

Johnson, Bill H (DNR)

From: Carlson, Erik (DNR)
Sent: Wednesday, September 05, 2012 7:56 AM
To: 'Fred Marinelli'
Cc: David Blaha; Al Trippel; Deb McGovern; Houston Kempton; John L. Adams; Paul Haby
Subject: RE: GoldSim QA Update

Fred,
See below. Barr intends to re-run the model but they now want to do that after AWMP ver 3 is delivered, not before as we had planned. My suggestion would be to do as much QA/QC work with the models you have that still makes sense to do, then wait until after AWMP ver 3 is delivered and the next version of the model is out to do your final work QA/QC work. What do you think?
Erik

From: Fred Marinelli [mailto:]
Sent: Tuesday, September 04, 2012 6:46 PM
To: Carlson, Erik (DNR)
Cc: David Blaha; Al Trippel; Deb McGovern; Houston Kempton; John L. Adams; Paul Haby
Subject: Re: GoldSim QA Update

Eric,

What engineered features are included in, or excluded from, the current Project? My list includes:

~~Cat 1 PRB~~

~~West Pit Engineered Wetland~~

~~FTB Engineered Wetland~~

Cat 1 geomembrane cover

Bentonite amended soils on the FTB

Bentonite amended pond bottom on the FTB

Cat 1 containment trench

FTB containment trench

Mine Site WWTF

Plant Site WWTF

Will Barr rerun the GoldSim models to reflect these changes?

Regards,

Fred

On Tue, Sep 4, 2012 at 7:12 AM, Carlson, Erik (DNR) <[REDACTED]> wrote:

Fred,

Thank you for the update. PolyMet has decided to remove the passive treatment technologies from their modeled project and describe them as potential options for post-closure treatment if and when the PRBs/PSBs/constructed wetlands etc are able to replace mechanical treatment. I suggest not spending time on PRBs/PSB/constructed wetland model features in the QA/QC.

-Erik

From: Fred Marinelli [mailto:[REDACTED]]
Sent: Friday, August 31, 2012 9:00 PM
To: Carlson, Erik (DNR)
Cc: David Blaha; Al Trippel; Deb McGovern; Houston Kempton; John L. Adams
Subject: GoldSim QA Update

All,

Because the models are so complex, it has certainly been a process of two steps forward, one step back. Some aspects of the models are far more complex than needed and use algorithms that are difficult to understand despite the good documentation provided by Barr. Other parts of the models use simplifying assumptions and so called calibration factors that greatly change the model predictions relative to laboratory measured properties. While these aspects don't necessarily reduce the model validity, it creates a complex network of algorithms that are time-consuming to disentangle and prioritize.

Most of our effort has been on understanding the basic workings of the models and evaluating how the models generate chemical mass at waste rock stockpiles, the West Pit, and the Flotation Tailings Basin (FTB). During this process we have identified some issues that caused Barr to correct the model and provide revised versions for our review. In other cases, Barr provided explanations that resolved our initial concerns. In addition, Barr has identified and fixed some of the model code based on its own QA process, which is on-going and in parallel to our effort.

At this stage, there are good indications that the models are generating chemical mass in the Cat 1 Stockpile and the FTB using algorithms that are consistent with the agreed upon methods. In our spot checking, we have been able to reproduce the model chemical generation rates with independent (Mathcad) calculations using the same input parameters. We have raised a theoretical concern regarding how sulfur generation is

modeled below bentonite-amended tailings and this issue is under discussion. We will perform a similar chemical generation analysis for the West Pit.

Much of the work for next week will be to track the generated chemical mass through PRBs, wetlands, groundwater, and in surface flow to the rivers. Our goal will be to develop independent calculations of mass flux to the points-of-evaluation and compare these with the GoldSim predictions.

In working with this model, we have seen instances of assumptions and mathematical approaches that could be interpreted as “conservative”, implying that the model might have a “tendency” to overestimate chemical concentrations at the points-of-evaluation. An example of this is not applying a calibration factor to sulfur release by the NorthMet tailings. There are however a few aspects of the model that might be interpreted as non-conservative. For example, a series of factors are used to reduce the LTVSMV sulfur generation rate by more than 95% compared to humidity cell measurements. While this may be reasonable, it opens the door to challenges from parties who were not intimately involved in the model development. If the reduction from humidity cell data were 90% rather than 95%, the predicted chemical concentrations in FTB seepage would be significantly increased.

Regards,

Fred

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Fred Marinelli

Senior Groundwater Hydrologist

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