TESTIMONY OF
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BEFORE THE
SUBCOMMITTEE ON ENVIRONMENT AND THE SUBCOMMITTEE ON ENERGY
OF THE
HOUSE COMMITTEE ON SCIENCE, SPACE AND TECHNOLOGY

JOINT HEARING ON
LESSONS LEARNED: EPA'S INVESTIGATIONS OF HYDRAULIC FRACTURING

JULY 24, 2013

Good morning Chairman Stewart, Ranking Member Bonamici, Chairman Lummis, Ranking Member Swallwell, Distinguished Subcommittee Members, Ladies and Gentlemen. Thank you for the opportunity to testify before both subcommittees. I am Dave Dzombak, the Walter J. Blenko, Sr. University Professor and Head of the Department of Civil and Environmental Engineering at Carnegie Mellon University. I am in my 25th year on the faculty at Carnegie Mellon. My teaching and research is focused in water quality engineering and science, and I have worked on a wide range of topics in this domain as a researcher and consultant. I have also been continuously engaged in professional and public service, including professional society service and editorial service for professional journals; service on various state and regional committees; and service for several federal agencies, including the U.S. Environmental Protection Agency (EPA). I served as a member of the Environmental Engineering Committee of the EPA Science Advisory Board (SAB) from 2002-2007, Chair of the Committee from 2007-2010, and since 2007 I have been a member of the Chartered SAB. I also served on the Environmental Technology Subcommittee of the EPA National Advisory Council for Environmental Policy and Technology from 2004-2008. In addition, I am a member of the National Academy of Engineering, and have served on and chaired a number of committees of the National Research Council, the research division of the National Academies.

I am Chair of the SAB Hydraulic Fracturing Advisory Panel. This is an ad hoc panel formed by the SAB staff in response to a request from the EPA Office of Research and Development for peer review of research progress and products from their Congressionally-requested study of the relationship of hydraulic fracturing and drinking water resources. In the July 16 invitation letter

from Chairman Stewart and Chairman Lummis, I was asked to address four specific topics. I have organized my testimony to address these topics.

I should emphasize that in my testimony I speak for myself and not for the Hydraulic Fracturing Advisory Panel members, the Chartered SAB, or SAB management and staff.

Role of the Science Advisory Board Hydraulic Fracturing Research Advisory Panel

Discuss the role of the Science Advisory Board's Hydraulic Fracturing Research Advisory Panel in reviewing, commenting on, and otherwise assessing the EPA's ongoing study of hydraulic fracturing. This should include an explanation of the relationship between the Panel, the SAB, and the Agency, as well as the roles and responsibilities of the Panel relative to the study and a timeline of review-related activities.

Relationship between the Panel, the SAB, and the Agency

Congress established the EPA Science Advisory Board in 1978 and gave it a broad mandate to advise the Agency on scientific and technical matters. The EPA Administrator appoints members to the Chartered SAB. The Chartered SAB often conducts its work using subcommittees, sometimes augmented with additional experts, or panels composed of SAB members and additional experts or consultants. All such groups report to the Chartered SAB, and are chaired by Chartered SAB members. Authority to approve and transmit advice to the EPA Administrator lies solely with the Chartered SAB. The SAB is subject to and operates under the regulations of the Federal Advisory Committee Act (FACA).

The SAB has been involved with providing scientific peer review and expert advice since the beginning of the EPA research study. This has included review of the research scoping plan in 2010 and the detailed research study plan in 2011. The SAB Environmental Engineering Committee augmented with other SAB members reviewed the research scoping plan in 2010, and the SAB formed a new ad hoc panel to review the research study plan. I chaired both of these reviews, and both resulted in consensus advisory reports that were submitted to the Administrator after review by the Chartered SAB. The EPA requested a consultation for the December 2012 Progress Report, for which the current Advisory Panel was formed by the SAB.

An SAB consultation is an opportunity for EPA to hear from individual experts and does not require consensus among the experts nor preparation of a detailed report. After a consultation meeting occurs, a compilation of individual expert comments from SAB Panel members is often developed for the Agency's consideration. Although individual members may prepare written comments, let me emphasize that this is not consensus advice and no report is prepared for consideration by the Chartered SAB. A brief letter is sent to the EPA Administrator for notification that the consultation was held.

