

COMMENTS OF THE AMERICAN PETROLEUM INSTITUTE (API) ON THE DOE SEAB SHALE GAS SUBCOMMITTEE RECOMMENDATIONS

API appreciates the opportunity to provide comments on the *SEAB Shale Gas Production Subcommittee Draft Ninety-Day Report*. API commends the committee for recognizing that natural gas is a cornerstone of the U.S. economy and that domestically produced shale gas has enormous potential to provide economic and environmental benefits for the country. In fact, the combination of domestically produced natural gas and oil makes up more than half of our nation's energy portfolio today, and will continue to do so through at least the year 2035. We have already seen tremendous benefits flowing to the country in the just the past few years. Development of shale gas resources has created hundreds of thousands of new jobs, billions of dollars more in revenue to government at all levels, and vast supplies of domestic, affordable and clean-burning energy. It has already significantly reduced the cost of home heating for millions of American consumers, lowered the cost of electricity production, and cut costs for many manufacturers who use natural gas as a fuel or raw material.

While the industry and states are constantly striving to improve operations, it is important to recognize the strong foundation for shale gas operations that currently exists through robust state regulatory programs in most parts of the country. Rather than deferring on the proper role of state governments, we recommend the Subcommittee acknowledge the success that has been demonstrated through state-level programs. Regulation of oil and natural gas has been led by states since the inception of the industry and has demonstrated a high degree of capability and flexibility in adapting to changes such as those seen with unconventional gas development. States have created systems that effectively protected the environment, including ground water and drinking water sources.

Overall, drilling operations are guided by a number of fundamental engineering principles. These principles are applied on a case-by-case specific way in designing, drilling, and operating each well or each field, tailored by the geology and specifics of the area. Regulation of exploration and production (E&P) operations through state agencies is the best approach, involving state technical professionals who understand the local climate, geology, hydrology, topography, and other factors. State conditions vary too much in the factors noted to be amenable to a one-size-fits-all national approach. States have played, and continue to play, the critical role in the oversight and management of natural gas and hydraulic fracturing operations and are best positioned to tailor requirements to local conditions and to closely monitor environmental performance. The Subcommittee should affirmatively recognize this important point.

API supports a strong state regulatory framework for natural gas and the dedication of appropriate resources and staff to carry out the regulatory functions. The Subcommittee should defer to the states on the question of how to generate the necessary funding for regulatory programs, rather than making this determination for the states.

In terms of the specific recommendations, we are concerned that the Subcommittee did not engage in a gap analysis to determine whether, and to what extent, the items included in its recommendations have been or are being addressed by state and federal regulators, academia, industry or third parties. We are also concerned that the Subcommittee does not appear to consider the costs of some recommendations against the benefits. A benefit-cost analysis is critical to balanced decisions related to the regulation of commercial activity. The failure to consider benefits and costs inevitably leads to poor decision-making that is often a burden with

little real return on the effort. The discussion below addresses each of the recommendations in the Subcommittee's report.

SEAB Recommendation:

Improve public information about shale gas operations: Create a portal for access to a wide range of public information on shale gas development, to include current data available from state and federal regulatory agencies. The portal should be open to the public for use to study and analyze shale gas operations and results.

API Comments:

FracFocus, the portal created by GWPC and IOGCC for access to a broad array of technical resources and information related to hydraulic fracturing, was launched in April of this year, a mere four months ago. The site currently contains and consolidates in one place much federal, state and independent reference material and study data that the public and other stakeholders may use to better understand hydraulic fracturing. Operators are using the site to provide well specific information, and the information provided is searchable for key fields of technical data.

API cautions the Subcommittee on the development of another portal for public information on shale gas operations. While linking information already available through state oil and gas offices might provide some useful information to the public, the Ground Water Protection Council's (GWPC's) *Risk Based Data Management System* should not serve as the public portal for this level of information sharing. Instead, high level information, specific to the concerns expressed by the public regarding fracturing operations, would possibly need to be extracted from the RBDMS database and placed on a separate public access site. While the industry is not opposed to information sharing, we believe that a special effort to accumulate huge quantities of data, made available with little to no context does little to help the public better understand our operations. It may be prudent to track the use of current databases to establish a justification for such a resource, along with a more concrete idea of the portal's design.

