

May 22, 2008

Compilation of Comments on MARSAME

Comments from Members Calling In:

LEAD REVIEWERS:

1) **Dr. David Dzombak:**

“Report on Agency Draft entitled ‘Multi-Agency Radiation Survey and Assessment of Materials and Equipment (MARSAME) Manual,’ Draft Report for Comment, December 2006”

(a) Are the original charge questions to the SAB Panel adequately addressed in the draft report?

The SAB Radiation Advisory Committee (RAC) MARSAME Review Panel has addressed all of the charge questions. Each of the charge questions appears to be addressed in sufficient depth, and specific recommendations have been developed for each of the charge questions and sub-questions.

Several of the charge questions ask the RAC to give their evaluation of the adequacy or acceptability of some approach or method. In some cases, the RAC does not answer the basic question of adequacy or acceptability directly, and in my view an explicit statement should be provided so that the view of the RAC is clear. Specific instances where this issue arises are as follows:

(i) Charge Question 2, p.14, lines 6-7: “Please comment on the technical acceptability of the statistical methodology considered in MARSAME ...”

The response begins on line 11 of page 14 with an observation about the relationship of the statistical methodology in MARSAME to that in MARSSSIM and MARLAP. In my view, the response should begin with a general statement indicating the RAC’s view of the technical acceptability of the statistical methodology.

(ii) Charge Question 2a, p.14, lines 23-24: “Discuss the adequacy of the procedures outlined for determining measurement uncertainty, detectability, and quantifiability, as described in MARSAME ...” The response begins on line 27 with a statement about the similarity in MARSAME procedures with those in MARSSSIM and MARLAP. In my view, the response should begin with a general statement indicating the RAC’s view of the adequacy of the procedures for determining measurement uncertainty, detectability, and quantifiability

(iii) Charge Question 2b, p.15, lines 9-10: “Discuss the adequacy of the data assessment process, especially the new assessment procedures ...” The response begins on line 13 with a statement indicating that “the data assessment process is carefully presented and thoroughly explored.” In my

view, the response should begin with a general statement indicating the RAC's view of the adequacy of the data assessment process.

(b) Is the draft report clear and logical?

The organization of the draft report by the SAB RAC MARSAME Review Panel follows the charge questions directly and is easy to follow. Detailed comments and suggestions for improving the statistical treatment in the MARSAME report are provided in an appendix which serves to keep the main body of the report concise and focused.

There are some specific portions of the text where some revision would improve clarity. These are listed below.

(i) The views of the RAC in response to charge questions about the adequacy and acceptability of some particular approaches and methods need to be stated more clearly, as discussed in my comments under question (a) above.

(ii) Letter to the Administrator.

- p.2, line 9: The recommendation to "provide training" needs to be explained a little more here. It is unclear as to whether a training guide is being requested for inclusion in the report, or whether separate training outside of the report is being discussed.

- p.2, lines 17-18: There is a logic problem in the latter part of this sentence. The first part of the sentence recommends that "illustrative examples" be used rather than "case studies", while in the latter part of the same sentence it is recommended to enhance the "illustrative studies so that they more closely approach that of case studies." This is confusing. I recommend replacing "illustrative studies" with "illustrative examples", and "case studies" with "real situations".

- p.2, line 22: Use of the term "volumetric" to refer to contamination in the bulk medium requires a little more explanation. "Volumetric contamination" is an imprecise term of jargon.

(iii) Executive Summary, p.2, line 3: It is unclear as to whether a training guide is being requested for inclusion in the report, or whether separate training outside of the report is being discussed.

(c) Are the conclusions drawn, and/or recommendations made, supported by the information in the body of the draft SAB report?

The conclusions drawn and recommendations made are supported by the information in the body of the draft report. My only recommendation in regard to this question is that some of the conclusions of the RAC need to be stated more clearly. Please see my comments under question (a) above.

