TO: Persons Interested in the Hydraulic Fracturing Guidelines

FROM: The STRONGER Board

DATE: February 8, 2010

SUBJECT: Update on the Development of Hydraulic Fracturing Guidelines

The STRONGER Board of Directors has received the attached guidelines from its Hydraulic Fracturing Workgroup. This document represents the consensus of the workgroup participants. Also attached is the workgroup's response to comments received on the draft hydraulic fracturing guidelines that were circulated in November 2009.

These hydraulic fracturing guidelines are designed to supplement the **Guidelines for the Review of State Oil and Natural Gas Environmental Regulatory Programs** (Guidelines), which are used by STRONGER and its stakeholder review teams in evaluating the oil and gas environmental regulatory programs of states that have volunteered to be reviewed. The Guidelines do not establish specific numerical criteria or prescriptive regulatory standards for states. The states vary too much in climate, geology, hydrology, topography, and other factors to be amenable to one-size-fits-all regulation. Instead, the Guidelines outline the key elements of effective state oil and gas environmental regulatory programs and establish environmental goals or objectives for those programs. The Guidelines are used by stakeholder review teams as a yardstick by which to evaluate state programs, identify program strengths, and make recommendations for improvement.

The Interstate Oil and Gas Compact Commission (IOGCC) originally adopted the Guidelines in 1990 with the understanding that they would be periodically reviewed and updated. The IOGCC adopted revisions to the Guidelines in 1994, and in 2000 the IOGCC accepted revisions to the Guidelines developed by STRONGER, the independent stakeholder organization newly formed to administer the State Review Process. Subsequently, STRONGER developed revisions addressing emerging issues, including storm water control, spill risk management, and program performance measurement. The Guidelines have served the state review process as an effective tool for documenting the strengths of state oil and natural gas environmental regulatory programs and making recommendations for program improvement.

Last year, STRONGER convened a stakeholder workgroup to consider the need to develop guidelines concerning hydraulic fracturing. The Hydraulic Fracturing Workgroup met several times to review the issues surrounding hydraulic fracturing and draft a new set of guidelines addressing those issues. After circulating the workgroup's draft and receiving comments in response, the STRONGER Board asked the workgroup to meet again to consider those comments. Earlier this year, the workgroup completed its task and submitted the attached hydraulic fracturing guidelines and response to comments to the STRONGER Board.

Over the next few months, the STRONGER Board will be making the hydraulic fracturing guidelines widely available for consideration by the states and other stakeholders. The Board is interested in hearing any of your thoughts or questions concerning these guidelines or the potential application of the State Review Process in addressing hydraulic fracturing issues.

Thank you for your interest in the State Review Process and the hydraulic fracturing guidelines. Please feel free to contact any member of the Board (roster attached) if you would like to discuss these developments further.

January 10, 2010

SECTION X

Hydraulic Fracturing

X.1. Background

The practice of completing oil and gas wells through hydraulic fracturing, while not new, has evolved into a key technology in the development of unconventional oil and gas resources, such as coal bed methane or shale gas. This has resulted in questions about the potential impacts on water resources due to the volume of water needed for hydraulic fracturing, the potential impacts to groundwater by the hydraulic fracturing process, and/or the proper management and disposal of fluids associated with hydraulic fracturing.

X.2. General

States should evaluate potential risks associated with hydraulic fracturing, taking into account factors such as depth of the reservoir to be fractured, proximity of the reservoir to fresh water resources, well completion practices, well design, and volume and nature of fluids. Where necessary and recognizing the local and regional differences discussed in Section 3.3, states should have standards to prevent the contamination of groundwater and surface water from hydraulic fracturing.

X.2.1. Standards

State programs should include standards for casing and cementing to meet anticipated pressures and protect other resources and the environment. The state program should address the identification of potential conduits for fluid migration in the area of hydraulic fracturing and the management of the extent of fracturing where appropriate. The program also should address actions to be taken in response to operational or mechanical changes that may cause concern.

Surface controls, such as dikes, pits or tanks, should meet Sections 5.5 and 5.9 of the guidelines. Contingency planning and spill risk management procedures which meet Section 4.2.1 of the guidelines should be required. Waste characterization, including, as appropriate, testing of fracturing fluids, should be consistent with Section 5.2 of the guidelines. The waste management hierarchy contained in Section 5.3 of the guidelines (source reduction, recycling, treatment and disposal), including the provisions relating to toxicity reduction, should be promoted. The tracking of waste disposed at commercial or centralized facilities should meet the requirements of Section 5.10.2.3 of the guidelines. Procedures for receipt of complaints related to hydraulic fracturing should be consistent with Section 4.1.2.1.

X.2.2. Reporting

The regulatory agency should require appropriate notification prior to, and reporting after completion of, hydraulic fracturing operations. Notification should be sufficient to allow for the presence of field staff to monitor activities. Reporting should include the identification of materials used, aggregate volumes of fracturing fluids and proppant used, and fracture pressures recorded.

