## NRCREP Resource

**From:** Findlan, Shane [sfindlan@epri.com]
**Sent:** Tuesday, September 29, 2009 3:05 PM
**To:** NRCREP Resource
**Cc:** Hixon, Jeffrey; RILEY, Jim; Frederick, Greg; McCracken, Steve
**Subject:** Comments on Draft Regulatory Guides (DG-1221, DG-1222, DG-1224)
**Attachments:** DRAFT REGULATORY GUIDE DG White Paper - 090727.doc

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Hello,
My name is Shane Findlan, with the Electric Power Research Institute, and I am forwarding the following comments from our welding group members regarding the draft welding-related regulatory guides. These comments are included below and in the attached white paper (for DG-1222, Preheat for Low-Alloy Steels).

**Draft Regulatory Guide 1.50 (DG-1222)**
**Preheat for Low-Alloy Steels**
The concern is with is the post-weld preheat maintenance requirement. This is something new and would require a weld program revision at DAEC. Currently this is only applicable to some P#s in B31.1. Scott Presler FP&L, Duane Arnold
RG-1.50 should be revised in accordance with the EPRI WRTC (RRAC) efforts and findings in the way of PWHT and pre heat requirements. Ron Clow XE Nuclear
The main change is the inclusion of a post weld hydrogen bakeout and an associated soak time if preheat maintenance is not done.

(Assuming a WPS is qualified in accordance with Section IX and Section III as specified by the Reg. Guide )
Comments are as follows:

· Part B, 3rd paragraph) When discussing welding fluxes what welding processes are being discussed?
· Part B, 3rd paragraph) Are Low hydrogen SMAW electrodes which have been tested to have low levels (H4) of hydrogen and properly controlled before welding included in the description "welding fluxes"?

· Part C, item 2. ) With proper use of low hydrogen processes and welding filler material, if employed, should negate the need for hydrogen bakeout and soak as the predominant source for hydrogen is controlled to a low level. Please explain why the use of low hydrogen processes and filler materials as one of the main ways to control hydrogen are not discussed as a mitigation technique.

· Part C, item 2. ), If PWHT is to be done and low hydrogen processes and/or low hydrogen filler materials used, the associated soak and preheat maintenance should not be required as the small amount of hydrogen will diffuse at the PWHT temperature.

Nick Mohr Duke Energy
Comment 1: In Section C2 of the regulatory position, there is only one exception when the preheat temperature doesn't need to be maintained before the final PWHT. That exception is only when a hydrogen bake out is performed. However, in cases where a low hydrogen welding process is used (i.e., GTAW or GMAW with solid wire), there shouldn't be any significant amounts of hydrogen in the weld or HAZ. In these cases, it should be allowed to slowly cool the weld to room temperature prior to the final PWHT. Another example would be in the case where a sufficient weld deposit has been applied (i.e., 3/8" or 25% of the groove is filled) and the weld is allowed to slowly cool to room temperature. In both of the latter cases, if welding has not been completed (due to end of shift), then the welds can be inspected prior to resuming any welding and the required preheat applied.

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Comment 2: In Section C4, it is not clear whether the weld is acceptable if the soundness is verified by an acceptable examination procedure. This sentence can be reworded for better clarification.

Alex Gutierrez PG&E

The wording in 2 requires a hydrogen bake out of all CrMo welds for 4 hours.

The wording in 4 states if we don't do steps 1-3 we need to an "acceptable" soundness examination. Soundness usually equals volumetric. Since underbead cracking is what is specifically mentioned surface exams are likely out.

The real concern is the 4 hour post bake out. We have done a lot of work (EPRI, ASME Code, others) to get unneeded PWHT and post-bake out of our Codes and here it is reintroduced at a lower temperature without any cited value.

Neal Chapman Entergy

Also, please see attached white paper related to DG-1222/Regulatory Guide 1.50, prepared on behalf of EPRI by Phil Flenner who is a member of ASME B31.1 and Section IX Code Committees:

<<DRAFT REGULATORY GUIDE DG White Paper - 090727.doc>>

The comments below are for Draft Regulatory Guide, DG-1224:

**Draft Regulatory Guide 1.44 (DG-1224)**
**Control of the Processing and Use of Stainless Steel**

Comment 1: The last paragraph in Section C6, can be more specific regarding the need to control welding practices to avoid excessive sensitization of the HAZ. Does this only apply when welding on materials with > .03 carbon? Also, what exactly are the welding practices (heat input and interpass temperature) that need to be controlled? The last paragraph of the discussion section specifically mentions heat input and interpass temperature. The discussion section and regulatory position section should be consistent.

Comment 2: In the second to last paragraph of the discussion section, it mentions performing the qualification tests on material with the minimum and maximum thicknesses anticipated. Wouldn't the worst case be the material with the minimum thickness (due to slow cooling rate)? The maximum thickness would provide the fastest cooling rate and best chance of preventing sensitization. Based on this, testing should only be required using the minimum thickness material anticipated.

Alex Gutierrez PG&E

The comments below are for Draft Regulatory Guide, DG-1221:

**Draft Regulatory Guide 1.43 (DG-1221)**
**Control of Stainless Steel Weld Cladding on Low Alloy Steel**

Comment 1: In the discussion section, paragraph 9, a better description is needed for the alternative bend test. Should the maximum tensile stress be applied to the fusion line area and HAZ? The way it is currently written, the face of the bend specimen would be the weld-bead overlap area which can be consider to be weld metal. However, the expected cracking is in the base metal HAZ.

Comment 2: What about the option of making multiple cross-sections (minimum of 3) in the through-thickness direction either transverse to the weld or parallel to the weld. This way the weld, HAZ and base metal can be viewed.

Comment 3: Why is the acceptance criteria being applied to both test methods (polishing method and bend test). Cracks identified in the bend test method may be generated due to the tensile loading.

Comment 4: In Section C.2.e, the acceptance criteria is applied for any 1-inch length. In the case of the polished surface test, should the acceptance criteria be over an area?

Alex Gutierrez PG&E

Thank you for the opportunity to provide comments and feel free to contact me if there are any questions.

*Shane Findlan PE-IWE*
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