HLWYM HEmails

From: Gustavo Cragnolino [gcragno@cnwra.swri.edu]
Sent: Tuesday, May 04, 2004 5:56 PM
To: Roberto Pabalan
Cc: Chandrika Manepally; DDUNN@cnwra.swri.edu; David Pickett; English Pearcy; gcragno@cnwra.swri.edu; LBROWNING@cnwra.swri.edu; Lietai Yang; Osvaldo Pensado; RFEDORS@cnwra.swri.edu; Andy Campbell; David Brooks; 'Dennis Galvin'; John Bradbury; Marissa Bailey; Richard Codell; 'Timothy McCartin'; Tae Ahn; Bret Leslie
Subject: RE: NWTRB Slides by R. Pabalan - Fwd: revised viewgraphs for NRC review

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Bobby,

I reviewed both your original file and the changes suggested by Bret. I essentially agreed with all of them and the suggested changes but I believe that the last point in slide 14 should be kept because it is the result of the analysis and the discussion we had before the dry run. All the environmental controlling factors that may tend to increase the likelihood of an extended life for alloy 22 WP should be listed including the presence of inhibitors, the role of the drip shield to avoid seepage if it remains intact and the dilution of concentrated brines with increasing RH and lower temperatures. However, it would be important to indicate in slide 4 that the analysis and all your presentation are based on the (questionable?) assumption that the emplacement drifts will be stable during the performance period. Regarding the concern expressed by Bret in one of his last paragraphs I believe that the presentation of Darrell will clarify the additional factors (metallurgical and electrochemical) that should be considered to establish the connection between environment and corrosion.

A minor point. For consistency you should use roman numerals for the various environments described after slide 4

-----Original Message-----
From: R Pabalan [mailto:rpabalan@cnwra.swri.edu]
Sent: Tuesday, May 04, 2004 3:30 PM
To: 'Bret Leslie'
Cc: CMANEPALLY@cnwra.swri.edu; DDUNN@cnwra.swri.edu; DPICKETT@cnwra.swri.edu; EPEARCY@cnwra.swri.edu; gcragno@cnwra.swri.edu; LBROWNING@cnwra.swri.edu; LTYANG@cnwra.swri.edu; OPENSADO@cnwra.swri.edu; RFEDORS@cnwra.swri.edu; 'Andy Campbell'; 'David Brooks'; 'Dennis Galvin'; 'John Bradbury'; 'Marissa Bailey'; 'Richard Codell'; 'Timothy McCartin'; 'Tae Ahn'; English Pearcy
Subject: RE: NWTRB Slides by R. Pabalan - Fwd: revised viewgraphs for NRC review

Bret,

Attached is a revised file. I've made your suggested changes to slides 5, 6, 7, 9, 10, and 14 with the following exceptions. I did not add "Cont'd" to slide 7 because slide 7 is an animation of slide 6. I did not delete bullet #3 on page 14 -- I'd like to hear first from other NRC staff.

I'll see what I can do about slides 11 and 12.

I also added your name to the list of contributors.

Thanks for your input.

We'll officially transmit the revised version to NRC this pm, but I would welcome other suggested changes.

bobby

-----Original Message-----
From: Bret Leslie [mailto:BWL@nrc.gov]
Sent: Tuesday, May 04, 2004 2:06 PM
To: RPABALAN@cnwra.swri.edu
Cc: CMANEPALLY@cnwra.swri.edu; DDUNN@cnwra.swri.edu; DPICKETT@cnwra.swri.edu; EPEARCY@cnwra.swri.edu; gcragno@cnwra.swri.edu; LBROWNING@cnwra.swri.edu; LTYANG@cnwra.swri.edu; OPENSADO@cnwra.swri.edu; RFEDORS@cnwra.swri.edu; Andy Campbell; David Brooks; Dennis Galvin; John Bradbury; Marissa Bailey; Richard Codell; Timothy McCartin; Tae Ahn
Subject: Re: NWTRB Slides by R. Pabalan - Fwd: revised viewgraphs for NRC review

Bobby,
Further to our phone call here are my comments. I changed the slides (5, 10 and 14). Because the thoughts on those slides are derived from Browning, Fedors, Yang, Pensado, Pabalan, Manepally, and Leslie, 2004 MRS paper I have included those co-authors and other ENFE folks on this note. In essence the MRS paper did not capture that the chemistry of seepage water is only important to waste package corrosion if the drip shield doesn't divert seepage from the waste package. From a risk perspective (what can happen? how likely? consequences?) if seepage doesn't directly contact the waste package, then the seepage whose composition is bad for the waste package dosen't really matter.

For slide 5 describing Environment 2
Evaporation of seepage water could result in brines with high concentrations of corrosive species (Cl*, F*) on drip shield, and only if the drip shield is no longer effectively protecting the waste package from seepage, and on waste package surface; brines formed by salt deliquescence

For Slide 10
Thermodynamic simulations of evaporation, supplemented by chemical divide analyses, were used to evaluate the range in chemistry of water which could contact the drip shield surface via seepage. These fluid compositions would only contact the waste package if the drip shield was not present.

For Slide 14
Of the four thermal-hydrologic environments considered, Environment 2 (duration ~ 500 yr) has the greatest potential for corrosion of the drip shields. Localized corrosion of waste packages could also occur, but only if the drip shield was not effective in diverting seepage, and if seepage did contact the waste package the concentration of corrosion inhibitors may be high enough to mitigate localized corrosion of Alloy 22

On slide 14 I also got rid of the third bullet "Environment 4 (estim. duration > 8,000 yr) has limited potential for localized corrosion of the drip shields and waste packages" (due to a lack of space and to help stop the NWTRB question of "given your third bullet, shouldn't the DOE adopt a low temperature repository?"). By the way, the answer to that question should be derived from the following, which is taken out of the YMRP (NUREG -1804, Revision 2, July 2003, Appendix A, pg A-4).
"The following three principles are important in implementing the U.S. Nuclear Regulatory Commission regulatory mission:
(1) The U.S. Nuclear Regulatory Commission does not select sites or designs, or participate with licensees or applicants in selecting proposed sites or designs;"

I also changed Slides 6, 7 to clarify what is DRH and add cont'd to title of slide 7.

For slide 9, can you remove the (NO3 + SO4)/Cl from the Y-axis and put it next to the mole ratio on the x-axis

For slide 11, could you change the the rightmost figure to indicate that the window of susceptibility is for localized corrosion of Alloy 22, and is there any way (shaded box?) to better identify a window of susceptibility, rather than using the red arrows

Similarly on Slide 12 is there a better to signify a "seepage is unlikely"
window than using the red arrows

Lauren and co-authors did a good job at trying to map the relevant parameters and processes into a usuable framework, however we will need to be very careful as we go forward to distinguish bewteen environments and processes that affect the drip shield and waste package (they are not necessarily the same: lesson learned is to not use the wp/ds informalism that was used in the MRS paper).

thanks for the opportunity to comment and I would be happy to discuss my comments with other folks, Bret

>>> Tae Ahn 05/04/04 12:08PM >>>

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Subject: RE: NWTRB Slides by R. Pabalan - Fwd: revised viewgraphs for NRC review
Sent Date: 5/4/2004 5:55:51 PM
Received Date: 5/4/2004 5:56:05 PM
From: Gustavo Cragnolino

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