Science Panel Coordination Meeting

ATTENDEES: Bill Moellmer, Anne Fairbrother, Bill Wuerthele, Harry Ohlendorf, Ying-Ying Macauley, Gary Santolo, Jeff DenBleyker, Earl Byron

OTHER ATTENDEES: Nathan Darnall, Bruce Waddell

FROM: CH2M HILL

DATE: October 11, 2007

The following summary is based on the author's notes and recollections of the discussion, and may include details that have not yet been verified. This summary is subject to review and comment by the attendees listed above, and will be discussed and approved during the November 8, 2007 Science Panel conference call. Please do not distribute to a wider audience until the summary is approved by the Science Panel.

EPA position on EC10

Bill Moellmer began the meeting by asking Bill Wuerthele if he thought the EPA was going to use the EC10 as the upper bound on threshold values. Bill Wuerthele agreed. He said that the EPA does not have any wildlife criteria except those developed as part of the Great Lakes Initiative. They used a NOEC which is fairly close to an EC10. The key was that the data and science allowed it. The EC value can be driven by the data and science. There was a constraint on the science for development of an ammonia criterion, so an EC20 was used for ammonia. Bill thought that the state would be safe using any value within the confidence intervals identified for the EC10 but could not go higher than an EC10.

Approve Meeting Summary from September 6, 2007 Panel Meeting

Jeff DenBleyker indicated that he had received comments only from Nathan Darnall/USFWS. No one else has indicated, or did indicate during the call, that they have any additional changes. The meeting summary will be finalized with Nathan's minor suggestions.

Future Meeting Summaries

It had been suggested that future Science Panel conference calls and meetings be recorded so that a more complete record of discussions could be maintained. DWQ is able to record the meetings if desired, but would not transcribe them to hard copy because of time limitations. Anne Fairbrother asked whether there were legal implications to how the recording could be used. Concern was also expressed by the group as to whether the Panel would feel as free to explore and discuss issues from all angles if the meetings and

conference calls were being recorded. It was agreed that this was a decision the entire Panel should make, because of the limited number of Panel members who participated in today's call.

Update on Lab Analyses and Projects

Jeff summarized progress on each of the projects. The Panel verified that they would prefer that reports be forwarded to them as they become available instead of all at once as part of the integration report. Below is a brief summary of progress:

Project 1 – Birds

Mike Conover – Mike has submitted draft reports for all of his work. CH2M HILL has reviewed and submitted comments back to Mike.

John Cavitt – John has completed his report for the 2006 sampling season. His draft report for the 2007 sampling season is expected shortly.

Project 2 – Food Chain

Wayne Wurtsbaugh – Final report is complete. Wayne has indicated that he will update with additional data he collected in May 2007.

Brad Marden – Brad has completed his draft report on the 2006 season. CH2M HILL has reviewed and submitted comments back to Brad. He is planning on submitting an updated report with all 2006 and 2007 data shortly.

Project 3 – Selenium Loads

Dave Naftz – Dave provided an updated report for data through July 2007 last week. CH2M HILL is currently reviewing it.

Project 4 – Selenium Flux

Bill Johnson – Bill provided an updated report for data through July 2007 last week. CH2M HILL is currently reviewing it. They expect to have a draft report for the sedimentation study by October 19. Volatilization measurements will continue through October with a draft report due in November.

Laboratory Analysis/Data Validation

Lab analyses and data validation are complete for samples collected through August; data are available on the web site as a database and also as compilations by project and by sampling medium. CH2M HILL is finishing the data validation report.

Update on Project 5 – Brine Shrimp Kinetics

Jeff asked Martin Grosell to provide a summary of progress to date. Below is a brief summary. Further detail may be found in his Progress Report 2 dated September 26, 2007.

1. *Experiments with Algae in Absence of Se*

   Algae were observed to grow much slower in the absence of Se. Se seems to promote algae growth. See figure 8.

2. *Experiment with Algae Cultured in 1 µg Se/L Solution*

   Experiments have been completed. The lower concentration had the same tri-phasic pattern (initial accumulation phase followed by depuration phase and finally a

period of relatively constant Se concentrations) as the others but lower Se accumulation (see Figure 1). Martin added the new point to Figure 2 and found that it fit perfectly. The equation for steady state Se did not change. Martin has observed slightly higher assimilation efficiency with lower Se concentrations than with higher Se concentrations; this finding is consistent with expectations. Assimilation efficiency is a measure of the amount of Se that is retained in the artemia after the gut is cleared. Martin observed that assimilation is not constant regardless of Se concentration. Se uptake is very limiting.

