HLWYM HEmails

From: David Pickett
Sent: Tuesday, February 19, 2002 9:48 AM
To: David Esh
Subject: RE: colloid models

Follow Up Flag: Follow up
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The species like Ic-239 represent colloids with irreversible attachment--in contrast to the reversible model that is facilitated by adjusting retardation factor and diffusion coefficient.

David

> -----Original Message-----
> From: David Esh [mailto:DWE@nrc.gov]
> Sent: Tuesday, February 19, 2002 6:32 AM
> To: DPICKETT@cnwra.swri.edu
> Cc: PBERTETTI@cnwra.swri.edu; JWB@nrc.gov
> Subject: Re: colloid models
>
>
> David,
>
> Thanks for the information and yes it will take some digesting. The
> basis for my impression about colloids is in the DOE model they create
> distinct species to represent colloids. So they will have [pu-239]
> then they will also have [Ic-239] to represent colloidal pu-239. If
> you look at the model output in the GoldSim file, very little [Ic-239]
> ever gets out.
>
> I know the easy way to get the answer, which is to e-mail the lead DOE
> PA guy and ask him. I'll forward you his response.
>
> Regards,
>
> Dave
>
> >>> David Pickett <dpickett@cnwra.swri.edu> 02/18/02 01:00PM >>>
> Dave,
>
> [Note: As you may know, NRC folks are having trouble replying to our
> email.
> If you do respond, you need to enter my address manually.]
>
> A few points about Pu dose and colloids, arising from our risk
> insights telecons last week.
>
> The bases for my saying last week that colloidal Pu-239 is the dose
> contributor are several of the Figures 4.1-X from the TSPA-SR report.
> See, for example, Figs 4.1-5, 4.1-6, and 4.1-11. (Note that at around
> 100,000 years, irreversible Pu-239 is catching up with reversible
> Pu-239.)
>

> Could you please point me to where you saw the statement about
> dissolved
> Pu-239 being >> colloidal Pu-239? I think the confusion may arise
> from how reversible attachment is modeled. This is done by lowering
> the retardation factor by an amount to account for the mobile colloid
> phase. The best places I can find where this is explained are:
>
> ANL-NBS-HS-000030 Rev 00 (S0055), page 26
> ANL-NBS-HS-000026 Rev 00 (U0065), pages 25-26
>
> You could also look for discussions of the KDRN9 and KDRN10 parameters
> in the TSPA-SR documents. The bottom line is that the reversible
> sorption model in effect enhances transport of the "dissolved"
> radionuclide. It is
> not an output of the model to define how much is dissolved and how
> much is reversibly attached to colloids. They are lumped together
> under one Kd.
>
> Here's a helpful sentence from the TSPA-SR report:
>
> TDR-WIS-PA-000001 REV 00 ICN 01, page 4-10, 2nd paragraph: "...the
> reversible component also includes 239Pu that transports as a solute."
>
> Also, there _is_ filtration of colloids with irreversible attachment
> at the interface of matrix units in the UZ, and smaller colloids may
> move advectively (not diffusionally) from fracture to matrix. In
> addition, a retardation factor is applied to irreversible colloids in
> the SZ.
>
> See also sections 3.7.1.5 and 3.8.2.1.2 of the TSPA-SR report.
>
> I hope this is helpful. It has not been easy trying to tease out all
> this information from the various reports.
>
> David
>
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