SEAB Recommendation:

Improve communication among state and federal regulators: Provide continuing annual support to STRONGER (the State Review of Oil and Natural Gas Environmental Regulation) and to the Ground Water Protection Council for expansion of the Risk Based Data Management System and similar projects that can be extended to all phases of shale gas development.

API Comments:

As a key participant and financial supporter of STRONGER since its inception and the primary funding source for STRONGER since 2006, API strongly supports enhanced federal funding of this important stakeholder collaboration. Additional resources would not only allow for more reviews of state hydraulic fracturing regulatory programs, but allow expansion of the STRONGER Guidelines to include other environmental areas as the Subcommittee recommends.

SEAB Recommendation:

Improve air quality: Measures should be taken to reduce emissions of air pollutants, ozone precursors, and methane as quickly as practicable. The Subcommittee supports adoption of rigorous standards for new and existing sources of methane, air toxics, ozone precursors and other air pollutants from shale gas operations. The Subcommittee recommends:

- (1) Enlisting a subset of producers in different basins to design and rapidly implement measurement systems to collect comprehensive methane and other air emissions data from shale gas operations and make these data publically available;*
- (2) Immediately launching a federal interagency planning effort to acquire data and analyze the overall greenhouse gas footprint of shale gas operations throughout the lifecycle of natural gas use in comparison to other fuels; and*
- (3) Encouraging shale-gas production companies and regulators to expand immediately efforts to reduce air emissions using proven technologies and practices.*

API Comments:

Shale gas operations are already subject to a myriad of federal (Clean Air Act) and state air emissions regulations that have been in place for many years and continue to evolve. States must often obtain primacy by having programs as or more stringent than the federal requirements in meeting human health and environmental goals. API's hydraulic fracturing guidance document series, API HF 3, *Practices for Mitigating Surface Impacts Associated with Hydraulic Fracturing* contains a section on "Protecting Air Quality" which highlights existing air quality requirements.

More recently, rules addressing emissions from engines used in operations were updated since last year. On July 28, 2011, EPA proposed amendments to its regulations for air emissions for oil and gas operations. After comments, finalization, and implementation the rule is intended to further control emissions of VOCs, air toxics and greenhouse gases such as methane. (Incorrectly, the report states that EPA's proposal does not address many existing types of sources, including emissions associated with hydraulic fracturing, in the natural gas production sector – the 600 page EPA proposal does, in fact, address many existing types of sources in the gas production sector.) API will be reviewing the proposed EPA rules and will work with EPA to ensure that the final rules don't inadvertently create unsafe operating conditions, are cost effective and truly provide additional public health benefits, and don't stifle the development of our abundant natural resources. Therefore, plans to address air emissions from the industry are already in place and these controls should be implemented before any additional air controls are contemplated for the industry. EPA estimates that its proposed rulemaking will reduce methane emissions from oil and gas operations by the equivalent of 65 million metric tons of CO₂ (page 311 of prepublication rule).

With respect to a footprint analysis for shale gas and greenhouse gas emissions estimation and reporting, these significant actions are already underway by EPA:

- Revisiting its emissions estimation methods for shale gas operations used as part of the broader national methane emissions estimates reported to the UN Framework Convention on Climate Change.
- Developing mandatory GHG emissions reporting rules for oil and gas operations under "Subpart W" of its Mandatory Reporting Rule. That program specifically

addresses emissions measurement protocols for methane emissions from shale gas operations.