Miscellaneous typos and cleanup needed:

(i) Letter to the Administrator, line 11: delete "Re" after "Subject:"

- (ii) Executive Summary, p.1, lines 38-39: additional text needed
- (iii) Executive Summary, p.2, line 23: delete extra “in sufficient detail”
- (iv) p.5, lines 40-41: additional text needed
- (v) p. 15, lines 20-21: insert “in all MARSAME chapters” after “distinguishing” in line 20, and remove “in all MARSAME chapters” from line 21
- (vi) p.15, line 31: the units should be cm^2 , not cm^3
- (vii) p.21, line 8: spell out Action Level in place of AL

2) Dr. Michael McFarland:

The SAB review panel (Panel) is commended for providing a clear and concise scientific evaluation of the Multi-Agency Radiation Survey and Assessment of Materials and Equipment (MARSAME) Manual. The Panel is applauded for highlighting the need of MARSAME to provide improved clarity and guidance in its description and use of statistical approaches for conducting radiation surveys and data assessments as well as its support for the use of sentinel measurements for initial radiation assessments. In addition to the following section, which summarizes specific responses to the quality review charge questions, a number of editorial corrections are provided at the end of the review comments.

- a) Are the original charge questions to the SAB panel adequately addressed in the draft report?

The Panel has systematically and comprehensively addressed each of the original charge questions posed by the Agency. Within each response, the Panel provides multiple technical recommendations rich in detail for Agency consideration including specific recommendations for improving the clarity of a number of report figures.

- b) Is the draft report is clear and logical?

On the whole, the draft report is clear and unambiguous. The Panel provides comprehensive descriptions of its salient findings as well as detailed recommendations for improving the framework and content of MARSAME.

- c) The conclusions drawn and/or recommendations made are supported by information in the body of the draft SAB report.

In general, all of the conclusions and recommendations are supported by information contained in the body of the report. The cover letter and executive summary provide a succinct yet compelling summary of the Panel’s findings and recommendations

all of which are corroborated by strong scientific and/or technical arguments that are fully described within the report.

Editorial Issues

Page 1 – Executive Summary Line 17: It isn't entirely clear what the Panel means by the phrase "competent radiation protection professionals". Are competent radiation protection professionals those who are licensed, certified and/or trained in an "accredited" program? Clarifying the language would make this statement unambiguous.

Page 2 – Executive Summary Lines 23-24: The phrase "in sufficient detail" is repeated twice in the same sentence.

Page 22 (Line 6-7) - The report states "Selection (of the value of α and/or β) may be a matter of acceptable uncertainty specified by the agency the sets the action level." In this report and all others that have espoused the use of the data quality objectives (DQO) process, the issue of how to establish the tolerable probability limits of committing Type I and Type II errors arises. Although it was not an explicit request made within the original charge, identification of the factors that should be considered by any agency in establishing the tolerable Type I and Type II error rates, e.g., practical consequences of committing a Type I and/or Type II error, assessment/monitoring budget etc., is vital if the Panel supports the DQO approach to decision-making. If the Panel anticipates addressing this issue as part of its overall recommendation for a separate chapter on statistical analysis, experimental design and hypothesis testing, that should be clearly stated somewhere in the report.

Page 30 – Appendix A Line 16 – The word "insures" should be changed to "ensures".

Page 33 – Appendix A Lines 28 – 29: The example states that $\alpha = \beta = 0.05$. Again, it is unclear whether the tolerable probability limits of committing Type I and Type II errors have been established by policy, costs or an evaluation of the consequences associated with committing a specific type of error. Highlighting the scientific, regulatory and/or policy considerations that resulted in the established error rates would be helpful in guiding future users of MARSAME.

Page 37 – Appendix A Lines 17 -19: A series of questions are posed by the Panel to the Agency. It isn't clear whether the Panel

is expecting the Agency to respond to these questions or if the questions are merely rhetorical.

3) **Dr. Thomas Theis:**

I have read the RAC review of the Marsame report, as well as the report itself. In general I think the RAC did an admirable job of answering the charge and providing useful comments to the multi-agency group that put the report together.

Reports such as Marsame have a difficult job in trying to explain the intricacies, details, and basis for guidance involving complex topics such as radiation safety. This is further confounded by the twin desires to write a report that is readable to more than one level of user (e.g. practitioner, theoretician, manager, etc.), and be as technically complete as possible. Marsame appears to contain all, or most, of the information needed to provide expert guidance for radiation assessments of M&E. Yet the RAC suggests, and for the most part I agree, that some clarifications are needed, some reorganization desirable, and in some instances different emphasis needed in parts of the report.

