

**Summary Minutes of the  
U.S. Environmental Protection Agency  
Science Advisory Board Hydraulic Fracturing Research Advisory Panel  
Public Teleconference, December 3, 2015**

Date and Time: Thursday, December 3, 2015, 2:00 p.m. – 6:20 p.m. ET.

Location: Teleconference Only.

Purpose: The purpose of the December 3, 2015 teleconference was to complete agenda items from the October 28-30, 2015 SAB Hydraulic Fracturing Research Advisory Panel meeting, namely to develop preliminary key points in response to charge questions on the EPA's *Assessment of the Potential Impacts of Hydraulic Fracturing for Oil and Gas on Drinking Water Resources (External Review Draft, EPA/600/R-15/047, June 2015)*.

Participants:

**SAB Hydraulic Fracturing Research Advisory Panel** (See Roster, Attachment A):

Dr. David A. Dzombak, Chair	Dr. Bruce D. Honeyman
Dr. Stephen W. Almond	Mr. Walter R. Hufford
Dr. E. Scott Bair	Dr. Richard F. Jack
Dr. Peter Bloomfield	Dr. Dawn S. Kaback
Dr. Steven R. Bohlen	Dr. Abby A. Li
Dr. Elizabeth W. Boyer	Mr. Dean Malouta
Dr. Susan L. Brantley	Dr. Cass T. Miller
Dr. James V. Bruckner	Dr. Laura J. Pyrak-Nolte
Dr. Thomas L. Davis	Dr. Stephen J. Randtke
Dr. Joseph J. DeGeorge	Dr. Joseph N. Ryan
Dr. Joel Ducoste	Dr. James E. Saiers
Dr. Shari Dunn-Norman	Dr. Eric P. Smith
Dr. Katherine Bennett Ensor	Dr. Azra N. Tutuncu
Dr. Elaine M. Faustman	Dr. Paul K. Westerhoff
Mr. John V. Fontana	Dr. Thomas M. Young
Dr. Daniel J. Goode	

Drs. Steven Bohlen, Elaine Faustman, Joseph Ryan, and James Saiers could not participate during the December 3, 2015 public teleconference.

**EPA SAB Staff:**

Mr. Edward Hanlon, Designated Federal Officer, SAB Staff Office

**Other Attendees:** A list of persons present on the teleconference, who requested information on accessing the teleconference line, or who noted via email that they participated on the teleconference, is provided in Attachment B.

Materials Available: The agenda and other teleconference materials are available on the SAB website ([www.epa.gov/sab](http://www.epa.gov/sab)) at the following SAB Hydraulic Fracturing Research Advisory Panel December 3, 2015 meeting page:

<http://yosemite.epa.gov/sab/sabproduct.nsf/a84bfee16cc358ad85256ccd006b0b4b/9ec89b6d7a63>

## **Teleconference Summary**

The public teleconference was announced in the Federal Register<sup>1</sup> and was conducted according to the teleconference agenda.<sup>2</sup> A summary of the public teleconference follows.

### **December 3, 2015**

#### **Opening Statements**

Mr. Edward Hanlon, the Designated Federal Officer (DFO), opened the public teleconference, and made a brief opening statement noting that the SAB Hydraulic Fracturing Research Advisory Panel operates in accordance with the Federal Advisory Committee Act (FACA). He noted the teleconference was open to the public and that Agency-provided briefing materials were posted on the SAB website. He noted the Panel previously met on October 28-30, 2015 where the Panel discussed and sought to respond to eight specific charge questions and identified preliminary areas of consensus and key points in draft response to each of the eight charge questions. He noted that the purpose of the December 3, 2015 Panel teleconference was to continue the Panel's discussion from its October meeting. Mr. Hanlon noted that most of the Panel's members were serving as Special Government Employees, with one Panel member already being a regular government employee employed at the U.S. Geological Survey. He noted that Panel members were appointed to provide individual expertise and advice, not to represent any organization. He stated that 283 sets of unique written public comments were received by the EPA Docket as of December 3, 2015 for the Panel's consideration, and that 36 members of the public had requested to present oral comments during the teleconference. He stated that the SAB Staff Office had identified no financial conflicts of interest or appearance of a loss of impartiality for any Panel members for this review. He also noted that minutes of the teleconference were being taken to summarize discussions and action items in accordance with the requirements of FACA.

Dr. David Dzombak, Chair of the Panel, then welcomed everyone. Dr. Dzombak noted that the goals and objectives for this teleconference were to complete agenda items from the October 28-30, 2015 SAB Hydraulic Fracturing Research Advisory Panel meeting, namely to develop preliminary key points in response to charge questions on the agency's draft Assessment Report. He noted that the materials for the teleconference were posted on the EPA Science Advisory Board website. He stated that there were eight specific charge questions for the Panel that were developed by EPA's Office of Research and Development with review by SAB, that the Panel sought to respond to and identify points of agreement and consensus advice on at the Panel's October 28-30, 2015 meeting.

Dr. Dzombak noted that during the October 30, 2015 Panel meeting in Washington DC, eight lead writers for the Panel (one per charge question) were each prepared to present their writing team's draft list of preliminary areas of consensus and key points for the Panel's consideration in the development of the Panel's preliminary draft response to that charge question. He noted that due to time constraints at the October 30, 2015 Panel meeting, only six of the eight lead writers presented their lists (for Charge Questions 1, 3, 4, 6, 7, and 8), and the Panel deliberated on those preliminary draft lists during the October 30, 2015 meeting. Dr. Dzombak stated that Panel members made changes to the Panel's preliminary summary responses to charge questions which were noted in an updated draft list of preliminary areas of consensus and key points for Charge

Questions 1, 3, 4, 6, 7, and 8.<sup>3</sup> Dr. Dzombak noted that two of the Panel's lead writers (Dr. Elizabeth Boyer for Charge Question 2, and Dr. Susan Brantley for Charge Question 5) were unable to present their preliminary draft lists of areas of consensus and key points for Charge Questions 2 and 5<sup>3</sup> for the Panel's consideration at the October 30, 2015 Panel meeting, and that during the December 3, 2015 Panel teleconference, the Panel would discuss those two preliminary draft lists and seek to reach the Panel's preliminary agreement on those draft areas of consensus and key points.

Dr. Dzombak noted that during the December 3, 2015 Panel teleconference, the Designated Federal Officer would make draft redline changes to the preliminary draft areas of consensus and key points for the Panel's preliminary responses to Charge Questions 2 and 5. Dr. Dzombak noted that during the evening of December 3, 2015, the Designated Federal Officer would send the Panel a draft 'redline version' of the Panel's preliminary draft areas of consensus and key points for the Panel's preliminary responses to charge questions 2 and 5 with changes noted from the Panel's discussion, and requested Panel members to send the Designated Federal Officer any additional comments on these draft redline changes by December 4<sup>th</sup>. Dr. Dzombak noted the Designated Federal Officer would make any additional changes if necessary to the preliminary draft areas of consensus and key points for the Panel's responses to Charge Questions 2 and 5, and would send the Panel the final version of these redline changes and post that final version<sup>4</sup> on the Panel's December 3, 2015 teleconference website.

Dr. Dzombak noted there were 36 requests to present oral public comments during the December 3, 2015 Panel teleconference. He noted that these oral public comments would occur after the Panel's discussion occurred regarding the preliminary draft lists of areas of consensus and key points for Charge Questions 2 and 5, regarding additional written public comments that were received for the Panel's consideration, and regarding next steps for the Panel's activities.

### **Discussion of Key Points in Response to Charge Questions 2 and 5**

Two Panel members presented preliminary draft lists of areas of consensus and key points for the Panel's preliminary responses to Charge Questions 2 and 5. They noted that the preliminary draft list for Charge Question 2 was provided on pages 4, 5 and 6, and the preliminary draft list for Charge Question 5 was provided on pages 18 and 19, of the Panel's *Preliminary Summary Responses to Charge Questions with changes from Members of the EPA Science Advisory Board (SAB) Hydraulic Fracturing Research Advisory Panel*.<sup>3</sup> The Panel discussed these preliminary draft lists of areas of consensus and key points, verbally amended or adjusted the preliminary draft lists as appropriate, and reached agreement on the wording associated with these preliminary draft lists. The Designated Federal Officer took notes on changes that the Panel agreed to make to these preliminary draft lists.