SEAB Recommendation:

Protection of water quality: The Subcommittee urges adoption of a systems approach to water management based on consistent measurement and public disclosure of the flow and composition of water at every stage of the shale gas production process. The Subcommittee recommends the following actions by shale gas companies and regulators – to the extent that such actions have not already been undertaken by particular companies and regulatory agencies:

- (1) Measure and publicly report the composition of water stocks and flow throughout the fracturing and clean-up process.*
- (2) Manifest all transfers of water among different locations.*
- (3) Adopt best practices in well development and construction, especially casing, cementing, and pressure management. Pressure testing of cemented casing and state-of-the-art cement bond logs should be used to confirm formation isolation. Microseismic surveys should be carried out to assure that hydraulic fracture growth is limited to the gas producing formations. Regulations and inspections are needed to confirm that operators have taken prompt action to repair defective cementing jobs. The regulation of shale gas development should include inspections at safety-critical stages of well construction and hydraulic fracturing.*
- (4) Additional field studies on possible methane leakage from shale gas wells to water reservoirs.*
- (5) Adopt requirements for background water quality measurements (e.g., existing methane levels in nearby water wells prior to drilling for gas) and report in advance of shale gas production activity.*
- (6) Agencies should review field experience and modernize rules and enforcement practices to ensure protection of drinking and surface waters.*

API Comments:

API agrees that the protection of water resources is a top priority for all industry operations including hydraulic fracturing. However, water is a highly regulated commodity subject to the federal Clean Water Act as administered by the federal government and the states. A systems approach is already occurring in most local, state, and interstate jurisdictions due to the many requirements associated with water allocation and management processes. In addition, in most states, there already exists a reasonable manifest system for tracking wastes to their point of disposal. We see little additional value from requiring a manifest for the transportation of fresh water hauls since most water management agencies require reporting of these volumes already. This type of requirement should be reserved for those elements posing the greatest risks.

Additionally, API HF1, *Hydraulic Fracturing Operations—Well Construction and Integrity Guidelines* addresses casing pressure testing and cement job evaluation including cement bond logs on a selective basis, API HF2, *Water Management Associated with Hydraulic Fracturing* recommends that water quality be evaluated on a regional level, and API HF3, *Practices for Mitigating Surface Impacts Associated with Hydraulic Fracturing* addresses background water quality testing. These are issues that are highlighted several times in the SEAB report.

Specifically, the Subcommittee notes on page 28 of the report that “casing and cementing programs should be designed to provide optimal isolation of gas producing zones.” Further, the report states “well integrity is an ideal example of where a best practices approach, adopted by the industry, can stress best practice and collect data to validate continuous improvement. The American Petroleum Institute, for example, has focused on well completion in its standards activity for shale gas production.” This sentence is then footnoted and a portion of API’s hydraulic fracturing series is referenced. Unfortunately the footnote fails to reference Standard 65 Part 2, *Isolating Potential Flow Zones During Well Construction* – which is the critical industry standard for zonal isolation. Nor does the report cite API Recommended Practice 51R, *Environmental Protection for Onshore Oil and Gas Production Operations and Leases*. API strongly contends that much of the work expressed in the recommendation has already been completed.

In addition, in order to show a clear commitment by industry to make measurable progress in the implementation of best practices based on technical innovation, field experience, and concerns of the public, we have just undertaken the development of Recommended Practice 90-2, *Annular Casing Pressure Management for Onshore Wells* to address the issue of stray gas migration.

Any additional field studies on possible methane leakage from shale gas wells should be contingent upon completion of already existing or planned studies such as the EPA study on *The Potential Impacts of Hydraulic Fracturing on Drinking Water Resource* and finalization of any required modifications to well containment practices. Note that industry and state regulator focus has traditionally been on prevention.

Finally, the use of microseismic surveys is a valuable industry tool but the Subcommittee appears to be suggesting a use that is incorrect in its assumptions. While it certainly would be ideal to limit generated hydraulic fractures to the gas-producing formation, inherent variability in rock properties make this infeasible. The key point around such fractures are that while some initial fracture growth may be outside of the target formation, such fall far short of reaching zones of concern (i.e., aquifers) and will be subject to immediate closure due to the fact that the proppant used to keep fractures open will not extend far enough in a vertical direction to make this an issue. The real value in microseismic surveys is demonstrating that initial vertical fracture height growth is limited and comes nowhere near aquifers of possible concern.

