HLWYM HEmails

From: Gustavo Cragnolino [gcragno@cnwra.swri.edu]
Sent: Friday, July 23, 2004 9:32 AM
To: Dennis Galvin; 'DDUNN@cnwra.swri.edu'; 'DGUTE@cnwra.swri.edu'; 'gcragno@cnwra.swri.edu'; Ken Chiang; Lietai Yang; Osvaldo Pensado; 'VJAIN@cnwra.swri.edu'; Xihua He; Yi-Ming Pan; Aladar Csontos; Tae Ahn
Cc: Asadul Chowdhury; Sitakanta Mohanty; Andy Campbell; 'Abou-Bakr Ibrahim'; Bret Leslie; 'Dan Rom'; Gregory Hatchett; Marissa Bailey; Mysore Nataraja; Richard Codell; Timothy Kobetz
Subject: RE: TBD-6 and CLST Agreements Meeting
Attachments: TBDoc#6_Appendix_O_MIC_Evaluation.doc; TBDoc#6_Appendix_V_Evaluation.doc

Importance: High

I'm attaching two files from Lietai. One complements CLST 1.11 and the other refers to CLST 1.03

-----Original Message-----
From: Dennis Galvin [mailto:DJG3@nrc.gov]
Sent: Thursday, July 22, 2004 10:13 AM
To: DDUNN@cnwra.swri.edu; DGUTE@cnwra.swri.edu; gcragno@cnwra.swri.edu; KCHIANG@cnwra.swri.edu; LTYANG@cnwra.swri.edu; OPENSADO@cnwra.swri.edu; VJAIN@cnwra.swri.edu; xhe@cnwra.swri.edu; YPAN@cnwra.swri.edu; Aladar Csontos; Tae Ahn
Cc: ACHOWDHURY@cnwra.swri.edu; SMOHANTY@cnwra.swri.edu; Andy Campbell; Abou-Bakr Ibrahim; Bret Leslie; Dan Rom; Gregory Hatchett; Marissa Bailey; Mysore Nataraja; Richard Codell; Timothy Kobetz
Subject: TBD-6 and CLST Agreements Meeting

CLST and Associates

I have scheduled a meeting for Friday 7/23/04 from 10:00 to 11:00, though the room is reserved until 12:00.

The first purpose of the meeting is to discuss the selection of authors, technical leads, and the agreement outline due dates. To the extext possible, I would like to identify dates for the first draft of letters based on the results of the second half of the meeting.

The second part of the meeting is to discuss our first impression of the appendices to see which agreements may be readlily closed or are likely to lead to a request for references. The CNWRA is scheduled to provide an compilation of initial impressions of the appendices by close of business Thursday 7/22/04. Please try and read the appendices assigned to you last Tueday by tomorrow morning's meeting.

The Bridge line is 1-800-638-8081 or 301-231-5539, pass code 5447#. I have reserved 4 lines.

I have also attched the TBD-6 Agreements table. Note for Appendix L, I had provided the ADAMs # for the transmittal letter. I have now provided the ADAMs number for the appendix.

Note that in our January 24, 2003 letter to DOE (ML030270065), we accepted the DOE approach to provide the information for CLST 1.05 with CLST 1.04 and CLST 2.07 with CLST 2.04. Please consider this when reviewing CLST 1.04 and CLST 2.04.

Also, references for CLST 1.14 and 1.15 should be available to in the DOE local office (see attached).

