

**United States Environmental Protection Agency (U.S. EPA)
Science Advisory Board (SAB)
Teleconference Meeting
Meeting Minutes**

Date and Time: September 26, 2018, 1:00 p.m. to 5:00 p.m. Eastern Time

Location: By teleconference only

Purpose: Conduct two quality reviews of (1) the draft SAB Review of EPA's Draft Toxicological Review of Ethyl Tertiary Butyl Ether and Draft Toxicological Review of tert-Butyl Alcohol; and (2) the draft SAB review of the EPA's Framework for Assessing Biogenic CO₂ Emissions from Stationary Sources (2014); and receive updates on current SAB projects and future topics from the EPA.

Meeting Participants:

SAB Members (see Roster¹)

Dr. Rodney Andrews	Dr. Joseph Gardella	Mr. Richard L. Poirot
Dr. Deborah Hall Bennett	Dr. John Graham	Dr. Kenneth Portier
Dr. Frederick Bernthal	Dr. Steven Hamburg	Dr. Tara Sabo-Atwood
Dr. Bob Blanz	Dr. Merlin R. Lindstrom	Dr. William Schlesinger
Dr. Todd Brewer	Dr. Robert E. Mace	Dr. Anne Smith
Dr. Joel G. Burken	Dr. Clyde F. Martin	Dr. Richard Smith
Dr. Janice E. Chambers	Dr. Sue Marty	Dr. Jay Turner
Dr. Samuel Cohen	Dr. Kristina D. Mena	Dr. Jeanne VanBriesen
Dr. Louis Anthony Cox, Jr.	Dr. Surabi Menon	Dr. Donald vanderVaart
Dr. Alison C. Cullen	Mr. Robert W. Merritt	Dr. Kimberly White
Dr. Otto Doering	Dr. Larry Monroe	Dr. Peter J. Wilcoxon
Dr. Susan Felter	Dr. Thomas Parkerton	Dr. S. Stanley Young
Dr. H. Christopher Frey	Dr. Robert Phalen	

SAB Staff:

Mr. Thomas Carpenter, Designated Federal Officer (DFO),
Mr. Thomas Brennan, SAB Staff Office Director
Dr. Shaunta Hill-Hammond, Designated Federal Officer

Other Attendees: Names of those who requested the teleconference call-in number are provided in Attachment A.

Meeting Summary:

Convene the meeting

Mr. Thomas Carpenter, Designated Federal Officer (DFO) for the chartered SAB, formally opened the meeting and noted that this federal advisory committee teleconference of the SAB had been announced in the Federal Register² (published Sept 6, 2018 VOL 83 FR 45235-42536 a prepublication version was also posted on the SAB website Aug 28, 2018). The SAB is an independent, expert federal advisory committee chartered under the authority of the Federal Advisory Committee Act. The SAB is empowered by law, the Environmental Research, Development, and Demonstration Authorization Act, to provide advice to the EPA Administrator on scientific and technical issues that support the EPA's decisions. The DFO noted that the Federal Register notice announcing the meeting had provided the public with an opportunity to provide written and oral comment. There was no request for oral comment and no written public comments received.

The DFO stated that the SAB consists entirely of special government employees (SGEs) appointed by EPA to their positions. As SGEs, chartered SAB members are subject to all applicable ethics laws and implementing regulations. Dr. Samuel Cohen has recused himself from the quality review discussion and disposition of 08-30-2018 Draft Review of EPA's Draft Toxicological Review of Ethyl Tertiary Butyl Ether (ETBE) and Draft Toxicological Review of tert-Butyl Alcohol (tBA) based on his involvement and comments on EPA assessment and previous drafts the augmented Drafts of the Chemical Assessment Advisory Committee report on today's agenda. Dr. Cohen will be providing public comments as a private citizen and not as a SAB member. Dr. Kimberly White also recused herself from the ETBE and tBA quality review based on previous comments on the assessments. EPA has determined that other advisors participating in this meeting have no financial conflicts of interest or appearance of a loss of impartiality under ethic regulations specified in 5 CFR §2635 relating to the topic of this meeting.

Purpose of the teleconference and review of the agenda

The SAB Chair, Dr. Michael Honeycutt stated that the purpose was to conduct two quality reviews of (1) the draft SAB Review of EPA's Draft Toxicological Review of Ethyl Tertiary Butyl Ether and Draft Toxicological Review of tert-Butyl Alcohol; and (2) the draft SAB review of the EPA's Framework for Assessing Biogenic CO₂ Emissions from Stationary Sources

(2014); and receive updates on current SAB projects and future topics from the EPA. He noted that members of the public have registered for both agenda items.

