Preliminary Comments – December 4, 2017

Risk and Technology Review (RTR) Methods Panel 2017

Jay Turner
Tami Bond
Tiffany Bredfeldt
Gregory Carmichael
Richard Di Giulio
Charles T. Driscoll, Jr.
David Eastmond
Gary Ginsberg
Dale Hattis
Stanley Hayes
Joseph Irudayaraj
Abby A Li
Slawo Lomnicki
Sidney Marlborough
P. Barry Ryan
James Sadd
Veronica Vieira

Tami Bond

No “big” issues identified

Tiffany Bredfeldt

No Comments Submitted

Gregory Carmichael

No Comments Submitted

Richard Di Giulio

No Comments Submitted

Charles T. Driscoll, Jr.

General Comments:
I have no issues with the report. I had previously reviewed the sub reports on the charge questions I was involved in. I recommend putting page numbers on the report, which would have made my review easier. Following my review/reading I did have a few wording suggestions that are detailed below.

Note that my numbering of the document includes the letter to the Administrator and front material. [page numbering corresponds to *Draft RTR Method Panel Report 11_20_17 numbered pages.pdf*]

1. Page 1, line 44; Page 8, line 15; Page 9, line 24. Rather than “quickly” how about “…goal to rapidly and effectively screen…”

2. Page 2, line 25. Should this be “among” rather than “between”?

3. Page 9, line 2. “…risk assessment screening, rather than for the …”

4. Page 9, line 25. “…facilities in order to focus … from a public health perspective…”

5. Page 10, line 40. "…physically based model, …"

6. Page 11, line 12; Page 28, line 31. The S in selenium should be lower case.

7. Page 15, line 36. "…from a public health perspective, in this case …"

8. Page 15, line 43. "…on actual sites with field based measurements, either …"

9. Page 16, line 24. "…the water that transports the chemical into the lake."

10. Page 19, line 24. Define BaP. Do you need "does"? Delete.

11. Page 24, line 18. "…of wetland influenced lakes …"

12. Page 25, line 3. "including surficial geological formations, …"

13. Page 29, line 11. 1980s - 1990s, no apostrophes.

14. Page 31, line 41; Page 32, line 7. Probably should use modeling with one "l" to be consistent with the remainder of the document.

15. Page 33, line 35; Page 34, line 36. "…ad hoc …" in italics.

16. Page 34, line 4. "…data are …"

17. Page 34, line 6. "…Earth™) could then be …"

David Eastmond

No Comments Submitted

Gary Ginsberg

General Comments

my comments are attached. My biggest concern is that our report appears to have missed the point of Tier 1 screening, we don't call out the need for sensitivity analysis as a high priority (it gets lost in the weeds), and we don't give enough credit to what EPA has accomplished.

Specific Comments [note page and line numbers were adjusted to match publicly posted version dated 11/20/17.]

Preface: I am not commenting on the cover letter or ES at this time but my detailed comments below would reflect back to statements made in those sections, which should be obvious from the following.

Page 15, Line 18, potentially may want to add: "since the main focus of this tiered screening is on persistent and bioaccumulative toxicants emitted by stationary sources." That would help clarify why the exposures are primarily via foods.

Page 15, Line 39: I wonder if here we should acknowledge that according to discussion with EPA at the in person meeting, it was stated that 30% were screened in tier 1 and 60-70% in tier 2 such that we give some credit to the claimed efficacy but require that this be documented in the RTR report. If so, then the next paragraph could begin with: "An improved document would report on tiered model performance in the following ways: ……"

Page 15, Line 46: "Field measurements" sentence – do we know if such information is available or will the Agency have to collect new data for this purpose. I'm sure that the models are based upon actual data at some level of development and now have evolved to attempt prediction of many different sources and scenarios. We know that the use of conservative assumptions is inherent to the screening approach in order to be protective of public health and environment. Perhaps the best way to phrase this is that the Agency should document the level of uncertainty and conservatism built into the models – a model sensitivity analysis may suffice to get at what we are seeking rather than resource intensive field work to obtain new data at particular facilities, which may or may not be representative of other facilities or other days or times of year given the vagaries of air sampling around sources.