SEAB Recommendation:

Disclosure of fracturing fluid composition: The Subcommittee shares the prevailing view that the risk of fracturing fluid leakage into drinking water sources through fractures made in deep shale reservoirs is remote. Nevertheless the Subcommittee believes there is no economic or technical reason to prevent public disclosure of all chemicals in fracturing fluids, with an exception for genuinely proprietary information. While companies and regulators are moving in this direction, progress needs to be accelerated in light of public concern.

API Comments:

API supports transparency regarding the disclosure of the chemical ingredients used in hydraulic fracturing operations and we finalized a policy position on this topic in July of 2010, which is included in API HF 3, *Practices for Mitigating Surface Impacts Associated with*

Hydraulic Fracturing. We also strongly support the GWPC/IOGCC FracFocus chemical registry.

As discussed above, oil and natural gas operators are using this important public site to provide well specific information to interested parties. API is appreciative that the Subcommittee recognizes the valuable contribution of FracFocus and the DOE's seminal support of the effort. API respectfully submits that the Subcommittee has underestimated the potential for the registry and the advancements already made to relay chemical use on a well-by-well basis. To date, over 3,000 wells have been posted by nearly 50 operators on the website. We urge the Subcommittee to recognize that the program has only been in place since April 2011 and it continues to be a "work in progress" with additional participants and data points being added on a weekly basis. Several states including Texas, Louisiana, and Montana have referenced its use specifically in recent legislative and regulatory initiatives. New Mexico is currently considering a reference to the program and we anticipate that this trend will continue. As a result, efforts are being made the GWPC and IOGCC to continually improve the database content. It should be noted that FracFocus can accommodate full disclosure as envisioned by the Subcommittee.

SEAB Recommendation:

Reduction in the use of diesel fuel: The Subcommittee believes there is no technical or economic reason to use diesel in shale gas production and recommends reducing the use of diesel engines for surface power in favor of natural gas engines or electricity where available.

API Comments:

In fact, API contends there are good economic, operational, and logistical reasons for using diesel in engines at oil and gas production sites. There are few rigs today that run on any fuel other than diesel. It is not a simple matter of switching fuel sources, substantial mechanical modification of the engines is required. Additionally, drilling rigs are not permanent installations; they operate with a high degree of mobility and need an independent fuel source to maintain that mobility. While there may be situations where conversion from diesel to gas or electricity can work and can be encouraged, elimination of diesel should not be considered for universal implementation.

Again, EPA has been regulating large horse power engines at E&P sites through many regulatory initiatives over many years. The vast majority of engines are running on low sulfur clean burning diesel.

With regard to diesel fuel as an additive to hydraulic fracturing fluid, as a legal matter, diesel fuel is currently authorized for use as a permitted fracturing additive under federal law. DOE would have to seek a legislative amendment to implement the Subcommittee's recommendation. Despite that, industry has largely moved away from the use of diesel in fluids and EPA is developing guidance – with an expected proposal date of fall 2011 – on its *Permitting Guidance for Oil and Gas Hydraulic Fracturing Activities Using Diesel Fuels*.

Finally, API remains concerned about the scope of this recommendation. Lumping two unrelated uses of diesel fuel under one heading creates the impression that this is one issue. API stresses that the appropriate definition of "diesel fuel" be used in any discussion.

