

**Summary Minutes of the United States Environmental Protection Agency (U.S. EPA)
Science Advisory Board (SAB) Quality Review Teleconference
August 31, 2012**

Teleconference of the Chartered SAB and SAB Liaisons¹

Date and Time: August 31, 2012, 11:00 a.m. – 2:00 p.m. Eastern Time

Location: By Teleconference

Purpose: to conduct a quality review of a draft SAB report entitled *SAB Review (7–26–12 Draft) of EPA’s Accounting Framework for Biogenic CO2 Emissions from Stationary Sources (September 2011)*.²

SAB Members and Liaison Participants:

SAB Members

Dr. Deborah Swackhamer, Chair
Dr. David Allen
Dr. Joseph Arvai
Dr. Ingrid Burke
Dr. George Daston
Dr. Costel Denson
Dr. Otto Doering
Dr. Michael Dourson
Dr. David Dzombak
Dr. Elaine Faustman
Dr. James Hammitt
Dr. Barbara Harper
Dr. Kimberly L. Jones
Dr. Bernd Kahn
Dr. Madhu Khanna

Dr. Nancy Kim
Dr. Cecil Lue-Hing
Dr. James Mihelcic
Dr. Christine Moe
Dr. Horace Moo-Young
Dr. Eileen Murphy
Dr. James Opaluch
Dr. Duncan Patten
Dr. Amanda Rodewald
Dr. James Sanders
Dr. Jerald Schnoor
Dr. Peter Thorne
Dr. John Vena
Dr. Robert Watts

SAB Staff Office Participants

Dr. Angela Nugent, Designated Federal Officer (DFO)
Dr. Vanessa Vu, Director
Dr. Holly Stallworth, DFO for the Biogenic Carbon Emissions Panel

Teleconference Summary:

The teleconference was announced in the Federal Register³ and discussion generally followed the issues and timing as presented in the agenda.⁴

Convene the meeting

Dr. Angela Nugent, SAB DFO, convened the advisory teleconference and welcomed the group. She noted that the meeting had been announced in the Federal Register, which provided an opportunity for public to provide oral and written comments. She noted that eight individuals had requested to provide oral public comments and that one had withdrawn his request prior to the meeting.⁵ She also noted that ten sets of written comments had been received, provided to SAB members and posted on the SAB website⁶. The DFO asked members of the public participating by teleconference to contact her so that their names could be listed in the minutes (Attachment A).

Purpose of meeting and review of the agenda

Dr. Deborah Swackhamer, the SAB Chair, welcomed SAB members to the teleconference. Dr. Swackhamer reviewed the purpose of the meeting, to conduct a quality review of a draft report entitled draft to conduct a quality review of a draft SAB report entitled *SAB Review (7-26-12 Draft) of EPA's Accounting Framework for Biogenic CO2 Emissions from Stationary Sources (September 2011)*. During quality reviews the chartered SAB deliberates to decide whether a draft report is ready to send to the EPA Administrator. She emphasized the importance of the quality review function of the chartered SAB and thanked members for their willingness to provide written comments⁷ and participate in the teleconference.

Public Commenters

Dr. Swackhamer introduced each of the public commenters in turn. Mr. Peter Becker was the first public speaker. He provided oral comment and referred to two sets of written comments on “leakage” submitted in collaboration with David Carr, Larry Edwards, Alec Giffen and Jonathan Lewis.⁸ He noted that the 100-year time frame recommended by the panel should be replaced by a shorter timeframe of decades to avoid possibly dangerous anthropogenic effects and emphasized that suitable methodologies exist to develop accounting framework, in response to a comment provided by lead reviewer Dr. Stephen Polasky. He suggested that the panel adopt language provided by SAB member Dr. James Opaluch in his written comments on the dissenting opinion provided in Appendix E.

Mr. Jerry Schwartz from American Forest & Paper Association was the second public speaker. He provided oral comment and referred to a slide presentation.⁹ He noted that the forest product industry was a leader in biomass energy. He expressed concern that the panel’s recommended alternative to EPA’s Framework was not workable or practical and would impose a burden to the fiber market, if adopted. He expressed the view that woody biomass and spent pulp, when used as fuel, emit fewer greenhouse gases than spent fuel and should be exempted from permitting requirements or have a Biogenic Accounting Factor (BAF) of zero, because such fuels is carbon neutral.

David P. Tenny from the National Alliance of Forest Owners was the third public speaker. He provided oral comments and referred to his organization’s written comments.¹⁰ He noted that the

SAB panel exceed its charge, considered hypothetical factors and did not flag them as improbable, made recommendations that were complex and not technically feasible (e.g., the anticipated future baseline would require permittees to tease out one product stream and its ultimate effects), and suggested an approach that would discourage the use of biomass. He supported the view that biomass emissions do not increase carbon in the atmosphere.