Page 16, Line 3 – A clarification is that we would like their analysis of the efficacy of the tiering framework to screen out facilities be done by source category so that one can determine whether some types of facilities ….

Page 16 – first para under Recommendations: this paragraph is problematical in a number of ways. First, EPA's primary purpose is as a screening tool, not as a way to protect specific subpopulations. Second, just about all risk assessments need to consider the most highly exposed subpopulation to make sure they are considering the maximal use of the resource when making risk-based decisions. Third, I think the panel comes off as missing the point with this first paragraph, especially in misquoting from page 7 of the RTR report – in that report EPA acknowledges that the former model from 2009 was too health protective and failed to screen out facilities. We are trying to judge whether this new version is any better, not the failings of the 2009 version. Tier 1 will of course be maximally health protective as it is a rapid, easy to apply screen which wants only the most obvious and low risk facilities to be eliminated from further consideration. The question for us is whether it reasonably accomplishes this goal and I think our request is valid that the agency provide examples of source categories which have gone thru some screening using this model be documented. If what they say in person – 30% eliminated in Tier 1 – is true, it may be fine as is.

Page 16, Line 22 – “without the water moving into the lake” – unclear

Page 16, Line 26 – in Tier 1 I don’t think EPA is necessarily shooting for more realistic assumptions – that comes in Tiers 2 and 3. In Tier 1 EPA assumes you take essentially all of the air deposition and put it into the soil and food a single receptor is contacting/eating, and asks do you have a problem. Its akin to a mass balance approach. If no problem, then we know that source cannot under any circumstance be an excessive health risk. This may be a reasonable premise for Tier 1 – the latter tiers are where I think we need to focus on how realistic.

Page 16 – Lines 39-41 – no need for this comment on farm locations as they won’t know where farms might be put in the future and the only reasonable approach is to locate them where there will be maximal deposition. The advent of small farming may place agriculture in suburban, industrial and even urban environments. EPA should not prejudge where farms may exist in the future based upon current or predicted land use patterns. However, we do know where water bodies are currently and thus where they will be in the future. Page 10, Lines 13-14 – not sure exactly what is intended by this and where in the model one would use USDA agricultural data, but as I said above this could change in the future so I’m not sure I see the point.

Page 17, Lines 33-41 – this paragraph seems out of place as it appears targeted to Tier 1 assumptions which was dealt with earlier, and essentially restates the earlier concern, to which I have already provided comments above. Along these lines, our recommendation for sensitivity analysis in the next paragraph could show the degree of conservatism in Tier 1 – as such I think the recommendation on sensitivity analysis should be elevated to higher prominence in our document.

Page 20, Line 24 – remove “does”

Page 21, Line 45 – Tier 2 more health protective? I don’t think this is accurate – more realistic, yes but I don’t see how it could be more health protective than Tier 1.

Page 22, Line 17 – “highly unlikely” is too strong – what is unlikely about subsistence fishing at fishable lakes downwind of a stationary source? These receptors are not also farmers as in Tier 1. I think we should give Tier 2 the credit it deserves in making more realistic assumptions about exposure.

Page 22, Line 32 – I don’t remember us agreeing that PAHs and dioxins accumulate more in benthic rather than water column fish – if we assert this, we should provide citations. Also, besides raising a few concerns, it’s not clear what this paragraph is asking EPA to do.

Page 22, Line 43 – it’s not clear to me how site-specific USGS data will help with runoff assumptions, but that’s why I’m not a geologist. However, I recommend that we say more about how such USGS data can help, perhaps with a citation where this has been done before.

Page 23, Line 01 – not sure we should be recommending they do a systematic review on all the screening model parameters – this could be an endless task – maybe on the 2 or 3 parameters

found to be most influential in sensitivity analysis? Or just the sensitivity analysis and better justification for one value vs another?