SEAB Recommendation:

Managing short-term and cumulative impacts on communities, land use, wildlife, and ecologies. Each relevant jurisdiction should pay greater attention to the combination of impacts from multiple drilling, production and delivery activities (e.g., impacts on air quality, traffic on roads, noise, visual pollution), and make efforts to plan for shale development impacts on a regional scale. Possible mechanisms include:

- (1) Use of multi-well drilling pads to minimize transport traffic and need for new road construction.*
- (2) Evaluation of water use at the scale of affected watersheds.*
- (3) Formal notification by regulated entities of anticipated environmental and community impacts.*
- (4) Preservation of unique and/or sensitive areas as off-limits to drilling and support infrastructure as determined through an appropriate science-based process.*
- (5) Undertaking science-based characterization of important landscapes, habitats and corridors to inform planning, prevention, mitigation and reclamation of surface impacts.*
- (6) Establishment of effective field monitoring and enforcement to inform ongoing assessment of cumulative community and land use impacts. The process for addressing these issues must afford opportunities for affected communities to participate and respect for the rights of surface and mineral rights owners.*

API Comments:

API agrees with the Subcommittee that pursuit of prudent development and environmental sustainability are expected by the public and must remain commitments for our industry going forward.

On page one of the Executive Summary, the Subcommittee states:

“Owing to breakthroughs in technology, production from shale formations has gone from a negligible amount just a few years ago to being almost 30 percent of total U.S. natural gas production. This has brought lower prices, domestic jobs, and the prospect of enhanced national security due to the potential of substantial production growth. But the growth has also brought questions about whether both current and future production can be done in an environmentally sound fashion that meets the needs of public trust.”

API recognizes that this statement captures the potential importance and strategic benefit of our nation’s shale gas endowment, along with the importance the public assigns to development of this resource in a safe and environmentally responsible manner. We believe that our industry is capable of meeting this expectation, and we acknowledge that assuring and demonstrating this capability must remain an ongoing area of focus and commitment.

On page 8 of the Report:

“The Subcommittee identifies four major areas of concern: (1) Possible pollution of drinking water from methane and chemicals used in fracturing fluids; (2) Air pollution; (3) Community disruption during shale gas production; and (4) Cumulative adverse impacts that intensive shale production can have on communities and ecosystems.”

We believe – as we state elsewhere in this letter – that sound regulatory frameworks, accepted industry practices, developments in technology, continuous improvements and ongoing research and study efforts are demonstrating the achievability of measures to respond to the first two areas of concern in an effective manner. We acknowledge that the third and fourth of these characterize areas of concern where many in the public have yet to be satisfied that industry is responding with an equivalent level of commitment. It can be argued that the questions of community disruption and cumulative impact describe an assortment of issues that arise from the scale and intensity of shale gas development activities, particularly as experienced during peak activity in several of the major shale gas plays. These issues and concerns fuel the “enormous difference in perception about the consequences of shale gas activities” that the report notes on page 13.

API has taken steps to address these concerns through development and publication of Recommended Practice 51R *Environmental Protection for Onshore Oil and Gas Production operations and Leases* (1st Edition, July 2009). This recommended practice document describes environmentally sound practices for domestic onshore oil and gas production operations, including hydraulic fracturing. The applicability of the practices described in this document begins with the design and construction of access roads and well locations, through to decommissioning, reclamation, and restoration operations.

The task of improving the industry’s ability to respond to public concerns and to address issues important to communities and regions where shale gas development is occurring continues through efforts at the state, county and local levels.. Toward that end, API is willing to work with local and regional governments to identify and publicize recommended practices for community engagement toward prevention, mitigation and remediation of surface impacts and effects upon communities from exploration and production activities. API has already engaged in outreach to various county governments to address specific issues brought to the attention of API by the county representatives. Industry and government together must meet the challenge of developing our nation’s shale gas endowment in a sustainable way over time in ways that protect the environment, respect other uses of lands and waters in the vicinity and that are appropriately tailored to the character and context of the regions in which shale gas development occurs.

SEAB Recommendation:

Organizing for best practice: The Subcommittee believes the creation of a shale gas industry production organization dedicated to continuous improvement of best practice, defined as improvements in techniques and methods that rely on measurement and field experience, is needed to improve operational and environmental outcomes. The Subcommittee favors a national approach including regional mechanisms that recognize differences in geology, land use, water resources, and regulation. The Subcommittee is aware that several different models for such efforts are under discussion and the Subcommittee will monitor progress during its next ninety days. The Subcommittee has identified several activities that deserve priority attention for developing best practices:

Air: (a) Reduction of pollutants and methane emissions from all shale gas production/delivery activity. (b) Establishment of an emission measurement and reporting system at various points in the production chain.