Reid Miner from the National Council for Air and Stream Improvement was the fourth public speaker. He provided oral comments and referred to written comments submitted on uncertainties regarding anticipated future baselines.¹¹ His major concern was the uncertainty associated with estimating the production of southern pine and the benefits of using that forest biomass for energy. Pine productivity has increased more than imagined possible. He suggested that the EPA and the SAB consider a range of possible outcomes, rather than a single scenario.

Sasha Lyutse of the Natural Resources Defense Council (NRDC) was the fifth public speaker. She provided oral comments and referred to comments submitted by Nathaniel Greene of NRDC.¹² She supported the panel's majority view that all biomass cannot be considered as carbon neutral because different biomass sources are heterogeneous and cannot have a categorical exclusion or inclusion from regulation. She suggested that new biomass regulations in Massachusetts provide a robust carbon accounting framework that offers a practical way to capture critical differences among sources of biomass.

Mary Booth from the Partnership for Policy Integrity was the sixth public speaker. She suggested that the report could be strengthened by providing a clearer exposition of the policy and regulatory context for EPA's proposed framework in the letter, Executive Summary, and body of the report. She also noted that it would be helpful to address the merits of recent Massachusetts regulations that effectively address the carbon debt from carbon biomass burning. Under the requirements for Best Available Control Technologies EPA needs a biogenic accounting framework for carbon dioxide that would compare fuels and technologies to identify which fuels are most efficient. Biomass emits more carbon dioxide than other fuels and, in the near term, burning wood fuel for bioenergy "is a disaster." However, in the longer term, forest regrowth replenishes forests that can act as sinks for carbon dioxide. Forest biomass compares favorably with other sources of energy. She also noted that bioenergy plans built since 2005 are more efficient and that the SAB report should distinguish between plants with different efficiency. She also noted that bioenergy facilities burn sources of fuel other than waste wood and that the SAB report should note this factor. She provided written comments after the meeting and asked that the report be strengthened by addressing her comments.¹³

Tim Searchinger from the Woodrow Wilson School, Princeton University, was the seventh public speaker. He referenced the written copy of his oral remarks provided immediately before the teleconference.¹⁴ He emphasized that the dissent presented in the draft report misrepresented the findings of the International Panel on Climate Change (IPCC) and suggested that the body of the report could be strengthened by clarifying the IPCC position. The IPCC finds the loss of trees used as biofuels as a sink for carbon dioxide significant. The IPCC approach is not carbon neutral and the panel's draft report is fully consistent with IPCC approach.

After the public commenters completed their remarks, the SAB Chair asked members of the chartered SAB for any clarifying or follow-up questions. One member asked both Mr. Searchinger and Mr. Miner if there was a possibility to manage forest growth in the long term to reach a breakeven point in the net carbon budget. Both speakers agree that projecting carbon budgets was very complex. Mr. Miner emphasized that the anticipated future baseline was especially sensitive to certain assumptions and there was great uncertainty around projecting the future. Mr. Searchinger responded that the panel should have communicated more clearly that EPA should analyze the incremental effect of forest harvest on the net carbon budget over different timeframes. There are eight related peer-reviewed papers that study the impacts of large reductions of reduced carbon in the forest for biofuel and compare that impact against burning coal. He emphasized that the timeframe for analysis was very important. He suggested that the report should explain more clearly that the President has announced a policy to reduce emissions by 2050. If wood is burned for fuel, carbon will increase in the atmosphere by 2050, but in the long term, forests can be replanted and the net carbon balance will change. It is important to evaluate the ages of trees harvested and the rate of regrowth.

Quality review discussion

Dr. Deborah Swackhamer introduced the panel chair, Dr. Madhu Khanna, and asked her to provide some background on the draft report. Dr. Khanna noted that EPA took a stationary source-centric approach to regulating emissions and that its draft framework considered carbon sequestration off site, related to the fuel used. In EPA's analysis, if a fuel source had a BAF that equaled 0 (zero), it was carbon neutral. The BAF for fossil fuels would equal 1 (one), and there would be no offset of emissions. In undertaking this review, the SAB panel had the challenging technical task of assessing greenhouse gas emission for different kinds of biomass. The panel found that EPA's framework generally tracked well for most kinds of biomass, and the panel identified a variety of implementation issues. Forest biomass, however, was more difficult to assess. The panel found that EPA did an admirable job of reviewing available science, but did not adequately consider timing as a factor in its framework. EPA considered the BAF at a point in time and did not address the different timing of emissions and timing of carbon sequestration in the forest. Intertemporal tradeoffs and sequestration with regrowth are important factors that need attention. There is potential for negative impacts in the short term with positive impacts in the long term as biomass replaces other fuels.

