

## Johnson, Bill H (DNR)

---

**From:** Peter J. Hinck <[REDACTED]>  
**Sent:** Thursday, August 02, 2012 11:25 AM  
**To:** Dave Blaha ([REDACTED]) Fred Marinelli ([REDACTED])  
**Cc:** Paul Haby ([REDACTED]) Jim Scott ([REDACTED]) Carlson, Erik (DNR); John Borovsky; Cory D. Anderson; Tina Pint  
**Subject:** NorthMet GoldSim Model QAQC  
**Attachments:** NorthMet GoldSim QAQC Tracking 2Aug2012.xlsx

Dave and Fred,

This email is to document Barr's understanding of the initial issues that have been identified thus far in ERM's Task 2 QA/QC of the NorthMet GoldSim models and the path forward to addressing these issues. Please let us know ASAP if anything here does not match your understanding.

### Issues identified

- 1) Category 1 stockpile pH: ERM identified that the pH used in the model did not match that proposed in Version 2 of the AWMP
- 2) Category 1 stockpile PRB: ERM identified a greater-than-expected mass removal in the PRB
- 3) Plant Site mass balance: ERM found that the first Plant Site control volume mass balance did not appear to close when using the initially provided flows and concentrations to calculate mass loading rates

### Paths forward

- 1) The Mine Site model was updated (email from Peter Hinck to Fred Marinelli on 7/19/12) to match AWMP V2. However, subsequent discussion of the AWMP modeling parameters has led to this change being dropped from the proposed model. **Barr will provide an updated model with the Category 1 pH returned to its original range (7.0 – 7.5).**
- 2) This issue is associated with the percolation through the Category 1 geomembrane, which was updated in the 7/19/12 email submittal to match the distribution proposed in the AWMP V2. The design flow of the PRB was not updated at the same time, resulting in longer-than-intended retention times in the PRB, and therefore greater-than-intended mass removal. **Barr will provide an updated model with the Category 1 PRB design flow updated to 2.5 gpm.**
- 3) Barr has shown (and discussed with Fred Marinelli on 8/1/12) that the model output flows and concentrations cannot be used to replicate GoldSim's mass loading results due to the complex differential equation solutions performed in GoldSim. An alternative means of performing the control volume calculations is to use GoldSim-reported water flow rates and GoldSim-reported constituent mass flux rates along with stored water volumes and constituent masses. **Barr will provide updated control volume spreadsheets that include mass flux rates from the GoldSim model.**

In addition to the model changes identified in #1 and #2 above, Barr has made several other minor model changes as part of our ongoing QA/QC and to facilitate exporting of results for the ERM control volume analysis. All model changes since the previous submittal will be identified via GoldSim's versioning feature.

Barr will institute a tracking sheet (current version attached) to track changes resulting from the QA/QC process and insure that there is clear understanding of the model version that is current. Any changes that impact the Workplan documentation (input tables) are identified in the tracking sheet and updated tables are attached as additional tabs.

We expect to post the revised models (noted as MS AWMPV2.1 and PS AWMPV2.1 in the tracking spreadsheet) on the project website by the end of the day today. Please let us know ASAP if you have any questions or suggestions for changes to this plan.

Regards,  
Peter

Peter J. Hinck, PE

Water Resources Engineer

Minneapolis office: [REDACTED]

cell: [REDACTED]

[REDACTED]

[www.barr.com](http://www.barr.com)