Water: (a) Well completion – casing and cementing including use of cement bond and other completion logging tools. (b) Minimizing water use

and limiting vertical fracture growth.

API Comments:

API and the industry are committed to continuous improvement in operations, which has been demonstrated by the numerous successful programs initiated by the industry in the U.S. and around the world. As part of this commitment, the industry continues to work collaboratively and with state, county, local governments, and the federal government, to address safety, environmental, operational and community concerns. The creation of a shale gas industry production organization is an initiative that must be carefully evaluated, and the industry is considering the feasibility of a shale gas production organization and the possible role that such an organization could play.

With regard to the development of operational standards, robust programs are already in place through API, the National Fire Protection Association, ASTM, and the International Standards Organization, among others. Since 1924, API's American National Standards Institute accredited standards development program has been the leader in the development and dissemination of industry standards and recommended practices. API standards provide industry the vehicle to share operational experiences and best practices through a transparent process that affords participants assurance of compliance with anti-trust laws, a specific need identified in the SEAB report. These performance-based standards allow for a variety of approaches to ensure that sound engineering judgment is employed to address regional and geological differences.

API standards are the essence of "technology transfer," whereby companies, regulators and organizations can participate in a formal consensus process that meets both industry and regulatory needs. This is why the API standards are the most widely cited petroleum industry standards by both federal and state regulators, with 100 standards cited over 270 times in federal regulations, and 184 standards cited over 3,300 times in state regulations.

The process is evergreen, with the requirement that all API standards be reviewed at a minimum of every five years, and some more frequently based on need. A specific example of how industry is responding to issues around hydraulic fracturing includes the new API standard Q2, "Specification for Quality Management Systems for Service Supply Organizations for the Petroleum and Natural Gas Industries," which will define the quality management system requirements for service supply organizations involved in upstream oil and gas well construction, intervention, production and abandonment, allowing an organization to demonstrate its ability to consistently provide services that meet customer and legal, statutory, regulatory, and other applicable requirements. This standard should be finalized by year's end, and API will provide a certification program for this standard, thereby providing an important measure of a service supply organization's ability to meet API's high standards.

In addition to API and other groups mentioned above, organizations developing standards, guidelines, and expertise in the area include the IOGCC, academic institutions, Society of Petroleum Engineers, American Association of Drilling Engineers, and the American Association of Geologists, among others. Given the spectrum of work already being done through these collective efforts, we would caution the Subcommittee and policy makers against promoting duplicative efforts, but rather to build upon the strength of existing programs.

Furthermore, the subcommittee suggests that the industry should take on certain responsibilities that are within the purview of the state regulatory agencies, including compliance assessment and enforcement. The subcommittee should recognize that compliance assessment and enforcement are functions that should remain with state agencies.

Finally, API is concerned here and in other portions of the report about the SEAB confusing parts of the processes occurring during oil and gas operations. For example, “well completion – casing and cementing”: Casing and cementing are part of the drilling process not the completion process. API suggests these be clarified as not to confuse interested stakeholders in future discussion.

SEAB Recommendation:

Research and Development needs. The public should expect significant technical advances associated with shale gas production that will significantly improve the efficiency of shale gas production and that will reduce environmental impact. The move from single well to multiple-well pad drilling is one clear example. Given the economic incentive for technical advances, much of the R&D will be performed by the oil and gas industry. Nevertheless the federal government has a role especially in basic R&D, environment protection, and safety. The current level of federal support for unconventional gas R&D is small, and the Subcommittee recommends that the Administration and the Congress set an appropriate mission for R&D and level funding.

API Comments:

API defers to Congress on funding for federal R&D efforts.