Page 25, Lines 24-28 – I think this para is talking about sensitivity analysis, not probabilistic, although it uses the latter term. Our document has already made numerous calls for probabilistic analysis but is light on calling out the need for sensitivity analysis.

Dale Hattis

General comments

The review summary fails to capture the critical tenor of my comments. There is a welcome call for a probabilistic analysis of the many component distributions in the methodology and

reevaluation of the choices of single-value parameters to represent individual components. However, the current document retains the existing single-value parameter choices made previously without making any such probabilistic analysis. Therefore, there can be no confidence that the current RTR methodology represents a known, let alone an appropriate proxy for the results of applying a more sophisticated analyses that might ultimately be needed to understand just how protective the RTR guidance is likely to be, and what residual risks can be expected. I think EPA should change its fundamental approach of doing this kind of analysis. Currently the practice is to pick a series of what are intended to be "conservative" values for multiple parameters and imagine that the combined result will be an analysis system that represents and appropriately "conservative" set of prescriptions to protect public health. Without a probabilistic analysis, however I think there is no one on the green earth who can reasonably integrate in his/her head the combined effects of three or more uncertainty distributions. This must be done in a full formal probabilistic analysis representing the uncertainty distributions for each parameter and then "run" to assess the combined uncertainty in all appreciably uncertain parameters. I think a final RTR system should therefore await a detailed probabilistic analysis and be calibrated to achieve specific risk levels or better (less) with a defined degree of confidence.

More detailed comments on specific sections of the document.

Charge Question #1 (Three-tiered approach.)

Similar to my general comments, the current three-tiered approach fails to reflect any probabilistic analysis of the many distributions of risk-related. EPA has not analyzed what the uncertainty distributions of the many uncertain parameters in the models are likely to be, or what the overall uncertainty of the model outputs are likely to be. How far can be expect the overall estimates to be from an overall "expected value" (arithmetic mean), and how far from an overall 95th percentile of the combined uncertainty distribution for the risks to be protected against? I agree, in general, that case-study analyses should be done to address these issues, but they must have an integrated probabilistic character. 10 such case studies, done in parallel, should be sufficient to allow EPA to judge how often specific characterizations from the 3-tiered modeling approach will yield results that appropriately reflect the degree of "conservatism" it wishes to achieve in specific contexts. I therefore agree with the draft panel comment that such "ground-truthing" with specific case studies will be an important step toward the design of an RTR system that will perform as intended.

Charge Question #2 (Risk Equivalency Method.)

I agree with the overall stated conclusion in this part of the report:

"this read across extrapolation of environmental fate could benefit 24 substantially from an alternative approach and has identified two options for improving 25 the EEF estimate as follows: 26

• Conduct further statistical evaluation of the relationship between Kow and LADD to yield an upper bound on the regression slope and then apply this to derive EEFs for data poor chemicals;

• Conduct further evaluation of the underlying fate and transport parameters to develop distributions for each influential parameter and then perform a probabilistic analysis that replaces the Fig 3.2 regression slope; EPA can then make a transparent choice of which percentile of the distribution of LADDs for a given Kow (and/or additional parameters) will be used in evaluating exposure and risk for data poor POMs. "

"The SAB also finds that the current documentation of key parameter inputs to this fate, transport and bioaccumulation model for PB-HAPs is not adequately described. The range of potential values and key citations should be presented in an appendix for all of the modeled PB-HAPs. The document states that the EEF will change based upon environmental and geospatial conditions (e.g., Page 19, paragraph 1) but examples of this dynamic relationship are not provided, which further precludes a full review. For example, how are the effects of age/weathering incorporated to account for the loss of lighter dioxin congeners over time or with distance? "

I would signal the EPA analysts even more strongly, as I did in my own summary comments on this charge question:

"This basic methodology—multiplying supposedly "conservative" values of several uncertain factors—is profoundly deficient. EPA has used this in the past many times, but it is high time EPA should routinely do probabilistic analyses combining the effects of distributions of multiple uncertain factors into a coherent analysis from which arithmetic means and specific "conservative" fractiles could be derived. Anything less is simply not sustainable as a modern analysis.