Dr. Honeycutt reminded members that the purpose of the quality review is to determine if the report is ready to transmit to the Administrator as a SAB report and under what conditions. In reaching that determination he asked them to focus on the SAB's four quality review questions:

- Were the charge questions adequately addressed?
- Are there any technical errors or omissions in the report or issues that are not adequately dealt with in the draft report?
- Is the draft report clear and logical?
- Are the conclusions drawn or recommendations provided supported by the body of the draft report?

Quality Review of the draft SAB Review of EPA's Draft Assessments titled Toxicological Review of Ethyl Tertiary Butyl Ether and Toxicological Review of tert-Butyl Alcohol (tert-Butanol)

Dr. Honeycutt briefly reviewed the agenda noting the registered speaker would begin the review followed by the lead reviewers, discussion by the Board and then a vote on the disposition of the report. He stated there were written comments on the SAB website in addition to today's presenters. He proceeded through the list of registered speakers.

Public Comments

Dr. Kris Thayer of EPA-NCEA, thanked the Panel for their work and acknowledged the Panel's efforts across areas of the assessments where consensus was not reached. She noted that the Agency had previously worked with pathologist experts and plans to amplify efforts to seek pathology expertise.

Dr. Mike Halpern presented comments on behalf of the Union of Concerned Scientists. He thanked the SAB for the reviewing IRIS assessments and moving them along. He then asked if the SAB could provide an update on the transparency rule and the remaining regulatory agenda items.

Dr. Samuel Cohen from the University of Nebraska Medical Center summarized his written comments³. Dr. Cohen noted that he recused himself from the SAB discussion on this peer review considering his previous reviews and publications on Review of Ethyl Tertiary Butyl Ether and Toxicological Review of tert-Butyl Alcohol. He presented his disagreement with the IRIS program and Chemical Assessment Advisory Committee (CAAC) Panel who reviewed the ETBE and tBA assessments. Specifically, he shared findings based on kidney effects associated with TBA and ETBE are entirely explainable by α 2Uglobulin nephropathy, chronic progressive nephropathy and corticomedullary mineralization, none of which are relevant to humans. He also expressed his concern about systematic review as used in this assessment and noted that no pathology expertise was on the CAAC Panel and that the SAB should consider redoing the assessment. Dr. Cohen resubmitted comments provided to the IRIS docket and to the CAAC panel reviewing the assessments.

Dr. Honeycutt asked the Board if there were any questions for the public commenters. None were raised.

Presentation from the Panel Chair

Dr. Honeycutt introduced Dr. Jan Chambers, Chair of the CAAC Augmented for the ETBE and tBA Review. Dr. Chambers provided background on the draft report as an introduction to the quality review discussion. Dr. Chambers acknowledged preliminary written comments received by chartered SAB members.⁴

Chartered SAB Discussion and Disposition of the Report

Dr. Chambers provided an overview of the CAAC Panel including meeting dates. She then provided a summary of ETBE and tBA, highlighted the presentation of recommendations within the draft report and identified areas where a lack of consensus was noted.

Dr. Honeycutt then proceeded with comments from the lead reviewers.

Dr. Sue Marty mentioned that she would highlight a few points based on her written comments. She noted that the CAAC Panel addressed all the charge questions and did a good job expressing concerns and identifying concerns. Dr. Marty suggested that some of the recommendations presented as tier 2 actions could be moved to tier 1. She also asked if the EPA had a guidance on the use of liver hypertrophy as an endpoint for establishing a reference dose?

Dr. Honeycutt offered Dr. Chambers an opportunity to respond to Dr. Marty's comments. Dr. Chambers thanked Dr. Marty for her comments. She then noted that if the Board agreed, the proposed changes to the tiered recommendations would be addressed. She also acknowledged that she would determine if the EPA has guidance on liver hypertrophy to address Dr. Marty's question.

Dr. Honeycutt asked that Dr. Kristina Mena present her comments. Dr. Mena stated that she provided written comments. Dr. Mena stated that overall the report was clear. She noted the range of expertise of the panel and questioned whether some of the recommendations would be clear to a non-toxicological person. She also noted her support for the modifications of several tiered recommendations. Dr. Honeycutt offered Dr. Chambers an opportunity to respond to Dr. Mena. Dr. Chambers thanked Dr. Mena for her comments. She then noted that if the Board agreed, the proposed changes to the tiered recommendations would be addressed.