During the Panel discussion, several Panel members asked whether the draft SAB report should include advice that recommends that "EPA could...." vs. "EPA should..." vs. "SAB recommends...". After discussion, Dr. Dzombak noted that the Panel was in agreement that the use of either of these terms within the draft SAB report may be appropriate depending on the intent of the SAB, and asked Panel members to carefully consider whether and how to use these terms when writing the draft SAB report.

### **Next Steps**

Dr. Dzombak noted that discussions were completed on the Panel's writing team preliminary

draft lists of areas of consensus and key points in preliminary response to each of the eight charge questions. He noted that the Designated Federal Officer would make additional changes to the preliminary draft areas of consensus and key points for the Panel's responses to Charge Questions 2 and 5, and would send the Panel the final version of redline changes and post that final version<sup>4</sup> on the Panel's December 3, 2015 teleconference website.

Dr. Dzombak noted that he and the Designated Federal Officer would work on minutes for the teleconference and the minutes would be posted onto the SAB teleconference website when they were final. Dr. Dzombak also noted that the desired outcome of the Panel's activities was to develop a consensus SAB report of advice to the EPA Administrator. He noted that the Panel planned to develop and release a draft SAB report onto the SAB's website by mid-January 2016 for comment by the Panel and members of the public. He also noted that the Panel planned to compile and post a compilation of individual panel member comments on the draft SAB report on the Panel's website by January 25, 2016. He further noted that the Panel planned to hold public SAB Panel teleconference calls on February 1 and February 2, 2016, in order to hear public comments and discuss the Panel's comments on the draft SAB report. He noted that these two public Panel teleconferences would be scheduled to run between 11am-6pm Eastern time on both days, and noted that the February 2 Panel teleconference would be cancelled if the teleconference agenda were completed on the February 1 teleconference.

Dr. Dzombak noted that if necessary, a second draft SAB Report would be developed after these SAB Panel teleconference calls on February 1 and February 2, 2016. He noted that if a second draft SAB report was prepared, the goal would be to send it to the Panel and post in on the SAB website by February 15, 2016. He then noted that a public Panel teleconference call would then occur on March 7, 2016, in order to hear public comments and discuss the Panel's comments on the second draft SAB report.

Dr. Dzombak noted that once the SAB Panel consensus was reached on sending the draft SAB report to the Chartered SAB for quality review, the updated draft SAB report would be posted on SAB's website and then discussed on a public teleconference or meeting of the Chartered SAB, where public comments would be heard and comments from the Chartered SAB would be discussed. Dr. Dzombak noted that the SAB Staff Office would provide notice in the Federal Register and on SAB's website regarding the above-noted Panel activities.

### **Summary of Written Public Comments**

Dr. Dzombak noted that at the time of the Panel's September 30, 2015 public teleconference, 257 sets of written public comments were received for the Panel's consideration related to the review of EPA's draft Assessment Report and the charge questions. He noted that on the Panel's September 30, 2015 public teleconference, three Panel members (Drs. Elizabeth Boyer and Susan Brantley, and Mr. Walt Hufford) provided an update to the Panel on these written public comments. Dr. Dzombak noted that as of December 3, 2015, 283 sets of unique written public comments were received for the Panel's consideration. He noted that these public comments were posted in the EPA's Docket, and that instructions on how to see these comments were provided on the SAB Panel's teleconference website. Dr. Dzombak noted that he had spent a considerable amount of time reviewing these written public comments, that he was impressed with the level of effort and thoughtfulness invested by members of the public in many of the comments, and that these comments had informed the Panel's perspective. He then asked for a summary from the three-member Panel subgroup on new public comments received since the September 30, 2015 teleconference.

Mr. Walt Hufford noted that as of December 3, 2015, a total of 283 unique written public comments were submitted and posted on the EPA's Docket website at <http://www.regulations.gov#!docketDetail;D=EPA-HQ-OA-2015-0245> for the Panel's consideration. He noted that he and Drs. Boyer and Brantley prepared an updated spreadsheet table dated December 2, 2015 that listed out these 283 written public comments, and that the spreadsheet was posted on the SAB Panel's December 3, 2015 SAB Teleconference website.<sup>5</sup> Mr. Hufford noted that within the 26 additional written public comments submitted to the Docket since September 30, 2015, there was some duplication and that a few of these public comments were submitted by members of the public who submitted earlier comments to the Docket. Mr. Hufford stated that the December 2, 2015 spreadsheet table noted how these 26 additional public comments related to each of the charge questions. Dr. Dzombak asked whether the 26 additional public comments focused on the previous categories of comments that were discussed during the Panel's September 30, 2015 teleconference or on particular areas of the EPA's draft Assessment Report. Mr. Hufford responded that several of the comments identified issues regarding air or other media that were not the focus for the Panel's review efforts. He noted that while those comments were important, those comments appeared to be outside the scope of the EPA's draft Assessment Report. Mr. Hufford noted he and Drs. Boyer and Brantley would continue to update the spreadsheet to keep Panel members apprised on additional written public comments submitted to the Docket.

## **Public Comments**

Dr. Dzombak stated that it was important for the Panel to consider public comments as the Panel deliberated on this SAB review, and noted that thirty-six members of the public requested to present oral comments during the teleconference. He further noted that while the SAB was not obligated to respond to public comments received during the Panel's deliberations for this peer review, members of the Panel could ask clarifying questions of the oral public commenters.

Ms. Lena Moffitt noted she was Director of the Sierra Club's Beyond Dirty Schools program. She noted she was shocked to see the EPA's conclusion in its draft Assessment Report that the EPA did not find evidence that hydraulic fracturing mechanisms have led to widespread, systemic impacts on drinking water resources in the United States. She stated there were many releases of contamination from hydraulic fracturing activities across the State of Pennsylvania, and that nearly 70% of hydraulic fracturing activities in the State of Pennsylvania indicated potential evidence of contamination in water. She noted that homes were dangerously contaminated and that local members of the public needed to get water from supermarkets. She also noted there were cases of nosebleeds, rashes and headache attributed to hydraulic fracturing. She commented that the EPA should better represent uncertainties associated with its draft Assessment Report, and clarify what specific hydraulic fracturing contamination had occurred in Dimock, Pennsylvania, Pavillion, Wyoming, and Parker County, Texas.

Ms. Karen Feridun presented her oral statement, reading from a statement<sup>6</sup> that was posted on the SAB teleconference website. Ms. Feridun noted she was the founder of a grassroots organization in Pennsylvania that was fighting for a statewide ban on hydraulic fracturing. She stated that she was one of a group of environmental advocates who met on a quarterly basis with the head of the Pennsylvania Department of Environmental Protection (PA DEP)'s Oil and Gas Division and members of his staff to discuss concerns regarding hydraulic fracturing impacts on water. She noted that well owners were provided results for only eight of twenty four contaminants that were being analyzed in waters. She noted that as of October 16, 2015, there

were 261 PA DEP “positive determination” cases that indicated that oil and gas activities had contaminated in Pennsylvania water. She stated that the PA DEP never explained its tally of total determinations. She also noted that the Director of the PA DEP’s Oil and Gas Division stated that the PA DEP did not have the resources to go back to negative determination cases when new science emerges that could alter the determination. She stated that she requested that the PA DEP reassess that figure. She also noted there were no Maximum Contaminant Limits (MCLs) for many substances that were indicated as present in water samples. She stated she was concerned about Pennsylvanians who were impacted and needed protection, and stated that when there are bad regulators and bad regulations, there are bad data. She stated that with limited data, the EPA was careless in claiming that the EPA did not find evidence that hydraulic fracturing mechanisms have led to widespread, systemic impacts on drinking water resources in the United States. She also stated that the EPA’s draft Assessment Report needed to clarify what specific hydraulic fracturing contamination had occurred in Dimock, Pennsylvania, Pavillion, Wyoming, and Parker County, Texas.

