Attachment 3: Required Revisions to CPG Modeling Approach

Proposed changes to address these concerns and the model codes, inputs, and outputs incorporating those changes must be provided to EPA for approval. Once these concerns have been addressed and their resolution approved by EPA, the RI Report sections related to modeling will need to be deleted, revised, or replaced to reflect these changes.

1. ST Model
    a. The CPG needs to address the impact of running the model in decoupled mode with as much as 2 months' lag between computed bed thickness changes and corresponding water depth changes.
    b. The CPG needs to address concerns about the use of constant grain stress partitioning, despite large changes in composition over time.
    c. Simulations of remediation must include the release of solids and incorporate associated changes in bathymetry and bed composition both during and post-remediation.

2. OC Model
    a. The CPG needs to present longer-term (decadal time scale) detrital POC, algal POC, DOC, and bed f_{OC} results compared to data with the model computation simulated as the CPG intends to use the model.
    b. The CPG needs to present longer-term (decadal time scale) results with the bed f_{OC} computed as they propose (function of fraction cohesive), as well as using the mass balance approach laid out in their carbon simplification memo (mass balance assuming a loss of some fraction due to decay), and address any differences in the resulting water column and sediment OC results.
    c. Simulations of remediation must include the release of sediment solids and POC and incorporate associated changes in bathymetry and bed composition both during and post-remediation.

3. CFT Model
    a. The current approach to COPC mapping is acceptable for purposes of establishing model initial conditions, but uncertainty in the approach needs to be accounted for prior to representing remediation and associated benefits.
    b. The model must represent partitioning to detrital POC, algal POC, DOC, and, if necessary (as the CPG has argued), sands with a low f_{OC}.
    c. The model must represent diffusive exchange between the bottom layer of the water column and the underlying layer of fluff or bed.
    d. The presence or absence, thickness, and composition of the fluff layer must match the ST model.
    e. The particle mixing rate between the fluff layer and bed must be at least as large as the rate between bed layers 1 and 2, and the calculation used to represent the mixing must be corrected.

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f. The CPG must address concerns about the time-variable bulk density approach coupled with the fixed volume layering approach currently used in the CFT model. This combination results in changes to the solids mass within each layer each time the ST model information is updated and does not conserve the mass of solids represented in the CFT model.
g. Simulations of remediation must include the release of sediment solids, POC, and contaminants and incorporate associated changes in bathymetry and bed composition both during and post-remediation, and realistically account for the uncertainty in interpolated bed concentrations. Remediation of a given grid cell should not assume a greater reduction in concentration than the areal fraction of that grid cell being remediated.

4. Bioaccumulation Model
   a. The CPG must present results from their time-variable model, and not rely exclusively on steady-state calibration results. Model-to-data comparisons must be made for times when fish tissue data were collected for all species or groups of species represented in both the RI dataset and model.
   b. Based on variation in contaminants in fish tissues by RM, model-to-data comparisons must be made at a finer spatial resolution than the species range (one model-to-data comparison per species is not sufficient).
   c. The CPG must use a 15-cm exposure depth, matching the available surficial sediment data sampling depth, to represent the surficial sediment in their bioaccumulation model computations until the dispute resolution related to the BEZ is resolved. At that time, the CPG must use whatever exposure depth is determined as appropriate in the dispute resolution decision.
   d. The CPG must account for the partitioning of contaminants to DOC and the impact of this partitioning on the bioavailability of the contaminants in the water column and sediment.
   e. The CPG must average sorbed concentrations by first computing the ratio of sorbed contaminant to solids and/or POC within an individual grid cell and layer prior to averaging over depth, space, or time periods greater than the model output frequency.
   f. The CPG must reassess the proportion of benthic biomass that is assigned to detritivores as compared to deposit feeders across the LPRSA. The current analysis is highly uncertain and seems to contain errors. The feeding preferences for the bioaccumulation model must then be modified to reflect the corrected analysis and the model recalibrated. The analysis of benthic biomass composition is likely to remain highly uncertain, so alternative calibrations are likely required to assess the impact of this model uncertainty on the predictions for various remedial alternatives.

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