HLWYM HEmails

From: Osvaldo Pensado
Sent: Friday, May 04, 2007 10:34 AM
To: Tae Ahn; Timothy McCartin
Cc: David Pickett; Gordon Wittmeyer; James Winterle; Sitakanta Mohanty; Brittain Hill; Christopher Grossman; Keith Compton; Sheena Whaley
Subject: RE: Re(2): SF lifetime

Follow Up Flag: Follow up
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Thanks Tae for the references. Indeed you have shared those with me before.

The presentation I posted and the equations are consistent with the TPA approach.

In the TPA code it is assumed that the specific surface (m2/mg) is a constant. This leads to an equation for the waste form equivalent to a decay equation with a lambda equal to the fractional release.

If the fractional release was constant (e.g., constant temperature), the SF would follow exponential "depletion." There will always be a little undissolved waste form in the TPA.

The constant specific surface is an assumption in TPA. Other assumptions are possible, but are not available in TPA.

For example, Tae, in your reference the assumption is that the particle radius decreases linearly with time. In that case, the SF follows a quadratic decay with time (as opposed to the exponential decay in the TPA code).

I can think of other possibilities. For example we could assume that the SF exposed surface (m2) is constant. There, the SF would follow linear decay in time.

Implementing other alternative requires source code changes. However, I do not believe that the overall results are strongly dependent on the exposed surface assumption.

If concerns exist with the range in the fractional release in the TPA code, those should be addressed by adjusting existing input parameters.

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-----Original Message-----
From: Tae Ahn [mailto:TMA@nrc.gov]
Sent: Friday, May 04, 2007 8:24 AM
To: Osvaldo Pensado; Timothy McCartin
Cc: David Pickett; Gordon Wittmeyer; James Winterle; Sitakanta Mohanty; Brittain Hill; Christopher Grossman; Keith Compton; Sheena Whaley
Subject: Re(2): SF lifetime

I have faxed you 6 page two references. This had been sent to you previously and we had worked on it for the TAD release. The conversion equation between release fraction (ramda) and dissolution rate (r) is not linear as the particle size shrinks. The secondary terms in the conversion from the references contribute to decrease the fractional release rate. Tae

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I would like to revisit our previous exercise about the effect of particle radius on fractional release. The plot shows ramda values a little higher than expected. I'll go over our past notes on the equation for ramda relation to particle size.

>>> Osvaldo Pensado <opensado@cnwra.swri.edu> 05/03/2007 3:56 PM >>>
Fellows

I know there is curiosity about the SF lifetime in the TPA code.
Please
take a look at the file

X:\Chris Grossman\SpentFuelLife.ppt

There is a broad variation depending on when WP failure occurs.

This may also help to explain why we have lots of variability in the TPA consequences.

The plots only address the SF lifetime. Depending on solubility and water flow rates, the residence of radionuclides in the EBS may be much different than the SF lifetime in the TPA code.

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From: Osvaldo Pensado

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