Mr. Hugh MacMillan, representing Food and Water Watch, presented his oral statement, reading from a statement<sup>7</sup> that was posted on the SAB teleconference website. Mr. MacMillan urged the EPA to revisit and include the hydraulic fracturing cases at Dimock, Pennsylvania, Pavillion, Wyoming, and Parker County, Texas into the EPA’s draft Assessment Report. He also noted that the EPA’s conclusion that the EPA did not find evidence that hydraulic fracturing mechanisms have led to widespread, systemic impacts on drinking water resources in the United States was not supported by data, and that the EPA did not define the terms widespread or systemic. He noted that the EPA concluded in 2004 that no further work was needed to assess impacts from hydraulic fracturing, and he urged the EPA to be responsive to the SAB Panel’s concerns. He noted that within the SAB Panel’s preliminary draft key points in response to charge questions,<sup>3</sup> the preliminary response to Charge Question 4b noted that methods for well completion have improved over time to help mitigate stray gas migration. He also noted the preliminary response to Charge Question 8a noted that the synthesis should summarize practices that have mitigated the frequency and severity of impacts, and that this could not be done without data on the frequency and severity of impacts from any number of points in the hydraulic fracturing water cycle. He stated that the EPA should be candid regarding where science stopped and where policy considerations started.

Ms. Kathleen Nolan, representing Catskill MountainKeeper, presented her oral statement. She noted that she was a physician and that the technical materials in the EPA’s draft Assessment Report should be preserved rather than diluted. She noted that the EPA’s draft Assessment Report should include:

- A formal study of hydraulic fracturing near treatment and disposal sites.
- Discussion of bioassays of farm animals and humans. She stated that the first indication of hydraulic fracturing contamination and wastestream activities may be seen in these bioassay data. She also noted that synergistic and other impacts could also be seen in these bioassays.
- Discussion on the need for monitoring in general.
- Discussion on the use and applicability of long-lasting, company-specific and chemical-specific tracers.
- Discussion on heavy metals, including radionuclides and radium, especially in the absence of state regulations related to hydraulic fracturing.
- Discussion on road spreading of hydraulic fracturing materials and wastes.
- Discussion on long-term assessments related to hydraulic fracturing.

- Discussion on incentives for responsible handling of hydraulic fracturing wastes.
- Discussion on induced seismicity.

Ms. Jenny Lisak presented her oral statement. She noted that there were many stories of hydraulic fracturing contamination of water in Pennsylvania, stated that her well was contaminated, and noted that two companies in her neighborhood were caught disposing of hazardous waste improperly. She noted that the State's forests were contaminated by hydraulic fracturing waters, and that she drank water from a hydraulic fracturing-contaminated spring in a State forest. She noted many communities in Pennsylvania could not rely on aquifers, and that several counties in Pennsylvania had contaminated groundwater. She stated that three billion gallons of hydraulic fracturing wastewater were sent to Pennsylvania treatment facilities, and that Dr. Avner Vengosh at Duke University stated there were various problems with treating water from hydraulic fracturing wells. She stated that members of the public living in Pennsylvania were exposed to drinking waters that could be unintentionally contaminated by dangerous hydraulic fracturing wells. She stated that there were over 100 situations where waters had been contaminated by hydraulic fracturing wells in three Pennsylvania counties, and that the Pittsburgh, PA *Public Herald* had published reviews of hydraulic fracturing wells that indicated those wells were contaminated. She also stated that there was a large amount of unreported, publicly unavailable data on such contamination.

Ms. Ann Bristow presented her oral statement, reading from a statement<sup>8</sup> that was posted on the SAB teleconference website. Ms. Bristow requested the SAB Panel to use its expertise and knowledge of research design to issue a statement to the general public about why there were so many significant data gaps about hydraulic fracturing and water contamination. She noted that the hydraulic fracturing industry had stated that hydraulic fracturing does not contaminate drinking water resources. She requested that the EPA's draft Assessment Report explain how industry participated in the design of the EPA's prospective studies. She requested that the EPA's draft Assessment Report explain why the Pavilion, WY well data was compromised and indicated contaminated water, and why the data were not reliable. She asked the EPA to discuss the history of groundwater contamination in Pennsylvania, and present information on baseline residential well water chemistry and cases of documented water well contamination from unconventional natural gas development. She noted that the general public did not understand how many cases of such contamination may have occurred because citizens settled with industry and signed non-disclosure clauses. She asked the EPA to explain how these non-disclosure clauses were making data inaccessible to researchers. She noted that as Matt Damon portrayed in the film "The Martian," science should solve problems, and that people deserved to know what water was contaminated from hydraulic fracturing activities.

Ms. Sharon Wilson, representing Earthworks, presented her oral statement, reading from a statement<sup>9</sup> that was posted on the SAB teleconference website. She stated that any fair reading of the EPA's draft Assessment Report leads to the conclusion that hydraulic fracturing pollutes drinking water. She also noted that despite the EPA's efforts to suggest otherwise, the draft Assessment Report showed that pollution from hydraulic fracturing activities was both widespread and systemic. She commented that the use of non-disclosure agreements resulted in data gaps associated with the potential effects of hydraulic fracturing on drinking water resources. She stated that the EPA solicited information from the public in two Texas counties where hydraulic fracturing was occurring (i.e., the Ruggiero property in Wise County and another in Argyle Bartonville). She stated that the EPA obtained baseline water tests on the Ruggiero property that noted the water was clean and safe and that six weeks after hydraulic fracturing began on the property, the groundwater was contaminated. She noted that a hydraulic

fracturing company purchased the property and that it was rumored that the EPA could not access information on this contamination. She also noted that hydraulic fracturing contamination was found in a home behind hers, but that nondisclosure agreements prevented this data from being released. She stated that industry efforts to silence and prevent release of hydraulic fracturing data was widespread and systemic.

Mr. John Noel, representing Clean Water Action, presented his oral statement, reading from a statement<sup>10</sup> that was posted on the SAB teleconference website. He requested that the EPA's final Assessment Report should remove the statement that the EPA did not find evidence that hydraulic fracturing mechanisms have led to widespread, systemic impacts on drinking water resources in the United States. He also noted that several members of SAB's Panel indicated that industry best practices should be described in the draft Assessment Report. He stated that while such practices were important, the EPA was directed by Congress to look at potential impacts of hydraulic fracturing activities on drinking water resources and not to recount the EPA's assessment of industry best practices. He noted that the EPA's Assessment should focus on identifying where impacts have happened and where they could persist in the future. He noted that bromide was present in oil and gas wastewater and was among the list of hydraulic fracturing contaminants of concern. He also noted that the EPA should incorporate new research from Harvard Law School's Environmental Policy Initiative that was recently published in Harvard's Energy Policy Journal, which described an update to a 2013 analysis of the FracFocus database. He stated that the publication noted there was an increasing rate of chemical entries into FracFocus that were withheld by companies claiming they were trade secrets or were otherwise confidential. He noted that this has hampered the EPA's ability to report on the data. He further noted that impacts on drinking water did not have to be widespread to be significant.

Ms. Karuna Jaggar, representing Breast Cancer Action, presented her oral statement. She noted that 10,000 members of Breast Cancer Action had concerns regarding hydraulic fracturing. She stated that each year 40,000 people die of breast cancer, and that most people who were diagnosed with breast cancer did not have information on the causes of breast cancer. She stated that environmental causes of breast cancer were significant, and that childhood cancer rates were also rising. She stated that drinking water must be protected from harmful chemicals, and that the EPA's draft Assessment Report failed to adequately recognize exposure to members of the public. She stated that even though the hydraulic fracturing industry played a major role in designing the EPA's draft Assessment Report, the draft Report still found a number of cases of hydraulic fracturing well contamination. She also noted that while the EPA only assessed a few cases of hydraulic fracturing, more than 70% of the situations that the EPA investigated indicated the presence of chemicals. She noted that benzene was found in these analyses, and that the EPA has set an MCL of zero for benzene. She stated that the SAB must urge the EPA to reflect the true dangers of hydraulic fracturing activities.

Mr. Scott Segal, representing Policy Resolution Group, presented his oral statement and noted he was an attorney that represented natural gas producers. He noted that a recent National Academies of Sciences publication stated that there was little credible evidence for direct communication with shallow drinking water wells due to upward migration from shale horizons. He also noted that the Susquehanna River Basin Commission, Groundwater Protection Council, and the Interstate Oil and Gas Compact Commission (IOGCC) recently concluded that hydraulic fracturing did not result in contamination to drinking water resources. He stated that the Massachusetts Institute of Technology recently reported that 20,000 hydraulic fracturing wells had no problems, and that the U.S. Government Accountability Office (U.S. GAO) recently reported there were no significant findings related to hydraulic fracturing contamination. He

stated that while 80% of wells tested in Pennsylvania indicated the presence of methane, no hydraulic fracturing wells were drilled when those wells were tested. He stated that background contamination was found where many members of the public in Pennsylvania relied on private wells for drinking water supplies. He noted that the State of Pennsylvania did not have mandated standards for hydraulic fracturing well construction. He requested that the EPA's draft Assessment Report not rely on non-scientific evidence.