The review conducted by the Chartered SAB on draft SAB reports is called a "quality review," which focuses on the quality, technical accuracy and clarity of the report. The quality review occurs in a separate public meeting, and is guided by four questions: a) Were the charge questions to the SAB committee or panel adequately addressed; b) Are there any technical errors or omissions or issues that are not adequately dealt with in the draft report; c) Is the draft report clear and logical; and d) Are the conclusions drawn or recommendations provided supported by the body of the draft report. As with panel meetings, Chartered SAB members usually prepare written pre-meeting comments that address the quality review questions. Members' review comments are posted to the SAB website.

During the SAB advisory process, representatives of EPA offices provide review documents for the SAB's consideration, and specific charge questions for which SAB response is requested. Agency representatives also provide briefings on scientific issues. They are a resource for the panel members, and answer questions about the work being reviewed. However, Agency personnel are not involved with preparation of an SAB advisory report; the SAB is independent in its evaluations and guards this independence scrupulously. The Agency is provided an opportunity to request technical corrections (errors of fact) or clarification of text in draft reports. Requests from the Agency for such clarifications or corrections must be made in writing and are posted to the SAB website. The SAB Staff Designated Federal Officer may request additional information from the Agency on behalf of the panel, and this information also is part of the public record.

The SAB anticipates that the Agency will submit the scheduled 2014 report of research study results for peer review. At that time the SAB will address charge questions, review the document, and develop a written report after deliberations by the Advisory Panel, opportunity for public comment, and a review by the Charted SAB before advice is provided to the Administrator. Each of these steps will be conducted at open meetings or teleconferences in accordance with FACA.

Roles and Responsibilities of the Panel relative to EPA's Hydraulic Fracturing Research, and Timeline for Panel Activities

EPA requested an SAB consultation on EPA's December 2012 "Progress Report: Potential Impacts of Hydraulic Fracturing on Drinking Water Resources." The SAB formed an advisory panel with appropriate expertise. The SAB announced in March 2013 the Hydraulic Fracturing Research Advisory Panel and conducted a consultation on the December 2012 Progress Report on May 7-8, 2013.

The Advisory Panel plans to hold a teleconference in Fall 2013 to discuss new and emerging information related to hydraulic fracturing and drinking water resources. The SAB Staff Office will follow the standard procedure to provide notice in the Federal Register on the SAB's website describing the logistics and venue for this teleconference.

I understand that EPA plans to develop a complete report of initial results of its research on the potential impacts of hydraulic fracturing on drinking water resources by December 2014 and request a peer review of this report. After receiving the report, I anticipate that it will take 10 months to one year before a final, consensus SAB Report is completed and subjected to quality review by the Chartered SAB. The Panel may also provide advice on other technical documents and issues related to the EPA study upon further request by EPA.

SAB Hydraulic Fracturing Research Advisory Panel Formation and Panel Member Information

The Advisory Panel was formed by the SAB Staff Office. SAB members do not participate in the selection of Panel members. Questions about Panel formation should be directed to the SAB Staff Office. The SAB Staff Office announced the SAB Hydraulic Fracturing Research

Advisory Panel on March 21, 2013.

The Advisory Panel has 31 members and is the largest SAB panel ever formed. The members of the Panel represent a balance of industrial, academic, non-government, and government experts.

The Panel has at least three experts in each of the following nine areas of expertise that were identified by the SAB staff as needed considering the activities included in the final Study Plan: Petroleum/Natural Gas Engineering; Petroleum/Natural Gas Well Drilling; Hydrology/Hydrogeology; Geology/Geophysics; Groundwater Chemistry/Geochemistry; Toxicology/Biology; Statistics; Civil Engineering; and Waste Water and Drinking Water Treatment.

The Panel comprises eight current employees of companies and consulting firms; two government employees; and 21 academics/university professors (including some previously employed in industry).

The eight Panel members who are currently employed by industry have a collective total of 218 years working in industry or consulting (average of 27 years experience each). Ten other Panel members have significant industry experience (i.e., at least two or more years working as industry employees or as full-time consultants). These ten members have a collective total of 61 years working in industry or consulting (i.e., an average of 6 years experience each).

May 2013 SAB Consultation on EPA's Hydraulic Fracturing Research Progress Report

Explain and discuss the consultation that took place between the Panel, the full SAB, and the Agency in May of 2013 with respect to the EPA Progress Report: Potential Impacts of Hydraulic Fracturing on Drinking Water Resources – December 2012. Please summarize the interactions that took place, the review mechanisms and processes that were undertaken, and the nature of the review.

During 2012, prior to release of the Progress Report, EPA requested the SAB to conduct a consultation on the research described in the report. An SAB consultation is a mechanism for

SAB Panel members to provide their individual expert comments for the Agency's consideration early in the implementation of a project or action. A consultation does not require consensus among the committee members nor preparation of a detailed report.

The SAB conducted the consultation at a public meeting in Arlington, VA on May 7 and 8, 2013. The meeting provided opportunity for individual members of the Advisory Panel to hear public comment, listen to EPA staff briefings, and provide their individual expert oral comments on charge questions associated with the research described in EPA's December 2012 Progress Report, as well as an opportunity for members of the public to provide oral and written comments for the Panel's consideration.

All materials and presentations from the May 7-8, 2013 meeting are posted on the SAB meeting website: http://yosemite.epa.gov/sab/sabproduct.nsf/a84bfee16cc358ad85256ccd006b0b4b/928483abb4f2a13285257b02004ab250!OpenDocument&Date=2013-05-07.

The SAB used several approaches to ensure the May 7-8, 2013 consultation meeting of the Panel was open to the public. Members of the public could attend the meeting, call into the meeting via teleconference, or follow the meeting via a live webcast with audio and visual feed from the meeting.

During the May 7-8, 2013 consultation meeting, the individual members of the SAB Hydraulic Fracturing Research Advisory Panel provided their individual expert comments on the 12 charge questions covering the five major stages of the hydraulic fracturing water cycle: water acquisition, chemical mixing, well injection, flowback and produced water management, wastewater treatment and disposal. Lead discussants were assigned by the Chair and DFO to facilitate the discussions, as identified in the Agenda for the meeting. The Panel did not seek to identify points of agreement or consensus advice. After the meeting, individual written comments were prepared by Panel members wishing to do so. These comments were compiled and posted on SAB's website. All Panel members were encouraged to provide individual written

comments responding to the charge questions and any other issues they identified in the Progress Report.

Seven members of the public presented oral statements at the beginning of the May 7, 2013 meeting, and two members of the public presented clarifying oral statements at the end of the May 8, 2013 meeting.

Six sets of written public comments for consideration by the SAB Hydraulic Fracturing Research Advisory Panel were received prior to the May 7-8, 2013 meeting. Seven sets of written public comments for the Panel's consideration were received after the start of the May 7-8, 2013 meeting. All submitted comments were posted promptly to the SAB website.

A letter was sent to the EPA Acting Administrator on June 27, 2013, notifying him that the May 2013 consultation meeting occurred.

Minutes of the May 2013 consultation meeting are being developed in accordance with requirements under FACA and will be posted on SAB's website when final.

Chairman Stewart sent a letter to Dr. David Allen, SAB Chair, and me on May 2, 2013, requesting that the SAB Hydraulic Fracturing Research Advisory Panel address thirteen specific questions related to EPA's ongoing research related to the potential effects of hydraulic fracturing on drinking water resources. Chairman Stewart's letter was provided to the Advisory Panel, and was placed on SAB's website prior to the Panel's May 7-8, 2013 meeting. The Panel members also received a copy of the SAB May 31, 2013 response to Chairman Stewart's letter. In the May 31 response to this letter, the SAB noted that the Panel members will have opportunity to consider these questions independently. Future meetings of the Panel are planned to consider new and emerging information related to the EPA study, including the May 2nd letter, and the SAB will provide notice in the Federal Register and on the SAB website about all future meetings of the Panel. Plans are in development for the Panel to hold a teleconference in Fall 2013.

Compilation of Individual Comments from Members of the SAB Panel

Explain the report on the consultation that was released by the Science Advisory Board on June 25, and summarize any comments, key findings, or details.

A compilation of individual comments on the December 2012 Progress Report from members of the SAB Hydraulic Fracturing Research Advisory Panel was released on June 25, 2013, and is available on SAB's website:
http://yosemite.epa.gov/sab/sabproduct.nsf/a84bfee16cc358ad85256ccd006b0b4b/928483abb4f2a13285257b02004ab250!OpenDocument&Date=2013-05-07
These are comments from individual members of the Panel. The Panel did not deliberate toward a consensus among the committee members, did not develop materials that can be construed as a product of the Panel, nor did the Panel present a product to the Chartered SAB for consideration.

Next Steps for the Panel

Discuss what the Panel's next steps will be in this process and explain the Panel's responsibilities with regard to the final study due out next year.

There will be additional opportunities for the SAB Hydraulic Fracturing Research Advisory Panel to consider new and emerging information related to the EPA hydraulic fracturing research study. The Panel plans to hold a teleconference in Fall 2013 to discuss such information. The SAB Staff Office will provide notice in the Federal Register and on SAB's website on the logistics for this meeting of the Panel.

The Panel anticipates receiving the Agency's draft report of results in late 2014. The same Advisory Panel will be in place to conduct peer review on EPA's 2014 report. At that time the SAB Staff Office will schedule an advisory meeting for the panel in 2015 to respond to charge questions related to the Agency's research results and to develop a panel draft peer review report.

The SAB will issue a peer review report through the Chartered SAB that will include the SAB's advice on EPA's 2014 report.

Any meetings or teleconferences of the SAB Hydraulic Fracturing Research Advisory Panel and Chartered SAB regarding its review and advice on EPA's research on the potential impacts of hydraulic fracturing on drinking water resources will occur in a public forum and follow the procedures required by FACA to keep the public informed.

Public and Stakeholder Confidence in the EPA Study

Based on your experience chairing the Panel to review the EPA study, please provide your recommendations on how EPA can best ensure public and stakeholder confidence in the design, methods, and associated scientific findings related to its ongoing study of hydraulic fracturing and drinking water resources. Additionally, please comment specifically on whether or not you believe that EPA's study of hydraulic fracturing should ensure that identification of the possible impacts of hydraulic fracturing on drinking water resources be accompanied by a corresponding analysis of risk based on probability and consequence, taking into account the current risk management practices of industry and the states.

I cannot speak for the Chartered SAB or the SAB Hydraulic Fracturing Research Advisory Panel regarding recommendations associated with EPA's research on the potential impacts of hydraulic fracturing on drinking water resources. As Chair of the Panel, it would be inappropriate for me offer personal views of the EPA study. However, I can offer the following observations of fact regarding process.

EPA has conducted a number of outreach efforts to ensure public and stakeholder confidence in its research. It would be appropriate for EPA, and not me, to provide more details on these efforts.

EPA has engaged the SAB and entered a transparent and public process to develop the scientific and technical information needed to complete the study. This public process encourages public discourse to identify and address issues. Earlier in my testimony I outlined the SAB efforts to convene a panel that:

- encompasses a broad range of professional expertise and background;

- includes a balance of industrial, academic, non-government, and government representatives across the needed disciplines; and
- includes members who have very strong credentials and who serve on the highest levels of industry and government committees and leadership positions within their professional associations.

Inclusion of Risk Analysis in the EPA Study

Please comment specifically on whether or not you believe that EPA's study of hydraulic fracturing should ensure that identification of the possible impacts of hydraulic fracturing on drinking water resources be accompanied by a corresponding analysis of risk based on probability and consequence, taking into account the current risk management practices of industry and the states.

I cannot speak for the Chartered SAB or the SAB Hydraulic Fracturing Research Advisory Panel regarding recommendations associated with EPA's research on the potential impacts of hydraulic fracturing on drinking water resources. As Chair of the Panel, it would be inappropriate for me offer personal views of the EPA study. I would note, however, that EPA finalized its Study Plan, which included consideration of various risks, after considering SAB advice on its draft Study Plan. Various risk topics were discussed in the March 2011 advisory meeting on the Study Plan and in the course of the May 2013 consultation. The Advisory Panel has had and will continue to have opportunities to opine on risk issues pertaining to the EPA study.

Concluding Remarks

I thank both subcommittees again for the opportunity to testify today and explain the role of the Science Advisory Board in providing scientific peer review and expert advice to EPA. In concluding I would like to note that EPA reached out early to the SAB for scientific peer review of the hydraulic fracturing research study, the engagement has continued since the initiation of the research, and it is my understanding that EPA plans to continue the engagement in the review of research products. I will do my best as Chair to ensure in-depth, very high quality, and transparent peer review.