



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 *Nilesh C. Chokshi*  
Materials Engineering Branch  
Division of Engineering Technology  
Office of Nuclear Regulatory Research

FROM: James A. Davis, Senior Materials Engineer *James A. Davis*  
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;

M. Mayfield

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- 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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OFFICE	MEB:DET	<u>E</u>	MEB:DET		MEB:DET
NAME	J. Davis	<u>gaw</u>	A. Hiser		N. Chokshi
DATE	<u>10/20/03</u>		<u>1</u> / 103		<u>11/16</u> / 103

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### Task Group Temper Bead Repair

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**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

<b>Member:</b>	Davis	<b>Committee:</b>	XI-WGWSRP		
<b>Date:</b>	08/26/2003	<b>Location:</b>	Scottsdale		
N-XI-RRM-01-02	RRM 00-02	RRM 00-02	N/A	N/A	
<b>Item Description:</b>	Clarify the use of Terms Welding and Brazing in Section XI				

<b>Action:</b>	Revision to Code Paragraph
<b>Action Description:</b>	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:**

**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**

<b>Member:</b>	Davis	<b>Committee:</b>	XI-WGWSRP		
<b>Date:</b>	08/26/2003	<b>Location:</b>	Scottsdale		
N-XI-RRM-01-04	RRM 00-04	RRM 00-04	N/A	N/A	
<b>Item Description:</b>	Revise IWA-4600 to Address Limitations on Size of Repairs				

**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

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<b>Member:</b>	Davis	<b>Committee:</b>	XI-WGWSRP		
<b>Date:</b>	08/26/2003	<b>Location:</b>	Scottsdale		
N-XI-RRM-01-16	RRM 92-18	RRM 92-18	N/A	N/A	
<b>Item Description:</b>	Incorporation of CC N-504-2 Weld Overlays Repair of Austenitic SS Piping				

<b>ASME Priority:</b>	None Assigned
<b>Action:</b>	Revision to Code Paragraph
<b>Action Description:</b>	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

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## Increase Public Confidence

## **Working Group Welding and Special Repair Processes**

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**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)**

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<b>Member:</b>	Davis	<b>Committee:</b>	XI-WGWSRP		
<b>Date:</b>	08/26/2003	<b>Location:</b>	Scottsdale		
<b>N-XI-RRM-01-44</b>	RRM 99-13	RRM 99-13	N/A	N/A	
<b>Item Description:</b>	ASME Section IX Adoption of Temper Bead Rules				

**Action Description:** Subcommittee IX is considering timberbead 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.

**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

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

**RG Input:**

## Increase Public Confidence



<b>Member:</b>	Davis	<b>Committee:</b>	XI-WGWSRP	
<b>Date:</b>	08/26/2003	<b>Location:</b>	Scottsdale	
N-XI-RRM-02-01	RRM 02-02	N/A	N/A	N/A
<b>Item Description:</b>	Clarify Requirements of IWA-4631(b)			

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

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

**Further Actions:** Table for several meetings.

**RG Input:**

## Increase Public Confidence

## **Working Group Welding and Special Repair Processes**

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**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**

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**Increase Efficiency and Effectiveness**

**Increase Public Confidence**

## Working Group Welding and Special Repair Processes

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**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 nanocrystalline 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)**

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## **Working Group Welding and Special Repair Processes**

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**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 maintained 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

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Increase Public Confidence

<b>Member:</b>	Davis	<b>Committee:</b>	XI-WGWSRP
<b>Date:</b>	08/26/2003	<b>Location:</b>	Scottsdale
N-XI-RRM-03-03	RRM 02-06	N/A	N/A
<b>Item Description:</b>	Welding and Welder Qualifications Including Welding Operators		

**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.

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

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

**RG Input:**

## Increase Public Confidence

<b>Member:</b>	Davis	<b>Committee:</b>	XI-WGWSRP	
<b>Date:</b>	08/26/2003	<b>Location:</b>	Scottsdale	
N-XI-RRM-03-04	RRM 03-04	N/A	N/A	N/A
<b>Item Description:</b>	Revision to Code Cases N-561, N-561-1, N-562 and N-562-1			

**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.

### Vote Details:

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

**RG Input:**

## Increase Public Confidence

## **Working Group Welding and Special Repair Processes**

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**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**

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**Increase Efficiency and Effectiveness**

**Increase Public Confidence**