Dr. Honeycutt asked that Dr. Ken Portier to present his comments. Dr. Portier noted his appreciation for a well written report. He also acknowledged his submission of written comments for the Board's review. He asked why for some areas of the report, no recommendations were presented. Dr. Chambers responded that the CAAC Panel had the option to include recommendations for each of the charge questions and in some cases felt that then none were needed.

Dr. Honeycutt asked for comments from other SAB members. Drs. Susan Felter and Stan Young responded. Dr. Felter raised concerns with respect to ETBE and the cancer classification. Dr. Felter was concerned that the high dose level used for ETBE and tBA were excessive and should have been removed from the analysis and may render the classification and the assessment as too conservative according to the EPA guidance She specifically disagreed with the EPA's determination and the Panels agreement that the cancer descriptor of "Suggestive Evidence of Carcinogenic Potential" was appropriate for ETBE due to Maximum Tolerate Dose concerns. Dr. Chambers responded that based on the Agency's current guidelines and policies, the classification was found to be scientifically supported. Dr. Young commented in agreement with Dr. Felter.

Dr. Honeycutt asked Mr. Carpenter for disposition options. Mr. Carpenter reviewed the options. Dr. Honeycutt asked for a motion. Dr. Felter motioned to revise the report with the lead reviewers, additional volunteers from the Board and the Panel chair. Dr. Portier seconded the motion. The motion was approved.

Dr. Honeycutt thanked the lead reviewers for their comments. He then began the Board's general discussion and there was a call for the vote. The motion was approved unanimously.

Quality review of a draft SAB review report on the Framework for Assessing Biogenic CO2 Emissions from Stationary Sources

Dr. Honeycutt turned the Board's attention to the quality review of the 8/29/18 draft report on the Framework for Assessing Biogenic CO2 Emissions from Stationary Sources. Dr. Honeycutt summarized the history of this SAB report that is returning to the Board for a third time, with the first review conducted in March 2016 and the second review August 2017. Dr. Honeycutt said the two primary issues were (1) time frame over which carbon emissions should be calculated and (2) use of modelling for computing Biogenic Assessment Factors (BAFs). Dr. Honeycutt also referenced EPA's recent policy statement of April 2018 in which former Administrator Pruitt stated that in future regulatory actions, biomass from managed forests will be treated as carbon neutral when used for energy production at stationary sources. He said this policy statement⁵ does not change the charge to the SAB which was still being asked to comment on the scientific underpinnings of calculating emissions from biomass. He briefly reviewed the agenda noting the registered speaker would begin the review followed by the lead reviewers, discussion by the Board and then a vote on the disposition of the report. He stated there was a chronology⁶ of the SAB's review and the submitted written comments on the SAB website in addition to today's presenters. He proceeded through the list of registered speakers.

Public Comments

Mr. Stanley Lancey of the American Forest & Paper Association and the American Wood Council summarized their written comments⁷. He said they agreed with concerns about using the anticipated baseline approach because of its complexity which makes it difficult to parameterize and validate. Mr. Lancey cited the Buchholz (2014) article which found that in 30 years of timber trend assessment, the level of uncertainty rules out the usefulness of a baseline. Mr. Lancey pointed out that the paper and wood products manufacturers are the largest industrial producer and user of bioenergy, predominately from biomass residuals which avoid the emission

of approximately 181 million metric tons of CO₂.

Mr. Sammi Yassa of the Natural Resources Defense Council⁸ said that biogenic carbon cannot be assumed to be carbon-neutral but cautioned against the 8/29/18 report's reversal of the Panel's rebuttal of reference point accounting, pointing to his written comments⁹ which cited the Panel's 2012 report which explained that an anticipated baseline approach would be needed to estimate additionality, i.e. the extent to which forest stocks would have been growing or declining over time in the absence of harvest for bioenergy. Mr. Yassa also cited a concern with Section 3.4 of the report which states that a landscape approach is required for accounting for the impacts of feedstock demand on carbon stocks. Mr. Yassa's concern, detailed in his written comments, is that report's language supporting this recommendation relied on undefined terms and did not distinguish among key measures of carbon stock changes.

