

Johnson, Bill H (DNR)

From: Jim Scott <[REDACTED]>
Sent: Thursday, March 29, 2012 12:49 PM
To: Carlson, Erik (DNR); Liljegren, Michael W (DNR); Engstrom, Jennifer N (DNR); Kunz, Michael (DNR); David Blaha; Schwanz, Neil T MVP
Cc: Hinck Peter; Cory D. Anderson; Borovsky John
Subject: Re: NorthMet QAPP

Erik

I have discussed with Barr – please see embedded comments in blue bold

Note three items where I am seeking feedback (noted by [Please advise](#))

Overall path forward looks good

Jim

From: [Carlson, Erik \(DNR\)](#)
Sent: Thursday, March 29, 2012 10:04 AM
To: [Jim Scott](#) ; [Liljegren, Michael W \(DNR\)](#) ; [Engstrom, Jennifer N \(DNR\)](#) ; [Kunz, Michael \(DNR\)](#) ; [David Blaha](#) ; [Schwanz, Neil T MVP](#)
Subject: FW: NorthMet QAPP

Jim,
ERM has completed their review of the EPA comments and the DNR has reviewed their comments.

For items under the red heading below, the DNR requests that Comment 1 be addressed by Barr/PolyMet. I recommend that this be done in updated Plant and Mine Site Calibration documents and not in a QAPP document. Establishing more robust acceptance criteria will need our review as will the resulting calibrations of the constituents, which may change. **[Barr: Calibration is currently performed to minimize the error between the observed and predicted values. This is a quantitative metric but is not a statistical test. We have not applied a statistical goodness-of-fit test, and believe this was an issue that was much discussed in the review of the calibration documents. [Please advise if Lead Agencies want a a different metric; agree that changing the metric would require re-calibration](#)]** I don't believe this is the only reason to update the calibrations. CDFs and new groundwater data at the mine site I believe would be triggers for a re-calibration. **[Barr: CDFs (XPSWMM and MODFLOW re-calibration) and new GW data at the Mine Site will trigger the need for re-calibration]** Also, the DNR is still not in agreement on the calibration of arsenic at the plant site. In January, Zach recommended a change to the arsenic calibration, but I am told his recommendation was not implemented. We need to re-visit this issue once more robust acceptance criteria have been applied to the calibrations. **[Barr: Understanding is that Zach's comment was addressed by Mike Liljegren internally, and the fact that it was not included in the comments submitted today (there were no outstanding comments) leads us to believe that it has been resolved. [Please advise if this is not the case. Do not anticipate any CDFs or new data at the Plant Site that would necessitate re-calibration](#)]** I see the re-calibrations happening prior to the DNR's comprehensive results review so we have a clear picture of model results prior to the application of mitigation. **[Understood]**

Comment #2, the DNR requests that this change be made to the Mine Site QAPP and a final version of this document be issued for our files. We recommend that the Plant Site QAPP be improved in the same way if the same issue exists. Once this change has been made to the Plant Site QAPP, please issue it to me for Co-lead review. **[Barr: Propose a "road map" table identifying all sources (document, section, table-figure) of data. [Please advise if this is acceptable](#)]**

Comments 3 &4 will be handled in the Co-lead Phase II QA/QC.

Please let me know if this path forward seems off the mark to you.

-Erik

From: David Blaha [mailto:]
Sent: Sunday, March 25, 2012 4:49 PM
To: Liljegren, Michael W (DNR); Carlson, Erik (DNR)
Cc: Al Trippel; Deb McGovern; Fred Marinelli; Houston Kempton
Subject: NorthMet QAPP

Erik/Mike

Per your request, ERM has reviewed USEPA's revised comments dated January 4, 2012 regarding the NorthMet Mine Site Water Quality Model Quality Assurance Project Plan (QAPP). USEPA used a "Checklist for QA Project Plan Elements for Modeling" from *Guidance for Quality Assurance Project Plans for Modeling* (EPA QA/G-5M Appendix C) to "audit" the Mine Site QAPP. USEPA suggests in their letter that the Co-Lead Agencies consider the checklist items marked as missing as possible improvements to the Mine Site QAPP. It should be noted, however, that the USEPA guidance is generic and acknowledges that not all checklist items are relevant to every QAPP.