Moreover, the document in its present form does not even appear to provide reviewers or the public with the actual single-point allegedly conservative values chosen for these parameters in the screening analyses. Without these values and the distributions, they come from, no evaluation of whether the set of values "adequately accounts" for differences in environmental fate and transport among the different chemicals is possible."

Charge Question #3 (Fishing, lake, and pond assumptions.)

I agree with the general conclusory statement, "The SAB encourages the EPA to consider other data available to make more realistic assumptions such using as the most recent NHANES data to estimate fish consumption. Additionally, the EPA could refine the assumptions on chemical runoff and erosion from the watershed by using relevant USGS data that is available for the region in interest. This approach would result in a more balanced approach for tiers 2 and 3, since there are refinements in air modeling at these tiers."

Charge Question #4 (Lake data, plume rise, and meteorology assumptions.)

I agree with the draft panel comments on this charge question.

Charge Question #5 (Inclusion of the gardener scenario.)

I agree with the draft panel comments on this charge question.

Charge Question #6 (Environmental risk screening methodology.)

I agree with the draft panel comments on this charge question.

Charge Question #7 (Enhancements of inhalation risk estimates.)

I agree with the draft panel comments on this charge question.

Charge Question #8 (Census block receptor check tool.)

I agree with the draft panel comments on this charge question.

Stanley Hayes

Please accept these comments on the draft SAB report from the Risk and Technology (RTR) Methods Review Panel. The draft is well done, recognizes EPA's substantial efforts to improve its RTR methodology, effectively blends the results of writing teams, and accurately captures panel discussions at the June 29-30, 2017 meeting.

I offer here several selected comments chosen to emphasize certain points that I consider important or to provide additional information that I hope will be helpful.

Overarching Issues

Comment 1: Suggestions for Reducing RTR Input Data Errors

"*Overarching data quality considerations are important in the assessment. The SAB recognizes the fundamental importance of accurate input data as a bedrock foundation on which all RTR risk analyses build. The SAB recognizes EPA's past efforts to ensure RTR input data accuracy, and strongly supports and encourages such efforts." (Executive Summary, page 9, lines 28-31)*

"The SAB recognizes the fundamental importance of accurate input data as a bedrock foundation on which all RTR risk analyses build. The Agency should continue to make meaningful efforts to ensure the validity of the data used. The possibility of errors should be considered in doing the analysis and in interpreting the results." (Section 3.1. The three-tiered multipathway screening approach, page 18, lines 17-20)

Over the past decade or more, my staff and I have conducted risk modeling of several hundred industrial facilities using EPA's evolving RTR risk modeling methodology and have reviewed RTR data collected in a number of EPA Section 114 Information Collection Requests (ICRs). Based on those experiences, I strongly agree with the above statements in the draft SAB report.

Further to those statements, I would ask the panel to consider the following suggestions for reducing RTR input data errors. The panel could simply leave this memorandum as my statement on the record, without inclusion in the SAB report. Or, should the panel concur, the suggestions could be incorporated in some form in the report (e.g., an appendix), acknowledged by referencing this comment memorandum in the report, or separately endorsed, either in total or portions (e.g., by motion):

It is evident from past RTR experiences that significant and material policy-relevant errors can occur in RTR input data, skewing risk results, possibly by large and misleading margins. Building on the substantial efforts that EPA staff has already made, EPA could further develop and expand its affirmative efforts to ensure RTR input data accuracy. The possibility and policy implications of such errors should continue to be considered when doing RTR risk analyses and interpreting results.