Mr. Jonathan Lewis, Clean Air Task Force summarized the joint comments from the Natural Resources Defense Council and Clean Air Task Force comments on Draft Science Advisory Board Review of Environmental Protection Agency's Framework for Assessing Biogenic CO₂ Emissions from Stationary Sources¹⁰. The Clean Air Task Force agreed with the 8/29/18 report (and all previous versions of the report) that it is scientifically indefensible to assume that all biomass has no net emissions to the atmosphere. Mr. Lewis also endorsed the idea that a policy-specific context was needed. Mr. Lewis echoed Mr. Yassa's concerns about the landscape approach advocated by the SAB in Section 3.4. Mr. Lewis also voiced disagreement with the SAB backtracking on its earlier warnings against a reference point baseline.

Dr. Jennifer Jenkins, Vice President of Enviva and Chief Sustainability Officer, described Enviva as the world's largest producer of wood pellets used to generate electricity and heat. Dr. Jenkins stressed the need for certainty in the treatment of biomass by regulators so that investors would have all the information they needed to make investments. Dr. Jenkins agreed with the SAB's conclusion that an approach based on carbon stocks is appropriate and that such an analysis should be conducted on a landscape/regional basis and not at the stand level. Dr. Jenkins said we need a way to discover what constitutes "good" biomass without complicated modelling and referred members to their written comments¹¹.

Dr. Timothy Searchinger, Princeton University cited a letter he co-signed to the European Parliament warning that going beyond waste and instead harvesting wood to burn for bioenergy would double or triple the greenhouses gases added to the atmosphere by 2050 for each energy unit of fossil fuels displaced. Dr. Searchinger warned against the SAB supporting EPA's reference point baseline approach and thereby co-mingling effects of bioenergy on carbon stocks from other exogeneous changes. Dr. Searchinger supported the warnings in the 8/29/18 report against use of the FASOM model and referred to his written comments¹².

Mr. Reid Miner, National Council for Air and Stream Improvements (NCASI)¹³ said only hydropower and biomass were capable of meeting baseload electricity requirements. Mr. Miner said NCASI's written comments offered some ways to deal with the implementation challenges associated with anticipated baselines. Mr. Miner said SAB's suggestion of a periodically updated reference point baseline should be considered in the context of several important factors, especially the insensitivity of global temperatures to short-term changes in carbon stocks and

CO2 emissions.

Dr. Shaye Wolf, Center for Biological Diversity summarized the Center's written comments¹⁴. Dr. Wolf referred the audience to written comments submitted jointly with the Partnership for Policy Integrity. Dr. Wolf encouraged the SAB to reject the reference point approach just as the earlier Biogenic Carbon Panels had. Dr. Wolf said the SAB should acknowledge that the Framework is not fit for purpose because it is not suited for evaluating net emissions from individual biomass facilities. She also said the 8/29/18 report seems confused about landscape versus stand-level analysis. Dr. Wolf said the correct approach is stand-level modelling aggregated up to the regional scale using regionally appropriate BAFs. Dr. Wolf said a robust framework is needed for facility-level carbon accounting considering the Center for Biological Diversity's lawsuit against EPA for issuance of a Prevention of Significant Deterioration permit using Best Available Control Technology for burning biomass. In that lawsuit, EPA said it was too difficult to quantify the atmospheric impacts of different feedstocks.

Dr. Madhu Khanna, former Chair of the Biogenic Carbon Emissions Panel and Professor at the University of Illinois, voiced concerns with the process that led to the latest set of revisions to the biogenic carbon emissions report. Dr. Khanna said the SAB had selectively deleted sections of the panel's report and left figures that no longer support the text. The SAB did not provide justifications for the changes in the text. As a second criticism, Dr. Khanna said the SAB's preference for a policy-based time horizon would lead to inconsistent BAFs, allowing regulated parties to opportunistically pick their own BAF leading to problems of leakage. As a third point, Dr. Khanna noted that a policy horizon implies that any carbon impacts that occur after that time period are not relevant. As a fourth point, Dr. Khanna pointed out the inconsistency between policy-based BAFs and climate change metrics used elsewhere¹⁵.

Dr. Robert Abt, a former Biogenic Carbon Emissions panelist and Professor at North Carolina State University, provided a written statement¹⁶ and said the reference point approach, updated periodically, would not address concerns. Dr. Abt raised the issue of leakage where reducing harvest in one area can lead to increased harvest elsewhere. Such leakage would not be captured by a reference point approach.

