

**U.S. Environmental Protection Agency  
Science Advisory Board  
Multimedia Multipathway Multireceptor Risk Assessment (3MRA)  
Modeling System Panel  
Minutes of Public Conference Call Meeting March 18, 2004**

**Committee:** Multimedia Multipathway Multireceptor Risk Assessment (3MRA) Modeling System Panel of the U.S. Environmental Protection Agency's Science Advisory Board (SAB). (See attached Roster)

**Date and Time:** March 18, 2004 1-3 p.m., Eastern Time (See attached Federal Register Notice )

**Location:** Science Advisory Board, Room 6450Z, Ariel Rios North, 1200 Pennsylvania Ave, Washington D.C.

**Purpose:** The purpose of the conference call was to allow the Panel to discuss and approve its draft report.

**Materials Available:** In addition to the materials distributed before the February 27, 2004 conference call meeting, the Panel, the Agency and Public had received the agenda for this conference call and the revised draft report.

**Attendees:** All panelists participated in at least parts of this call. A list of participants, including the Agency and the Public, is attached to these minutes.

**Summary**

The Panel unanimously approved its draft report with certain changes specified during the call. (Boissevain, who was not on the call at the time of approval, emailed her approval afterwards.) The report will be reviewed by a specially formed Quality Review Committee and then forwarded to the SAB Board for approval before it is transmitted to the Administrator.

The remainder of the minutes are a chronological summary of the meeting.

The chair confirmed that everyone had draft 5 and the cover letter. His goal was to get the report approved today, then forward it for approval. The QRC and SAB Board will have comments and it is possible that the Panel may have to meet again to discuss them if they are more than purely editorial.

He began the discussion with places in the document where he had questions or comments.

## **P 2 Notice has wrong Panel, DFO will correct**

### **p 44 Lines 37-40**

Brown asked about the origin and DePinto and Thibodeaux responded about the content. They thought the language should have been softer. Theis said that 3MRA has many sources of uncertainty and variability. The Panel needs to consider where this one fits in that context. Is it of the same order as the others? Much larger? Smaller? DeFur suggested an “if it fails . . . , if it doesn’t fail . . .” alternative. DePinto thinks the last sentence should be removed. DeFur reminded the Panel that this module stands out because it is the only non-legacy model and so it seems consistent that we ask for extra attention to the validation of this one because it does not have that track record. Theis thinks we are all agreed on it and that’s what the paragraph says. Merrill thinks the last discussion of these sentences led to the recommendation that EPA develop performance criteria, test the module, and indicate whether the criteria were met. Theis said this text also suggests the model be revised if the criteria were not met. Brown doesn’t like the last sentence. Carlisle suggested ending with “report to the SAB”, but agreed to Theis’s suggestion to end with “documented” because the SAB might not want to take it on. There was general agreement on this.

Theis mentioned there were email exchanges on issues raised by Carlisle, Maddalena and Merrill which were clarified by EPA. He took Maddalena’s suggestion for a change on page 24, middle paragraph, starting on line 18 with, “The panel notes that 3MRA already outputs specific media concentrations and the Site Visualization Tool.” He asked Maddalena to speak about it. Maddalena responded that he likes what Theis wrote. He was concerned about population density around a WMU might not pick up a contamination of environmental media. The new text highlights the potential for the model to miss contamination and provides a suggestion. DeFur raised a question about the end of the preceding paragraph on page 24. Everyone was comfortable with this.

Theis turned the panel’s discussion to **page 32** where Carlisle had suggested specific language on binning, as follows:

“For the purpose of generating an exit level, a model user or risk manager must select a suite of choices in the exit level processor, e.g. percent sites protected, population protection, risk level, hazard quotient, receptor, cohort, pathway, radius of the area of interest, etc. He or she would expect that by selecting, for example, 99% population protection at a risk level of  $10^{-6}$  and a hazard quotient of 1, the processor would return an exit concentration that would result in 99% of the selected receptors in the specified area of interest having a calculated risk of  $\leq 10^{-6}$  and a hazard quotient of  $\leq 1$  at the specified percentage of sites. However, that would not be the case. Instead,

those selections would mean that 99% of the selected receptors in the specified area of interest would have a calculated risk of  $\leq 2.5 \times 10^{-6}$  and a hazard quotient of  $\leq 5$  at the specified percentage of sites. The Panel therefore recommends that this disconnect be remedied by changing the bin boundaries so that the upper limit for the bins correspond with the risk and hazard levels in the exit level processor.”

Carlisle’s concern is that the choice you make in ELP2 is not exactly 10 to the minus six; the error is fairly small. But for a hazard quotient of 1, the actual hazard quotient might be as high as five. If he were a risk manager, he would like it to be 1 or less, not 1 to 5. He read the language he proposed. This believes this language would fit as a separate paragraph following this one. Carlisle’s table can go to the appendix.

