The MODFLOW (groundwater) model:

- Provide comment on how the model has been constructed.
  - Due to the way the model was constructed, it provides little to no use in assessing impacts to nearby wetlands.
    - The MODFLOW model was designed with the wetlands set as predetermined recharge areas that are allowed to provide an infinite amount of water to the underlying aquifer. The way the model is designed provided little to no information regarding impacts to the wetlands from the mining activities.
  - No constituent generation/particle tracking. A constituent generator based on humidity cell testing coupled with a particle/concentration tracking routine would provide a more accurate estimation of contaminant loading to the nearby surface water bodies. The use of Fick's law, in this manner, for estimating GSI concentrations is a fundamentally flawed approach.

- How does this construction represent conditions of groundwater drawdown and wetland hydrology on and near the project site?
  - Wetland connectivity was predetermined in the conceptual model to not be influenced by aquifer drawdown. Therefore, model results indicating the lack of impact to the nearby wetlands are merely a function of how the model was built and not a revelation from the modeling study.

- Provide brief recommendations on how this form of modeling could be designed to represent onsite conditions.
  - Transient simulations (time steps) should be utilized in a reconstructed model. The wetlands should be modelled based on data from nested piezometers surrounding and within each wetland. A water budget approach should be taken when assessing impacts to the wetland. For example, mass flux of water into and out of each wetland complex should be assessed for before, during, and after mining activities have taken place.

- What type of data collected onsite would best support a revised model that realistically addresses impacts to wetlands and streams?
  - Nested piezometers and continuous soil cores would be necessary in and around each wetland complex where these data don't already exist. To account for complex local geology, certain wetland complexes and the interactions with the water table should be evaluated with specific smaller scale numeric models.

- Is it possible to assess the extent of groundwater drawdown during operations conditions, and therefore the changes to the mass balance of each wetland watershed, based upon the information presented in the existing model?
  - Yes, once the degree of connectivity to the underlying aquifer is determined, a water budget approach should be taken in assessing both temporal and spatial impacts to wetlands.

Part 22/ Part 31:

- Provide comment on known residential wells within the bedrock near the project site. How is this information useful for assessment of potential groundwater conditions and flows. Is there potential risk to these wells that is proposed by the project?
    - Numerous residential wells in the study area get their water supply from the fractured bedrock, including deeper portions. This indicates that the fractured bedrock is permeable and able to transport significant quantities of water. Given that the proposed mine is located up gradient from these wells, there is risk of impact to the residential wells as well as potential discharge to the Menominee River at GSI locations that will be difficult to determine.

- Provide any additional comments or recommendations on the methodology of assessment for mobilization of constituents into groundwater.
    - I would recommend that the model utilize a mass loading approach that incorporates quantitative results such as the humidity cells testing. A mass loading per unit time could then be incorporated into a transient numeric model that would allow for a loading rate to be released per time interval. This would provide an accurate estimate (a baseline) for untreated material being backfilled into the pit. Proposed treatment options (limestone/carbonate) could then be incorporated into the model to estimate their effectiveness.