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May 12, 2011

Mr. Edward Hanlon
Designated Federal Officer
EPA Science Advisory Board Staff Office (1400R)
U.S. Environmental Protection Agency
1200 Pennsylvania Avenue, NW
Washington, DC 20460

Re: Comments of the American Petroleum Institute on EPA's Science Advisory Board Draft Review of EPA's Draft Hydraulic Fracturing Study Plan

The American Petroleum Institute ("API") submits the following comments on EPA's Science Advisory Board's April 28, 2011 Draft Review of EPA's Draft Hydraulic Fracturing Study Plan ("SAB Draft"). API is a national trade association representing over 400 member companies involved in all aspects of the oil and natural gas industry across the United States. Our members have extensive experience with the drilling and completion techniques used in natural gas development in shale formations and in developing America's oil and natural gas resources in a safe and environmentally responsible manner.

API and our member companies previously submitted comments on EPA's proposed Study Plan, *see* Letter from Erik Milito, API, to Edward Hanlon, EPA (February 28, 2011) ("API Letter"), and we appreciate the opportunity to comment on the SAB Draft. We believe that it is essential for EPA to maintain a transparent and collaborative effort throughout the proposed study by allowing experts in the field of hydraulic fracturing to participate and comment during all phases of the work.

Upon careful review, however, we must express our concern that EPA's Study Plan and this SAB review process have already ventured into offering conclusions, suggesting a bias and pre-disposition against hydraulic fracturing, unduly influenced by common misconceptions and front page media coverage. As one example, the SAB Draft states that "SAB anticipates that the primary opportunity for human health exposure is likely to be through surface waters, and recommends that EPA's first order human health exposure assessment focus on surface water management of flowback and produced water, and disposal of treated wastewater." SAB Draft at 43. An impartial, unbiased, scientific study would not suggest at this juncture *the primary opportunity for exposure is* ***likely to be*** due to any particular cause. That determination should be reserved to the study itself.

Our concerns are heightened, in part, because, to paraphrase one Panel member, there is a serious lack of knowledge and hands on experience with hydraulic fracturing within the Panel. API remains available to assist the Science Advisory Board (―Board" or ―SAB") and in particular this panel (―Panel") as it refines its recommendations further, and we welcome the opportunity to be a continuing partner in EPA's research concerning hydraulic fracturing. We are confident that a fair, unbiased, transparent, peer-reviewed study of the sound application of this long applied technology following well recognized risk-based decision-making principles will yield results that can be accepted by all stakeholders.

1. **Consistent with the direction from Congress, the Study scope should be focused on studying the relationship between drinking water and hydraulic fracturing**

API welcomes the Panel's statement that the Study Plan should be ―narrowed and focused." SAB Draft at i. This has been one of API's principal concerns from the outset – that the scope of the Study was too broad and extended beyond the narrow charter given by Congress to study the ―relationship between drinking water and hydraulic fracturing." API supports those draft recommendations that urge EPA to narrow and focus the Study Plan. *E.g.,* SAB Draft at 8, 17, 56 (―the SAB recommends that no toxicity testing be carried out as part of the current research."); SAB Draft at 56 (―The SAB does not believe that developing new analytical methods for detecting and quantifying HF additives is an achievable goal for the current research program, given the constraints of time and funding."); SAB Draft at 57 (―The SAB does not support use of resources from the current project to develop new analytical methods for detecting components of the flowback and produced water").

We are, however, very concerned that even while the Panel may be stating that the Study Plan be ―narrowed and focused," the SAB draft in fact appears to repeatedly recommend expanding the scope of this Study and proposes numerous additional topics. Here are just a handful of examples:

- Scope of waters to be studied. The Board has proposed to expand the definition of a core issue to be studied – the definition of ―drinking water" – beyond the existing EPA regulation. SAB Draft at 30 (―reconsider the present definition of ‗drinking water resources'" to include waters with more than 10,000 mg/L of total dissolved solids). Moreover, the SAB draft urges that ―EPA's framework should take a broader view with regard to water quantity than depicted in Figure 7, and link water fluxes associated with hydraulic fracturing to water flows in the surrounding natural hydrological cycle." SAB Draft at 1; *see also* Draft at 1-2 (―EPA should also assess interbasin transfers of flowback and produced water in order to identify possible water quality and quantity issues associated with such transfers.").

- Toxicity analyses. At the same time that the draft suggests that toxicity not be tested, the draft states that ―t[]oxicity studies, if exposure is likely, may need to be undertaken." SAB Draft at 42. It further recommends that ―EPA should consider using predictive

toxicology tools as a way to identify possible problematic constituents of various HF fluids. This activity may be carried out separately from activities associated with EPA's Study Plan so as not to affect the timeliness and completeness of EPA's Study Plan." SAB Draft at 42. Even if outside the Study Plan, it is beyond the charter of this effort to propose a series of new and additional analyses.[1]

- Watershed scale studies. While panel members expressed considerable concern during the public sessions about the ability to conduct the case studies at all, the SAB draft is recommending that one of the case studies expand to an entire watershed. "The SAB recommends that EPA conduct at least one case study with this larger watershed-scale focus." SAB Draft at 23. Indeed, not only does the draft expand the scope in this fashion, but without reference to scientific data, suggests a location to conduct the study. "The SAB specifically suggests that EPA consider conducting a case study in the Ohio River Basin of Southwestern Pennsylvania, since this is a location where such watershed-scale drinking water impacts are suspected." SAB Draft at 23.

- Environmental justice. "The SAB recommends that a separate section of the research plan be devoted explicitly to environmental justice issues." SAB Draft at 2. Similarly, the Board suggests EPA "[i]dentify and characterize potential environmental justice concerns associated with hydraulic fracturing and explicitly recognize such concerns in the research questions." SAB Draft at ii. Environmental justice may be a serious social issue, but we are not aware of any basis for it to be a focus of concern associated with the scientific analysis of hydraulic fracturing. Regardless, this effort should be directed solely to the scientific study question presented by Congress and blind to such social policy considerations.

- Expansion of POTW studies. Despite the fact that wastewater treatment plants are now rarely used as a disposal method and recent state regulatory revisions have nearly eliminated the potential for Marcellus Shale operators to discharge their flowback and produced waters to POTWs, the SAB draft recommends expanding the scope of research on POTWs. For example, EPA is encouraged to study the economics of treating hydraulic fracturing waters at a POTW. SAB Draft at 48 (evaluate "the impact of the potential increased burden of analyzing for contaminants in the treated effluent any plants (POTWs or industrial) that treat hydraulic fracturing wastewater and discharge the treated effluent upstream of water treatment plants"); *see also id.* (study "POTW life cycle costs in light of this new stream of wastewater"). The draft further recommends extending the study to consider whether there is a "need for any special storage, handling, management, or disposal controls" if a POTW treats hydraulic fracturing waters. SAB Draft at 48. Most problematic is the suggestion to expand the retrospective case studies to include "all POTWs that now accept hydraulic fracturing return flows" in order to assess "the impacts

[1] In addition, the recommendation to estimate toxicity based on quantitative structure-activity relationships (QSARS) must be appropriately qualified, as QSARs are only estimations and subject to considerable uncertainty.

of TDS." SAB Draft at 48. These expansive requests would misallocate limited resources from the focused research directed by Congress.

- Spill release and mitigation. There are ample programs already in place to address standard water and chemicals management practices. The SAB draft however suggests that it "may be appropriate for EPA to expand the existing secondary questions to explicitly identify the need for identifying the likelihood of spills or releases and the effectiveness of mitigation practices." SAB Draft at 19.

- Expansion of studies in geologic formations. For example, the SAB draft urges hydraulic fracturing studies be done "in areas that are highly stressed (e.g., shale formations) which when unloaded, may have the potential to fracture. Stresses should be measured and quantified at certain sites. Modeling studies could be incorporated to address various scenarios. Studies should include worst case scenarios and catastrophic failures such as the creation of earthquakes." SAB Draft at 42.

- Well construction practices. The SAB Draft appears to make two different, somewhat inconsistent recommendations regarding the scope and timing of research into well construction practices. On the one hand, the draft appears to set aside but propose to expand research into this topic. Specifically, the draft states that the "consensus of the Panel is that well drilling and cementing practices be researched separately from the hydraulic fracturing process itself. In doing so, the SAB believes it is essential that EPA prioritize the research to address the fundamental question of the potential influence of the hydraulic fracturing process on drinking water resources and contamination of aquifers given the charge to the EPA from Congress, and given the limited time frame allocated to this study." SAB Draft at 38. API certainly supports focusing the Study on the charge given by Congress. However, the Panel then goes on to recommend that EPA "identify and characterize common and best practices for well construction (e.g., casing design, construction under different scenarios, settings, failure rates, life expectancies, and performance of cements under a variety of hydraulic fracturing conditions), and determine whether such practices meet minimum standards from a public water supply perspective." SAB Draft at 42.

  As an initial matter, API's guidance already does exactly what the SAB recommends for the EPA Study – identify and characterize common and best practices for hydraulic fracturing well construction. Second, we urge the Panel to address this apparent inconsistency by removing the recommendation for "separate research" and focusing the recommendation for well construction research on evaluating the unique aspects of hydraulic fracturing – specifically, the methods that are employed to confirm casings and well cements can contain hydraulic fracturing fluids and pressures. API has expertise and guidance that it can provide to assist EPA in such an effort.

- Consideration of air impacts. An earlier draft of the Study Plan had considered a broader scope, including air impacts. The more recent draft had appropriately eliminated that

> aspect from a study that Congress had proposed to evaluate relationship between hydraulic fracturing and drinking water. Now, the SAB Draft would seek to resurrect this (and expand the scope) by recommending that ―EPA should consider the potential release of volatile organic contaminants and other contaminants to the air.‖ SAB Draft at 14.

There are other examples.[2] We urge the Panel to follow its own direction and recommend specifically how the Study Plan ―can be narrowed and focused" consistent with the time, resources, and direction provided by the Congress that commissioned this work.

2. The Study process should draw upon the knowledge and expertise of industry stakeholders to ensure findings are scientifically accurate

API appreciates the Board's suggestion that EPA ―use a wide variety of sources available to EPA in order to increase the chances of success of the research program, and analyze data from HF service companies and states to provide additional insight.‖ SAB Draft at ii. We agree with the Board that EPA ―underemphasizes the review and analysis of existing data" and in the recommendation that ―EPA should review all available data sources to learn what is already known about the relationship of hydraulic fracturing and drinking water resources.‖ SAB Draft at 4. We also welcome the Board's suggestion that EPA work with the Ground Water Protection Council (GWPC) and the Interstate Oil and Gas Compact Commission (IOGCC). SAB Draft at 35. We look forward to assisting EPA, as the Board suggests, in ―gathering available information on [well construction] from the American Petroleum Institute and the National Ground Water Association.‖ SAB Draft at 42. And we recognize the Board adopted API's recommendation that EPA rely on the Colorado Oil and Gas Commission database for existing data. SAB Draft at 44. The Board should also recommend EPA consider the comprehensive Texas Water Development Board's ―Current and Projected Water Use in the Texas Mining and Oil and Gas Industry," which API included with its previous comments. *See* API Letter, exhibit B.

Still, API remains concerned that EPA and this Panel is not engaging fully those with knowledge of the industry. The failure to enlist API members and other industry groups will negatively impact the study and possibly lead to erroneous assumption, models, findings, and conclusions. The Board should ensure knowledgeable industry participants are included in all phases of the research. The Board should further expressly recommend that field work, model development, scenario analysis, case studies, and other work be transparent with opportunities for stakeholders to participate fully and fairly in the process. API intends to participate fully through comment and collaboration throughout the ongoing Study. The Board and EPA should draw upon the long experience in hydraulic fracturing of API members as EPA implements the Study in accordance with SAB's recommendation that ―engagement with stakeholders occur throughout the research process.‖ Letter from Fred S. Hauchman, Director, Office of Science Policy to Edward Hanlon, Designated Federal Officer, EPA SAB Staff re: Request for Review of the Draft Plan (February 11, 2011).

[2] Additional comments on specific portions of the SAB Draft are attached here as Exhibit A.

3. The final Study Plan should expressly direct that the Study will rely on the best available science in this undertaking

Scientific Sources: API appreciates the Panel's draft recommendation that EPA consider additional scientific material, including API research, to guide EPA's research questions. SAB Draft at 25-29. This Study is a scientific endeavor that must rely on sound science, consistent with the policies of EPA and the federal government. API agrees with the panel member who suggests that EPA should cite "textbooks, or original sources for fundamental technology points related to hydraulic fracturing" and should "[u]se peer review literature to describe fracturing technology." Preliminary Comments from Members of EPA Science Advisory Board (SAB) Panel for Review of EPA's Hydraulic Fracturing Study Plan As Of March 22, 2011 ("Preliminary Comments") at 29. It is incumbent on this peer review Panel to ensure that the work as proposed and undertaken under the Study Plan relies on peer-reviewed, scientific literature at all stages, including as EPA develops this planning document.

This Board should go further, however, and insist that EPA not base this important research on possibly unreliable sources. Currently, "[t]he SAB notes that while anecdotal information may provide useful data, EPA should classify the data as such." SAB Draft at 22. That would be a useful step, but instead of instructing the EPA to classify anecdotal information separately, the Board should insist on scientific evidence rather than anecdotes in this scientific endeavor. This Board should vigorously challenge EPA's reliance on – and remove from its own draft – any anecdotes and news sources that underpin the proposed research. As one Panel member acknowledges, when the Draft Plan cites "activist groups such as 'Earthworks,' [it] reduces the credibility of the study plan." Preliminary Comments at 29.

Modeling: API welcomes the Board's proposed recommendation that EPA not waste time or resources recreating models that already exist. Indeed, the SAB Draft acknowledges explicitly that EPA should "us[e] existing data acquisition and analysis methods rather than develop new methods." SAB Draft at 4; *see also id.* at 25 ("the SAB concludes that there is insufficient time or resources to develop new methods during this study."). As API mentioned in its earlier comments to this Panel, the Department of Energy maintains existing fracturing models that could be used rather than creating entirely new models. API Letter at 6.

However, this Panel should again go further and insist that any modeling comport with the guidance EPA has already adopted to ensure basic quality assurance and quality control requirements. For example, while the SAB Draft recognizes that modeling fractures "will be strongly dependent on assumptions and choices made about how to represent the physical system," *see* SAB Draft at 8, the Board does not request that the Draft Plan comply with EPA's normal quality assurance requirements and never even mentions EPA's guidance documents. *See* EPA, *Guidance for Quality Assurance Project Plans for Modeling*, EPA QA/G-5M, EPA/240/R-02/007 (Dec. 2002). Indeed, EPA's guidance on modeling is very clear that a model that "creates a prediction" should be "peer reviewed" at every step of the process, including design, testing, and application of the model. EPA, *Guidance for Quality Assurance Project Plans for Modeling, supra* at 1, 2, 14. Thus, if the Board insists on encouraging EPA to use modeling "to evaluate

scenarios . . . across all research questions identified," SAB Draft at 24, this Board should likewise ensure each step of modeling is subject to a rigorous peer-review process.

Risk Assessment: As this Panel is aware, the proposed Study is under the direction of EPA's Office of Research and Development ("ORD"). In May 11, 2011 testimony before Congress, Dr. Paul Anastas, Assistant Administrator and Science Advisor in charge of ORD, testified before the full House Committee on Science, Space, and Technology and represented that the hydraulic fracturing study is "[n]ot intended to be a risk assessment."[3] If that is the case, then the Study Plan should be adjusted to make clear that there is no intention to conduct a risk assessment of hydraulic fracturing – but only evaluate the relationship between drinking water resources and hydraulic fracturing, as Congress directed.

To the extent that EPA intends to conduct a risk assessment, API supports the Panel's apparent draft recommendation that EPA use the standard risk assessment paradigm, including "hazard identification, dose-response assessment, exposure assessment, and risk management for each lifecycle stage and use the paradigm to assist in problem formulation." SAB Draft at 44. However, the SAB draft then recommends skipping essential steps that EPA would typically require when conducting a risk assessment. "The SAB recommends that EPA focus on potential human exposure, followed by hazard identification if sufficient time and resources are available." If adopted, this recommendation effectively short-circuits the process, assumes that hazards exist, and ignores existing controls.

Moreover, critical to any risk assessment are the assumptions that frame the assessment. Hence, if a risk assessment is going to be conducted, the assessment must be transparent to allow for stakeholder review – and indeed the Study Plan itself should specify the risk assessment methodology, tools, and assumptions to facilitate that review. Further, any assessment must specify the uncertainties associated with the analysis. The SAB Draft appropriately would direct EPA to "[i]dentify or estimate the uncertainty or confidence in all research conclusions." SAB Draft at iii, 2. Acknowledging the short time frame does not permit EPA "to answer all questions with a high degree of certainty" is realistic. SAB Draft at 15. EPA should heed such concerns and avoid unsound generalizations in any findings.

4. The SAB Draft unnecessarily recommends eschewing well established standards for protection of human health and the environment

API objects to the draft recommendation to change well established definitions and standards governing research on human health and the environment. This Panel has taken it upon itself to suggest a change in some very well established standards for protection of human health and the environment. There is no justification for applying arbitrarily determined restrictive standards to one industry.

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[3] Dr. Paul Anastas, Office of Research and Development US Environmental Protection Agency before the full House Committee on Science, Space, and Technology, Hearing on the Review of Hydraulic Fracturing Technology and Practices (May 11, 2011).

Specifically, the Panel would problematically suggest that EPA "reconsider the present definition of 'drinking water resources'" to include waters with more than 10,000 mg/L of total dissolved solids. SAB Draft at 30. This certainly would not "narrow and focus" the Study, but would greatly expand its reach. Indeed, it is simply inconceivable that Congress contemplated this Study of hydraulic fracturing would blithely ignore the established regulatory definition of "drinking water." Accordingly, API strongly agrees with the Panel members who raised concerns that changing such well established definitions concerning safe drinking water is "beyond the scope of the study." SAB Draft at 30.

Similarly, the Panel suggests that EPA ignore the Safe Water Drinking Act's established Maximum Contaminant Levels (MCLs). SAB Draft at 30. Besides brushing aside standards established in regulations promulgated under federal law, the SAB Draft fails to provide replacement criteria for acceptable contaminant levels to supplant the MCLs. Regardless, the Board should not recommend abandoning established regulatory standards while completing this Congressionally directed research. If Congress or EPA wishes to review or change these standards, such change should be undertaken in legislation or in a separate regulatory proceeding. Abandoning well established standards here might create uncertainty concerning the validity and credibility of any EPA findings based on new, untested, and undefined standards.

5. The SAB Draft does not address further concerns identified in API's February 2011 Comment Letter

The SAB Draft does not address a number of other concerns that API raised in its February 2011 letter commenting on the EPA Draft Study Plan. We urge this Panel to review those concerns again and include them in its final recommendations to EPA. Specifically:

Premature Release Of Findings: The Panel draft has not addressed API's recommendation that EPA not issue an Interim Report due to the substantial risk that many policy considerations and potential regulatory and legislative actions could take place based on an incomplete analysis. To ensure policy decisions do not overly rely on a retrospective review of a handful of locations, EPA should include and finalize their prospective case study findings before releasing any report to maintain a credible scientific process.

Best Practices Standard: The draft does not address API's recommendation that EPA include industry best practices in its risk assessment studies. EPA proposed to rely on "the minimum requirements imposed by state regulatory agencies" rather than industry best practices. Draft Plan at 16. These legal minimums may differ from actual practice, thus, EPA should consider the industry best practices.

API issues standards, recommended practices, and guidelines for the industry and this Panel should ensure that any research takes account of those practices. To ensure basic knowledge of industry practices is available to policy makers across the country, API is providing copies to state regulators of API's latest hydraulic fracturing guidance documents that the industry proactively developed to provide appropriate management practices and to address

concerns that have been raised by regulators and others regarding the potential impacts of hydraulic fracturing.

The new guidance documents are a five part "HF-series" that address proper well construction; water acquisition, use, management, and disposal practices; and mitigation of other surface impacts.[4] This series guides operations related to hydraulic fracturing and complements two other API recommended practices – one covering proper "zonal isolation," which provides multiple levels of protection between sources of drinking water and the production zone of an oil and gas well; and the other detailing steps for the effective reclamation and remediation of onshore exploration and production sites – to reduce the environmental footprint of hydraulic fracturing as much as possible. Additionally, there are over 100 other similar documents that set "best practices" for virtually all aspects of oil and gas drilling and production operations.

These documents were developed as part of API's Standards Program, a standard setting process accredited by the American National Standards Institute (ANSI) – requiring openness, balance, consensus and due process. API's Standards Program requires that industry specifications, recommended practices, and guidance documents be reviewed on a regular basis to ensure they remain current. As a result, many of our standards are referenced in federal and state regulations because they are recognized as industry best practices. The HF Series was developed with state regulators in mind, noting that regulation of oil and gas operations is most effectively done at the state level.

We will likewise be sending a copy of these February 2011 guidance documents to each panel member. [A summary sheet providing further explanation about the guidance is attached to this letter as Exhibit B.]

Alternative Causation In Retrospective Studies: The SAB Draft does not instruct EPA to consider potential alternative causes in its retrospective studies. The possibility of mischaracterizing the risk of hydraulic fracturing by not ruling out alternative causes in a retrospective study requires this Board's attention. To ensure scientific validity in the retrospective studies, we urge this Panel to recommend that EPA consider alternate sources of contamination during those studies.

Protecting Confidential Business Information: API welcomes the advice to EPA to reach out to API and other industry stakeholders. But despite expecting hydraulic fracturing companies to be "forthcoming with information," the Board fails to recommend EPA explicitly promise to protect any information claimed as Confidential Business Information pursuant to 40 C.F.R. Part 2, Subpart B. SAB Draft at 54, 34. This is a simple and straightforward addition that will greatly facilitate the exchange of information.

[4] The specific documents are: HF1, Hydraulic Fracturing Operations—Well Construction and Integrity; HF2, Water Management Associated with Hydraulic Fracturing Guidance; HF3, Practices for Mitigating Surface Impacts Associated With Hydraulic Fracturing; Standard 65-Part 2, Isolating Potential Flow Zones During Well Construction; and RP51R, Environmental Protection for Onshore Oil and Gas production Operations and Leases.

Biased Assumptions: API reiterates its concern that the Draft Plan espouses a point of view that may predetermine some issues in the Study Plan before research begins. We provided examples in previous comments, and we therefore urge the Panel to review the Draft Plan and recommend that such statements be revised in the final Study Plan. API Letter at 8-9. Indeed, at times, the Panel itself indicates a predisposition wholly inappropriate for an objective, scientific peer review. For instance, "[t]he SAB believes that the handling of the flowback and produced water represents the *most likely important route of exposure* and potential for adverse impacts on drinking water resources." SAB Draft at ii (emphasis added). Congress requested an objective study to determine whether any exposure exists. The Panel should avoid presuming a conclusion that flowback or produced water has exposed or created adverse impacts on drinking water resources.

* * * *

API appreciates the opportunity to comment on SAB's Draft Recommendations. We have endeavored to identify and articulate as many of our concerns as we could, given the short time frame for these comments. As such, the concerns expressed here are, by no means, exclusive.

As we outlined in our earlier comments, API will continue to work with the Board and EPA as constructive partners in this process. We and our members share the common interest with the panel of ensuring the best possible study is performed and stand ready to assist the Board and EPA in the development of the final Study Plan, as well as its execution. We are the experts in the field and have tremendous knowledge and experience to offer the Agency – on the operational practices, on chemical characterization and monitoring, on modeling, treatment technologies and management practices, and on the potential risks posed by these operations. We appreciate your recognition that openness, transparency, and stakeholder involvement are an integral part to the overall hydraulic fracturing study, and we plan to remain engaged at every step in the process. We also recommend that, at appropriate milestones, EPA make its data and analyses available to the public and for peer-review by a qualified cross-section of stakeholders.

We look forward to further collaboration with the Science Advisory Board and EPA as the study commences.

Sincerely,

American Petroleum Institute

ADDITIONAL ITEMS OF CONCERN

API would also note, without limitation, the following additional items of concern regarding the Panel's draft recommendations:

Page 17. If the mixing components are studied, then the SAB should recommend that concentrations be considered and not just volumes and properties. Ultimately, potential exposures will depend upon concentrations:

> "The SAB recommends that the secondary question be expanded to explicitly recognize the need for information regarding volumes and physical and chemical properties of the mixing components."

Page 18. This section suggests a lack of knowledge of the hydraulic fracturing process and that the writers of the draft document did not consult fully with the oil and gas experts on the panel. For example, the following statement confuses hydraulic fracturing and its associated stages to broaden the scope of the EPA study plan:

> "Well construction (and subsequent post-use closure) could be considered another life-cycle stage for hydraulic fracturing so that the potential impacts to drinking water resources could be addressed by specific research questions."

Page 18. The SAB panel was provided expert information from EPA technical workshops on hydraulic fracturing. However, the state-of-the-art knowledge detailed at these workshops was not incorporated in this draft review. For example, knowledge that the depth of hydraulic fracturing prevents impacts to shallow water resources is not reflected in this statement:

> "Since hydraulic fracturing occurs in the deep subsurface environment where it is difficult to assess effects on ground water resources, the operation and injection life cycle of a hydraulic fracturing well has significant uncertainties."

Page 30 + 31. The SAB recommends a list of analytes without providing any justification for the listing:

> "The SAB recommends that the EPA's list of analytes that would be studied to assess the impacts of water acquisition and other HF activities on water quality should specifically include the following constituents: hydrogen sulfide, ammonium, radon, iron, manganese, arsenic, selenium, total organic carbon, and bromide."

> "EPA's list of analytes to be considered in studying the impacts of water acquisition (and other HF activities) on water quality (Table G1) should explicitly include: 1) hydrogen sulfide, a toxic and corrosive substance that also imparts a strongly offensive odor to air…"

Page 32. The SAB panel is unilaterally incorporating language that suggests significant risk even when approved standards are being met. If MCLs are considered an issue, they should be addressed under a separate effort, not as part of a hydraulic fracturing study:

> "An increase in bromide in source waters may cause an increase in cancer risk (if more carcinogenic brominated species are preferentially formed) even if the MCLs for DBPs are not exceeded."

Page 38. This SAB review panel again appears not to have relied on the technical knowledge related to the hydraulic fracturing process of some of its members, by continuing to confuse things like storage leaks and irrigation to the hydraulic fracturing process, and suggesting that leakoff has more than local to fracture impacts:

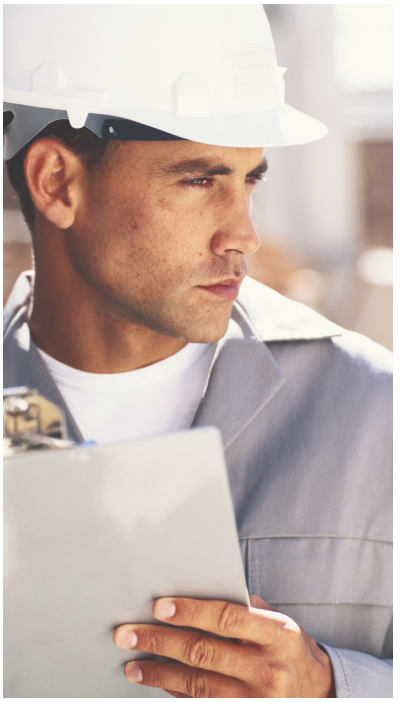
> "However, since groundwater can potentially be contaminated by HF in a number of ways (including leakage from storage, leakages from injection wells, leakoff during hydrofracking potentially along faults or up abandoned wells, and seepage into ground if used for irrigation, a strong secondary emphasis should be placed on assessing exposures through potential groundwater contamination."

Page 38. This statement that BTEX compounds being used for preparing HF fluids is misleading. It implies use of pure BTEX which is not the case.

> "…groundwater is more susceptible to contamination by VOCs, including the BTEX compounds that have reportedly been used at times to prepare HF fluids."

Future energy policies call for forward-thinking. And that's what the new oil and natural gas industry guidance documents from API are all about. The documents provide best practices for safely using hydraulic fracturing, a technology vitally important to helping produce the nation's immense natural gas reserves which are critical to meeting our future energy needs and supplying thousands of well paying jobs for Americans.

Hydraulic Fracturing Guidance Documents from API



Best practices for safe energy production, more U.S. jobs, and more energy security.

View these guidance documents at:
API.org/HydraulicFracturing

For hard copies contact Stephanie Meadows at:
meadows@api.org

RP 51R, *Environmental Protection for Onshore Oil and Gas Production Operations and Leases:* The document provides environmentally sound practices and reclamation guidelines for all domestic onshore oil and gas production operations. It begins with the design and construction of access roads and well locations prior to drilling, and extends to reclamation, abandonment, and restoration operations. The guidance applies to all production facilities including produced water handling and gas compression facilities.

API HF1, *Hydraulic Fracturing Operations – Well Construction and Integrity Guidelines:* These guidelines cover proper well construction in hydraulic fracturing, so that groundwater aquifers and the surrounding environment are protected.

API HF2, *Water Management Associated with Hydraulic Fracturing Guidance:* This document describes the best practices for protecting the environment during the acquisition, use, management, treatment, and disposal of water and other fluids used in hydraulic fracturing.

API HF3, *Practices for Mitigating Surface Impacts Associated with Hydraulic Fracturing:* This guidance document describes the best practices for minimizing surface environmental impacts associated with hydraulic fracturing operations. It complements the well integrity guidance and water use guidance and is aimed at protecting surface water, soils, wildlife, other surface ecosystems, and nearby communities.

STD 65-Part 2, *Isolating Potential Flow Zones During Well Construction:* This document contains best practices for isolating potential flow zones within a well during drilling operations by means of cement and mechanical barriers, and verifying the integrity of these pressure-containment barriers. The document also contains extensive information on the important aspects of well planning activities, including hazards analysis, identification of potential flow zones, and contingency planning.

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