Thanks,

Dennis

Hearing Identifier: HLW_YuccaMountain_Hold_EX
Email Number: 1679

Mail Envelope Properties
(!~!UENERkVCMDkAAQACAAAAAAAAAAAAAAAAABgAAAAAAAAAee6GNYnO0xGN1ABgCDO/z8KAA
AAQAAAAy7SORVnNKEGryFj84o4kfgEAAAAA)

Subject: RE: TBD-6 and CLST Agreements Meeting
Sent Date: 7/23/2004 9:31:56 AM
Received Date: 7/23/2004 9:26:35 AM
From: Gustavo Cragnolino

Created By: gcragno@cnwra.swri.edu

Recipients:
"Asadul Chowdhury" <achowdhury@cnwra.swri.edu>
Tracking Status: None
"Sitakanta Mohanty" <smohanty@cnwra.swri.edu>
Tracking Status: None
"Andy Campbell" <Andy.Campbell@nrc.gov>
Tracking Status: None
"'Abou-Bakr Ibrahim'" <AKI@nrc.gov>
Tracking Status: None
"Bret Leslie" <Bret.Leslie@nrc.gov>
Tracking Status: None
"'Dan Rom'" <DSR@nrc.gov>
Tracking Status: None
"Gregory Hatchett" <Gregory.Hatchett@nrc.gov>
Tracking Status: None
"Marissa Bailey" <Marissa.Bailey@nrc.gov>
Tracking Status: None
"Mysore Nataraja" <Mysore.Nataraja@nrc.gov>
Tracking Status: None
"Richard Codell" <Richard.Codell@nrc.gov>
Tracking Status: None
"Timothy Kobetz" <Timothy.Kobetz@nrc.gov>
Tracking Status: None
"Dennis Galvin" <Dennis.Galvin@nrc.gov>
Tracking Status: None
"'DDUNN@cnwra.swri.edu'" <DDUNN@cnwra.swri.edu>
Tracking Status: None
"'DGUTE@cnwra.swri.edu'" <DGUTE@cnwra.swri.edu>
Tracking Status: None
"'gcragno@cnwra.swri.edu'" <gcragno@cnwra.swri.edu>
Tracking Status: None
"Ken Chiang" <kchiang@cnwra.swri.edu>
Tracking Status: None
"Lietai Yang" <ltyang@cnwra.swri.edu>
Tracking Status: None
"Osvaldo Pensado" <opensado@cnwra.swri.edu>
Tracking Status: None
"'VJAIN@cnwra.swri.edu'" <VJAIN@cnwra.swri.edu>
Tracking Status: None
"Xihua He" <xhe@cnwra.swri.edu>

Tracking Status: None
"Yi-Ming Pan" <ypan@cnwra.swri.edu>
Tracking Status: None
"Aladar Csontos" <Aladar.Csontos@nrc.gov>
Tracking Status: None
"Tae Ahn" <Tae.Ahn@nrc.gov>
Tracking Status: None

Post Office: cnwra.swri.edu

Files	**Size**	**Date & Time**
MESSAGE	2155	7/23/2004 9:26:35 AM
TBDoc#6_Appendix_O_MIC_Evaluation.doc	31808	
TBDoc#6_Appendix_V_Evaluation.doc	33344	

Options
Priority: High
Return Notification: No
Reply Requested: Yes
Sensitivity: Normal
Expiration Date:
Recipients Received:

Comments on Appendix O
Critical and Corrosion Potentials for Alloy 22
(Response to CLST. 1.11)

CLST 1.11:
Provide the technical basis for the selection of the critical potentials as bounding Parameters for localized corrosion, **taking into account MIC**. DOE will provide the documentation in a revision to the AMRs (ANL-EBS-MD-000003 and ANL-EBS-MD-000004) prior to LA.

DOE Response in Appendix O, Taking into account MIC:

Corrosion testing of Alloy 22 specimens has been ongoing for more than 5 years at the LTCTF. These tests are being conducted in concentrated brines. While the solutions were not initially sterilized, they were intermittently exposed to air. As a result, there was a potential for the establishment of microbial community in the test solutions. Indeed, characterization of the solutions showed the presence of heat-tolerant and desiccation-tolerant organism in the 60 oC SDW (pH~10) and SAW (pH~3). Heat- and desiccation-resistant microorganisms were also found in the repository rock samples. It is therefore possible to apply the results of the LTCTF in a microbe-containing environment to that expected in the repository.

