From: Ellinger, Scott
To: Moats, William, NMENV
Cc: McDonald, William, NMENV; Brandwein, Sid, NMENV; Dave.Cobrain@state.nm.us; King, Laurie; Smith, Melissa
Subject: RE: review of the KAFB Model
Date: Wednesday, February 20, 2013 9:38:46 AM

Hi Will,
The far down gradient wells mean Ridgecrest 3 and 5, and the subject of the question to Dr. Harvey was about dispersion. Dispersion affects how quickly and at what concentration EDB moves into the Ridgecrest well field and what happens after its there. Higher values cause EDB to move further and quicker into the well field but at relatively low concentrations, and lower values of dispersion do the opposite. (Which is how it should work). I've been calculating longitudinal dispersion based on an equation by Xu and Eckstein, which is 0.83 X (log of the length of the plume) $^{2.414}$. There are also ratios of longitudinal to transverse, and longitudinal to vertical. I may not be able to pin dispersion down to single value and may have to report a range.

From: Moats, William, NMENV [mailto:Williams.Moats@state.nm.us]
Sent: Monday, February 18, 2013 3:45 PM
To: Ellinger, Scott
Cc: McDonald, William, NMENV; Brandwein, Sid, NMENV; Dave.Cobrain@state.nm.us
Subject: RE: review of the KAFB Model

Hi Scott,

Thanks for the update on the model.

You mention below:

"The advancing front of the plume begins to dissipate over time and distance and is especially noticeable around far down-gradient production wells, such that production wells are not impacted above the maximum contaminant level for ethylene dibromide (0.5 ppb)."

What wells do you mean as being "far down-gradient"?

-Will

From: Ellinger.Scott@epamail.epa.gov [mailto:Ellinger.Scott@epamail.epa.gov]
Sent: Friday, February 15, 2013 12:29 PM
To: Kieling, John, NMENV; Moats, William, NMENV; Brandwein, Sid, NMENV; McDonald, William, NMENV
Cc: Smith.Melissa@epamail.epa.gov; Spalding.Susan@epamail.epa.gov; King.Laurie@epamail.epa.gov; Hubner.Tara@epamail.epa.gov; Torcoletti.Paul@epamail.epa.gov
Subject: Fw: review of the KAFB Model

These are clarifications I needed to get from Schlumberger on the model. I don't want to drag you into the weeds, but just keep you informed.

----- Forwarded by Scott Ellinger/R6/USEPA/US on 02/15/2013 01:23 PM -----

From: Dougall James Miln Harvey <MHarvey4@slb.com>
To: Scott Ellinger/R6/USEPA/US@EPA
Date: 02/15/2013 12:12 PM
Subject: RE: review of the KAFB Model

Scott,

- You are correct on the dispersivity. If you convert the 9000 feet to 2750 meters, then the longitudinal dispersivity is approximately 16.4 m (53.7 feet).
- For boundaries, you could use General Head boundaries; these are not as constrained as Constant head boundaries, but you are still modeling in a large cone of depression and increasing the size of the model domain (in combination with GHB) would minimize artificial boundary effects on the predictison
- In Visual MODFLOW, the rows and columns are always NS and EW, so if you rotate the model domain, you end up with maps in Visual MODFLOW that are rotated (this is the same as in other GUIs like Vistas). If you want to see the results in true NS, you have to export them to GIS. For example, if you export the model grid to a DXF, you can open it in AutoCAD or ArcGIS and see the grid rotated (and the back ground maps in their true NS orientation)
- If you are only using Advection and Dispersion, then a higher value of dispersion should cause EDB to move faster toward the production wells; with no decay, the contaminant will get there, its just a matter of time; however, the impact of higher dispersion also depends on what concentration contour you are vieweing – with a higher dispersion, a high concentration contour (i.e. 1 mg/L) may appear to not move as far, and lower concentration contour (i.e. 1 ug/L) may appear to move farther (see Attached image); you might want to try changing the level of grid refinement to see if it is affecting numerical dispersion
- In 3D Explorer, you can zoom in on the image using the Shift button (it's the one on the bottom panel beside the Rotate button; just grab the Z slider and move it to the right)

Cheers,

Miln Harvey, Ph.D., P.Eng.
Senior Hydrogeologist

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From: Ellinger.Scott@epamail.epa.gov [mailto:Ellinger.Scott@epamail.epa.gov]
Sent: Friday, February 15, 2013 11:52 AM
To: Dougall James Miln Harvey
Cc: Smith.Melissa@epamail.epa.gov
Subject: RE: review of the KAFB Model

Thanks for your review. I have a few questions just to clarify a few things.

- On Xu and Eckstein, I thought the equation was valid for units in meters but not in feet. So the length (in feet) has to be converted to meters for the calculation, then back to feet again for use in the model (since my units are feet)
-
- What alternatives besides constant head boundaries placed around the domain would make sense? There is a large city-wide cone of depression centered on the eastern side of Albuquerque causing flow inward towards groups of production wells. Its been that way for decades. There aren't any physical flow boundaries in the area, so my thoughts were to use constant head boundaries to approximate the edges of the cone of depression. Any thoughts on a better way?
-
- I rotated the grid by constructing a separate model. On the new model, the grid lines are vertical and horizontal and the base map is tilted. Is there a way to rotate the grid but leave the base map oriented N-S on the screen.
-
- The advancing front of the plume begins to dissipate over time and distance and is especially noticeable around far down-gradient production wells, such that production wells are not impacted above the maximum contaminant level for ethylene dibromide (0.5 ppb). A greater value of dispersion causes less EDB to move into the production well field, as shown by the 0.5 ppb contour. I believe this is correct but I would appreciate your thoughts.
-
- In the 3D Explorer, is there a way to zoom in on a 3D image?
-
- Thanks so much for your help.

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