HLWYM HEmails

From: David Pickett
Sent: Tuesday, November 09, 2004 3:27 PM
To: vjain@cnwra.swri.edu; Roberto Pabalan; Osvaldo Pensado; Jude Mcmurry
Subject: RE: Draft response to ENFE 3.03
Attachments: Pickett notes on Codell ENFE 3.wpd

Follow Up Flag: Follow up
Flag Status: Flagged

I've attached Dick Codell's write-up on ENFE 3.03, annotated by me. As Osvaldo points out below, Dick's rationale that it can be closed could just as easily apply to almost all agreements related to in-package chemistry. Let's try to meet after the team meeting tomorrow (circa 11 AM) to discuss this. As you can see, I have questions for Dick.

David

> -----Original Message-----
> From: Vijay Jain [mailto:vjain@cnwra.swri.edu]
> Sent: Tuesday, November 09, 2004 11:12 AM
> To: dpickett@cnwra.swri.edu; 'Roberto Pabalan';
> opensado@cnwra.swri.edu
> Subject: RE: Draft response to ENFE 3.03
>
>
> yes
>
> Vijay Jain
> Center for Nuclear Waste Regulatory Analyses Southwest Research
> Institute 6220 Culebra Road San Antonio, TX 78228
> V: (210) 522 5439
> F: (210) 522 6081
>
> -----Original Message-----
> From: David Pickett [mailto:dpickett@cnwra.swri.edu]
> Sent: Tuesday, November 09, 2004 11:12 AM
> To: vjain@cnwra.swri.edu; 'Roberto Pabalan'; opensado@cnwra.swri.edu
> Subject: RE: Draft response to ENFE 3.03
>
> I've come up with some comments on Dick's points. Shall we get
> together to talk amongst ourselves first?
>
> David
>
> > -----Original Message-----
> > From: Vijay Jain [mailto:vjain@cnwra.swri.edu]
> > Sent: Tuesday, November 09, 2004 10:54 AM
> > To: David Pickett; Roberto Pabalan
> > Subject: FW: Draft response to ENFE 3.03
> >
> >
> >
> > -----Original Message-----
> > From: Osvaldo Pensado [mailto:opensado@cnwra.swri.edu]

> > Sent: Tuesday, November 09, 2004 10:47 AM
> > To: Vijay Jain
> > Subject: RE: Draft response to ENFE 3.03
> >
> > We need to have a discussion with Dick. If nothing else because we
> > are not using his argument in assessing other agreements. His
> > argument applies to almost all agreements.
> > If that is the way NRC wants to go, we need some guideline.
> >
> >
> >
> > -----Original Message-----
> > From: Richard Codell [mailto:RBC@nrc.gov]
> > Sent: Monday, November 08, 2004 5:24 PM
> > To: OPENSADO@cnwra.swri.edu; VJAIN@cnwra.swri.edu; Bret Leslie; Tae
> > Ahn
> > Cc: Gregory Hatchett
> > Subject: Draft response to ENFE 3.03
> >
> > See my draft response. We can put into a common format if you
> > approve of my analysis. Dick
> >
> >
>

Hearing Identifier: HLW_YuccaMountain_Hold_EX
Email Number: 645

Mail Envelope Properties (dpickett@cnwra.swri.edu20041109152700)

Subject: RE: Draft response to ENFE 3.03
Sent Date: 11/9/2004 3:27:23 PM
Received Date: 11/9/2004 3:27:00 PM
From: David Pickett

Created By: dpickett@cnwra.swri.edu

Recipients:
"vjain@cnwra.swri.edu" <vjain@cnwra.swri.edu>
Tracking Status: None
"Roberto Pabalan" <rpabalan@cnwra.swri.edu>
Tracking Status: None
"Osvaldo Pensado" <opensado@cnwra.swri.edu>
Tracking Status: None
"Jude Mcmurry" <jmcmurry@cnwra.swri.edu>
Tracking Status: None

Post Office:

Files	**Size**	**Date & Time**
MESSAGE	2308	11/9/2004 3:27:00 PM
Pickett notes on Codell ENFE 3.wpd	10120	

Options
Priority: Standard
Return Notification: No
Reply Requested: No
Sensitivity: Normal
Expiration Date:
Recipients Received: Follow up

ENFE 3.03

Provide justification that bulk-scale chemical processes, as opposed to local chemistry, dominate the in-package chemical environment for solubility and waste form degradation models.

DOE response - DOE comments that the exact pathway that infiltrating or condensing water would follow within the waste package is unknown, but that it is very unlikely that water would contact only the fuel and bypass the other materials inside the waste package, especially corrosion products. Although corrosion of iron and hydrolysis of chromium would lead to potentially large decreases in pH, the acidity could be buffered by sorption of hydrogen ions onto corrosion product surface sites (e.g., ferrihydrite or goethite), and dissolution of schoepite, which is a the likely spent fuel corrosion product. Corrosion of waste glass might lead to high pH, but this would also be buffered by schoepite dissolution.

NRC Assessment - NRC staff finds that there is reasonable expectation that infiltrating or condensing water within the waste package will mix with all materials present, either by direct contact or by diffusion. On the time scale of the repository and under conditions where there is sufficient water present to allow transport out of the waste package, diffusion will have a pronounce effect on homogenizing contrasts in water concentrations. The mechanisms that DOE suggests would limit large swings in pH are reasonable. Even a large decrease in pH for the spent fuel waste form that would lead to a large increase in potential release rate from the waste form, would not necessary translate to a big increase in consequences. For example, the relatively large shift to a pH of 3.3 caused by the hydrolysis of chromium (TBD-7, figure A-1) would lead to an increase in spent fuel dissolution rate less than a factor of 20 over that for pH = 7.

Based on what calculation?

Results of NRC's performance assessments presented in the Risk Insights Baseline Report (Section 4.3.4.1) indicate that a two order-of-magnitude increase in the degradation rate of spent fuel leads to a much smaller increase in peak expected dose of 2.5.

Actually, more like 4, and it raises dose from 10 to 40 mrem/yr. From 50,000 to 100,000 years, Model 1 higher by factor of 3 to 7.

The high solubilities associated with the important radioelements iodine and technetium as used in the NRC performance assessments makes shifts in solubility of these elements caused by changes in chemistry unimportant.

OK.

Other important radioelements like neptunium are more affected by shifts in chemistry, but performance assessment studies show only moderate sensitivities of results to neptunium solubilities.

What is meant by "moderate"? New Mohanty et al. paper on solubility limits shows Np being solubility-limited 85% of the time. Thus, solubility limit changes could be significant.

Therefore, waste form degradation rate was given a rating of only medium significance to waste isolation. NRC staff therefore finds that DOE has properly addressed the intent of the

agreement. If later assessments result in significant differences in the expected performance because of waste form degradation rate or changes to solubilities because of local chemistry, the issue will be reassessed.

Are all medium agreements to be closed irrespective of technical content?