On page 32 in the first full paragraph, Merrill suggested striking the entire sentence beginning “Most key variables” which starts on line 9. The rest of the text covers it. On the next line, deFur suggested adding “variables” to read “These variables include”

Carlisle had another issue over counter-intuitive results. He has a pared down paragraph he would like in the report someplace. The paragraph Carlisle suggested was,

“The Example Exit Level Analysis version 1.x, dated December 2003, reveals a number of unexpected results. The Panel understands that environmental fate and transport processes are not always linear, that distributions of receptors may be non-uniform around a waste management unit, and that population or site protection levels are not linearly related to the resulting exit criteria. Nonetheless, the Panel finds that reasonably informed people who are not experts in 3MRA might expect that a change in radius of the area of interest would have about the same relative effect on the exit concentration when the user has selected, for example, 99% protection as when the user has selected 95% protection. Or, the same reasonably informed people might expect that a change in the selected hazard quotient or risk level would have about the same relative effect on the exit concentration when the user has selected 99% protection as when the user has selected 95% protection. This expectation is not always met. The panel infers that this is partly the result of using bins, rather than actual protection values, and/or of the method of interpolation (the use of bins and the method of interpolation are addressed under question 2C). The Panel has provided the Agency with some examples of these unexpected results, and believes that the public’s confidence in the results of the 3MRA analysis will be increased if these results are analyzed and explained. “

This is not sure it belongs in the report. He is not sure what it means if the results are counter-intuitive. A panelist said it appears to be another example of the need for a sensitivity analysis that shows why the model does what it does. This’s concerns deal with being intuitive with a model as complex as 3MRA. DePinto

suggested the Panel add this as an example of the values of a sensitivity analysis, how it can help us understand non-intuitive model results. It could go in section 3B, except that it is almost all Monte Carlo. Perhaps it might be better in section 2, perhaps in 2c, perhaps in the discussion of site-specific applications in 2b. A Panelist commented that, when you go out on the tails of distributes, say from 95<sup>th</sup> to 99<sup>th</sup> percentiles, you can have large changes, so you should not expect to see the same relative things happening as you might elsewhere. Things can behave abruptly on the tails and this can be magnified by the binning process. Thibodeaux asked if this was trying to second-guess the model. Carlisle said the Panel has asked if 3MRA is consistent with things we are familiar with, but Theis is right that some results will be different from what we expect. Theis is thinking about the relationship of exposure and risk. A panelist reminded people that the roll-up is non-linear. On a site-specific basis, you would expect things to behave more linearly with exposure and risk moving together. But when you do this at multiple sites and weight by population densities, it won't necessarily be linear. The chair thinks this is covered by recommendations that EPA explain the model carefully. The overall sense of the Panel was not to include it, especially because the fuller discussion is in the record for those who need it.

On a separate issue, Merrill had raised some issues about the use of  $K_d$ s within a waste pile. His original question had been how 3MRA handles situations where the material is tightly bound in the waste stream. The fact-finding indicates there is an ability to apply a KD to the waste stream which is different than the  $K_d$  for the WMU. You could then adjust the KD appropriately. He is satisfied with the response.

At 2:00, Theis turned the Panel to the first draft cover letter. Murarka thought the first paragraph, which contains a lot of historical information, could be simplified and shrunk to half its size. He thinks this will increase the likelihood of it being read by the Administrator. Theis said he thought the letter was too long and was looking for ways to cut it. deFur asked whether we really expect the Administrator to read the cover letter and the DFO responded that it was difficult to predict. Murarka is sure the Office Director will read the letter and pay attention. deFur doesn't think the Administrator would get the message from the letter, but an OD would. deFur thinks the key message is, "You need to put your money where your mouth is," and it should go in the first paragraph. Currently it is at the end of page 1 going onto page 2 and is negative. He suggests, "If the Agency intends to maintain the value and use of the 3MRA model, it should continue to support its further development." deFur also thinks this should be the second sentence of the letter. Carbone suggested an initial three sentence para: kudos, need for continued funding, and something else, then reiterate the rest. Carlisle says the third sentence should be that the model can be used today for setting national risk-based standards. Carbone thinks the shortened history can follow, another panelist thought it was diversionary. Murarka will give shortened para on history to Theis. Smith thinks that the history ends with criticism of HWIR and that you close the circle by saying that 3MRA successfully addressed those concerns. deFur will send his stylistic suggestions tonight to Theis.. Theis agreed to the changes, using bullets for the three major points.

deFur had a question on the sentence, “While it carries some discomfort . . .” in the last of the full paras on page 3. He confirmed they were all reading it the same way.

