-02 RRA 03-XX N/A N/A N/A

Item Description: Inquiry of ASME Section XI, 1992 Edition with 1992 Addenda, Paragraph IWA-4513.1(b)

ASME Priority: None Assigned

Action: New Inquiry

Action Description: The 1992 Edition of the Code, Paragraph IWA-4513.1b states that covered electrodes for use in temper bead repair welding be "baked and maintaned in accordance with the manufacturer's recommendations." If the manufacturer recommends that there be no baking, is it acceptable not to bake.

NRC Vote: Approve

Vote Details:

Committee Votes: 10 Approved 3 Disapproved 0 Abstained

Item Status: Passed

Further Actions: Submit the item to SGRRA for a vote.

RG Input: N/A

Applicable NRC Pillar: (Subgroup only)

Maintain Safety
Reduce Unnecessary Regulatory Burden
Increase Efficiency and Effectiveness
Increase Public Confidence

Member: Davis **Committee:** XI-WGWSRP

Date: 08/26/2003 **Location:** Scottsdale

N-XI-RRM-03-03 RRM 02-06 N/A N/A N/A

Item Description: Welding and Welder Qualifications Including Welding Operators

ASME Priority: None Assigned

Action: New Code Paragraph

Action Description: Incorporate CC N-600 into the code. This Code Case basically states that if a welder is qualified by one owner, a second owner does not have to requalify the welder as long as he or she meets the requirements for being qualified.

NRC Vote: Approve

Vote Details: The motion was to accept changes as editorial comments.

Committee Votes: 12 Approved 0 Disapproved 1 Abstained

Item Status: Passed

Further Actions: This code revision will be sent to SGRRA for consideration.

RG Input:

Applicable NRC Pillar: (Subgroup only)

- **Maintain Safety**
- **Reduce Unnecessary Regulatory Burden**
- **Increase Efficiency and Effectiveness**
- **Increase Public Confidence**

Member: Davis **Committee:** XI-WGWSRP

Date: 08/26/2003 **Location:** Scottsdale

N-XI-RRM-03-04 RRM 03-04 N/A N/A N/A

Item Description: Revision to Code Cases N-561, N-561-1, N-562 and N-562-1

ASME Priority: None Assigned

Action: Revision to Code Case

Action Description: CCs N-561 and N561-2 Alternative requirements for wall thickness restoration of Class 2 and high energy Class 3 Carbon steel piping and CCs N-562 and N562-1, Wall thickness restoration of Class 3 moderate energy carbon steel piping.

NRC Vote: No Action

Vote Details:

Committee Votes: 0 Approved 0 Disapproved 0 Abstained

Item Status:

Further Actions: Check with NRR on the status of these Code Cases and notify the committee members of the status.

RG Input:

Applicable NRC Pillar: (Subgroup only)

Maintain Safety
Reduce Unnecessary Regulatory Burden
Increase Efficiency and Effectiveness
Increase Public Confidence

Member: Davis **Committee:** XI-WGWSRP

Date: 08/26/2003 **Location:** Scottsdale

N-XI-RRM-03-05 ISI 03-16 N/A ISI 03-16 N/A

Item Description: Revise Appendix D to Reduce the Weld Crowns and Weld Roots with an Enhanced Surface to Ensure a Better Response to Volumetric and Surface Examinations

ASME Priority: None Assigned

Action: Revision to Code Paragraph

Action Description: Revise Appendix D to reduce the weld crowns and weld roots with an enhanced surface to ensure a better response to volumetric and surface examinations

NRC Vote: No Action

Vote Details:

Committee Votes: **0 Approved** **0 Disapproved** **0 Abstained**

Item Status: No Action

Further Actions: Reconsider at the next meeting.

RG Input:

Applicable NRC Pillar: (Subgroup only)

Maintain Safety
Reduce Unnecessary Regulatory Burden
Increase Efficiency and Effectiveness
Increase Public Confidence