From: Andy Jung
Sent: Thursday, March 08, 2007 11:21 AM
To: Xihua He; Pavan Shukla
Cc: 'Yiming Pan'
Subject: RE: Summary on different modes of corrosion

Pavan,

I summarize two processes, i.e., dry-air oxidation and localized corrosion of Titanium drip shield materials from IIRSR. The other processes, hydrogen embrittlement and stress corrosion cracking, may be needed to ask to Xihua.

Thanks,
Andy

The degradation of the titanium drip shield by dry-air oxidation was excluded because the dry-air oxidation rate is insufficient to penetrate the drip shield in 10,000 years (Bechtel SAIC Company, 2003). At a constant temperature of 200oC [392oF], the titanium oxide thickness is expected to be approximately 0.0021 mm [8.3X10-5 in] in 10,000 years (Schutz and Thomas, 1987).

Based on the cyclic polarization experiments conducted with Titanium Grade 7 in simulated saturated water at 120oC [248oF] and in simulated concentrated water at 90oC [164oF], no localized corrosion was observed (CRWMS M&O, 2000h). The results from Brossia and Cragnolino (2001b) also suggest that the fabrication processes do not significantly alter the localized corrosion resistance of Titanium Grade 7. Similar tests results have not been reported for Titanium Grade 24, the localized corrosion resistance of titanium Grade 24 is expected to be similar to that of Titanium Grade 7.

References:
Bechtel SAIC Company, LLC. Technical Basis Document No.5: In-Drift Chemical Environment. Rev. 1. las Vegas, Nevada: Bechtel SAIC Company, LLC. 2003
Schutz, R.W. and D.E. Thomas, Corrosion of Titanium and Titanium Alloys. Corrosion. Vol.13. ASM Handbook. Materials Park, Ohio: ASM International. Pp.669-706. 1987
CRWMS M&O, General Corrosion and Localized Corrosion of Drip Shield, ANL-EBS-MD-000004. Rev. 00. Las Vegas, Nevada: CRWMS M&O. 2000
Brossia C. S. and G. A. Cragnolino, Effects of Environmental and Metallurgical Conditions on the Passive and Localized Dissolution of Ti-0.15%Pd. Corrosion Journal . Vol. 57. pp.768-776. 2001

-----Original Message-----
From: Xihua He [mailto:xhe@cnwra.swri.edu]
Sent: Thursday, March 08, 2007 8:27 AM
To: 'Pavan Shukla'; 'Hundal Jung'
Cc: 'Yiming Pan'
Subject: RE: Summary on different modes of corrosion

Andy,

Some information on this is available at IIRSR. I can review it after you finish writing it.

Thanks,

Xihua

-----Original Message-----
From: Pavan Shukla [mailto:pshukla@cnwra.swri.edu]
Sent: Thursday, March 08, 2007 6:51 AM
To: 'Hundal Jung'; xhe@cnwra.swri.edu
Cc: 'Yiming Pan'
Subject: Summary on different modes of corrosion

Andy,

Please provide a two paragraph summary on why different modes of corrosion such as localized corrosion, stress corrosion cracking, and hydrogen embrittlement
are neglected. In the current version of the chapter, we have only mentioned why
these modes of corrosion will not degrade the drip shield. In contrast, extensive
explanations are provided for selecting/neglecting different modes of corrosion for waste packages. Please look at the chapter for appropriate references.

-Pavan

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Subject: RE: Summary on different modes of corrosion
Sent Date: 3/8/2007 11:20:50 AM
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From: Andy Jung

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Recipients:
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"Xihua He" <xhe@cnwra.swri.edu>
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