Mr. Jeff Zimmerman, representing Damascus Citizens for Sustainability, NYH2O, and Citizens for Water, presented his oral statement, reading from a statement<sup>11</sup> that was posted on the SAB teleconference website. Mr. Zimmerman noted that the EPA's draft Assessment Report and the SAB Panel's preliminary draft response lamented that there were major gaps in data and information on several issues, and stated that the EPA created this problem by restricting its investigation only to peer-reviewed materials. He noted that state information was available that indicated contamination of water supply wells in proximity to oil or gas wells. He stated that the PA DEP has issued hundreds of "positive determination letters" that found that oil or gas wells have contaminated drinking water resources. He noted that the EPA's draft Assessment Report acknowledged the existence of these letters but then stated that the EPA did not investigate or review these cases any further. He requested the EPA further investigate these cases within its draft Assessment Report. He noted that individuals who had their water supplies adversely impacted by oil or gas development had often, at their own expense, gathered contamination data from their wells and submitted this data to federal and/or state agencies. He noted that while this information was not generated and reported through a peer-reviewed publication process, this information was not irrelevant to the EPA's draft Assessment Report. He noted that the EPA should investigate and respond to this information, and may want to examine the methodology by which the information was produced. He stated that while the EPA's personnel often visited sites before 2012 and conducted sampling, since 2012 the federal EPA dropped several key hydraulic fracturing site investigations and left any further response to the state agencies. He noted that in each of these key hydraulic fracturing site investigations, the state agency suspended any further action. He noted that in many recent situations the default response by state regulatory agencies has been silence, and that the EPA should consider and evaluate data related to contamination for each of these cases. He also noted that within the EPA's draft Assessment Report, the EPA should consider the multiple cases presented in the 3<sup>rd</sup> Compendium by Concerned Health Professionals of N.Y. He stated that the SAB Panel should object to any and all generalizations or characterization in the EPA's draft Assessment Report of linkages or lack thereof between the hydraulic fracturing water cycle and drinking water resources.

Ms. Rebecca Roter presented her oral statement, reading from a statement<sup>12</sup> that was posted on the SAB teleconference website. She noted that she served as a consultant for the EPA's draft Assessment Report and helped the EPA gather data for the development of its draft assessment. She noted she helped the EPA locate water wells in Susquehanna County, Pennsylvania four years ago and that the EPA only included those wells that were determined by the State of Pennsylvania to have groundwater impacted by natural gas extraction. She stated that the EPA's draft Assessment Report was flawed in scientific design because it relied entirely on the PA DEP laboratory protocol and data. She noted there was no data transparency between PA DEP and the EPA regarding well water data, and that the EPA was blindfolded by the PA DEP regarding what wells the PA DEP determined were impacted by hydraulic fracturing drilling activities. She noted that the head of the PA DEP laboratory admitted under oath that the PA DEP did not test for key parameters associated with hydraulic fracturing gas activity, and did not report all results to Pennsylvania residents. She stated that in April 2014 she noticed impacts to her wellwater and

that testing of her wellwater by her hydrologist indicated the presence of trimethylsilanol and 2,5,5 trimethyl 2 hexene. She stated that the PA DEP did not find these chemicals in her wellwater and that her PA DEP water complaint investigation was still open. She stated that she had swollen glands and other health issues which improved after she stopped using her wellwater for drinking, cooking and bathing. She stated that the EPA was a regulatory agency subject to political pressure, and noted that was why the EPA's scientific reports about Dimock, Pennsylvania, about the hydraulic fracturing chemical glutaraldehyde that was found at significant levels in emissions from hydraulically fractured gas compressors, and about other hydraulic fracturing cases would never see the light of truth.

Mr. Ray Kemble presented his oral statement. He noted that within Pennsylvania, hydraulic fracturing waters were illegally dumped, used for road dust control, and ate through hoses, shoes, and gloves. He noted there were twenty-seven chemicals in his home's water supply and stated this was a widespread problem. He noted he worked for several large oil and gas companies, where each of these companies would dump their hydraulic fracturing wastewaters if they could. He stated that the Dimock, Pennsylvania wellpad had hydraulic fracturing contamination that was covered over. He noted this was a serious problem within the United States, and that the EPA staff writing the draft Assessment Report needed to see these sites to understand what was actually occurring.

Mr. Andrew Chichura presented his oral statement, reading from a statement<sup>13</sup> that was posted on the SAB teleconference website. He noted he lived in northeastern Pennsylvania in Susquehanna County, approximately thirty miles from Dimock. He stated that his family had experience with drilling and fracking of a hydraulic fracturing well that was 1500 feet from his drinking water well. He noted that on August 16, 2011 he discovered pure white water coming from his sink faucet and gas coming out of his well. He said the company that drilled the nearby hydraulic fracturing well tried to alleviate the situation, and that the PA DEP tested his well and found methane gas in his well above the lower explosive limits (LEL). He noted that his water well's current methane levels were still above 20,000 micrograms/liter. He stated that he was personally involved in gas drilling and that he supported correct, properly conducted development of oil and gas wells. He noted that since 2011 his water well has not provided him with water, and that for the past four years, water buffalos were provided for his use and alternative water and bottled water has been supplied to him by the water company. He noted that the PA DEP issued a Notice of Violation to the gas company in 2011, and that this Notice indicated that one of the company's hydraulic fracturing wells was causing the release of methane into the water aquifer.

Ms. Victoria Switzer presented her oral statement, reading from a statement<sup>14</sup> that was posted on the SAB teleconference website. She noted she was a resident of Dimock, Pennsylvania, and stated that the PA DEP had placed a ban on new hydraulic fracturing drilling after it determined that the nine square mile area of Dimock was impacted by industry. She noted that high levels of methane in the area remained uncorrected, drinking water supplies have been contaminated and have changed color since hydraulic fracturing has occurred, and high levels of manganese and turbidity have been found in her drinking water well. She noted she participates in a water replacement program through which she buys water, and through which other homes receive water deliveries for their use and for use by their livestock. She asked why there was no urgent investigation into these impacts, and how many families, citizens, and water sources must be affected before a full investigative effort occurred into the impacts of hydraulic fracturing. She requested that the EPA return to Dimock, Pennsylvania.

Mr. Mark Ruffalo presented his oral statement, reading from a statement<sup>15</sup> that was posted on the SAB teleconference website. He noted he founded an organization called Water Defense to address water contamination issues created by hydraulic fracturing in Dimock, Pennsylvania. He noted that acetone and toluene were detected in tap water and water used for showering and bathing in the area of Dimock. He said he had large concerns regarding the draft Assessment Report's statement that: "We did not find evidence that these mechanisms have led to widespread, systemic impacts on drinking water resources in the United States." He noted this statement downplays the potentially catastrophic effects that hydraulic fracturing could and will have on local communities. He noted that the statement seemed to conclude that because hydraulic fracturing was not having an effect on drinking water everywhere, it was not a widespread issue, and failed to recognize that water contamination caused by hydraulic fracturing could happen anywhere. He stated that the effects of hydraulic fracturing were devastating, and that while hydraulic fracturing may not affect everyone, this does not mean that its consequences were acceptable. He noted that since the EPA's draft Assessment Report stated that contamination has occurred in some instances, hydraulic fracturing should be stopped. He noted that Water Defense recently visited every major hydraulic fracturing water contamination site and found that water testing conducted by state agencies and the EPA was incomplete. He noted that state and federal agencies took grab samples from surface water only and neglected to measure contamination below the surface. He noted that the EPA in general and the EPA's draft Assessment Report in particular suffered from a lack of public credibility. He recommended that the EPA should invite all public individuals and organizations who felt harmed by hydraulic fracturing to speak at a public hearing, and that there should be an amnesty for members of the public who have been forced to silence their voices through non-disclosure agreements.