3. *Se Elimination Experiments*

   See Figure 3 for results from exposure to water-borne Se. Adult artemia were exposed to a water-borne concentration of 70 µg Se/L for 48 hours. They were limited to 48 hours because it was felt that that plus the depuration period was the limit of how long the artemia could go without feeding. He found that after they were no longer exposed to the water-borne Se, 6.79% of Se is eliminated per day.

   See Figure 4 for results from exposure to dietary Se. Adult artemia were fed algae with Se for 24 hours; they were then fed "clean" algae, and then observed. He found that 7.37% of Se is eliminated per day.

   Martin will be including Ke constants for both water-borne and dietary Se in his model as opposed to just one.

4. *Model*

   Martin has suggested modifying the DYMBAM equation to include both water-borne and diet sources of Se. He has focused his model on water concentrations less than 10 µg Se/L (used data in Panel B of Figure 5). He has developed two scenarios: Scenario 1 is the method most commonly used and assumes that regardless of the concentration in the medium, uptake is constant. He has determined that this is only applicable to water-borne concentrations less than 2.5 µg /L. Scenario 2 applies to water-borne concentrations of 0-10 µg /L; it predicts a higher concentration in artemia for water-borne concentrations less than 2.5 µg /L but lower for concentrations 2.5-10 µg /L. Dietary assimilation is sometimes assumed constant but this is not the case for artemia. He has developed an exponential decay equation for the model. He has converted some of the data from wet weight to dry weight and will do so for the rest of his relationships to remain consistent with the project and literature.

   Martin observed that values in Tables 2 and 3 are quite close to values observed in the Great Salt Lake and the low end of the curve reported in Brix et al. 2004, Figure 3. Brad Marden's data, as reported in March 2007, ranged from 0.5 – 3.0 µg Se/g dw. Earl Byron stated that Brad's mean value for 2006 appears to be between 1.0 and 1.5 µg /L, slightly less than predicted by Martin's model. Martin pointed out that the discrepancy was likely from the dietary side of the model. His artemia's feeding rate might be higher than on the GSL. He had a much higher concentration of algae (~37 million/L) than Brad has estimated (10,000 – 600,000/L).

   There was some discussion as to how food in the GSL could be related to the lab exposures. Earl suggested looking at carbon and chlorophyll. Martin pointed out

that most of the Se uptake is from water and not diet. Looking at Tables 2 and 3, it appears that 2/3 of Se in artemia is from water and not diet. Nathan pointed out that GSL salinities were closer to 14-16% over the last year vs. the 10% that Martin used. Martin observed that his initial tests showed that there was a lower accumulation of Se from water and diet for higher salinities. Martin thought that he could determine an adjustment for salinity and feeding rate but not food quality (i.e., what they are eating in GSL).

Martin confirmed that he has verified Se concentrations in his lab but will send his stock solution to our project lab for confirmation.

The group agreed that Martin has done an excellent job and his data will be very valuable to the project. Martin will be presenting his study at SETAC in November. DWQ asked that he forward his presentation to them for review prior to SETAC. All data must be approved by the Panel prior to publication or public presentation.

Update on Data Integration

Earl summarized some of the observations made in the Project 3 and Project 4 report updates. Over the long term we are observing an apparent disconnect between loading, flux and water column concentrations. He and the PIs have discussed various reasons and will continue to pursue this issue.

Gary Santolo summarized his progress in developing the avian component of the model. He and Earl are looking at partitioning the GSL to account for spatial differences in bird data. Earl is looking at data on a monthly and quarterly time step to account for temporal trends.

Draft Outline for Report

Anne said she had a few comments and would forward them to Jeff. Primarily it was hard for her to see how the conceptual model was tied into all of the chapters. Jeff verified that it is the foundation of all of the work and would be tied in.

Project Schedule

Please schedule 11:00 am (Mountain) on November 8 for next Panel conference call.

October 19, 2007	Draft reports expected from sedimentation study November 1, 2007
	CH2M HILL submits draft model and report
November 8, 2007	**Panel conference call**
November 19, 2007	Draft report expected from volatilization study
November 28-30, 2007	Panel meeting in Salt Lake City, joint meeting on 11/30
December 18, 2007	Panel conference call – **NOTE NEW CALL – WILL THIS WORK**?
January 11, 2008	CH2M HILL submits final model and report
February 8, 2008	Individual Panel members submit recommendations for standard
February 20-22, 2008	Panel meeting in Salt Lake City, joint meeting on 2/22,
	Make Recommendation to Steering Committee
February 27, 2008	Steering Committee/Stakeholders meeting
February 28, 2008	Steering Committee meeting
	Make Recommendation to Water Quality Board