Dr. Ken Skog, USDA Forest Service¹⁷, a former panelist with the Biogenic Carbon Emissions Panel and former lead author for the Intergovernmental Panel on Climate Change (IPCC) 2006 guidelines for preparing national greenhouse gas inventories, cited two of the IPCC guidelines that he thought were not met in the 8/29/18 report: comparability and accuracy. The SAB promotes a policy-based horizon that is inconsistent with a science-based time horizon. The policy-based horizon supported in the new SAB draft would not allow comparison across various fuels and contexts, unlike the Social Cost of Carbon which is based on a 300- year time frame. In a rebuttal of the SAB's new preference for "simple models," Dr. Skog said accurate models are best.

Dr. Steven Rose, a former panelist with the Biogenic Carbon Emissions Panel and Senior Research Economist at the Electric Power Research Institute, objected to the SAB setting aside the work of an 18-member panel originally convened in 2011. On the SAB's policy-based time horizon, Dr. Rose said that metrics should not be used to form policy; rather they should be

derived from science. The Social Cost of Carbon example, based on 300 years, captures effects well beyond any policy horizon. Dr. Rose said the carbon effects of biomass could only be determined with use of a counterfactual (anticipated baseline).

Presentation from the Panel Chair

Dr. Honeycutt introduced Drs. Steven Hamburg, William Schlesinger, and Jeanne VanBriesen, the SAB members assigned to revise the report at the August 2017 chartered SAB meeting and acknowledged preliminary written comments received by chartered SAB members^{18, 19}.

Chartered SAB Discussion and Disposition of the Report

Comments from SAB Writing Group:

Dr. Steven Hamburg of the SAB said he was pleased that many of the public comments reflected the sentiment that the 8/29/18 report was responsive to earlier concerns. He said he would implement many specific suggestions on how to clarify the report. On the time frame, Dr. Hamburg said he believed the approach should depend on the objective to which the accounting is deployed, citing Global Warming Potential as not being based on a single time horizon. The IPCC, according to Dr. Hamburg, says science cannot determine the correct time horizon. With respect to baselines, Dr. Hamburg said the SAB had outlined the options and challenges associated with different options.

Dr. William Schlesinger of the SAB acknowledged that outside comments highlighted some issues that needed further revision. He noted the Paris Climate Accord had the objective of limiting atmospheric emissions by 2025. Dr. Schlesinger said he would like to pull back statements in the 8/29/18 report that support landscape scale accounting. We should not assume that butting biomass is mitigated by growing stocks elsewhere. Dr. Schlesinger voiced skepticism that estimating anything over a 300-year time period could be feasible.

Dr. Jeanne VanBriesen of the SAB said an important component of the review was adequately presenting the challenge in addressing biogenic carbon feedstocks within the context of the BAF. EPA sought to define a BAF across multiple policy objectives. Since the BAF depends on expectations about the future state of carbon stocks, the models are critical in this. Models that simulate the future for both ecological and economic factors are challenging to parameterize and validate. Assumptions about past conditions and parameters can be difficult to acquire at necessary spatial and temporal resolutions. Dr. VanBriesen said the SAB was recommending that EPA revise the Framework to include the policy context and use both uncertainty and sensitivity analysis.

Comments from Lead SAB Reviewers:

Dr. Rodney Andrews said he did not think questions 2a or 2b were adequately addressed. He also noted that a lot of the issues were outside the charge questions. Dr. Andrews noted that the condensation of responses to many sub-questions resulted in a loss of specificity. He noted the conclusions were supported by the body of the report.

Dr. Surabi Menon said she appreciated the difficulty of the report and the difficulty of getting consensus. She said she thought the charge questions on temporal and spatial scale were adequately addressed.

Dr. Larry Monroe said the report was not well-written and was repetitive in places. The Executive Summary did not describe what was said in the body of the report. He said the report's quality was not sufficient to merit an endorsement of the SAB and it was non-responsive to the charge questions. Dr. Monroe said he was puzzled by the defensive nature of the report in which authors declined to say much without a policy context. Most of the recommendations, according to Dr. Monroe, were platitudes, e.g. periodically revisiting the baselines. Dr. Monroe recommended the SAB abandon the report.

During the general discussion, one SAB member said it would be good to update the report to show where it departs from previous drafts. Another member said he would like to see some statement about the significance of CO₂ emissions from bioenergy in the overall picture of U.S. greenhouse gas emissions. Another member expressed disappointment about the lack of clarity and clear guidance while also voicing opposition to the statement that simpler models were needed in the face of extraordinary complexity. Another member requested more context so that readers understand the issue of how long we should wait before carbon neutrality is achieved.