At times, RTR input data errors have been caused by reporting errors by individual facilities, including:
- *Unrealistically wide-margin emission outliers,*
- *Sources mislocated offsite,*
- *Incorrect measurement units,*
- *Mismatched data conventions, and*
- *Typographical mistakes.*

At other times, errors have been made due to undetected incorrect information in publicly available national, regional, and local emission inventories, including:

• *Outdated or inaccurate data,*

• *Non-existent "phantom" sources no longer operating, and*

• *Embedded errors carried over from predecessor legacy inventories.*

Possible approaches to reducing such errors could include the following:

• *Guidance could be developed to assist facilities in*
- *Prioritizing quality assurance efforts to focus on those data likely to matter most for risk assessments, such as source emissions and locations.*
- *Assessing the representativeness of EPA "defaults" for less critical facility data (temperature, stack diameter, etc.) when such defaults are used.*
- *Assessing the representativeness of EPA "gap filled" facility data when such data are used.*

• *Development, online distribution, training, and certification in the use of a suite of input data screening tools to detect and flag common errors could be undertaken, including emission outliers, offsite sources, incorrect units, and data convention mismatches.*
- *Such tools could include data visualization techniques similar to the Google Earth imagery provided in EPA's RTR inhalation risk model HEM-3.*
- *While such imagery is currently available in HEM-3 only after the model is run, data visualization tools could be employed earlier in the RTR risk assessment process, when data quality assurance feedback (e.g., source locations) would be most helpful.*

• *Submittal of additional information to support data quality screening could be required where needed.*
- *For example, facility fenceline information in electronic format could be submitted.*

• *RTR risk models could be modified to:*
- *Add an optional data quality assurance step, including the flagging of suspect offsite sources (e.g., outside of the fenceline and nonrepresentative census blocks) and other risk-driver information.*
- *Expand the risk attribution breakdown in Google Earth map visualization imagery to include risks both by HAP and by source at each modeled receptor, similar to that currently provided in HEM-3 by HAP for the maximum individual risk (MIR) receptor.*

• *Improved methods for verification and certification of data accuracy could be implemented for both facility-reported information and public emission inventories, e.g., EPA's NEI, state/local emission inventories.*

• *An EPA in-house RTR data verification team could be formed (or its role expanded)*

with affirmative responsibility for certifying data accuracy.

• An independent in-house EPA team could be formed (or its role expanded) to "stresstest" risk results to verify their accuracy prior to public release.

• Further efforts could be made to compare and, where appropriate, to reconcile similar data submitted in different EPA programs (e.g., TRI).

• EPA's multi-cycle iterative approach to RTR risk modeling could be further refined and formalized, including the following steps:

1. Conduct individual facility risk assessments.
2. Rank order facilities by risk.
3. Determine risk-driver emission sources and hazardous air pollutants (HAPs) for the highest-risk facilities (e.g., top 10%).
4. For highest-risk facilities, seek verification of risk-driver data (e.g., contact affected facilities), especially if risks exceed maximum acceptable levels.
5. For lower-risk facilities, conduct screening to guard against risk underestimation (e.g., sources mislocated far offsite).
6. Incorporate and document facility corrections as appropriate.
7. Repeat until risk results are stable.

Chapter Comments

<u>Comment 2: Need to Clarify Summary Paragraph in Executive Summary</u>
The division among the multiple topics in the Executive Summary's paragraph (page 2, lines 18-26) summarizing "additional observations and recommendations" is not clear. I would modify that paragraph to clarify that division as follows:

"The SAB makes several additional observations and recommendations. Among these are the following: (a) inclusion of the gardener scenario is appropriate, though evaluation of how many people this applies to should be conducted to determine the efficacy of the addition; (b) the accuracy of dispersion and deposition results from the TRIM.FaTE model should be evaluated by comparing them to results from a more technically robust dispersion model, such as AERMOD; (c) while incorporation of turbulence in determining urban/rural selection in dispersion modeling is appropriate, a different approach was suggested; and (d) although EPA's reliance on census block centroid locations as surrogates for where people live often can be reliable, because such an approach might not always be sufficient to ensure that receptors are representative of residential areas near facilities, additional methods should be identified and evaluated."

