

Technical Memorandum

To: Kristie Elickson, Minnesota Pollution Control Agency
From: Nadine Czoschke, Pat Sheehy, and Todd Fasking, Barr Engineering Company
Subject: True up to modeling files used for: Summary of updated AERA related risk value estimates in 2017
Date: October 5, 2017
Project: 23690862.09
c: Suzanne Baumann, Minnesota Pollution Control Agency; Kevin Pylka, PolyMet

This memo responds to questions received by PolyMet from MPCA on the Air Emissions Risk Analysis (AERA) update that was submitted on August 17, 2017. PolyMet has submitted Air Emissions Risk Analysis (AERA) evaluations for both the Mine and Plant components of the Project with the Air Permit Application (Aug 2016). Supplemental evaluations have been completed since this submission including:

- an evaluation reflecting corrections to the bugs in the EPA approved model (AERMOD) and incorporating the WWTS modifications (May 2017),
- a demonstration of acute risk estimates at the NAAQs effective fenceline (June 2017), and
- an evaluation after an emissions true-up (August 2017)

The specific questions MPCA had about the August 17, 2017 update were:

- The apparent absence of arsenic in the 2017 paired in space evaluation at the Plant Site; file: [1Hr_results_value_Cu_Ni_fix.xlsx]
- Inconsistencies in crystalline silica concentrations as determined by MPCA staff and those shown in the file provided by PolyMet/Barr: [AnnualMAX_Results_silicaPM4.xlsx]

This technical memorandum provides a response to these questions. Details follow below.

Arsenic in file: [1Hr_results_value_Cu_Ni_fix.xlsx]

The results in Table 4 submitted in the August 17 update correctly reflects the arsenic risk contribution. The supporting excel file submitted with the update did not show arsenic. The hazard quotient for arsenic has been added to the risk by receptor analysis in the excel file and will be provided to MPCA staff under the file name [1Hr_results_value_Cu_Ni_fix_with As.xlsx]. Adding this to the spreadsheet does not change the reported result in Table 4 nor does it change the receptor with the maximum hazard index.

Crystalline Silica hourly concentrations in file: [AnnualMAX_Results_silicaPM4.xlsx]

We reviewed and compared the MPCA modeling results for hourly crystalline silica concentrations to the submitted file and have identified the reason for the apparent inconsistencies in values. Like with arsenic, Table 5 of the August 17 memo does include the correct Hazard Quotient and result for crystalline silica and the correct Hazard Index for chronic non-cancer hazards. The reason for the different modeling results is described below.

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The inhalation benchmark for crystalline silica is based on PM₄ concentrations; therefore, the emission inventory for the Plant Site calculates emissions of PM₄ crystalline silica. Because the emissions of crystalline silica from the LTVSMC tailings are calculated specifically for PM₄, it is not appropriate to model crystalline silica with the deposition parameters for PM₃₀. As such, crystalline silica at the Plant Site is conservatively modeled in a separate model run as PM₄ with no deposition. Note that the separate crystalline silica modeling run is specific to crystalline silica and does not use Multi-Chem. Separate model input and output files for crystalline silica will be provided to clarify the procedure used.

It appears that the MPCA modeling runs included the crystalline silica with all other chemicals in the deposition modeling run. These results then used Multi-Chem to determine chemical specific air concentrations.

In our review, it was noted that the summary table had a linking error and was not linking to the results that included the tailings basin road updates. The maximum air concentration for crystalline silica with the tailings basin road updates is less than 1% smaller than the maximum concentration before the updates. This linking error has been corrected. An updated file with the correct links and an updated RASS will be provided to the MPCA.

Summary

While there are some inconsistencies with the modeling files and Excel spreadsheets, the results reported in the August AERA update do not change. Several updated supporting files will be provided to the MPCA in response to these questions. The summary tables in the August 17 memo do not need updates and contain correct and inclusive information.

Attachments:

See associated Flash drive "Response to Silica/As Questions" which contains the following files:

- Risk paired in space with arsenic hazard quotients included
- Crystalline silica PM₄ annual concentrations
- RASS for chronic non-cancer risks at the Plant Site
- Modeling input files for crystalline silica
- Modeling output files for crystalline silica