Dr. Hamburg said he could add some sentences to provide context for the relative importance of biogenic carbon emissions in the U.S. In response to critics who were skeptical that the report should go forward, Dr. Schlesinger said he thought the report contributed to the conversation and Dr. Hamburg reminded the audience they were not free to write a new report de novo. In response to comments that certain of the charge questions were not answered, Dr. VanBriesen said they could clarify which charge questions were unanswerable.

Dr. Honeycutt guided members in a discussion of whether they thought the problems in the report could be fixed. One member suggested the writers try to highlight the pros and cons of the recommendations on timeline, baseline and landscape scale versus stand level modelling.

The SAB Chair asked for a motion regarding the development of this letter. Dr. Rodney Andrews moved that the Drs. Hamburg, Monroe, and Smith work on revisions for Dr. Honeycutt to review. Dr. vanderVaart seconded that motion. Dr. Honeycutt invited members to discuss the motion. Members called for the vote on the motion. The motion was accepted unanimously with none abstaining.

Updates on SAB Activities

Mr. Carpenter noted that the SAB Staff Office and Dr. Honeycutt received an email from William Wehrum, Assistant Administrator to the Office of Air and Radiation, on September 26 regarding the Office of Air follow up on the SAB review of the Regulatory Agenda. The email notes the EPA is coordinating the response from several offices through the office of Air. They noted that:

“Due to the complexity of some of these regulatory actions as well as regulatory developments since the Board's June meeting as well as the involvement of a number of EPA programs, the development and finalization of this response has taken slightly longer than expected. We want to ensure

that the information provided to the board is up to date and comprehensive in order to facilitate meaningful engagement on these important regulatory science issues. We anticipate that the agency's response will be transmitted in the next week or so ..."

The SAB staff Office is briefing members of Acting Administrator Wheelers staff on the candidates for the SAB and the four standing committees. We will be notifying members of the Acting Administrator's decisions in the fall.

Mr. Carpenter noted that several members terms were ending on September 30 and acknowledged their leadership, advice and service to the SAB and the EPA. He invited the members to thank Drs. Joel Ducoste, Cynthia Harris, William Field, Chris Frey, Surabi Menon, William Schlesinger, and Jeanne VanBriesen.

The DFO adjourned the meeting at 5:10 p.m.

Respectfully Submitted

Certified as Accurate

_____/s/_____
Mr. Thomas Carpenter
SAB DFO

_____/s/_____
Dr. Michael Honeycutt
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 to 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.

Materials Cited

The following meeting materials are available on the EPA and SAB website, respectively (<http://www.epa.gov> and <http://www.epa.gov/sab>), at the page for the September 26, 2018 teleconference:

<https://yosemite.epa.gov/sab/sabproduct.nsf/a84bfee16cc358ad85256ccd006b0b4b/42057c1cb38c7ad5852582f8004f2de7!OpenDocument&Date=2018-09-26>

¹ Roster of SAB members

² Federal Register published Vol. 83, No 173. Thursday, September 6, 2018 (4525-45236)

³ ETBE tBA: Dr. Samuel Cohen comments on the 08-30-2018 Draft Review of EPA's Draft Toxicological Review of Ethyl Tertiary Butyl Ether and Draft Toxicological Review of tert-Butyl Alcohol.

⁴ ETBE tBA: Quality Review comments as of September 24, 2018

[https://yosemite.epa.gov/sab/sabproduct.nsf/D96CA5DF5CB9078985258312007E878F/\\$File/ETBE+QR+members+comments+09242018.pdf](https://yosemite.epa.gov/sab/sabproduct.nsf/D96CA5DF5CB9078985258312007E878F/$File/ETBE+QR+members+comments+09242018.pdf)

⁵ EPA's Treatment of Biogenic Carbon Dioxide Emissions from Stationary Sources that Use Forest Biomass for Energy Production. <https://www.epa.gov/air-and-radiation/epas-treatment-biogenic-carbon-dioxide-emissions-stationary-sources-use-forest>

⁶ Biogenic CO2 Emissions: Chronology of SAB activities and advice regarding Biogenic Carbon Emissions from Stationary Sources. [https://yosemite.epa.gov/sab/sabproduct.nsf/45EEC58BBA7C476085258312007799C0/\\$File/Chronology+Biogenic+Carbon+EmissionsReport.pdf](https://yosemite.epa.gov/sab/sabproduct.nsf/45EEC58BBA7C476085258312007799C0/$File/Chronology+Biogenic+Carbon+EmissionsReport.pdf)

