

Johnson, Bill H (DNR)

From: Fred Marinelli <[REDACTED]>
Sent: Saturday, July 21, 2012 7:45 PM
To: Cory D. Anderson; Peter Hinck ([REDACTED])
Cc: Houston Kempton; Paul Haby; David Blaha; Al Trippel; Carlson, Erik (DNR); Fred Marinelli; Tina Pint ([REDACTED])
Subject: Flow, concentration, and chemical flux from Cat 1 stockpile.
Attachments: WP_Culpability_Long-term closure - sulfate.pdf; Mathcad - Mine Site - Cat 1 sulfate mass flux.pdf

Cory and Peter,

I'm having difficulty reproducing sulfate values in the model with regard to outflow from the Cat 1 stockpile to West Pit during closure with the geomembrane and PRB. Attached is a copy of the MathCad worksheet that I'm using to do the calcs. I think the worksheet is self-explanatory.

One issue is the amount of chemical removal by the PRB. The value stated in the AWMP and used in the model is 50%. Several agency people and I have interpreted this to mean that the PRB removes 50% of the incoming sulfate mass. This for example would imply that if the inflow is 10 gpm and the incoming sulfate concentration is 1000 mg/L, the outflow would be 10 gpm with a sulfate concentration of 500 mg/L. The algorithm used in the model seems much more complicated and if I understand it correctly (certainly debatable!), it leads to much lower concentrations in the PRB outflow. I think this is born out by values pulled from the model (blue and red values on the worksheet). For mass loading from Cat1 to the West Pit, see the yellow zone on the attached graph obtained from culpability spreadsheet.

Can you please review this worksheet and let me know if incorrect values are being used. Also, it would be helpful if you can explain how the 50% removal value for sulfate is used to compute the concentration of outflow from the PRB. I think this issue also relates to how the PRB calcs are done in the Plant Site model.

Thanks for your time on this.

Regards,

Fred

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