

HLWYM HEmails

From: James Winterle
Sent: Wednesday, March 28, 2007 9:35 AM
To: Timothy McCartin; Christopher Grossman
Cc: 'Rob Rice'; David Pickett; Olufemi Osidele; Osvaldo Pensado; Richard Codell; Scott Painter; Sitakanta Mohanty; Gordon Wittmeyer; Budhi Sagar
Subject: RE: Follow-up from validation presentation

Follow Up Flag: Follow up
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Tim and others:

Perhaps we can take some time at the meetings today and tomorrow to discuss what other factors appear to be contributing to the relatively few realizations that seem to be dominating the mean. Below are two factors that seem to be important in at least some of the realizations that produce large peak dose estimates.

1. As already discussed, when CHv is not present, majority of source term bypasses UZ and no filtration of colloids occurs.
2. When item 1 occurs, and low values are sampled for ColloidRetardationFactor_SAV_[] (ranges from 1.0 to 5188) and ColloidRetardationFactor_SAV (1.0 to 800), then colloids basically are transported straight from the EBS to the receptor within only a few hundred years. The difference between a colloid retardation factor of 1.0 versus 5,000, when multiplied by groundwater travel time, determine whether Am and Pu colloids get to the receptor within 100 years or 100,000 years. Since Am-243 and Pu 240 have a half lives on the order of ~7 and 6ky, respectively, the amount of retardation will have a huge effect on dose.

The schedule calls for initiating any SCRs by April 13, so we have a week or so to think of ways to improve this abstraction or to consider whether we can reduce the range of uncertainty in colloid retardation.

--Jim

-----Original Message-----

From: Timothy McCartin [mailto:TJM3@nrc.gov]
Sent: Wednesday, March 28, 2007 6:01 AM
To: James Winterle; Christopher Grossman
Cc: 'Rob Rice'; David Pickett; Femi Osidele; Osvaldo Pensado; Richard Codell
Subject: Re: Follow-up from validation presentation

Jim's item 4 seems the best of the alternatives given, however, another approach could be to just set the colloid concentration to that which represents the colloids that make it through the UZ and not use a filtration term at all - this would result in not sequestering the colloids that get filtered (i.e., they would end up as dissolved species) but I believe given retardation in the alluvium this would not lead to any significant issue of conservatism. Regardless what is done this still leaves a single vector with a very large contribution and I am still wondering what the explanation is? as noted by Jim in the input file CHv is not present 80% of the time how come all the other times the unit is bypassed the dose is significantly lower - there is something very unique going on that does not occur in the other 399 realizations where CHv is bypassed (80% of 500). On the plus side this is exactly the kind of issue that affords us an opportunity to better understand the representation of this phenomenon - if the code didn't make us pause and think once in awhile it would

not be very good. Kudos to Rob for examining the results and pointing out this type of behaviour - this (in my opinion) is why we do the PA.

>>> James Winterle <jwinterle@cnwra.swri.edu> 03/27/2007 6:58 PM >>>

Chris:

We did some follow-up on the realization with the high dose that we discussed at today's presentation. As I suspected, the CHnv layer had a zero thickness sampled for this realization; because the next most permeable layer was the CHnz, which has quite a low permeability, 96 percent of source was directly bypassed to SZ without any colloid filtration or retardation.

This basically works exactly the way we programmed it. I'm thinking, though, that it doesn't make sense to completely throw out colloid filtration for the fraction that doesn't go into a UZ matrix layer just because NEFTRAN cannot handle thin layers. Although the colloid filtration factors are layer specific, what they really represent is all of the total permanent loss that would occur along the entire UZ and SZ transport path. If that is what we really should be representing, then it would make sense to also apply colloid filtration to the fraction of flow that has fast bypass of the UZ. Below are some options on how to do this in order of ease of implementation:

1. Do nothing and call the current approach conservative. (given the high effect on dose in some realizations, this strikes me as too conservative).
2. Just apply the same filtration factor to the bypass fraction that was used for the matrix flow fraction. (Easiest to implement, but could be difficult to explain)
3. Add a separate new parameter to account for filtration of bypassed fraction in the saturated zone. (Not too hard to implement, but would require some revision to the user manual chapter.)
4. Rethink the whole filtration factor concept. Rather trying to use uncertain layer-specific factors, we could use a single effective parameter to represent permanent colloid filtration along the entire UZ/SZ flow path. (probably not too hard to implement; but would require some revision to the user manual chapter)

I am interested to hear thoughts on the subject. I'll also talk to David Pickett since he has helped on this topic in the past.

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From: James Winterle

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