

LSNReviews

From: Keith Compton [KLC@nrc.gov]
Sent: Monday, April 04, 2005 12:29 PM
To: rfedors@cnwra.swri.edu; rjanetzke@cnwra.swri.edu; Richard Codell
Cc: Christopher Grossman; Hans Arlt; Timothy McCartin
Subject: Interim Update of wpflow.def
Attachments: wpflow.def

Ron,

attached is a first cut at an updated wpflow.def file with time-dependent Fow and Fwet out to 1 MY. The values of Fwet and Fow are defined for the timesteps identified by Randy in his email last Wednesday (3/30). If these are not the right timesteps, please let me know so that I can derive the proper values. I have left Fmult = 1, and Randy will be providing an updated set of values for that parameter. For now, I would like to focus on making sure that this structure will work. I have not modified column spacings; they are currently defined by tabs. If you let me know what format it will be read as, I can make those changes, or you can make them yourself.

This table is based on the following assumptions:

- Fwet and Fow are the mean values of 6000 realizations of a 1000 subarea discretization of the repository
- Values were determined for nominal percolation rates ranging from 5 to 80 mm/yr with a 5 mm/yr interval (e.g., 5,10,15, 20...80)
- The spatial variability in matrix hydraulic conductivity in each realization is assumed to have a lognormal distribution with a mean uniformly distributed between 1.4 and 1.8 mm/yr and a coefficient of variation uniformly distributed between 1.5 and 2.5
- The spatial variability in percolation for each realization is assumed to have a lognormal distribution with a mean uniformly distributed between 90% and 110% of the nominal value and a coefficient of variation uniformly distributed between 0.4 and 0.6
- The arithmetic mean value of Fwet and Fow were determined for each set of 6000 realizations at each nominal percolation rate
- These were mapped to the percolation rates (NOT reflux rate) provided by Fedors email of 3/30 by using a linear interpolation between the 5 mm/yr intervals

Notes:

- The current analysis only considers spatial flow heterogeneity induced by spatial heterogeneity of the matrix hydraulic conductivity, consistent with Dick's original analysis
- Spatial flow heterogeneity induced by discrete fracture spacing as analyzed by Hughson et al has not yet been accounted for; this may significantly alter Fwet and Fow.
- No spatial structure was assumed in heterogeneity; this implies that the correlation length length of vertical matrix hydraulic conductivity is less than ~ 50 m
- The uncertainty in Fwet and Fow is dominated by the uncertainty in Fow; however, it is still very low (CV ~2 for 5 mm/yr nominal percolation rate). I suspect that uncertainty in Fmult will dominate the uncertainty in the process, unless we explicitly account for discrete fracture spacing as discussed in point 2.

We identified a process last week (bullet 2 above) that may be important, so I will be working on trying to bring that into the analysis as well. I may therefore provide an updated table in a week or so. I will also work on an extended writeup to document the assumptions on which this analysis is based so that Dick and Randy can review it and see if any more revisions will be necessary. I still owe you an updated distribution for WPFLOWMultiplicationFactor as identified in the tpa.inp file and will get that to you by the end of the week. My goal for this deliverable is to provide you with a straw man to get the structure nailed down this week so that we can go forward with code testing; refinements to the values may take a few more days.

Keith

wpflow.def

Time history of the factors for flow diversion (Fmult), flow contacting waste packages (Fow), and fraction wetted (Fwet) used in release set (klc 4/4/05)

time(yr)	Fmult	Fow	Fwet
0	1.00	0.87	0.94
26	1.00	0.87	0.94
58	1.00	0.87	0.94
99	1.00	0.87	0.94
150	1.00	0.87	0.94
215	1.00	0.87	0.94
297	1.00	0.87	0.94
400	1.00	0.87	0.94
530	1.00	0.94	0.98
693	1.00	0.94	0.98
900	1.00	0.94	0.98
1160	1.00	0.96	0.99
1487	1.00	0.96	0.99
1900	1.00	0.97	1.00
2420	1.00	0.97	1.00
3076	1.00	0.97	1.00
3903	1.00	0.97	1.00
4945	1.00	0.98	1.00
6258	1.00	0.98	1.00
7914	1.00	0.98	1.00
10000	1.00	0.97	1.00
34750	1.00	0.97	1.00
59500	1.00	0.97	1.00
84250	1.00	0.97	1.00
109000	1.00	0.98	1.00
133750	1.00	0.97	1.00
158500	1.00	0.97	1.00
183250	1.00	0.97	1.00
208000	1.00	0.99	1.00
232750	1.00	0.87	0.94
257500	1.00	0.97	1.00
282250	1.00	0.97	1.00
307000	1.00	0.96	0.99
331750	1.00	0.97	1.00
356500	1.00	0.97	1.00
381250	1.00	0.97	1.00
406000	1.00	0.98	1.00
430750	1.00	0.95	0.99
455500	1.00	0.97	1.00
480250	1.00	0.98	1.00
505000	1.00	0.94	0.97
529750	1.00	0.97	1.00
554500	1.00	0.99	1.00
579250	1.00	0.99	1.00
604000	1.00	0.97	1.00
628750	1.00	0.97	1.00
653500	1.00	0.97	1.00
678250	1.00	0.96	0.99
703000	1.00	0.95	0.99
727750	1.00	0.97	1.00
752500	1.00	0.97	1.00
777250	1.00	0.98	1.00
802000	1.00	0.87	0.94
826750	1.00	0.97	1.00
851500	1.00	0.97	1.00
876250	1.00	0.94	0.98
901000	1.00	0.97	1.00
925750	1.00	0.97	1.00
950500	1.00	0.99	1.00
975250	1.00	0.87	0.94

1000000 1.00 0.97 1.00

wpflow.def