⁷ Biogenic CO2 Emissions: American Forest and Paper Association & American Wood Council comments on 8/29/18 SAB's Draft Report on EPA's 2014 Draft "Framework for Assessing Biogenic CO2 Emissions from Stationary Sources." [https://yosemite.epa.gov/sab/sabproduct.nsf/BC4266734A05F51F8525830C00785559/\\$File/AF&PA-AWC+SAB+Report+Comments+091818.pdf](https://yosemite.epa.gov/sab/sabproduct.nsf/BC4266734A05F51F8525830C00785559/$File/AF&PA-AWC+SAB+Report+Comments+091818.pdf)

⁸ Biogenic CO2 Emissions: Mr. Sami Yassa Oral Remarks. [https://yosemite.epa.gov/sab/sabproduct.nsf/AF905A771E3061AB852583140059B512/\\$File/71687988.pdf](https://yosemite.epa.gov/sab/sabproduct.nsf/AF905A771E3061AB852583140059B512/$File/71687988.pdf)

⁹ Biogenic CO2 Emissions: Mr. Sami Yassa Oral Remarks.

¹⁰ Biogenic CO2 Emissions: Comments from the Clean Air Task Force and the Natural Resources Defense Council on 8/29/18 Draft SAB Review of EPA Framework for Assessing Biogenic CO2 Emissions from Stationary Sources. [https://yosemite.epa.gov/sab/sabproduct.nsf/5A0CC03BBB14B0508525830E00633412/\\$File/99095000.pdf](https://yosemite.epa.gov/sab/sabproduct.nsf/5A0CC03BBB14B0508525830E00633412/$File/99095000.pdf)

¹¹ Biogenic CO2 Emissions: Enviva comments on the 8/29/18 SAB Review of the EPA Framework for Assessing Biogenic CO2 Emissions from Stationary Sources. [https://yosemite.epa.gov/sab/sabproduct.nsf/25E8AB29D36DE7928525830D00756A0A/\\$File/Enviva_comment&enclosure.pdf](https://yosemite.epa.gov/sab/sabproduct.nsf/25E8AB29D36DE7928525830D00756A0A/$File/Enviva_comment&enclosure.pdf)

¹² Biogenic CO2 Emissions: Dr. Searchinger, Princeton University, and Drs. Duffy and Moomaw, Woods Hole Research Center, comments on the 8/29/18 Draft SAB Review of EPA's Framework for Assessing Biogenic CO2 Emissions from Stationary Sources. [https://yosemite.epa.gov/sab/sabproduct.nsf/6F14ECF23E90E0818525830E00638542/\\$File/DuffyMoomaw&SearchingerBiogenic.pdf](https://yosemite.epa.gov/sab/sabproduct.nsf/6F14ECF23E90E0818525830E00638542/$File/DuffyMoomaw&SearchingerBiogenic.pdf)

¹³ Biogenic CO2 Emissions: National Council for Air and Stream Improvement, Inc. comments on 8/29/18 draft SAB's review of the 2014 draft Framework for Assessing Biogenic CO2 Emissions from Stationary Sources. [https://yosemite.epa.gov/sab/sabproduct.nsf/D70F2F3BE59D26E98525830D007587BB/\\$File/NCASI+comments+on+Biogenic+CO2.pdf](https://yosemite.epa.gov/sab/sabproduct.nsf/D70F2F3BE59D26E98525830D007587BB/$File/NCASI+comments+on+Biogenic+CO2.pdf)

¹⁴ Biogenic CO2 Emissions: Center for Biological Diversity and Partnership for Policy Integrity Comments to the SAB on 8-29-18 Draft Quality Review of EPA's Biogenic CO2 Accounting Framework [https://yosemite.epa.gov/sab/sabproduct.nsf/8DA7B41C90DF00DF8525830E00659061/\\$File/06876547.pdf](https://yosemite.epa.gov/sab/sabproduct.nsf/8DA7B41C90DF00DF8525830E00659061/$File/06876547.pdf)

¹⁵ Biogenic CO2 Emissions: Drs. Khanna, Abt, Shrag and Skog comments on Science Advisory Board (SAB) 8-29-18 Draft Report for Quality Review. [https://yosemite.epa.gov/sab/sabproduct.nsf/2EB9B4E0D77B35D28525831200588A65/\\$File/Khanna_et_al_BioCO2_comment.pdf](https://yosemite.epa.gov/sab/sabproduct.nsf/2EB9B4E0D77B35D28525831200588A65/$File/Khanna_et_al_BioCO2_comment.pdf)