Ms. Shelly Perdu presented her oral statement. She noted that she lived in Parker County, Texas and stated that her well was compromised. She noted that she grew up in Oklahoma and had never previously seen where someone had struck a match above a well head and created a torch. She stated that she and her son suffered daily migraine headaches and could not sleep through the night, and noted these problems were due to a hydraulic fracturing well across the street from her home. She noted her son had lost hair and had sores, and since moving away no longer suffers from headaches. She stated that many metals were being released from water taps in her home, but noted that she did not have data on this. She stated there was something wrong with her drinking water, noted that no one wanted to drink water when visiting her home, and expressed concern that something needed to be done.

Mr. Steven Lipsky presented his oral statement. He noted that he lived in Parker County, Texas, that his home and water was contaminated with methane since 2012, and that his daughter thought their home would explode. He stated that there was an isotopic fingerprint of methane releases caused by hydraulic fracturing that was provided as part of Geoffrey Thyne's report within Mr. Lipsky's written comments. He noted that scientists had concluded that the Lipsky well was contaminated with 80 milligrams/liter of methane, and that the EPA prevented this data from reaching the SAB Panel. He stated that the EPA ignored these problems in 2012 and asked whether the EPA was hiding other information. He noted that over the past year, ten new instances have occurred where hydraulic fracturing had contaminated drinking water. He stated that the EPA makes a ridiculous conclusion within its draft Assessment Report that hydraulic fracturing did not contaminate water supplies.

Mr. John Fenton presented his oral statement, and noted that he lived in Pavillion, Wyoming. He noted that the EPA stated that water quantities were low for hydraulic fracturing activities in comparison to other uses. He stated that hydraulic fracturing water was contaminated and was

used only for an industrial process. He also stated that at the SAB Panel's October 28-30, 2015 meeting, an SAB Panel member noted that while problems associated with the hydraulic fracturing water cycle occurred, those problems did not relate to hydraulic fracturing itself. He asked how hydraulic fracturing wells could isolate zones and contain pressures if those wells were not properly cased. He noted that the State of Wyoming was trying to exempt a drinking water aquifer to allow hydraulic fracturing injection into the aquifer. He noted that the hydraulic fracturing company that would conduct this injection stated with certainty that the hydraulic fracturing water to be injected would not move for ten thousand years. He noted that this statement was not accurate, and that he would submit a written comment for the Panel's consideration on this topic. He also noted that the EPA's draft Assessment Report should include a concise statement of hydraulic fracturing-related problems across the country, and include the hydraulic fracturing cases at Dimock, Pennsylvania, Pavillion, Wyoming, and Parker County, Texas.

Mr. Bryce Payne presented his oral statement. He noted that he would submit written comments for the Panel's consideration, and that he had considerable data from his own investigations regarding hydraulic fracturing impacts on drinking water resources. He stated that the EPA should make a different conclusion than the one the EPA made in its draft Assessment Report regarding widespread, systemic impacts on drinking water resources in the United States. He noted it was almost certain that there were many more hydraulic fracturing contamination cases linked to hydraulic fracturing than indicated in the EPA's draft Assessment Report. He noted that two recent contamination cases linked to hydraulic fracturing provide information on the frequency of impacts associated with hydraulic fracturing activities.

Ms. Barbara Arrindell, representing Damascus Citizens for Sustainability presented her oral statement, reading from a statement<sup>16</sup> that was posted on the SAB teleconference website. She noted that her organization submitted a Freedom of Information Act request for notes taken or recordings made of the SAB Panel's October 28-30, 2015 meeting. She stated that she received a telephone call from the EPA SAB Deputy Director and was told there was no recording of the Panel's October meeting even though the proceedings were live streamed with cameras and microphones, and also that there was no official transcription made of the public meeting. She noted that since members of the public made the effort to speak and the Panel held a meeting, the EPA SAB Staff Office should record what they presented. She asked how oral statements in meetings or teleconference statements would remain part of the record if they were not captured. She stated that changes should be made to ensure integrity of the SAB's process. She noted that regarding the following statement from the draft Assessment Report: "We did not find evidence that these mechanisms have led to widespread, systemic impacts on drinking water resources in the United States," during the October 29, 2015 Panel meeting the Panel nearly unanimously agreed to recommend that the statement be removed since the statement was erroneous and not supported. She also noted that during the October 30, 2015 Panel meeting, Panel member Dr. Azra Tutuncu asked that the hydraulic fracturing cases at Dimock, Pennsylvania, Pavillion, Wyoming, and Parker County, Texas, and all associated data and available information, be put back into the EPA's draft Assessment Report. She noted that the Panel nearly unanimously agreed to this recommendation during this discussion. She stated that page 3 of the Panel's preliminary summary responses to charge questions<sup>3</sup> notes that a summary of these three cases should be included in the EPA's draft Assessment Report. She stated that a summary of these three cases was not the same thing as putting the case studies back into the EPA's draft Assessment Report, and that the Panel's preliminary summary responses to charge questions inaccurately reflected what the Panel discussed on October 30<sup>th</sup>. She noted that the EPA's draft

Assessment Report should describe the relationship of the hydraulic fracturing water cycle in Dimock, Pennsylvania. She stated that she would submit written comments.

Mr. Robert Lee McCaslin presented his oral statement, reading from a statement<sup>17</sup> that was posted on the SAB teleconference website. He noted that he had ten years of experience in security observation and reporting and twenty six years of experience in the development of oil and gas, and that he worked in Wyoming, Michigan, Illinois, Colorado, Oklahoma, Texas, North Dakota, Pennsylvania, and offshore in the Gulf of Mexico and Mexico. He stated that high volume hydraulic fracturing drilling occurs through aquifers without casing. He noted there were known cases of hydraulic fracturing contamination to aquifers in Michigan where blowouts have occurred at the bottom of hydraulic fracturing wells, and that twenty two million gallons of hydraulic fracturing fluids that were injected into these wells were not returned back up the well after being injected into the wells. He noted there was no such thing as safe drilling, and that it was not possible to make hydraulic fracturing safe. He stated that he would submit written comments.

Ms. Elizabeth Arnold presented her oral statement. She noted that she lived in Philadelphia which did not have shale but was impacted by hydraulic fracturing for gas and oil. She noted that due to oil shale hydraulic fracturing in Wyoming, train derailments have occurred in Philadelphia and explosions on trains have occurred. She also noted it will be terrifying when one of these trains explodes in a major urban area. She stated that the billions of gallons of hydraulic fracturing wastewater that travels around the State of Pennsylvania will spill and be subject to illegal activities. She stated that members of the public have said that the hydraulic fracturing industry does not operate in a respectful manner, and that young members of the public such as Rebecca Roter should have clean water. She demanded that members of the public living in Dimock, Pennsylvania, Pavillion, Wyoming, and Parker County, Texas should receive clean water.

Mr. David Walczak presented his oral statement. He noted that he was a documentary filmmaker and has been following members of the public who were affected by hydraulic fracturing. He stated that the EPA has not protected members of the public from the harms of hydraulic fracturing, and has displayed evidence that it works for industry. He noted that members of the public have a low amount of trust in the EPA. He noted he reviewed PA DEP data that indicated there was water contaminated by hydraulic fracturing activities, including in Dimock, Pennsylvania. He stated that the Cabot Oil and Gas Company supplied water to members of the public for some time, then stopped supplying water to these members of the public when the EPA said their drinking water wells were safe. He stated that members of the public who signed nondisclosure agreements with the Cabot Oil and Gas Company received supplied water, and that those who did not sign such agreements did not receive supplied water. He stated that members of the public had moved from homes that were contaminated from hydraulic fracturing activities, and that these homes had permanent restrictions on future use for human occupancy. He stated that these cases should be included within the EPA's draft Assessment Report, along with the studies from Pavillion, Wyoming and Parker County, Texas. He stated that the EPA should protect the environment since state regulators were underfunded and understaffed.