Note that I have also included as (b) above EPA's evaluation of the accuracy of TRIM.FaTE's dispersion and deposition calculations.

<u>Comment 3: Need to Evaluate TRIM.FaTE Dispersion and Deposition Accuracy</u>
Estimation of the dose received by a fisher under the refined fisher scenario depends closely on the estimation of PB-HAP deposition. EPA calculates such deposition using the TRIM.FaTE

model.

Unlike EPA-recommended, state-of-the-practice dispersion models such as AERMOD, TRIM.FaTE substantially simplifies the complex atmospheric processes that govern the transport, dispersion, and deposition of airborne material. As stated in the TRIM.FaTE technical support document (EPA 2002)[1]: "horizontal dispersion between air compartments is not currently modeled" and "vertical dispersion is not modeled either." Instead, TRIM.FaTE makes the highly simplifying assumption that airborne material emitted into or transported in the air within TRIM.FaTE is "instantaneously distributed evenly throughout a compartment."

Deposition onto lakes directly and onto land surfaces that then affects run-off into lakes is driven by the air concentrations calculated by TRIM.FaTE. It is unclear how accurately PB-HAP deposition is calculated by such a simplified model. Additional information is needed to demonstrate the accuracy (or for a screening methodology, the conservatism) of such deposition estimates and to evaluate the implications of that accuracy for the reliability of fish consumption exposure estimates. Absent this demonstration of TRIM.FaTE deposition accuracy, it is difficult to assess the validity of refined fisher scenario results.

Dispersion models recommended by EPA, such as AERMOD, have been continuously improved and updated many times over the years (as recently as December 2016). Such models have been employed by many users in a variety of regulatory proceedings, and have been subject to rigorous performance evaluation by EPA and the scientific community to test and demonstrate model accuracy.

It is not clear to me the extent to which TRIM.FaTE has been updated since 2002, when its technical support document was released and the most recent scientific paper cited by EPA on the TRIM.FaTE website was published.

EPA should test and demonstrate across a relevant range of representative scenarios the reliability of TRIM.FaTE air concentration and deposition estimates by comparing TRIM.FaTE results to those calculated by more physically realistic models, such as AERMOD. In addition, a probabilistic approach to the design and specification of parameters used to define fisher exposure scenarios could be helpful and provide important insights.

I would add the following paragraph to the Executive Summary, page 10, after line 44:

"EPA should consider evaluating the accuracy of dispersion and deposition modeling results from its TRIM.FaTE model by comparing them to those calculated by a more physically realistic dispersion model, one that is more fully documented, regularly updated, and whose performance has been more rigorously evaluated and demonstrated, such as AERMOD. If the results of such a performance evaluation warrant it, the SAB suggests using a different approach."

Note also that the draft SAB report has a more complete discussion of this topic in Section 3.3,

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[1] EPA. 2002. "Total Risk Integrated Methodology, TRIM.FaTE Technical Support Document, Volume I: Description of Module." EPA-453/R-02-011a. U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, North Carolina. September.

Fishing, Lake and Pond Assumptions, page 23, lines 8-33. The Transmittal Letter and Executive Summary should match the sense of that discussion.

Comment 4: Importance of Professional Judgment in Selecting Urban or Rural Dispersion
Because the choice between urban and rural dispersion in AERMOD can make a materially significant difference in the risks calculated using the HEM-3 risk model, it is helpful to EPA to automate that choice to supplement the professional judgment of the HEM-3 user.

A number of complexities can be present, though, that bear on urban/rural dispersion selection, including the presence of land-water boundaries, facility heat-island effects, and unique population distribution patterns. As a result, individual physical circumstances should be inspected to confirm tool selection results.