Three of the recommendations (1b-3, 1c-1, and 2a-1) suggest the addition of a new chapter in which mathematical and statistical details are segregated from other chapters in the report, with Appendix G being incorporated into the main text of this new chapter. These recommendations are clearly motivated by the desire to provide a more readable report, parts of which could then be read by different user groups as appropriate. I faced much the same problem as editor of a journal that tried to serve both the academic and practitioner communities, in general satisfying neither (one common critique: too many equations; its opposite, also common, not enough theoretical development). Marsame isn't a collection of scholarly articles, so the parallel shouldn't be taken too far, but it does suggest the value of deciding who the main users are so that the "readability" of the report can be tailored, and appendices used in their appropriate, and necessary, supporting role. Thus an alternate approach to that proposed by the RAC, which I would favor, is to place as much background material as possible in the appendices, relieving the main text of the burden of supplying too much information and improving the readability in its totality (a third alternative, as I think about it, might be to place as much detail and information as possible in the body of the report, minimizing appendices, but then providing a "guide to readers" on which chapters to read depending on one's function--but this, I think, would be much too cumbersome).

OTHER MEMBERS:

1) Dr. Rebecca Parkin:

a) The original charge questions are adequately addressed.

b) The report is clearly organized and well-written. I agree with the panel that the statistical methods should be presented in a separate section of MARSAME. There are several calls for clarity about assumptions, contexts, methods and terminology; all of which should improve the practical value and use of the report.

The panel's logic supporting its points is almost always described well. One section of the draft that didn't flow adequately for me was on p. 15, lines 2-7. There seem to be some gaps in logic or assumptions about reader understanding here.

c) The conclusions drawn and recommendations are in large part supported by the text provided.

Minor edits noted:

p. 2, line 23: Delete "in sufficient detail" as it is repeated here

p. 16-17: I suggest adding color to highlight the changes. Color would aid the reader in finding the changes more rapidly.

p. 20: What are the black lines with blue boxes indicating? If they only mark the separation between phases, I don't think they add much to this figure. I actually think they distract the reader, and suggest that they be removed.

2) Dr. Valerie Thomas:

a) Yes, the original charge questions were adequately addressed in the report.

b) the draft report is logical and for the most part clear (although some of the detailed recommendations are, understandably, hard to follow without in-depth knowledge of the Marsame report). Three suggestions for clarification are given below:

i) In the overall recommendation that as much attention be given to contamination that is removable and volumetric (Exec Summ p. 2, lines 18-21) it would be helpful to clarify that the types considered are removable versus non-removable and surface versus volumetric; the Executive Summary statement is a bit hard to grasp because it refers to removable, volumetric and undifferentiated contamination.

ii) Recommendation 3-3 and Figure 3 are not clear. Specifically, what are EPA staff supposed to do with Figure 3? Is it meant to be inserted into the Marsame report to help clarify the structure? Or is it a template for reorganization? Also, what are the three oar-shaped levers in Figure 3 meant to signify?

iii) The appendix is welcome in that it provides a more comprehensive discussion that is normally contained in the "responses to charge questions" format. However, in contrast to the main body of the report which very clearly identifies recommendations that are referenced in the Executive Summary, the suggestions made in the Appendix are not shown as Recommendations and are not cross referenced with the Executive Summary or the main body of the report. The statistical recommendations could be made more clearly with introduction of explicit recommendations in the Appendix, and cross-referencing in the main body of the report.

c) The recommendations are well supported by information in the body of the SAB report. The panel is to be commended for the cross-referencing of the overall recommendations in the Executive Summary with the detailed recommendations in the body of the report.

3) Dr. Baruch Fischhoff:

I will be unavailable during the May 29 meeting. However, I did read through the report quickly and did not see any obvious problems with it (although this is far from my area of expertise). It seems clearly written, conscientious, and responsive to the charge.

4) Dr. Agnes Kane:

I find the draft report to be acceptable.