She noted that the IPCC approach measures emissions in the sector where they occur and does not link between a stationary source and other source-related impacts on emissions being measured. These impacts are important to determine the net impact of biogenic feedstocks on carbon emissions. The SAB panel included that the carbon impact of bioenergy needs to be estimated rather than assumed. EPA's framework must consider the heterogeneity of biofuel sources, rate of harvest, regrowth, and leakage. A categorical inclusion or exclusion from regulatory requirements is not appropriate.

The panel's draft report also provided many suggestions to strengthen EPA's framework. Most importantly, a fixed reference point baseline is too simple; it doesn't address changes over time. Therefore, the panel suggested an alternative approach for forest biomass that would use an

anticipated baseline rather than a single reference baseline to account for markets and leakage (i.e., assessing the magnitude of leakage and how to address it within the framework, two questions that are not well explored in the scientific literature). This approach would need to be updated as it was implemented and more information was gathered about net impacts of use of forest biomass for energy production. Similar approaches have been used in other regulatory contexts. EPA's renewable fuel standards uses an anticipated baseline approach, and California's low carbon fuel standards does also.

After Dr. Khanna completed her remarks, Dr. Swackhamer asked the lead reviewers to provide comments. The first lead reviewer, Dr. James Hammitt noted that the body of the draft report should be revised to clarify the difference between the dissent and the panel views. The report needs to define key terms such as BAU and "anywhere emissions." He asked how the BAU considers different temporal paths for using plant material, combusting it and regrowing it. Does the BAU summarize that information as a single number, similar to calculating global warming potential? The report would be clearer if the concept of BAU were better explained. He noted that the report should include introductory section explaining the issue and key points. If the introductory section were strengthened, responses to individual charge questions could be brief.

Dr. Duncan Patten, the second lead reviewer, noted that, overall, the panel did an excellent job. The report is clearly critical of EPA's approach. The report could have been clearer if it had created a carbon cycle diagram that showed the problems with EPA's approach on a temporal and spatial basis and how the panel's alternative approach would work. Temporal considerations need to be explained more effectively. He also asked whether the panel had considered the impacts of substituting non-forest products for forest products. He emphasized the importance of considering time scales of different products. Overall, the panel did respond to EPA's charge questions and made a contribution in emphasizing key considerations.

Dr. Jerald Schnoor, the third lead reviewer, agreed that the panel did a good job of reviewing framework and charge questions. He asked whether the report could present the panel's view about whether using biomass for power is a good idea and whether it should be incentivized. EPA might benefit from what the panel thinks. He liked BAF default value and viewed it as a "compromise between total inclusion and total exclusion." He emphasized the importance of consistency between fossil fuel and biogenic accounting. He asked whether the panel had considered recommending an adaptive management approach with mid-course corrections.

Dr. Swackhamer noted that Dr. Stephen Polasky, the third lead reviewer, was not able to participate in the quality review teleconference. Dr. Swackhamer summarized his comments. He agreed that framework needs to be internally consistent and consistent with framework for fossil fuel. It was important for the framework to include all relevant greenhouse gases and not just carbon dioxide. The draft report should more clearly communicate recommendations for improving EPA's accounting framework. The issues around leakage are important but need to be tied better to the accounting framework. The draft report would be strengthened by providing more context, framing and greater clarity. Repetitive sections of the report detract from its clarity. He noted that the justification for "not going with the IPCC approach" should be communicated clearly in the letter to the Administrator, the Executive Summary and the report.

Dr. Swackhamer asked Dr. Khanna to respond to the reviewers' main points. Dr. Khanna noted that the report can be revised to incorporate a response to the dissent and explain more clearly where views differ and the panel's rationale for its view. The report will be revised to provide a clearer explanation of BAU and to reduce redundancy. She noted that the report had provided the Cherubini graph in Appendix B to address temporal tradeoffs across different types of biomass. It may be possible to include that graph in the body of the text or a clearer discussion of those issues. The report can include a strengthened discussion of the panel's anticipated baseline recommendation and relate it to adaptive management. The report can be revised to more clearly discuss how timing and leakage are relevant to EPA's framework and provide more context. She emphasized however, that EPA must choose its framework and that any given choice raises a set of complex issues, with pros and cons for each. The panel's comments on leakage may not be so relevant for the BAF approach, but may be useful for other approaches.