It would be helpful if HEM-3 produced a summary of the model's rationale/calculations for its urban/rural recommendation (perhaps as an option). While it is sensible to seek greater consistency in the choice of urban/rural dispersion through use of an automated tool such as that proposed by EPA, ultimately the final choice of urban/rural dispersion should be a matter of risk assessor professional judgment based on "facts on the ground."

I would add the following new paragraph on page 31, after line 45:

"In any event, because this procedure is automated, with calculations internal to the selection tool, the final choice of urban/rural dispersion should be a matter of professional judgment based on 'facts on the ground.' Where a material difference in risk results exists between urban and rural dispersion, EPA could seek an explanation and justification, should professional judgment differ from that of the selection tool."

Comment 5: Need to Clarify the Representativeness of Census Block Centroids
"Overall, the SAB finds that the tool's reliance on census block centroid locations is not sufficient to ensure that receptors are representative of residential areas near the facilities." (Section 3.8. The census block receptor check tool, page 33, lines 42-43).

High risks calculated at mislocated or nonrepresentative census blocks can be misleading, sometimes by a wide margin. Census block issues can arise in circumstances such as the following:

• Onsite, within a facility's fenceline

• Offsite, but where the extended exposure required for development of cancer or noncancer chronic health effects is not physically plausible (e.g., roadway, river/lake, parking lot)

• Offsite, but not representative of the actual population (e.g., the census block centroid does not match the physical locations where the people represented by that census block actually live).

EPA's proposed census block tool can be helpful in flagging locations that are not representative of actual human exposures. However, it is not always possible to anticipate every circumstance. Based on my experience with HEM-3 and RTR risk analyses, manual inspection of each facility

should be conducted to verify and supplement if necessary any receptor adjustments recommended by the census block tool.

The draft report's statement that reliance on census block centroid locations was not sufficient does not seem to be adequately supported, since the panel did not review and evaluate evidence sufficient to justify such a sweeping statement.

Moreover, the statement is contrary to my experience, having done risk modeling of several hundred facilities using EPA's RTR facility-specific inhalation risk model HEM-3. Google Earth imagery provided by HEM-3 shows clearly residential patterns around modeled facilities, their orientation with respect to modeled emission sources and census block centroids, and the magnitude and geographical pattern of risks in surrounding areas.

Using such imagery and initial risk results, it is straightforward to identify circumstances where census blocks are not adequately representative of nearby residential areas. In such cases, the locations of additional modelled receptors can be clearly identified (e.g., nearest residence) and added to the risk analysis. Should uncertainty exist in identifying such receptors, multiple new receptors spanning the range of such uncertainty can be added and risks re-calculated (with the new highest-risk receptor then used).

Where such adjustment causes a material difference in risk results, EPA could seek an explanation and justification, should professional judgment differ from that of the census block tool.

I would modify the draft SAB report text as follows:

"Overall, the SAB finds that, while the method's reliance on census block centroid locations often can be reliable, care must be taken that they are sufficiently well-placed to ensure that receptors are representative of residential areas near the facilities. The SAB suggests additional methods be identified and evaluated (e.g., using Google Earth imagery and preliminary risk calculations)."

I would also replace the last sentence to the Executive Summary paragraph on page 11, line 27 (at the end of the paragraph) with the following:

"Overall, the SAB found that, while the method's reliance on census block centroid locations often can be reliable, care must be taken that they are sufficiently well-placed to ensure that receptors are representative of residential areas near the facilities. To facilitate tool transparency and results reproducibility, EPA could develop tools to enable risk assessors to exercise their professional judgment in verifying tool risk receptor placement (e.g., using Google Earth imagery and preliminary risk calculations)."

Editorial Comments

Acronyms and Abbreviations, page 7, line 3: AERMOD should be identified as AMS/EPA Regulatory Model (dispersion model)
Executive Summary, page 9, lines 31-32: Recommend moving last sentence in paragraph to first

sentence of next paragraph
Executive Summary, page 10, line 38: Correct “suggest’s” to “suggests”
3.1. The three-tiered multipathway screening approach, page 17, line 24: Correct “Program” to “Programs”
3.2. Risk equivalency factor methodology, page 20, lines 11 and 32, elsewhere?: Should “read across” be “read-across” throughout for consistency?
3.6. Environmental risk screening methodology, page 29, line 32: Correct “famer” to “farmer”
3.7. Inhalation risk assessment enhancements, page 30, line 35: Correct “90percent” to “90 percent”

Joseph Irudayaraj

No Comments Submitted

Abby A Li

An overall impression, [perhaps] the overall tone of the executive summary appears to enthusiastically endorse the Draft report more so than it should given the issues we identify. Perhaps the summary can indicate that there were mixed opinions on whether the tiered approach will accomplish EPA’s goal of effectively and efficiently screening given the lack of data to groundtruth the EPA’s approach. I think the response to Question 1 is more balanced reflection of EPA SAB response.

Slawo Lomnicki (note: page and line number reference adjusted to match 11/20/17 publicly posted version)

I am in agreement with the consensus document. I think it reflects very well all the discussions and opinions that were presented during the review. Thus, I do not have any major comments, with one exception I strongly believe that the baseline measurement have to be performed in the model evaluation. This opinion is expressed in the document, however, I thin[k] it needs some strengthening. Thus I am suggesting to replace the world “could” (page 10 line 39) with “should”

Sidney Marlborough

No Comments Submitted

P. Barry Ryan

…my sense that the document is very close to complete with only a few minor editing changes to be made. I have read the document and he comments. Many of the comments are redundant with earlier ones and reflect needs that specific reviewers want emphasized. I believe that Dr. Turner, and perhaps you as well, have made a good effort in synthesizing the document to speak in "one voice."

I have focused my review on Question 5, or which I had principal responsibility. The section is short, perhaps the shortest of all sections, but the length is justified given that it discusses a single scenario modification/addition. I see no substantive changes needed in this section.

I want to add my endorsement to the comments made by Dr. Hattis in which he emphasized the need for distributional approaches within the modeling framework. In particular, the differences between the three Tiers is not readily apparent given the description of the scenarios and the discussion the group had. Modeling based on Distributional approaches, e.g., Monte Carlo and other methods, would address this issue. I would urge EPA to consider such approaches, as we did in June, in an effort to understand the implications of the Tiered approach with regard to screening. I believe Dr. Ginsburg pointed out that the screening percentages reported verbally by EPA- as I recall 15% by Tier 1 and 60% by Tier 2- are unsupported in this document. The distributional approaches could be used to assess the validity of such comments.

All in all, the document looks good and is quite tightly written. I support reporting it out. Let me address your specific questions below.

1) ***Were the charge questions to the committee adequately addressed?***

   I believe we addressed the charge questions both succinctly and in detail. Responses were developed by subgroups within the committee, synthesized and distributed to the group as a whole for comments. This comments were then put together with the original response and a final document- the one we see now- developed. I think our job is done.

2) ***Are there any technical errors or omissions or issues that are not adequately dealt with in the draft report?***

My colleagues have addressed some technical errors, desired clarifications, and typographical errors that need attention. None affect the content of the document, but should be fixed in order to make the document more readable professionally done.

3) ***Is the draft report clear and logical?***

   I think that the document as sent to us in the most recent draft is both clearly developed and logically laid out. I see no particular reason to modify any of the flow.

4) ***Are the conclusions drawn or recommendations provided supported by the body of the draft report?***

   I think our recommendations are supported throughout our response in a manner that would afford EPA an excellent report.

Both EPA for producing the original document and my colleagues for performing a solid review should be commended for their work.

James Sadd

No Comments Submitted

Veronica Vieira

I think the report looks great. I have no additional content issues. I noticed that Line 4 on page 25 of the report (33 of the pdf) is missing punctuation.