5) Dr. Meryl Karol:

- a) The charge questions were adequately addressed in the draft report.
- b) The draft report makes some excellent recommendations, such as organizing guidance for statistical analyses, design, and hypothesis testing into a separate chapter, and in an Appendix.
- c) A number of recommendations would gain clarity if their sentence structure were less complex. For example,
 - i) Cover letter, (p.2) lines 26-27 are unclear.
 - ii) Executive Summary, (p.2), lines 23-26 could be clarified by forming 2 (or more) sentences.
 - iii) Introduction, (p.4), lines 8-9 are unclear.
 - iv) Recommendation 1c-1 (p.12) is unclear.
 - v) Recommendation 1d-3 (p.13) lines 7-10.
- d) Appendix A, section A-1 would benefit from use of sub-headings, such as:
 - Null hypothesis
 - Alternative hypotheses
 - Experimental power, etc
 - Variance
- e) Consider inclusion of a list of Definitions
 - Null hypothesis
 - Discrimination limit

Variance, etc.

6) Dr. Jerald Schnoor

I have read the 50 page report from the Radiation Advisory Committee (RAC) of the SAB reviewing the Agency Draft MARSAME Manual, and I find it to be an excellent report. It is well written and well organized from the cover letter to the Table of Contents, and from the Executive Summary through the numbered sections of the report, which respond to each charge question. RAC makes its recommendations clearly and persuasively. I especially like the Appendix on Statistical Analysis (which I have saved and intend to use in my water quality class).

I agree with the points made on page 8 of the report (lines 24-30) regarding the importance of stating the null hypothesis and alpha and beta values for Type I and Type II errors. I also agree with the revisions to Figures 6.3 and 6.4 in the MARSAME report depicted in the RAC review as Figures 1 and 2.

In summary, I find the report to be exemplary and concur fully with its findings. As stated by the RAC in its report, the MARSAME manual is “an admirable ... and competently written effort by staff from several agencies to provide guidance in an important endeavor”.

7) Dr. Steve Heeringa:

A few comments on the draft report on the "MARSAME Manual" follow.

I did not read or study the MARSAME Manual that is the basis for the Panel's report in detail. Therefore, my comments pertain more to the overall clarity and organization of the Panel's report than to the accuracy of the specific statements it contains. In general, the Panel's responses to the charge questions are clear and in many cases highly specific when pointing out changes or additions that it feels are needed. I have just a few suggestions and edits that I would like to note.

a) Introductory letter, Page 2, Lines 1-3: The intent is clear but this might be rephrased. This reader stumbled a bit in reading this the first time. It might be broken in two simpler sentences—one acknowledging the collaborative effort and a second commenting on the writing quality.

b) Page iii) Strike the ZIP from Dr. Johnson's listing.

c) Pages 16 and 17 - Including the revised Figures (as opposed to simply describing the changes in text) is very useful.

d) Appendix A (General) - The Panel has collected its response to Charge questions related to the statistical presentation in the Manual in Appendix

- A. Given the breadth of the comments, I believe this is an effective strategy for communicating several messages:
- i) The manual must be more consistent in its discussion of decision criteria for hypothesis tests, variability in measurement and sampling variability, and a number of related statistical concepts.
 - ii) The importance of not masking the operational implications of the statistical decision-making process in the mathematics of defining the decision regions and rules.
 - iii) Specific recommendations (A-2) for reordering some content correcting/clarifying terminology.

e) Appendix A (Specific)

- i) Page 26, Line 19 "sampling standard distribution" should probably be "sampling standard deviation"
- ii) Page 26, Line 30 "in favor of the alternative".
- iii) The definition of the statistical decision rules for Scenario A and B is touched on at several points in the Appendix. Reading Lines 38-44 on Page 26, it was not clear to me why the null hypothesis in A is that the measure exceeds the AL threshold and in B the null is at the AL (indicated to be near background) and the alternative is that the AL is exceeded. The Panel discusses this issue on Page 26 and Page 28. In fact, the italicized note on Lines 21-22 of Page 28 confirmed my hunch. At a minimum, I suggest this sentence be brought forward to Page 26 when the decision rules for A and B are first discussed. My preference though would be to suggest that for Scenario A, the Manual present the null for A as "safe for release if the null is not rejected" just as in Scenario B. I believe this would make the decision rule for both Scenarios consistent with standard practice as I know it and would require only Figure A-2 to illustrate the decision principles. Even in one sided tests of the type considered here, the concepts of Type I and Type II error are often difficult for practitioners to visualize. Flopping the alternative distribution from right to left in the two scenarios--while not necessarily incorrect--just increases the risk of confusion.