Other SAB members then provided additional comments and questions. One member reinforced the report's emphasis on timing of the use of biofuels vs. the timing for sequestration of carbon dioxide. He asked about the discount factor for lost future sequestration and noted that trades across time are not on a one-to-one basis. Dr. Khanna responded that choice of an appropriate discount rate is a complex technical question and also raises ethical issues involving burdens for future generations. It may take 100 years for full regrowth to completely balance the initial cost of biofuels and analyses must also address the long-term benefits of bioenergy. She noted that the report has a few sentences that suggest EPA should consider discounting as one approach EPA should consider.

Another member expressed appreciation for the panel's work on this complex issue. He suggested that the report include a chart or table that identifies by timeframe where different accounting systems or protocols do or do not make sense for different kinds of biomass used as fuel. Dr. Khanna agreed to try to develop a table that would help communicate the panel's findings related to short-term vs. long-term effects. The SAB chair agreed that such a table would be useful because many members of the chartered SAB and public commenters raised questions about timing. Another panel member suggested that the report should address a related question, whether the use of forest biomass emissions in the short run would increase carbon in atmosphere and reach a tipping point causing adverse global warming effects. The SAB Chair noted that it would be useful to address this topic.

Another SAB member supported the addition of a conceptual diagram that indicated where carbon comes from and goes, illustrating leakages. The SAB Chair also supported the addition of such a diagram showing the carbon cycle and its relevance to the points made in the report. Dr. Khanna agreed to add such a table.

An SAB member asked about the relationship between information presented by several commenters (Mr Milner in slide 5 of his presentation, Mr. Schlesinger's comments on the relationship of increasing forest biomass and carbon load, Mr. Larson's comments on biochar, and Dr. Sammen's written comments about health effects from carbon dioxide exposure). Dr. Khanna responded that the rate of emissions decline from use of biogenic feedstocks depends on

the turnover and life of the particular feedstock. Some trees may live 50 to 60 years. Once they are cut, there is a spike in emissions and then trees grow back to sequester carbon dioxide. There are short-rotation woody crops and short-rotation trees that regrow in eight to ten years and the benefits accrue more quickly. Turnover times need to be considered and require a framework to accommodate those factors.

Members then touched on other factors. One member noted that the Executive Summary and letter to the Administrator do not refer to charge questions. Both the letter and the summary should track and be consistent with the body of the report. Another member noted that the report would be clearer if it highlighted recommendations throughout the report. Other members supported that view. A member observed that the letter to the Administrator and the Executive Summary did not express the same level of concern about issues with EPA's draft framework as the body of the report. He suggested that it would be helpful to review the draft to ensure that the language and tone are internally consistent. The SAB Chair noted that several members' written comments (e.g., Drs. Meyer and Opaluch) provided particularly useful comments to help revise language why the IPCC approach was not appropriate for the regulatory framework EPA is developing.

After discussion had concluded, Dr. Swackhamer asked for a motion to dispose of the report. . She reminded members that the purpose of the quality review is to determine if the report is ready to transmit to the Administrator as an SAB report and under what conditions. Dr. Opaluch moved that the draft report be revised, based on the members' written comments and quality review discussion, with final review by the SAB Chair to ensure that all changes were made. Dr. Cecil Lue-Hing seconded the motion. Dr. Swackhamer asked for a discussion of the motion. A member asked why public comments were so disparate and why there was a dissent. Dr. Swackhamer and Dr. Khanna clarified that the panel had only one dissenter; other members of the panel had reached consensus on the panel's language. Two other members expressed the view that the proposed changes were relatively extensive; they did not consider the revisions to be purely editorial. Dr. Costel Denson called the question and Dr. Peter Thorne seconded the motion. The committee held a voice vote and the motion did not carry (16 nays; 13 ayes). Dr. Swackhamer requested another motion. Dr. Otto Doering moved that the report be revised in light of the written comments and the quality review discussion, reviewed by a group of chartered SAB members, and then reviewed by the Chair. Dr. Peter Thorne seconded the motion. Dr. Swackhamer asked for a discussion of the motion. Dr. Watts expressed the view that all members should review the revised report. Dr. Swackhamer clarified that the motion on the table referred to review by a group of SAB members. The motion passed unanimously with 2 abstentions (Drs. Michael Dourson and Robert Watts). Dr. Swackhamer asked Drs. Hammitt, Opaluch, Patten and Sanders to serve on the group reviewing the revised report; they agreed to serve. She asked the DFO of the chartered SAB to request that Drs. Polasky and Schnoor, who served as lead reviewers, and Dr. David Dzombak also serve on the review group. She asked for volunteers from the chartered SAB to serve on the review group. Drs. Doering and Dourson volunteered.