After confirming there were no more questions on the cover letter, at 2:15 Theis asked if other people had comments on other parts of the body of the report.

deFur asked whether the language on **page 22**, lines 22-24, “. . . the panel notes . . .” meant that the Panel wanted the EPA to do anything. Brown thinks the Panel is asking EPA to put it on their “to do” list. Murarka agrees with deFur that another line is needed to make this explicit rather than implicit. DePinto thinks this is addressed in the response to Q3 and we could reference it, or at least make the recommendations (to add a broader range of chemicals) consistent. ORD’s Schwede asked for clarification because it seemed to her the Panel was looking for a different modeling paradigm. Smith spoke of some models used in the radiological arena and how they handle resuspension. Schwede and Smith discussed puff models, then Theis moved the discussion along, asking Maddalena to draft an additional sentence and send it to Theis by Friday.

deFur had a question about **page 23**, the last line. Some stakeholders won’t have the capacity to run the model at all. The Panel doesn’t want to discuss it. Another panelist raised the use of the word “recommends”. He thought recommend was more than just a suggestion, but that, in the case of the training workshops, it doesn’t rise to that level. Theis agreed to modify it on **page 31, section 3.2.4, line 23**

Merrill doesn’t like “statistically significant” on **page 13, line 30**. The Panel agreed to “a significant number”. Similarly on **page 14, lines 2 and 4**, it was designed that way. Theis offered to replace with “intended”. Carlisle suggested taking out “both”. On **page 16, line 12**, “is currently undergoing” not “has undergone”. **Page 33, line 4**, “No statements. . . can be reliably made.” Murarka responded that the statement can’t be made on the decision. Merrill doesn’t think that’s what it says. deFur thinks Murarka is right. Merrill says then, that he disagrees because you can make decisions about the degree of uncertainty. Foran thinks this point is made elsewhere. He is convinced we can’t tell if there are over- or under-estimates. Theis proposed taking out “of any decisions” on line 4, because a decision to set standards depends on many things besides 3MRA. deFur suggested “statements about” and Carlisle added “quantitative statements” Carbone thought it was interesting that we seem to be saying that, without accounting for the uncertainty in toxicity, there are limitations. A panelist is willing to say the model is ready for use given the weight of evidence, but doesn’t want internal contradictions. Theis says this arises out of Agency policy, which the Panel has criticized in a couple of places. The Panel agreed to, “Unless the issue of . . . is addressed, quantitative statements about uncertainty cannot be reliably made”

Merrill would like the word “major” pulled from **Appendix 2B, page 4**. There was also some discussion about discounting of risk for vinyl chloride. He noted that his

name appears as a header on appendices he did not prepare and Theis mentioned renumbering the appendix pages.

deFur raised an issue on **page 37** of the report. The para basically says the entire model will always over-estimate risk on the basis of toxicity estimates because it treats them as point estimates. We had agreed to remove words like over- and under-. This para doesn't use those words, but still retains that sense. Carlisle thinks that the values are deliberately chosen as upper end estimates, to which deFur agrees. However, the model will miss other risks that aren't incorporated, such as the risk of childhood exposure to vinyl chloride. Murarka likes it the way it is. Carlisle wondered if deFur's concern was addressed elsewhere – that overall, we can make not quantitative statements about uncertainty. Foran suggested striking “(meaning that a given scenario appears more risk than it really is). This was agreed to.

Another panelist had a comment **on page 7, lines 34-35**, change to “data model, model-model comparison, and sensitivity analysis”

There were no more comments from the Panel.

At 2:45 Babendreier asked for clarification based on consistency between **page 8**, lines 3-4 and lines 20-21. These relate to ICTC3 and GSCM. Theis thought this might be an artifact. He thought he had copied it from the response to Q1. Babendreier thought lines 20-21 were not in draft 4. Theis asked Maddalena for some suggestions and worried, also about the response to Question 1. A synopsis of what's on page 22 is what's supposed to be on page 8 and it isn't. A panelist suggested striking everything after “concerns” on line 20 and leaving the rest. Carlisle thought the recommendation should be a separate sentence, or subordinating the clauses. Brown thinks the previous draft, page 14 has changes of the type he thinks Theis is considering making.

Theis is concerned that, if this happened, there might be other inconsistencies.

Barnes Johnson extended a sincere thanks to the Panel for their efforts in doing an unprecedented review. From his perspective the Panel has provided a wealth of information to the Agency and, hopefully, to other future users of the model. The Panel's work will be vary valuable. Theis responded that the Panel was very impressed with everyone from the Agency they worked with, not just their knowledge, but their professional demeanor and patience.

Theis asked if there were any public comments. There were none.

deFur, Maddalena, and Murarka have promised to send some text. It will go next to the Board, after which there may the need for a further call.

The roll was called and the report was unanimously approved. by those present.  
Only Boissevain was missing.

Dr. Theis adjourned the meeting at 3:00 p.m..

Respectfully Submitted:

Certified as True:

\_\_\_\_\_/s/\_\_\_\_\_  
\_\_\_\_\_

Ms. Kathleen White  
Designated Federal Official  
Environmental Engineering Committee

\_\_\_\_\_/s/\_\_\_\_\_  
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Dr. Thomas Theis, Chair  
3MRA Panel

**Attachments** (hardcopy)

1. Agenda for the meeting
2. List of attendees
3. Committee roster
4. Federal Register Notice
5. DFO's notes from the January 9 Fact-Finding Call on the 2 km radius
6. DFO's notes from the January 12 Fact-Finding Call on uncertainty