These are the only comments that I have. My appreciation to the Panel for the work that they put into this review.

8) Dr. James Galloway:

I have read the MARSAME Review Panel's report and find that the panel has more than adequately addressed the SAB charge in a clear and logical manner. Further, the conclusions/recommendations are supported by the report itself. The only suggestion for a change is in the letter to the Administrator, page 2, line 32. Specifically, the use of the phrase 'potentially useful document' implies that it will

only be useful if something is done. Does the panel mean that that 'something' is to follow their recommendations, or is it something else? In either case, a clarification would probably be helpful."

9) Dr. James Sanders:

Charge questions adequately addressed?

The draft report addresses the charge questions in clear, tightly focused fashion. The review panel should be commended for their attention to each question, and for also identifying several other areas that, if considered, would result in a more valuable report. In particular, the suggestion to pull the discussions of statistical analyses into a separate chapter will improve readability, and the panel's desire to ensure a report that will serve management personnel as well as professionals will be of value overall.

Report clear and logical?

The panel has written a short report that is logical and easy to understand. Their attention to statistical issues, while more detailed, is still clear to the outside reader.

Support for conclusions and recommendations?

The panel's recommendations all flow from either the MARSAME draft itself, or from the panel's deliberations. It is possible for the reader to follow the panel's arguments, and to find support for their recommendations. In addition, the general conclusion that the MARSAME draft will be a valuable addition is also supported.

Other comments:

One typo on p.1, l 37. I believe that the panel meant March 10, 2008.

10) Dr. James Hammitt:

Dr. Hammitt responded in the affirmative on the report and did not provide additional comment.

11) Dr. Steve Roberts:

General comments:

The SAB MARSAME Panel Report is constructive, well-written, and well thought out. Responses to the charge questions are on-target, and each of the charge questions is adequately addressed. The organization of the report is logical, listing each charge question and the Panel's response. Recommendations are clear and linked logically to the charge questions. Overall, this is an excellent report that should be quite useful to the Agency.

I do, however, have a few suggestions for improvement. As often happens with these reports, the body of the report is quite lucid, but some of that clarity gets lost in preparing a condensed Executive Summary. Even more is lost trying to construct a concise cover letter to the Administrator. In the case of this report, the Executive Summary is actually pretty good, but the summary of the main Panel recommendations in the letter to Administrator Johnson has been diminished to the point of being cryptic. Some are almost incomprehensible without having read the report first (e.g., the fifth bullet), and for others the summary description is not entirely faithful to the actual recommendation in the report (e.g., the third bullet). In my opinion, the cover letter should not try to summarize the report in 200 words, but should instead highlight a few key points that the Administrator should know (e.g., in this case, 1) what the MARSAME manual is; 2) that the MARSAME manual we reviewed is quite good; 3) we have some suggestions to make it even better -- with maybe an example or two; and 4) this is part of a really useful program that the Agency should continue to support).

Picky details:

Cover letter

P2,L9: delete “important” Are there unimportant users?

P2,L29-30: Actually, all of the recommendations concern refinements and improvements in content and presentation. Do we mean to say “Other Panel recommendations concern additional refinements ...”?

Executive Summary:

Obviously, notes to “KJK” need to be deleted.

P2,L23: “in sufficient detail” is repeated

Main Report

Delete notes to “KJK”

12) Dr. Virginia Dale

The original change question to SAB Panel were adequately addressed

The draft report is clear and logical (with minor exceptions noted below)

The conclusions drawn are supported by the report (with wording exceptions noted below). Appendix A seems particularly useful to the Agency. The recommendations are clearly designed to assist in the clarity and implementation of the report.

The SAB report needs to have an editor go over it to eliminate several wording, punctuation and grammatical errors.