Results of corrosion rate measurements on the 5-year exposed specimens showed that the rates were very low for all specimen configurations. Effects of temperature difference between 90 oC (without microbes) and 60 oC (with microbes) were also not discernible. These results indicate that the effects of the presence of microbes in the test solutions had no deleterious effects on general corrosion rates. Therefore, the life time of the waste package will not be limited by the presence of microbial activity.

CNWRA Position and Request Justification:

1) DOE has not provided adequate technical basis for the selection of critical potentials as bounding parameters when condition for MIC exists.

Although the solutions used in the LTCTF were not sterilized and the characterization of the solutions showed the presence of heat-tolerant and desiccation-tolerant organisms in the 60 oC SDW and SAW. Quantitative characterizations of these organisms (e.g., cell counts and cell types) are needed to evaluate the significance of these microorganisms. A certain level of microbial activity is required to cause MIC.

Because the conditions in the potential repository may vary considerably, the condition in the LTCTF may not represent the conditions that favor the growth of these bacteria.

References:

Comments on Appendix V
Waste Package-Corrosion Rate Measurements on Alloy 22
(Response to CLST. 1.03)

CLST 1.03:
Provide the documentation that confirms the linear polarization resistance measurements with corrosion rate measurements using other techniques. DOE will document the results of testing in the general corrosion rate measurements in the revision of Alloy 22 AMR (ANL-EBS-MD-000003) prior to LA.

DOE Response in Appendix V:

The Alloy 22 general corrosion rates measured with linear polarization resistance method were compared with the weight-loss and potentiostatic polarization methods (BSC 2003a, AppendixV) at 90 ^{o}C. The corrosion rates obtained with weight-loss method were derived from the long-term corrosion test facility in three solutions (simulated acidified water, simulated dilute water and simulated concentrated water) in four time intervals (6,12, 28 and 60 months). The data were scattered in a large range, but the general trend is that the corrosion rate decrease from 50 nm/yr at a 6-month interval to 7 nm/year at a 60- month interval. The corrosion rates obtained with linear polarization resistance method were derived in saturated acidified water at 90 oC. The corrosion rates were high initially (the first few hours), but decrease rapidly to about 300 nm/year after about 30 hours and to about 200 after about 140 hours. When compared with the corrosion rates obtained with the weight-loss method in a corrosion rate-time plot, the corrosion rates obtained with the linear polarization method are close the extrapolated line.

The appendix also presented the corrosion rates of welded Alloy 22 specimen measured with the linear polarization method at room temperatures in solutions with and without the presence of microorganisms. The measured corrosion rates with and without the presence of microorganism scattered from 5 to 30 nm/yr. The data exhibit no decreasing trend over a 123 day-period. On average, it appeared that the corrosion rate obtained in the presence of microorganism were higher than those obtained without the presence of the microorganism.

The corrosion rate obtained with potentiostatic polarization method in concentrated saturated acidified water and other concentrated NaCl containing solutions were also presented in the appendix. The Alloy 22 specimens were polarized to constant anodic potentials (0.2 or 0.4 V versus Ag/AgCl electrode) in the passive range. The polarization current was measured at the end of the polarization period (1, 7 or 28 days) and used to derive the passive dissolution rate. Such-measured passive dissolution rates were from 0.22 to 1.25 um/yr at temperatures from 90 to 100 ^{o}C. Linear polarization resistance method was also used to measure the corrosion rate 2 hour after the potentiostatic polarization. These rates are from 0.06 to 0.57 at temperatures from 90 to 100 ^{o}C.

CNWRA Position and Request Justification:

1) DOE has provided documentation that confirms the linear polarization resistance measurements for general corrosion with corrosion rate measurements using other techniques (mainly weight loss method).

However, the results obtained with linear polarization method for Alloy 22 in solutions containing microorganism may be flawed. Some microorganisms such as SRB produce electrochemically active chemical species. These electrochemically active species may affect the results of the linear polarization resistance measurements, According to the theory of linear polarization resistance technique, this technique should only be used when no secondary electrochemical reactions are present in the system.

References: