

**Comments from Members of the SAB Committee on Science Integration on
the draft report *Science Integration for Decision Making at the U.S.
Environmental Protection Agency (EPA) (draft January 5, 2012).***

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Comments from Dr. Deborah Cory-Slechta

The letter doesn't provide even a brief definition of 'science integration'. Given the somewhat broad connotations of the phrase, it might prove instructive to provide a working definition so that the administrator has a more precise idea of what exactly the goal of the exercise was.

Additionally, given the long delay in the process, the letter somehow needs to recognize the leadership changes in the AA level in the interim and that the recommendations are nonetheless still relevant.

The paragraph from lines 40-44 should precede that on lines 27-34.

The second page of the letter, the sentence on lines 1-2 is redundant.

In general, the recommendations are not prominent enough in the letter and seem to be lost in the rest of the text. It would be nice if the letter provided more succinct presentation of recommendations and not what seems like too much emphasis on how important science integration is to the Agency.

Comments on the Document

The material on p. 4-5, i.e., the Science Integration Framework Recommended by the SAB in 2000 would seem to be more appropriately placed earlier in the document, while the point of the finding that no EPA program has fully implemented the framework be retained in the recommendations. It might be a more useful document to describe the findings relative to this framework, as well as the associated recommendations.

p. 5, lines 15-16: inertia within scientific disciplines? What does that mean? It isn't clear what it is and therefore how it is an obstacle to scientific integration.

P. 6, lines 1—40. the title of the findings is that 'science assessment is a critical function at the EPA'...the point of this as a finding is not clear. That EPA needs science assessments seems like a given; its just not clear what the point of this section is intended to be.

P. 7, lines 12-20. Are these comments descriptive of some specific example from the interviews or just an overview of a best case scenario?

P. 7, lines 28-30. The case here needs to be more specific in terms of defining the need. How is this person different from the AA? Is another structure being recommended, doesn't seem to provide a specific recommendation despite the title of this section.

P. 8, line 36. Why are other recommendations listed as an Attachment instead of as a part of the document?

Comments from Dr. Terry Daniel

This revision of the prior versions of the report (and the cover letter to the Administrator) is excellent. It is shorter and more succinctly and more effectively makes our key points about science integration. It is uniformly well-written and highly readable, so it has a better chance than many SAB advisory reports to have a real effect on how the Agency does its science and decision making. There is a good balance and clear correspondence between the reported findings from the interviews and the conclusions and recommendations of the Committee. This excellent report culminates a long process involving a lot of work by a lot of SAB members and staff. We should all be proud of our accomplishment.

One general concern (expressed in the first item below) is the framing of this report as an “open letter” to the Administrator. This may be a very effective way to get the immediate attention, and hopefully action, of the Administrator. However, as we have seen, many (most) of SAB’s reports take a while to “age” before starting to show up where Agency leaders and scientists might actually see/read them (think of the 2000 report). Will the same Administrator be on hand at that time? This is not a major issue (for me at least), but it may be worth considering further before we stick a fork in this report and declare it well-done.

Specific suggestions (note that copied line numbers did not always transfer exactly)

Page 1

6 After conferring with you in the spring of 2009 to receive your support for this effort, the SAB [Is this the voice we want for the report—a letter to the current administrator?]

23 For the purpose of this report, the SAB defines “science” ~~in this report~~ broadly as any enterprise

26 innovation. The SAB supports (U.S. EPA SAB 2011) ORD’s initial steps to implement this new 27 direction, which ~~has the potential to change [encourage, foster or facilitate?]~~ science integration practices at EPA.

Page 2-3

Rather than focus on ORD science, this report ~~focuses on~~ extends consideration to science integration in the EPA’s program and 34 regional offices. ~~Over 6,000 EPA employees are involved in scientific assessments, research, and related activities, 1 with approximately 1,300 full time scientific staff in ORD and approximately 4,700 full-time scientific 2 staff in program and regional offices. 3~~ These programs and offices, along with ORD, are responsible for integrating science to support the environmental 35 decisions you make as Administrator as well as to support the environmental decisions delegated to 3 them.

[We should not imply that we are leaving ORD out altogether.]

Page 3

17 significant actions to be taken by senior managers, the agency’s Action Development Process and 18 associated Analytical Blueprint process provide a structure ~~to~~ that could encourage

science integration.⁴ Many 19 regional and site-specific decisions and routine decisions involving science, however, are not part of the 20 Action
 [It is not clear that these processes were explicitly designed, or have consistently been effectively used to foster science integration—but they certainly could be!]

Page 4

First, NAAQS 19 reviews have focused primarily on single-pollutant air quality issues, [with limited consideration](#) of 20 multi-pollutant impacts and impacts of criteria pollutants on water quality and related ecological 21 impacts¹⁰. Second, [NAAQS reviews by law focus on human health and ecological impacts](#).

[Given the first sentence, the second sentence seems to suggest that NAAQs has been derelict in its duties—is that what we intend?]

Page 5

The agency's focus on program and disciplinary "silos" remains a significant barrier to science 8 integration. The need to [determine and implement actions to protect human health and the environment through](#) individual programs complicates the quest for innovative or 9 sustainable ways to achieve the Agency's mission. 10

[Suggested change to emphasize that the actions are the goal, and the program structure is the obstacle. Also, do we need a sentence acknowledging that these silos are at least in part a product of the legal authorizations and limits on the Agency?]

Page 6

6 assessments. Program and regional decisions are delayed or questioned when the agency lacks 7 [adequate and credible](#) assessments of currently available science. 8

Although the Integrated Risk Information System (IRIS) program, which provides assessments of 10 [chronic](#) human health effects used widely by EPA programs and regions, was discussed in many SAB 11 interviews, this SAB report will not specifically comment on IRIS. IRIS has been the topic of several 12

[Only "chronic" health problems? See also the reference to "acute" effects on line 22.]

reviewed models because manufacturers are not required to test new chemicals and generally provide 28 little or no human health hazard information or information on ecological impacts. Scientists in these 29 [organizations](#) offices work within statutory constraints, often on an extremely short time-table, to assess

[To avoid a mistaken reference to the "manufacturers organizations."]

Page 7

Support for science in the EPA's regional and program offices has been 27 recognized as a priority (U.S. EPA Expert Panel 1992) and there have been calls for a top science 28 official with responsibility and authority for all the research, science and technical functions at the 29 agency (NRC 2000, U.S. Government Accountability Office 2011). At present, [however](#), the EPA has 30 not assigned a lead responsibility to manage and strengthen EPA's scientific workforce as a resource for 31 the agency as a whole.

[The first sentence is about “all the research, science and technical functions.” The second (however) sentence is only about workforce. So perhaps the second sentence should be an “even” sentence—“At present the EPA has not even assigned ...”]

Page 8

For each decision requiring science, science integration will require an initial problem formulation step, 16 with the following components: 17

- **Involvement of the responsible decision-maker** to define the initial questions that will look 18 broadly at the physical, economic, and social context of specific environmental problems to seek 19 a management decision with the broadest environmental benefits;

[This seems to imply that the “office” or “program” that is to be responsible has somehow been determined before the problem formulation process begins. Would it not be better to extend the problem formulation process forward to include some explicit consideration of what offices/programs (emphasis on the plural) are most relevant? Alternatively, we might suggest that an early step in problem formulation be to look outside the assigned responsible office/program for possible important inputs, interactions and implications, and look across the Agency (and elsewhere) for possible collaborations.]

Page 9

The EPA should increase the incentives (e.g., awards, performance evaluations, developmental 1 assignments, career opportunities) for scientists **throughout the Agency** to support the translation and integration of science into 2 decision making.

Comments from Dr. Taylor Eighmy

General/Major Comments:

1. This is an excellent and concise description of the issues, efforts and recommendations and it gets the right message across. From a timing perspective, I think it is better to get this report sent to the administrator rather than trying to perfect it further.
2. Full report, page 2, line 16.... How might we make our summary notes of the 72 meetings available in the companion document permanently available (or is the web site sufficient)?
3. Full Report, bottom page 3/top of page 4... The provided integration examples in this section are excellent. I recommend that this sentence be added at the end of line 10 on page 4: "Additional examples of science integration in the regional offices can be found in the summary notes of the 72 meetings located on the SAB web site."
4. Full report, page 9, line 10... consider adding a recommendation about linking a science integration push to "one EPA" and "Path Forward" initiatives to strengthen the message within the agency.

More Detailed Minor Comments:

1. Letter, p.1, line 28...Is the "Framework the SAB recommends for EPA" based on this report or our earlier recommendations by the NRC and SAB? I think it is the later and should state this.
2. Letter, p.1, starting line 27... somewhere before this paragraph, move the paragraph starting lower down on line 40 here first, mention needs to be made that the new "One EPA" (and the Path Forward) approach is very promising, but not fully used yet or fully reliant on complete science integration.

Comments from Dr. Penny Fenner-Crisp

See attached pdf

Comments from Dr. John Giesy

I have read the report and as I indicated before I think that the basic message is fine. I like the more streamlined version. It makes the points that need to be made. In the end I am not surprised by what was learned and I do not see that there is really anything that we at the SAB can do to change it. It is what it is. Now we know what we suspected all along. So to me, the report is sort of a statement of the obvious. Also, as I said before, the task was undertaken at a very different point in time within EPA. When the report was commissioned by Administrator Johnson, people were skeptical of EPA and its use of science in developing policy. I think that there is a new ethos within the top management and of the central government and how it relates to EPA.

Things have changed, I think for the better. But I think the timing of the report is good with the departure of Paul Anastas, I think that the timing of this report is good. So I suggest getting it to the administrator at exactly the time a replacement for Paul is named.

As I indicated before, I think that the report can use a good critical technical editing, but that is not my job.

I will not be able to be on the conference call, but between this email and my last one you have my overall opinion on the report. I do not think that there is anything novel or unexpected in the report, at least not based on my experience of working with EPA in many capacities for many years. It is and I think for better or worse will be, business as usual in many portions, especially the regions. These institutions are no different than many others and function in the same way. As long as that is understood I think that it is fine.

Comments from Dr. Rogene Henderson

I have attached my comments on the report. Good job!
Comments on draft report from SAB Committee on Science Inegration for
decision Making.-Rogene Henderson

I found the report to be in good shape and wish to express my gratitude
to those who must have worked hard to pull it together. I have a few
editorial comments.

Letter:

Page 1, line 20: I suggest adding "the various EPA programs and from"
following "with integrated input from." This adds the EPA program input
to the public input, so the sentence reads ".....to address problems as
they occur in the real world with integrated input from the various EPA
programs and from the public and interested and affected parties."

Page 1, line 46: I suggest changing "like" to "as well as".

Report:

Page 1, line 23: Delete "in this report" since it repeats what was just
said in the first part of the sentence.

Page 6, line11: Insert "and which is" following "human health effects".

Page C-1: We could combine suggestions 5 and 8.

Comments from Dr. James Johnson

Although I was amazed at how the last draft used a framework to discuss the committee's findings and recommendations, this report is an improvement. It is clear, concise and I believe will be helpful.

Two minor comments:

1. page ii, line 35: please add Jr. to my name
2. page 9, lines 4-7: do we want to provide examples such as expansion of the Title 42 hiring authority beyond ORD and utilization of Title 5 hiring authority for science and professional and senior level positions?

Comments from Dr. Wayne Landis

This is an excellent and important report and worth the considerable effort. My comments are focused on making clearer the importance of science and policy integration and the support of science in all the offices and regions of EPA.

Notes on the letter

Letter page 1 line 34, beyond ORD. Let us be very specific in this statement. We note that the majority of scientists are in the offices and regions. Let's say specifically that there is a need for scientific leadership in the program offices and regions that is oriented towards problems solving and science integration.

Letter page 1 line 46. Should we estimate the amount of change, a lot or a little?

Letter page 2 line 1. Drop the however, I do not see a contrast. I would suggest a rewording to make it a more active voice.

We view science integration as essential to achieving your environmental goals, those mandated by regulation and including the goal of sustainability.

Notes on the report.

Page 2 line 34. It seems that we are trying in this paragraph and the one previous that we are justifying our emphasis on focusing on the regions and offices. So let's be specific and say that science and policy integration happens in those parts of EPA that make rules and determine policy. We only get to this at the end of the introductory section and I would think it would have a greater impact at the very beginning of the report.

Page 3, Findings. These are well done and documented.

Is Figure 1 needed in our report? We say that it has not been implemented as much as it should have, but are there areas that have been successfully integrated? The report does not go into detail so why include the figure? Do we need a simplified figure with emphasis on the Phase I-to II steps?

Page 4. Lines 22-25. Great note. The program does not even integrate the science let alone the science and policy.

Page 6. Line 33-40. Great point and can this be made even stronger? Should there be a region-office based effort to conduct science assessments that is independent of ORD and focused on regional decision-making?

Page 7, line 22. Great point. As I noted in the letter should we be more specific about promoting science leadership in the regions and the offices? The rest of the paragraph is very strong and points out a number of problems in EPA's management of its scientific workforce. I suggest breaking these points out as numbered bullets to that they are very clear. I note that we use bullets in the Recommendations section.

We talk a lot about ORD in this paragraph. ORD's mission is not science integration as gathered from our interviews and my personal experience. The mission of science integration is the mission of the regions-offices and that is where the leadership effort should be placed. Let's be specific.

Recommendations. Again, this is a great section.

Page 8, line 32. I am concerned about the wording of "management oversight". Management oversight can also be taken to mean management altering the outcome of a science integration as has been documented in other agencies. My impression from our interviews is that many managers would have difficulty implementing a science integration program. Do we actually

mean that science integration is a specified management goal at every level in the regional and program offices? I understand what we are trying to say but we need to be specific.

Page 8 line 40. I think we are saying that a program similar to STAA for ORD needs to be implemented for scientists in other parts of EPA. Scientists in the regions-offices also need to be encouraged to be part of the broader scientific community and that needs to be supported.

Page 9 line 34. Great call for change. I suspect we will see a lot of pushback.

Comments from Dr. Thomas Theis

General

Memory is beginning to fade a bit for me on this report, but I seem to recall earlier drafts were longer than this one, and had more examples of science integration (or lack thereof). I'm a fan of concise reports in general (and this is one), but this seems to be more of an executive summary than an SAB report. Hundreds of person-hours went into the information-gathering phase of this, but that isn't reflected in the body of the report. For example, we might locate "text boxes" at strategic points to illustrate good examples of science integration, or some of the barriers that we found for science integration. I recall in Region 2 the case of PCBs in window caulking in public schools as a good example of integrating science and stakeholder input to reach a decision. In region 10 a barrier that arose was the urgency of establishing air quality standards for a drilling permit (I think it was Shell who wanted a rapid finding). Also in Region 10 there was an example of going wherever necessary to find "usable" science—I think in this case to the Fish and Wildlife Service. I'm sure there are other examples from the interviews—seems like there was an example of ORD helping at the regional level.

The report captures most of the major findings and recommendations, but leaves out the hierarchical problem of science in the regions. It is true, as the letter to the administrator notes, that most EPA scientists are in the regional offices. But structurally they represent an "underclass" of science in the Agency—many do not have Ph.D.s and most are a grade level below colleagues in the laboratories and offices. This, plus the different nature of the problems regions face versus labs and offices, creates a "science chasm" that is difficult to bridge. To me it isn't clear if one framework (our Figure 1) can be adapted to all kinds of science-based decisions.

Letter to the Administrator

Page 1 Line 20 should read "...with input integrated..." rather than "integrated input"

Page 2 Line 2 should read "...achieving the Agency's environmental goals..." not "...your..." goals

More generally I think it would be more effective if we stated our findings as concise bullets rather than unconnected paragraphs. Page 1 third paragraph looks like it has four or five findings kind of strung together ("variations", "no full implementation of previous SAB framework", "barriers", "silos", leadership"). I think it would be more effective if these were singled out.

The letter does not summarize our recommendations (only lines 36-39), but pages 8-9 of the report set out several recommendations. Again, I think the bullet approach is the most effective way of getting these in while keeping the concise tone. This may lengthen the letter somewhat, but it is already onto the beginning of page 2—we have the rest of the page to make our points.

Comments from Dr. Lauren Zeise

I think we need to add a caveat that acknowledges the important role of ORD in EPA science, maybe on page 2 at say line 24. Our focus on the program offices and regions is not to take issue with ORD. That science produced by ORD is critical and it would be inefficient to have a diffuse approach to it.

Delete on page 3 at line 24 the clause “Despite a general recognition that science is critical for decision making,” We could add a caveat that we are not advocating for a one size fits all approach to science integration, around the bottom of page 3. Different problems have different science needs.

Page 5, line 13. The language could be tweaked so that it doesn't look like we are downplaying the importance of complying with the law and meeting court ordered mandates. How about something like, “While acknowledging the importance of meeting legal mandates, to achieve science integration and broader protection goals such as sustainability an enlarged perspective it needed, that stretches beyond specific program objectives.”

Page 6, lines 10-17. IRIS is an essential piece of agency science, and we heard from a number of programs about its importance. I think we should just add a simple statement acknowledging that IRIS is important and central to decision making. I think we can do that in a way that doesn't conflict with the other SAB panel's process. Page 6, line 38 would insert the word “environmental” in front of “impacts”

Page 7, line 22. How about “EPA needs science leadership in addition to ORD” or “inclusive of, but beyond, ORD” ORD has steadily improved its scientific leadership and this is a very good thing. This should be more of a win-win framing.

Page 9, lines 8 and 9. That is a lot of review. I can see different bodies reviewing different pieces of the plan, but to have 3 organizations review the entire plan would consume too many resources and much time.