Minor wording points:

Letter:

Page 2, line 2- replace “to provide” with “that provides”

Page 2, line 4 – eliminate comma

Page 2, lines 17-18 – eliminate “so that they more closer approach that of case studies” for this leaves the reader wondering what the differences are been illustrative examples and case studies. Also, it is not clear what “enhance the content “means here or “assure their realism” means in the executive summary.
Page 2, line 31 – Modify sentence so that it begins “After the SAB’s recommendations are implemented, the MARSAME Manual draft should be a useful document ... “for otherwise it sounds rather negative.

General comment – The letter spends too much space explaining what MARSAME. It would helpful if the background be presented in less space so that the important points beginning on page 2, line 8 can occur earlier in the letter.

Report

Page 1, line 15 – use “comprised of” instead of “comprising”

Page 1, line 24 – replace “be in nature” with “occur under natural conditions”

Page 2, line 13 – not clear what or “to assure realism” means.

Page 2 – I do not think it is useful to refer to the numbered sections where the charge questions are answered.

Page 2, line 23-24 – “in sufficient detail” is repeated. [Clearly the report needs to have an editor go over it to eliminate such problems].

Page 2, lines 30-31 – This could be a bit more specific.

Page 3, lines 1 – Scenarios A and B have not been defined, so this section needs rewording.

Page 3 – It seems that the executive summary should end with a sentence stating the overall value and importance of the report.

Page 4, Lines 32 to next page – I do not see the value of giving the table of contents of the report.

Page 5, Lines 30-41 – Too many details on meetings are included here.

13) Dr. Kerry Smith:

I looked quickly at the report on the MARSAME Manual; the review looks fine and does address the primary comments. My quick review raised only one question --what are the provisions for periodic updates as technology changes -- shouldn't we build in a process for review and updates in fields with rapidly changing technologies? This may be there and I missed it --it is my only question

14) Dr. Kathy Segerson:

I have reviewed the draft report of the MARSAME Manual review panel. This is way outside my area of expertise but here is my reaction.

In my view, the draft report is generally very responsive to the charge questions. The only possible exception is 1c. The Agency asked for advice on the acceptability of new scan-only and in-situ survey designs. While the draft report refers to these methods on p. 12, line 4, I did not see any discussion of the acceptability of these methods. Perhaps it is there, but, if so, it wasn't clear to me.

The draft report is clear and logical, and the conclusions and recommendations are well-supported. The committee has done a very good job of considering how the manual will be used and by whom, and making recommendations for improving its usefulness (particularly for less technical managers).

My only other comment relates to the letter to the Administrator. The letter describes the MARSAME manual as "an admirable cooperative and competently written effort" that will be a "potentially useful document for ORIA/EPA..." Yet the opening statement of the actual review (p. 9, lines 13-14) describes the manual as "an excellent technical document for guiding an M&E survey." At first glance, this appears to be a much stronger statement than those included in the letter. But perhaps the general point the review panel wants to make is that, while the manual provides excellent technical guidance on conducting the survey, it would be more useful for the overall process (which includes but is not limited to the M&E survey itself) if it were revised along the lines suggested in the panel's recommendations. If this is, in fact, their point, then I would suggest revising the letter to the administrator (and the executive summary) to make this clearer.

15) Dr. Jana Milford:

I have reviewed the MARSAME review panel report and find that the panel adequately addressed the charge questions, the report is clear and logical, and conclusions are well supported. I particularly appreciated the organization used in the report, with the comments on experimental design and statistical analysis pulled out separately. I would recommend promoting the appendix containing those comments to a full-fledged report chapter, since labeling them as an appendix may suggest they are of secondary importance, which is not the case.

On p. 15, line 31 the units of area are given as cm^3 -- is this a typo?

On p. 35, lines 14 - 16, the report refers to blue and red curves in the figure, which is inappropriate since the report is not printed in color.

16) Dr. Rogene Henderson:

I have reviewed the charge questions and the report of the SAB subcommittee on the MARSAME manual. I did not review Appendix A in detail. I found the report to be clear and logical as well as responsive to the original charge questions. The conclusions and recommendations were supported by information in the text.