Dr. Swackhamer concluded the teleconference by thanking Dr. Khanna for her leadership on this activity, the panel for its work, Dr. Holly Stallworth, the panel DFO, and the DFO for the chartered SAB for supporting the teleconference.

The DFO adjourned the teleconference at 1:20 p.m.

Respectfully Submitted:

Certified as True:

Signed

Signed

Dr. Angela Nugent

Dr. Deborah L. Swackhamer

SAB DFO

SAB Chair

NOTE AND DISCLAIMER: The minutes of this public meeting reflect diverse ideas and suggestions offered by committee members during the course of deliberations within the meeting. Such ideas, suggestions, and deliberations do not necessarily reflect definitive consensus advice from the panel members. The reader is cautioned to not rely on the minutes represent final, approved, consensus advice and recommendations offered to the Agency. Such advice and recommendations may be found in the final advisories, commentaries, letters, or reports prepared and transmitted to the EPA Administrator following the public meetings.

**Attachment A: Members of the Public Who Indicated Participation in the August 31, 2012
Teleconference**

Bob Abt, North Carolina State University
Stephanie Batchelor, Biotechnology Industry Organization (BIO)
Peter Becker
Kelsi Bracmort, Congressional Research Service
Marilyn Buford, USDA
Vincent Camobreco, EPA
Ann Claassen, Latham & Watkins LLP
Kipp Coddington, Mowrey Meezan Coddington Cloud LLP
Casey Deitrich CQ Transcriptions
Larry Edwards, Greenpeace
Alexander Evans, PhD
Mark Flugge, ICF international
Jennifer Jenkins, EPA
Mike Jostrom | Director Renewable Resources
W. Dean Kaiser, Stratus Environmental Solutions, Inc
Dina Kruger, Kruger Environmental Strategies
Jeffrey Morris, Sound Resource Management Group
Peter Nangelhout, EPA
Sara Ohrel, EPA
Ben Paulos
Dawn Reeves, Inside EPA
Steven Rose, EPRI
Roger Sedjo, Resources for the Future
Christopher Sherry, EPA
Kenneth E. Skog USDA Forest Service
Joe Tannery, Dominion Resources
David Tenny
Joel F. Visser,
Sidley Austin LLP
Thomas Lee Wells Jr., Ph.D., Southern Company
Linda Wilson, New York State
Clint Wood, House Science, Space and Technology Committee

Materials Cited

The following meeting materials are available on the SAB Web site, <http://www.epa.gov/sab>, at the following address:
<http://yosemite.epa.gov/sab/sabproduct.nsf/a84bfee16cc358ad85256ccd006b0b4b/bc90c429f6b1c8a685257a340003d315!OpenDocument&Date=2012-08-31>

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- ¹ Roster, Chartered SAB Members and Liaisons
 - ² Draft *SAB Review (7–26–12 Draft) of EPA’s Accounting Framework for Biogenic CO2 Emissions from Stationary Sources (September 2011)*.
 - ³ Federal Register Notice announcing the meeting (77 FR 47067-47068)
 - ⁴ Agenda
 - ⁵ List of Registered Public Speakers. Joshua Martin withdrew his request.
 - ⁶ Besides the written comments supporting the oral commenters, as noted below, written comments received included:
Comments from Jay O’Laughlin
Comments from Linc Cannon, Oregon Forest Industries Council.
Comments from Ronal W. Larson. (PDF, 7 pp., 113,018 bytes)
Comments from William A. H. Sammons. (PDF, pp., 92,355 bytes)
 - ⁷ Preliminary Comments from Chartered SAB Members as of August 24, 2012, 2:00 p.m.
 - ⁸ Comments from Peter Becker, David Carr, Larry Edwards, and Jonathan Lewis; Comments received from Jonathan Lewis on "leakage" signed by Peter Becker, David Carr, Larry Edwards, Alec Giffen and Jonathan Lewis
 - ⁹ Slides from Jerry Schwartz, American Forest & Paper Association
 - ¹⁰ Comments from David P. Tenny, National Alliance of Forest Owners
 - ¹¹ Comments from Reid Miner, NCAS: Uncertainties in Anticipated Future Baselines
 - ¹² Comments from Nathaniel Greene, Natural Resources Defense Council
 - ¹³ Statement of Mary S. Booth, Partnership for Policy Integrity
 - ¹⁴ Tim Searchinger Oral Comments.