

Memorandum

To: Doug Plachy, US Army Corps of Engineers
From: Danny Mendelsohn, Applied Technology and Management, Inc.
Jim Greenfield, USEPA IV
CC: Larry Keegan, LGE, Kostas Kalimtgis, ATM, Bo Ellis, ATM
Date: November 10, 2002
Subject: Dissolved Oxygen Model Direction, Procedures and Out of Scope Tasks

The purpose of this memorandum is to inform you and the other members of the Savannah Harbor Expansion Project (SHEP) PDT of the outcome of a meeting between Jim Greenfield, Kostas Kalimtgis and Danny Mendelsohn on November 1st in EPA's Region IV Atlanta office. The meeting was held at the request of Jim Greenfield to discuss how to proceed with the final phase of the DO modeling effort so that the calibration will be accomplished in an efficient and appropriate time frame to the satisfaction of the Federal Agencies.

The memorandum summarizes the *direction* of the final phase of the modeling effort, the *tasks* to be performed, the *procedures* for communication of work in progress, and the *timeframe* for completion.

The points we discussed can roughly be broken down into three categories:

- 1) Status, recommendations and 'to do' items for the present calibration task, and
- 2) Recommendations for proposed out of scope tasks that will improve the present effort and assist in obtaining final closure of the calibration effort to the technical and procedural satisfaction of the Federal Agencies.
- 3) Timeframe for closure.

1. Status, Recommendations, and "To Do" Items

The points that we discussed regarding the status and task list of the DO calibration at present included the following:

- (a) The EPA has recently provided an application of the EPA-GAEPD/ RIV1 (upstream basin model) to the Savannah River for the 1999 calibration period and delivered the model results to ATM. ATM will review the EPA-GAEPD/ RIV1 model results for potential use as the upstream water quality boundary condition for the harbor model. The applicability will also be reviewed in the context of the analysis done to re-evaluate the WQ boundary conditions (#2 below).
- (b) The WQ model boundary conditions and loads must be further evaluated and refined. Boundary conditions and loads must be appropriate in order to progress on the calibration.

- (c) Test the marsh boundary influence on the harbor area. Evaluate the impact based on harbor area segments. If harbor area impact is significant, we will implement new dynamic marsh boundary condition in the WQ model. If the marsh boundary variation impact in the harbor is not important, then implementation of the dynamic marsh boundary condition is not necessary.
- (d) Add a model to data comparison using box and whisker plots to the prediction analyses for better clarity of overall picture.
- (e) Analysis of the model results should initially focus on the harbor area as the area of prime importance. A section of the report should focus on the harbor as the target area and should address results in that area specifically.
- (f) The process for presentation of the calibration results will be to put together results as sections of a calibration report. The calibration process will follow the most recent outline which has been presented to the COE. We will adopt the 'weight of evidence' approach for determination of satisfactory calibration. ATM will work with EPA and the SMART (EPA and the SMART will provide critical review of ATM work) to develop the report sections and present as a draft report to the COE and other Federal agencies upon completion.
- (g) Documentation in the final report should include descriptions of modeling and parameter choices made. This description will include the rate constants and coefficients evaluated and the reasoning behind the choices. Comparison will be made to literature values as well as values used historically on the Savannah River (e.g. GAEPD applications).
- (h) ATM will provide a monthly 'Status Report' of progress on the Savannah DO modeling effort. The report may include notes, process, results, analyses or simply list activities.

2. Recommendations for Proposed Out of Scope Tasks for Project Closure

The following items are suggested tasks that will enhance and facilitate the DO model calibration effort but *are not included on the present scope of work*.

- (a) Need to re-evaluate the DO (and other WQ) data. Need to look at the data that was considered suspect, and later 'corrected', due to instrument fouling. In addition, a critical review and analysis of the data will further help to understand what is going on the estuary. We will evaluate the system wide relationships between the DO, SOD, BOD and boundary conditions to better understand the trends and relative importance of the major variables.
- (b) Investigate the possibility of using an ANN system to further analyze the WQ data. In particular we would like to further evaluate the system wide relationships between the DO, SOD, BOD, boundary conditions, etc. for which only time series, point data is available. For example, a better map of the SOD may be developed for WQ model input. The template for this

type of analysis will be the work performed by Paul Conrads in his ANN model applications.

- (c) Develop and implement a hydrodynamic model output post processing utility to convert the WQMAP model predictions output to the BMD format used by the EPA.
- (d) Implement the ability to use time-series boundary conditions in the WQ model and develop a segmentation tool in the WQMAP interface, which will allow post processing and evaluation of WQ model results on a segment basis.
- (e) Develop a model output post processor to evaluate predictions on a segment basis. The post processor should be stand alone and have the capability of analyzing output for various different integration/averaging periods (e.g. 1 day, 7 day, 30day averaging periods) that the user can manipulate. The analysis should be performed on a volume basis in the segments.
- (f) DLM will meet with Jim Greenfield in Atlanta once a month for model progress, review and direction discussions. This will be in addition to the regularly scheduled SMART meetings.
- (g) Provide a scoping level analysis of the idea of a bio-impacts model post processor for the WQ model results. This would provide a link between the proposed EPA DO criteria and deterministic modeling for applications of the WQ model.

3. Timeframe for Project Closure

Regarding timeframe, we arrived at a consensus that the most recently proposed schedule for completion of the DO model calibration that envisions the process finishing in 4 months is unrealistic. A more realistic schedule for completion of the final model calibration report is 6 to 8 months (April-June 2003).

Conclusion

The out of scope tasks and some of the refinements to existing tasks related to project closure will require additional time and funding. We trust that the common understanding of tasks, timeframe, and review procedures provide sufficient assurance that the action items will be completed as scheduled pending approval of the work items listed in this memorandum.

As the technical leads for this model calibration effort, we want to assure you that we are committed to meeting the agreed upon schedule for completing these tasks. Furthermore the procedures worked out for direct communication and in-process regulatory review have already helped in streamlining the effort and from here on will serve to keep all parties informed of the project's progress towards final completion in April-June 2003.