



360 Thames Street, Suite 1B  
Newport, RI 02840  
Tel 401/841-8901  
Fax 401/841-8903

# MEMORANDUM

To: Larry Keegan  
From: Daniel Mendelsohn  
CC: David Schaller, Hope Moorer  
Date: 4/30/2004  
Re: SMART model review recommendation

---

## Message:

I would like to take this opportunity to clear up some critical misconceptions that we believe were presented at the Savannah Modeling Agency Review Team (SMART) meeting on Wednesday March 3, 2004. I believe, based upon my discussions with Dr. Sung-Chan Kim after the meeting, that the decision to reject the model may have been based on these misconceptions. The following is a brief description of my understanding of the events leading up to the meeting, and the information that was presented at the SMART meeting on March 3, 2004. As no members of the model development team were at this meeting, this understanding is based solely on conversations with Dr. Kim following the meeting.

Since the time when ATM submitted the final calibration report for review, I have been working closely with Dr. Kim to provide explanations, answer any questions, and occasionally to provide additional data and analyses for his evaluation of the calibration effort as the USACOE independent technical reviewer. Similarly, I received some requests for assistance and explanation from Wade Cantrell for his review, as well as a request from Paul Conrads for the final coefficients for the Log Law vertical mixing model to enable him to recreate the model input used for the calibration. In order to facilitate Paul's recreation of the vertical mixing input, I also sent out a copy of the spreadsheet that I had used for both the 1997 and 1999 calculations. I did not receive any additional questions or responses from Paul after sending the calculations spreadsheet.

In speaking with Dr. Kim after the meeting, I learned that Paul provided a presentation of the formulation of our vertical mixing coefficients to the SMART. We should remember that a key component of the model review has been our vertical mixing formulation, and how it was used in the model. For his presentation it appears that Paul may have misinterpreted the spreadsheet and erroneously indicated that; 1) we had treated 1997 and 1999 differently and; 2) the original analysis was altered to capture the distinct differences in the river between the two years. This implied that the tests of the vertical mixing model were therefore invalid.

Neither of the two points are true. The spreadsheet calculations actually show that the original Log Law equation implemented back in 1998 was used identically for both the 1997 and 1999 calculations of the vertical mixing coefficient. The underlying relationship developed from the

1997 data for the vertical mixing algorithm was not altered for use in the 1999 modeling, which provided an excellent test of whether it was robust enough to be used, unaltered, for the 1999 predictions. The calibration as it stands gives a clear indication of the robustness of the mixing scheme and its usefulness for the present project.

Finally, it appears that it was also stated that, for the final calibration, ATM had added an offset factor of 0.0001 to the vertical mixing input file for one year but not for the other, again implying that we had treated the two years differently. This also was in error. The 1999 calibration simulation and 1997 validation simulation used identical formulations for the two years. An incremental factor of 0.0001 was added to the predicted vertical mixing formulation as a “tuning” factor for the calibration. The tuning of coefficients is a standard part of any calibration process and is similar in this case to the adjustment of the  $A_v$ -min factor in a turbulence closure model. We applied the final vertical mixing coefficients to both 1999 and 1997 identically. As a point of note the 1999 and 1997 simulations without the 0.0001 addition to the vertical mixing term showed very good results. The addition of the 0.0001 merely added a slight improvement to the statistics, contributing to a 1% overall increase in the number of stations passing the Federal Criteria for salinity.

When this meeting was originally set up, and ATM was informed that members of the SMART did not want the ATM Modeling Team to attend, we were concerned that the model developers would not be present to clarify any issues that arose during review discussions. In a meeting on February 19<sup>th</sup>, between representatives of the Georgia Ports Authority, USACOE, and ATM, it was stated to us that the purpose of this meeting was for the SMART members to formulate any questions or concerns relative to the model and provide a written request for clarification on any issues raised, not for the purpose of making a final decision on the model. This made sense given the complexity of the models and the volume of information given to the SMART members for review in the reports.

We have been unofficially informed that a final recommendation has been made by the SMART to reject the model. Based upon our discussions with Dr. Kim, ATM is concerned that this decision may have been made based upon a presentation that incorrectly summarized the work that was done. It is critical, given the amount of time and effort spent in the development of these models, that a decision be made based on complete and accurate information. ATM therefore recommends that a revised presentation be provided to all SMART members prior to a final decision.