Mr. Josh Fox presented his oral statement. He noted he was proud of the members of the public who were speaking on the issue of impacts of hydraulic fracturing on drinking water resources. He noted he has documented stories of such impacts for eight years, and made movies entitled "Gasland Part 1" and "Gasland Part 2". He stated that hydraulic fracturing activity and processes contaminated drinking water and that hydraulic fracturing problems were endemic. He stated that

most members of the public who were presenting oral statements during the Panel's teleconference were providing information on how their wells were contaminated, and that science indicated their wells were contaminated. He stated that if the EPA and the SAB admitted defeat and gave in to the hydraulic fracturing industry, this would prove that the EPA was protecting the hydraulic fracturing industry. He noted that what was in question was whether the EPA had credibility. He stated that the EPA was on notice, that the burden of proof was on the EPA to prove it was worthy, and that the EPA should preserve its integrity. He noted that if the EPA continued to deny facts, the EPA would suffer.

Mr. James Cromwell presented his oral statement. He noted that while he was not an expert on the issue of impacts of hydraulic fracturing on drinking water resources, he was struck by the importance, context and framing of the SAB Panel regarding this topic. He recommended that members of the public should watch the George Lucas film "THX 1138," in which a man was tortured in a room by two scientists who were more concerned about the metrics of the dials being turned associated with the torture than about the torture itself. He stated that effects from global warming were occurring in Paris, the Philippines, the Martial Islands and in the Mideast, and that there was a need to transition away from the use of fossil fuels. He stated that the world's temperature should not be raised by 3.9 degrees, and that hydraulic fracturing wells should be stopped now because these wells are destroying the planet.

Ms. Dorothy E. Bassett presented her oral statement. She noted that she had planned to talk about water contamination in southwestern Pennsylvania, where many families have problems with their water. She noted that rather than reiterating statements that have already been presented during the teleconference, she was reiterating comments from Mr. Fox. She noted she was providing water to a family who was discussed in the EPA's draft Assessment Report, and stated that there was a human and civil rights issue involved in this topic. She stated that there was a problem in government at the state and national level, and that workers at government agencies should not be prevented from doing their jobs. She noted that the EPA was playing with semantics in its claim that it did not find evidence that hydraulic fracturing mechanisms have led to widespread, systemic impacts on drinking water resources in the United States. She stated that the EPA should assess and describe local impacts in its draft Assessment Report, and include a scenario where all hydraulic fracturing well fields were fully developed.

Ms. Vera Scroggins presented her oral statement, reading from a statement<sup>18</sup> that was posted on the SAB teleconference website. Ms. Scroggins noted she was speaking on behalf of Ms. Pramilla Malick. Ms. Scroggins noted that a high pressure hydraulic fracturing gas line was near Ms. Malick's home and that a power plant was nearby. She stated that Ms. Malick requested a moratorium on hydraulic fracturing pipelines, and was giving tours in her county to show members of the public contamination and harm caused by hydraulic fracturing. She noted that Ms. Malick was suffering from toxic air emissions, air and water problems, breathing problems and a loss of her home's value, and that Ms. Malick's four children were impacted and that they should not be considered guinea pigs. She stated that the Cabot Oil and Gas Company was one of the highest violators in its hydraulic fracturing operations, and that there was a nine square mile moratorium on hydraulic fracturing activities near her home in Pennsylvania. She stated that Ms. Malick noted that water had high levels of methane ranging up to 80 milligrams/liter, and that members of the public had signed nondisclosure agreements and could not disclose their problems in order to receive a settlement and water or an infiltration system installed at their homes. She stated that over ten Pennsylvania townships had been contaminated from hydraulic fracturing activities. She noted that hydraulic fracturing operations caused impacts to climate and released carcinogenic air emissions with no minimum setbacks. She requested that the EPA redo

its draft Assessment Report to show major, widespread, systemic impacts and chemicals moving through water. She noted that the EPA was not testing for chemicals that were moving through water. She also stated that hydraulic fracturing chemicals within the Barnett Shale should be included in the EPA's draft Assessment Report and that the hydraulic fracturing industry would not report this data.

Ms. Sharon Kinney presented her oral statement, reading from a statement<sup>19</sup> that was posted on the SAB teleconference website. She stated she was not a scientist and lived in West Virginia where a significant amount of hydraulic fracturing has occurred over the past six years. She noted she was concerned about the oral public statements that preceded her and would pray that these concerns would be considered. She noted she was impacted and had suffered physically and mentally due to hydraulic fracturing. She stated that hydraulic fracturing drilling has occurred since 2008 on a hydraulic fracturing drilling wellpad near her home and that she continues to see contaminated water being released from the wellpad. She noted that her drinking water well was 40 feet from the hydraulic fracturing drilling wellpad and that her drinking water has been contaminated for the past ten years. She noted that chemicals from the hydraulic fracturing drilling wellpad has flowed into trenches near her drinking water wells. She stated that her water well collapsed from hydraulic fracturing drilling and that a private company tested her well water for effects from hydraulic fracturing drilling.

Ms. Jennifer Gourley presented her oral statement. She noted that she has lived on a 25 acre farm in southwestern Pennsylvania for 20 years. She stated that in 2011 hydraulic fracturing began near her home and that within months of the hydraulic fracturing drilling she began to shake and have neurological problems. She stated that her blood was tested for aluminum, cadmium, lead, mercury and uranium. She noted that the PA DEP tested the water near her home and that those tests indicated that the water was fine with elevated iron and manganese levels. She also noted that the PA DEP did not provide her with results of additional tests that were taken and that the PA DEP stated there were no additional, available test results. She stated that she asked the PA DEP how uranium could contaminate the water, and noted that Mr. Larry Rich of the PA DEP stated that the water could not be contaminated with uranium. She stated that the PA DEP was not helpful and has continually lied to her, and that she was not sure how many more violations have occurred associated with hydraulic fracturing activity. She stated that she was buying and hauling water for use at her home.

Mr. Doug Mazer had registered to speak but was not available to present his oral statement on the public teleconference line. Dr. Dzombak then recognized the next public speaker.

Mr. Jack Kruell had registered to speak but was not available to present his oral statement on the public teleconference line. Dr. Dzombak then recognized the next public speaker.

Ms. Vickie Nutter had registered to speak but was not available to present her oral statement on the public teleconference line. Dr. Dzombak then recognized the next public speaker.

Ms. Carol French had registered to speak but was not available to present her oral statement on the public teleconference line. Dr. Dzombak then recognized the next public speaker.

Mr. Don Ludwig presented his oral statement and noted that he lived in Snow Shoe, Pennsylvania. He stated that he had four laboratory testing results that confirmed contamination due to hydraulic fracturing operations. He noted that while the PA DEP Deputy Director for Oil and Gas denied that barium was used by hydraulic fracturing operations, in 2014 the PA DEP

stated that barium was used in hydraulic fracturing operations. He stated that testing of the drilling mud for a hydraulic fracturing well indicated 4000 parts per million barium, and that the PA DEP stated that this was a normal barium concentration for such mud. He stated that the company who installed a hydraulic fracturing well denied the existence of the hydraulic fracturing well, then shut the well down. He noted that the company left the area and did not have a PA DEP permit to conduct hydraulic fracturing activities.

Mr. James Shreves presented his oral statement. He noted that he lived in West Virginia, and had a water buffalo water tank to store and transport water for several years. He stated that he lived on a road where many members of the public had water buffalos. He asked whether there were any available studies of West Virginia watersheds, and noted that the EPA was visiting West Virginia in January 2016 to inform West Virginia about activities related to hydraulic fracturing. He stated that there were many volunteer citizens who had information related to hydraulic fracturing.

Dr. Dzombak then reiterated the names of registered speakers who did not respond when their name was called to speak, and no additional speakers made an oral statement.

Dr. Dzombak then asked if any Panel members had any clarifying questions for the public commenters who presented oral comments during the teleconference. One Panel member noted that one oral public commenter (Mr. John Noel) stated that the hydraulic fracturing industry best practices should not be described in the draft Assessment Report. The Panel member noted that it was not clear why such best practices should not be incorporated into the draft Assessment Report, nor why details on how industry best practices could affect potential impacts to drinking water supplies should not also be described. Another Panel member requested more information regarding the Harvard study that Mr. Noel referred to in his oral public comments, and stated that information on this study should be incorporated into the draft Assessment Report.

Dr. Dzombak stated that Panel members should submit their draft responses to charge questions to the Designated Federal Officer.

Dr. Dzombak then asked if the Panel members had any additional questions or comments. Hearing none, Dr. Dzombak thanked the Panel members, the EPA staff, and SAB Staff Office. With the teleconference business concluded, the Designated Federal Officer adjourned the teleconference at 6:20 pm ET.

Respectfully Submitted:

*/Signed/*  
Mr. Edward Hanlon  
Designated Federal Officer

Certified as Accurate:

*/Signed/*  
Dr. David A. Dzombak, Chair  
SAB Hydraulic Fracturing Research  
Advisory Panel

NOTE AND DISCLAIMER: The minutes of this public teleconference reflect diverse ideas and suggestions offered by Panel members during the course of deliberations within the teleconference. Such ideas, suggestions and deliberations do not necessarily reflect 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 or teleconferences.

## Materials Cited

The following teleconference materials are available on the SAB website ([www.epa.gov/sab](http://www.epa.gov/sab)) or through the following SAB Hydraulic Fracturing Research Advisory Panel December 3, 2015 public teleconference webpage:

<http://yosemite.epa.gov/sab/sabproduct.nsf/a84bfee16cc358ad85256ccd006b0b4b/9ec89b6d7a63d7e385257ef10074acb6!OpenDocument&Date=2015-12-03>

<sup>1</sup> November 10, 2015 Federal Register Notice announcing the public teleconference (80 FR 69652 – 69653)

<sup>2</sup> Agenda for December 3, 2015 public teleconference

<sup>3</sup> Preliminary Summary Responses to Charge Questions with Changes from Members of the EPA Science Advisory Board (SAB) Hydraulic Fracturing Research Advisory Panel

<sup>4</sup> Preliminary Summary Bullets-Responses to Charge Questions-from Members of the EPA SAB Hydraulic Fracturing Research Advisory Panel-December 4, 2015

<sup>5</sup> Table of Public Comments-Hydraulic Fracturing draft Assessment Report-Sorted by Relationship to Charge Questions-Docket EPA-HQ-OA-2015-0245-as of 12-2-15

<sup>6</sup> Oral Statement submitted by Karen Feridun

<sup>7</sup> Oral Statement submitted by Hugh MacMillan

<sup>8</sup> Oral Statement submitted by Ann Bristow

<sup>9</sup> Oral Statement submitted by Sharon Wilson

<sup>10</sup> Oral Statement submitted by John Noel

<sup>11</sup> Oral Statement submitted by Jeff Zimmerman

<sup>12</sup> Oral Statement submitted by Rebecca Roter

<sup>13</sup> Oral Statement submitted by Andrew Chichura

<sup>15</sup> Oral Statement submitted by Victoria Switzer

<sup>15</sup> Oral Statement submitted by Mark Ruffalo

<sup>16</sup> Oral Statement submitted by Barbara Arrindell

<sup>17</sup> Oral Statement submitted by Robert Lee McCaslin

<sup>18</sup> Oral Statement submitted by Pramilla Malick

<sup>19</sup> Oral Statement submitted by Sharon Kinney

## ATTACHMENT A – ROSTER

### U.S. Environmental Protection Agency Science Advisory Board Hydraulic Fracturing Research Advisory Panel

#### CHAIR

**Dr. David A. Dzombak**, Hamerschlag University Professor and Department Head, Civil and Environmental Engineering, Carnegie Mellon University, Pittsburgh, PA

#### MEMBERS

**Dr. Stephen W. Almond**, Director of Research & Development, Fritz Industries, Inc, Houston, TX

**Dr. E. Scott Bair**, Emeritus Professor, School of Earth Sciences, Ohio State University, Columbus, OH

**Dr. Peter Bloomfield**, Professor, Statistics Department, North Carolina State University, Raleigh, NC

**Dr. Steven R. Bohlen**, State Oil and Gas Supervisor, and Head of the Division of Oil, Gas and Geothermal Resources (DOGGR), State of California Department of Conservation, Sacramento, CA

**Dr. Elizabeth W. Boyer**, Associate Professor, Department of Ecosystem Science & Management, Pennsylvania State University, University Park, PA

**Dr. Susan L. Brantley**, Distinguished Professor of Geosciences and Director, Earth and Environmental Systems Institute, Pennsylvania State University, University Park, PA

**Dr. James V. Bruckner**, Professor of Pharmacology and Toxicology, Department of Pharmaceutical and Biomedical Sciences, College of Pharmacy, University of Georgia, Athens, GA

**Dr. Thomas L. Davis**, Professor, Department of Geophysics, Colorado School of Mines, Golden, CO

**Dr. Joseph J. DeGeorge**, Global Head of Safety Assessment and Laboratory Animal Resources, Merck Research Laboratories, Lansdale, PA

**Dr. Joel Ducoste**, Professor, Civil, Construction, and Environmental Engineering Department, North Carolina State University, Raleigh, NC

**Dr. Shari Dunn-Norman**, Professor, Geosciences and Geological and Petroleum Engineering Department, Missouri University of Science and Technology, Rolla, MO

**Dr. Katherine Bennett Ensor**, Professor and Chair, Department of Statistics, Rice University, Houston, TX

**Dr. Elaine M. Faustman**, Professor, Department of Environmental Health, and Director, Institute for Risk Analysis and Risk Communication, School of Public Health, University of Washington, Seattle, WA

**Mr. John V. Fontana**, Professional Geologist and President, Vista GeoScience LLC, Golden, CO

**Dr. Daniel J. Goode**, Research Hydrologist, U.S. Geological Survey, Pennsylvania Water Science Center, Exton, PA

**Dr. Bruce D. Honeyman**, Associate Vice President for Research and Emeritus Professor of Environmental Science and Engineering, Colorado School of Mines, Golden, CO

**Mr. Walter R. Hufford**, Director of Government and Regulatory Affairs, Talisman Energy USA Inc. - REPSOL, Warrendale, PA

**Dr. Richard F. Jack**, Director, Vertical Marketing for Environmental and Industrial Markets, Thermo Fisher Scientific Inc., San Jose, CA

**Dr. Dawn S. Kaback**, Principal Geochemist, Amec Foster Wheeler, Denver, CO

**Dr. Abby A. Li**, Senior Managing Scientist, Exponent Health Sciences, Exponent, Inc., San Francisco, CA

**Mr. Dean N. Malouta**, White Mountain Energy Consulting, LLC, Houston, TX

**Dr. Cass T. Miller**, Daniel A. Okun Distinguished Professor of Environmental Engineering, Department of Environmental Sciences and Engineering, University of North Carolina, Chapel Hill, NC

**Dr. Laura J. Pyrak-Nolte**, Professor, Department of Physics, College of Science, Purdue University, West Lafayette, IN

**Dr. Stephen Randtke**, Professor, Department of Civil, Environmental, and Architectural Engineering, University of Kansas, Lawrence, KS

**Dr. Joseph N. Ryan**, Professor of Environmental Engineering and Bennett-Lindstedt Faculty Fellow, Department of Civil, Environmental, and Architectural Engineering, University of Colorado-Boulder, Boulder CO

**Dr. James E. Saiers**, Clifton R. Musser Professor of Hydrology and Associate Dean of Academic Affairs, School of Forestry and Environmental Studies, Yale University, New Haven, CT

**Dr. Azra N. Tutuncu**, Professor and Harry D. Campbell Chair, Petroleum Engineering Department, and Director, Unconventional Natural Gas and Oil Institute, Colorado School of Mines, Golden, CO

**Dr. Paul K. Westerhoff**, Professor, School of Sustainable Engineering and The Built Environment, Ira A. Fulton Schools of Engineering, Arizona State University, Tempe, AZ

**Dr. Thomas M. Young**, Professor of Civil and Environmental Engineering, University of California – Davis, Davis, CA

**SCIENCE ADVISORY BOARD STAFF**

**Mr. Edward Hanlon**, Designated Federal Officer, U.S. Environmental Protection Agency, Science Advisory Board Staff, Washington, DC

## ATTACHMENT B – Other Attendees

### List of Members of the Public Who Requested Information on Accessing the Teleconference Line or Live Webcast, or Who Participated On the Teleconference or Live Webcast:

December 3, 2015

<b>Name</b>	<b>Affiliation</b>
Alexander, Kim	No Affiliation Given
Ambrose, Jeannie	No Affiliation Given
Ames, Bren	Aye Open Outcomes
Anderson, Loren	No Affiliation Given
Angiola, Gina	No Affiliation Given
Arnold, Elizabeth	No Affiliation Given
Arrindell, Barbara	Damascus Citizens for Sustainability
Aubie, Karissa	No Affiliation Given
Barkau, Lily	No Affiliation Given
Bassett, Dorothy E.	No Affiliation Given
Bazin, Abby	No Affiliation Given
Black, Judy	No Affiliation Given
Briskin, Jeanne	EPA
Bristow, Ann	No Affiliation Given
Brown, Katie	FTI Consulting
Burden, Susan	EPA
Calhoun, Lee	No Affiliation Given
Calhoun, Tom	No Affiliation Given
Canova, Thomas A.	The Law Office of Jack Fitzgerald, PC
Carluccio, Tracy	Delaware Riverkeeper Network
Carr, Beth	No Affiliation Given
Ceplecha, Zachary	No Affiliation Given
Ceplecha, Zachary	FTS International Services, LLC
Charles, George	No Affiliation Given
Chichura, Andrew	No Affiliation Given
Clancy, Reenie	No Affiliation Given

<b>Name</b>	<b>Affiliation</b>
Clark, Maria	No Affiliation Given
Cluff, Maryam	No Affiliation Given
Costigan, Annie	FTI Consulting
Cromwell, James	No Affiliation Given
Dermansky, Julie	DeSmog
Dickert, John	No Affiliation Given
DiCosmo, Bridget	Inside EPA
Diefenbach, Jane	No Affiliation Given
DiTucci, Allie	No Affiliation Given
Dlouhy, Jennifer	Bloomberg
Doucette, Paul	GE O&G
Duman, Jo Ann	Friends United for a Safe Environment (FUSE)
Dunmore, Karen	No Affiliation Given
Durfee, Donna	No Affiliation Given
Eriksen, Timothy M.	Moody and Associates, Inc.
Fenton, John	No Affiliation Given
Ferguson, Brian	No Affiliation Given
Feridun, Karen	No Affiliation Given
Flores, Amy	No Affiliation Given
Flynn, Marian	Food and Water Watch
Forpeace, Hope	No Affiliation Given
Fox, Josh	No Affiliation Given
Francis, Dick	No Affiliation Given
Frantz, Joe	Range Resources Corp.
Freeman, Marc E.	No Affiliation Given
French, Carol	No Affiliation Given
Frithsen, Jeff	EPA
Gabelich, Christopher	Metroplitan Water District of Southern California
Ghorayshi, Azeen	No Affiliation Given
Ghorayshi, Azeen	BuzzFeed News

<b>Name</b>	<b>Affiliation</b>
Gilmer, Ellen M.	EnergyWire
Girolami, Martha	No Affiliation Given
Goldman, Todd	EPA
Gottlieb, Barbara	Physicians for Social Responsibility
Gourley, Jennifer	No Affiliation Given
Hahn, Carrie	No Affiliation Given
Hanuan, Kenda	Friends of Buckingham
Harmon, Shani	Baker Botts L.L.P.
Herrera, Roxana	No Affiliation Given
Holdridge, Victoria T.	No Affiliation Given
Holland, Bill	No Affiliation Given
Holt, Alyson	No Affiliation Given
Hudon, Karen	No Affiliation Given
Jackson, Tom	Baker Botts L.L.P.
Jaggar, Karuna	Breast Cancer Action
Jennings, Bret	No Affiliation Given
Johnson, Eric V.	No Affiliation Given
Kemble, Ray	No Affiliation Given
Kenney, James	EPA
Kinney, Sharon	No Affiliation Given
Klick, Jacques	University of Miami
Kolbensschlag, Pete	MWS
Koplos, Jonathan	No Affiliation Given
Kostis, Steven	No Affiliation Given
Kothari, Yogin	No Affiliation Given
Kovski, Alan	No Affiliation Given
Kretzmann, Hollin	Center for Biological Diversity
Kropatsch, Tom	Wyoming Oil and Gas Commission
Kruell, Jack	No Affiliation Given
Kurose, Stephanie	No Affiliation Given
Lambert, Debbie	No Affiliation Given

<b>Name</b>	<b>Affiliation</b>
Lipsky, Steven	No Affiliation Given
Lisak, Jenny	No Affiliation Given
Ludwig, Don	No Affiliation Given
Ludwig, R	No Affiliation Given
Lvey, Gwendolyn	No Affiliation Given
Lyman, Richard	No Affiliation Given
MacMillan, Hugh	Food and Water Watch
Maloney, Kelsey	EPA
Marks, Teresa	No Affiliation Given
Marquart, James P.	No Affiliation Given
Martin, Jimmie	No Affiliation Given
Mason, Deirdre	Association of State Drinking Water Administrators
Mathis, Mike	No Affiliation Given
Mazer, Doug	No Affiliation Given
McCaslin, Robert Lee	No Affiliation Given
McFadden, Angela	No Affiliation Given
McGough, Alice	No Affiliation Given
Meadows, Stephanie	American Petroleum Institute
Moffitt, Lena	Sierra Club
Nelson, Peter	No Affiliation Given
Newman, Colleen	American Association of Petroleum Geologists
Nickolaus, Michael P.	Ground Water Protection Council
Noel, John	Clean Water Action
Nolan, Kathleen	Catskill MountainKeeper
Nolen, Heather	No Affiliation Given
Nowicki, Brian	No Affiliation Given
Nutter, Vickie	No Affiliation Given
Olson, Beth	No Affiliation Given
Pappas, Alex	No Affiliation Given
Pappas, Alex	Bracewell and Giuliani

<b>Name</b>	<b>Affiliation</b>
Payne, Bryce	No Affiliation Given
Peairs, Clydell	No Affiliation Given
Penoyer, Pete	U.S. National Park Service
Purdu, Shelly	No Affiliation Given
Richardson, Rachel	Environment America
Ring, Shari	The Cadmus Group, Inc.
Rocco, Jim	International Association of Drilling Contractors
Roter, Rebecca	No Affiliation Given
Routledge, Judy	No Affiliation Given
Ruffalo, Mark	No Affiliation Given
Russell, Emily	No Affiliation Given
Ryan, Vanessa	No Affiliation Given
Sandilos, Robert	Chevron USA. Inc.
Savta, Deanna	No Affiliation Given
Schab, Margery	No Affiliation Given
Schwartz, Lenn	No Affiliation Given
Scroggins, Vera	No Affiliation Given
Segal, Scott	Policy Resolution Group
Septoff, Alan	No Affiliation Given
Shreves, James	No Affiliation Given
Skerry, Priscilla	No Affiliation Given
Slottje, Helen	No Affiliation Given
Smith, Kelley	No Affiliation Given
Snyder, Bruce	Range Resources Corp.
Solomon, Sarah	No Affiliation Given
Soraghan, Mike	EnergyWire
Stamm, M.	No Affiliation Given
Stanek, John	EPA
Steele, Ed	GE Global Research
Stetson, Sam	No Affiliation Given
Stevens, Craig	No Affiliation Given

<b>Name</b>	<b>Affiliation</b>
Stevens, Craig	Patriots From The Oil & Gas Shales
Strong, Scott	No Affiliation Given
Sturm, David	No Affiliation Given
Styles, Kate	No Affiliation Given
Swartz, Leslie	No Affiliation Given
Switzer, Victoria	No Affiliation Given
Teichman, Kevin	EPA
Thiesse, Mark	No Affiliation Given
Tong, Scott	No Affiliation Given
Tuccillo, Mary Ellen	No Affiliation Given
Tytko, Mary Jane	No Affiliation Given
Vergano, Dan	BuzzFeed News
Vic Bredl, Therese	No Affiliation Given
Vogelsang, Renee	Frack Action
Walczak, David	No Affiliation Given
Walker, Stuart	EPA
Weill, Jennifer	No Affiliation Given
Wells, Tansy	No Affiliation Given
Williams, Wes	No Affiliation Given
Wilson, Sharon	Earthworks
Wiser, Nathan	EPA
Wright, Sam	Water Defense
Wurth, Emily	Food & Water Watch
Yost, Erin	No Affiliation Given
Young, Maggi	Chesapeake Energy Corporation
Zarter, Ellen	No Affiliation Given
Zimmerman, Jeff	Damascus Citizens for Sustainability, NYH2O, and Citizens for Water