ERM was asked by the Co-Lead agencies to determine whether any of the items which USEPA identified as missing or only partially included would strengthen the Mine Site QAPP. ERM (Blaha, Adams, Kempton) reviewed both the Mine Site QAPP and USEPA's comments. We offer the following general comments on the USEPA letter and specific recommendations for strengthening the Mine Site QAPP and the future Plant Site QAPP:

General Comments and Observations

- As USEPA notes, Barr mistakenly references the EPAQA/R-2 (*EPA Requirements for Quality Management Plans*), rather than EPA QA/G-5M (*Guidance for Quality Assurance Project Plans for Modeling*). Barr should use the correct USEPA guidance for the Plant Site QAPP.
- Many of the missing or partially included items identified by USEPA have in fact been done, but are simply not documented in the Mine Site QAPP, rather are found in other NorthMet documents (e.g., IAP memos, Work Plans, Data Packages), such as "conflicts or uncertainties that will be resolved by this project", "summary of all work to be performed, products to be produced, and the schedule for implementation". Although there is some value in having all of these items in a single document, they are not critical to achieve the objectives of the QAPP – cross-referencing other documents would be valuable in some cases to provide a trail to the information.
- **Group A: Project Management** – much of this Group's items are generally valuable, especially for reviewers who have not been involved in the model development process at all, but are not critical to the QAPP's primary function as a quality assurance plan.
- **Group C: Assessment and Oversight** – ERM's Model Evaluation Review will address most of the missing items from this Group, including items such as assessments, code verification, checking for programming errors, correct insertion of model equations, code linkage to analysis of uncertainty, and hardware/software configuration tests.
- **Group C1: Plans for Science and Product Peer Review** – the Co-Leads Model Results Check process is essentially addressing these missing items.
- **Group D: Data Validation and Usability** – ERM's Model Evaluation Review will address most of the missing items from this Group, including review of model input data and model outputs.

Specific Comments and Recommendations

1. **Group B7: Calibration. First bullet. "acceptance criteria"** - Barr should present the acceptance criteria used to verify that the model is sufficiently calibrated. Barr should consider using quantitative metrics that assess the goodness of fit for purposes of model calibration.
2. **Group B9: Non-direct Measurements. Third bullet. "Method(s) of identifying and acquiring data"** - Should be more specific in identifying the references for acquired data. In addition to the report citation, should provide page, table, and or figure numbers. If the data are dispersed within and between reports, should produce an appendix with all issue-specific data compiled in one place.
3. **Group B10: Requirements Documentation** - The Mine Site Data Package contains many of the equations used in the GoldSim model, but it is not complete. Conditional programming ("if this, then that") is commonly described verbally, but not mathematically. It is in our interests for Barr to present all of the equations and conditionals used in GoldSim programming. This will allow every line in the program to be traceable to a technical document.
4. **Group B10: Hardware/Software Configuration – Source Code** - The complete source code for the model should be provided to the Co-Leads.

I hope this review is helpful. If you have any questions please do not hesitate to contact us.

Take care

From: Liljegren, Michael W (DNR) [<mailto:> [REDACTED]]
Sent: Friday, January 13, 2012 9:18 AM
To: Fred Marinelli; David Blaha
Cc: Carlson, Erik (DNR)
Subject: FW:

Morning Fred and Dave

Attached is the EPA letter we received in regards to the Barr QAPP document that EPA was asked to review. In the letter you will notice the checklist that EPA went through during there review. We would like the ERM team to review the EPA response letter and determine if any of the elements in which EPA determined as missing or only partial included in the Barr QAPP need to be include. Also, be thinking about inclusion into the ERM QA/QC document if need be.

We would like to make sure the Barr QAPP and the ERM QA/QC produce a high degree of comfort that the model has been fully vetted. This will help with EPA's review of the model in future.

Let me know if you have questions.

Thanks
Mike

From: Carlson, Erik (DNR)
Sent: Tuesday, January 10, 2012 2:56 PM
To: Liljegren, Michael W (DNR)
Subject: FW:

From: Michael Sedlacek [mailto: [REDACTED]]
Sent: Wednesday, January 04, 2012 4:53 PM
To: Carlson, Erik (DNR); [REDACTED]
Subject:

Attached is EPA's revised comment letter over the NorthMet Project Mine Site Water Quality Model Quality Assurance Project Plan:

Sincerely,

Mike Sedlacek
Environmental Scientist
U.S. EPA Region 5
NEPA Implementation Section
Phone: (312) [REDACTED]
Email: [REDACTED]

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