University of Maryland
CENTER FOR ENVIRONMENTAL SCIENCE
HORN POINT LABORATORY

POST OFFICE BOX 775
CAMBRIDGE, MD 21613-0775
(410) 228-8200
FAX (410) 221-8490
http://www.umces.edu

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Mr. Lewis Linker
Chesapeake Bay Program
410 Severn Avenue, Suite 109
Annapolis, MD 21403

Dear Lewis,

This letter summarizes the conclusions of the Hydrodynamic Model Expert Team (HydroMET) on revisions to the Chesapeake Bay Hydrodynamic Model carried out during 2000 and 2001. The HydroMET was formed by the Chesapeake Bay Program office late in 1999 as an independent panel to oversee these model revisions, which were carried out by the Coastal Hydraulics Laboratory (CHL) of the US Army Corps of Engineers (USACE) Engineering Research and Development Center (ERDC) in support of improved Chesapeake Bay water quality modeling. The HydroMET carried out its job during a series of meetings and conference calls from February 2000 through July 2001, and reviewed a draft report by the ERDC in June 2001. Our primary points of contact were yourself and Mr. Billy Johnson of the ERDC.

The HydroMET found the review/revision process to be enlightening and ultimately satisfying, if occasionally frustrating. In general we were quite satisfied with the responsiveness of both the CBP and the ERDC to our requests for modifications and additional model tests. The draft final report prepared by the ERDC (Johnson and Nail, 2001) accurately represents the conclusions of this exercise and recommendations for future work. We are pleased to accept this report and the associated "final" hydrodynamic model runs as satisfactory outcomes of the review/revision process, with one caveat. As stated in the conclusions section, "[this] 3D numerical hydrodynamic model is a good representation of the hydrodynamics of Chesapeake Bay". It will serve well as the hydrodynamic basis for the Chesapeake Bay Water Quality Model, at least in the near term. However, we would like to add one key recommendation and reiterate the need for continuing work in certain areas.

In particular, the report presents two sets of results that were forwarded to the water quality modelers. The first set was calculated with a hybrid turbulent Prandtl/Schmidt number scheme utilizing one formulation (Bloss) in the main Bay and another (Munk-Andersen) in the tributaries. The second set was calculated utilizing the Bloss turbulent Prandtl/Schmidt number scheme for the entire grid. We strongly recommend the latter. The use of different representations for vertical mixing in different regions of the model is not justifiable and would not withstand rigorous external review. Additional studies of vertical mixing parameterizations are

recommended in the future. The parameterization used in the present model yields a good calibration over the 1985-1994 period of observations, but it is not necessarily correct and it may yield erroneous extrapolations outside of the observed range of conditions. The same may be said of the methods for specifying salinity boundary conditions, wind forcing, and atmospheric pressure variations. Finally, a set of concise statistical measures of model performance should be developed for evaluating future model refinements. Except for our specific recommendation of the "all-Bloss" model runs, these recommendations are all contained in Johnson and Nail (2001), and are reiterated here only for emphasis.

We appreciate the opportunity to be involved in the review/revision process.

Sincerely,

Lawrence P. Sanford, Ph.D.

representing the Hydrodynamic Model Expert Team (Lawrence Sanford, William Boicourt, Richard Garvine, and Albert Kuo)

References:

Johnson, B. and Nail, G., 2001. A 10 Year (1985-1994) Simulation with a Refined Three-Dimensional Numerical Hydrodynamic, Salinity, and Temperature Model of Chesapeake Bay and its Tributaries. Technical Report CHL-, US Army Engineer Research and Development Center, Vicksburg, MS.