¹⁶ Biogenic CO2 Emissions: Dr. Robert Abt oral remarks. [https://yosemite.epa.gov/sab/sabproduct.nsf/AE41BC038A563F0F85258316005570C5/\\$File/92985302.pdf](https://yosemite.epa.gov/sab/sabproduct.nsf/AE41BC038A563F0F85258316005570C5/$File/92985302.pdf)

¹⁷ Biogenic CO2 Emissions: Dr. Ken Skog oral presentation [https://yosemite.epa.gov/sab/sabproduct.nsf/8B029FC06509994C852583140058D6DA/\\$File/61232278.pdf](https://yosemite.epa.gov/sab/sabproduct.nsf/8B029FC06509994C852583140058D6DA/$File/61232278.pdf)

¹⁸ Biogenic CO2 Emissions: Quality Review Comments from Members of the Chartered SAB on the SAB Draft Report:

Draft (8/29/2018) SAB review of Framework for Assessing Biogenic CO2 Emissions from Stationary Sources (2014)

[https://yosemite.epa.gov/sab/sabproduct.nsf/FE2D5C4546DEB18A85258312007E967D/\\$File/BioCO2+QR+members+comments09242018.pdf](https://yosemite.epa.gov/sab/sabproduct.nsf/FE2D5C4546DEB18A85258312007E967D/$File/BioCO2+QR+members+comments09242018.pdf)

¹⁹ Biogenic CO2 Emissions: Comments of Anne Smith on the 8-29-18 SAB Draft Report: “SAB review of Framework for Assessing Biogenic CO2 Emissions from Stationary Sources (2014)” September 25, 2018.

[https://yosemite.epa.gov/sab/sabproduct.nsf/D3FAAF26163E4C5D852583140056ED5F/\\$File/73835686.pdf](https://yosemite.epa.gov/sab/sabproduct.nsf/D3FAAF26163E4C5D852583140056ED5F/$File/73835686.pdf)

Attachment A
U.S. EPA Science Advisory Board (SAB)
Teleconference Meeting September 26, 2018,

Members of the public who requested the teleconference call-in number

Sasha Stashwick, Natural Resources Defense Council (NRDC)
William Hohenstein, US Department of Agriculture
Jefferson Cole, US Environmental Protection Agency (EPA)
Paul Schlosser, U.S. EPA
Tristram West, US Department of Energy
Tina Bahadori, EPA
Sylvia Carignan, Bloomberg Environment
Wes Hanson, USDA
Alyssa Tsuchiya, Union of Concerned Scientists
Abby Smith, Bloomberg Environment
David Dunlap, US EPA
Kevin Bromberg, Small Business Administration
John Steller, US EPA
Vicki Soto, U.S. EPA
Chris Dockins, US EPA
Vincent Camobreco, US EPA
Li, Abby Exponent
Maria Hegstad, Inside EPA
Leif Hockstad, U.S. EPA
Brent Wall, ExxonMobil
James Bus, Exponent, Inc
Mark Drajem, NRDC
Laura Seidman, AF&PA
James Weaver, US EPA
Jerry Schwartz, AF&PA
Tim Bushman, None
Chip Murray, National Alliance of Forest Owners
William Moomaw, Princeton University
Kathleen Newhouse, US EPA
Janice Lee, US EPA
Shaye Wolf, Center for Biological Diversity
Lori Shepherd, U.S. EPA
Melissa Chun, US EPA
Ali Schmidt, ANTARES Group Inc.,
Jennifer Jenkins, Enviva LP
Dan Kelly, Marathon Petroleum Corporation
Mary Catherine Fish, MCF Consulting for API
Suzanne Hartigan, American Chemistry Council
Stanley Lancey, American Forest & Paper Association
Elliott Levine, Energy and Environmental Strategies
Itai Chipinda, Phillips 66
Madhu Khanna, University of Illinois, Urbana-Champaign

Attachment A
U.S. EPA Science Advisory Board (SAB)
Teleconference Meeting September 26, 2018,

Sara Ohrel, US EPA

Jessica Ryman-Rasmussen, American Petroleum Institute (API)

Dawn Reeves, Inside EPA

Elizabeth Corona, US EPA

Alexandra Teitz, AT Strategies, LLC

Kate Shenk, BIO

Steve Woock, Weyerhaeuser Company

Kyle Harris, Corn Refiners Association