State programs should contain mechanisms for disclosure of information on chemical constituents used in fracturing fluids to the state in the event of an investigation or to medical personnel in the event of a medical emergency. Where information submitted is of a confidential business nature, that information should be treated consistent with Section 4.2.2 of the guidelines.

X.2.3. Staffing and Training

In addition to the personnel and funding recommendations found in Section 4.3 of the guidelines, state staffing levels should be sufficient to receive, record and respond to complaints of human health impacts and environmental damage resulting from hydraulic fracturing. Staff should receive adequate training to stay current with new and developing hydraulic fracturing technology.

X.2.4. Public Information

State agencies should provide for dissemination of educational information regarding well construction and hydraulic fracturing to bridge the knowledge gap between experts and the public as provided in Section 4.2.2.2 of the guidelines. This is especially important in areas where development has not occurred historically and in areas where high volume water use for hydraulic fracturing is occurring.

X.3. Water and Waste Management

Fundamental differences exist from state to state, and between regions within a state, in terms of geology and hydrology. The state should evaluate and address, where necessary, the availability of water for hydraulic fracturing in the context of all competing uses and potential environmental impacts resulting from the volume of water used for hydraulic fracturing. The availability and use of alternative water sources, including recycled water, should be encouraged.

Waste associated with hydraulic fracturing should be managed consistent with Section 4.1.1. and Section 7 of the guidelines.

States should encourage the efficient development of adequate capacity and infrastructure for the management of hydraulic fracturing fluids, including the transportation, recycling, treatment and disposal of source water and hydraulic fracturing wastes.

01/11/2010

Response to Comments on the Draft Hydraulic Fracturing Guidelines

The Hydraulic Fracturing Workgroup (the Workgroup) met in St Louis on January 7th and 8th to discuss the comments received on the Workgroup's draft hydraulic fracturing guidelines. The Workgroup made changes to the draft guidelines in response to many of the comments.

The purpose of this letter is to provide a summary of the Workgroup's discussions of the comment and its responses.

GENERAL COMMENTS:

Several commenters stated that portions of the draft guidelines were duplicative of federal regulations. These commenters cited federal Occupational Safety and Health Administration, Comprehensive Environmental Response and Compensation Liability Act, and Toxic Substances Control Act regulations, which contain recordkeeping and reporting requirements with respect to the chemical composition of fracturing fluids in an emergency or investigation. The Workgroup had lengthy discussions during its first meeting about this issue and decided that, while those regulations require disclosure of chemicals, the requirements might not be adequate. However, it was not the intent of the Workgroup to suggest that states have duplicative regulations. In addition, several commenters requested that proprietary issues should be vetted through a broader audience of representatives including service companies, environmental groups, operators, and state regulators, to determine a feasible and efficient regulatory framework.

Several commentors expressed concern about the perceived negative connotations of some of the draft guidelines with regard to the implications of fracturing. The Workgroup reworded several sentences in the draft guidelines to address this concern.

Several commenters believe that the guidelines were too vague. One commenter was concerned that such vague language could be "misconstrued by state regulators leading to excessive, unnecessary and burdensome regulations." Another stated that the recommendations should contain more specific language that puts additional responsibility on the states to increase their review and regulatory procedures for managing the process of hydraulic fracturing. The Workgroup believes the draft guidelines for hydraulic fracturing are consistent with the other existing guidelines and provide the necessary flexibility to best manage hydraulic fracturing within each state.

Several commenters expressed concern that the draft guidelines did not include sufficient language to differentiate between risks related to the volumes of water used, the vertical distance between the fractured zone and ground water, those that use lower volumes of water, and coal bed methane. The Workgroup agreed and has added language regarding factors to be considered when determining risk.

Several commenters recommended that the guidelines include language regarding the practical feasibility and the cost/benefit of additional regulations for hydraulic fracturing. The existing Guidelines include language in Section 3.2 (Goals) stating that the goals of an effective state program should, at a minimum, protect human health and the environment from the mismanagement of E&P wastes while recognizing the need for an economically viable oil and gas industry.

SPECIFIC COMMENTS:

X.1. BACKGROUND

Several commenters recommended the inclusion in the draft guidelines of a discussion of the history of hydraulic fracturing, the hydraulic fracturing process, the STRONGER Guidelines, and regulatory issues. The Workgroup believes that any state or review team that refers to the guidelines should have a rudimentary knowledge of hydraulic fracturing practices and history, as well as STRONGER, the STRONGER Guidelines, and the state review process.

Several commenters expressed concern with what they perceived as negative language in this section. These commenters pointed to language such as "growing public attention", questions about the potential impact, and large volumes of water. The Workgroup revised the language of the draft to address these concerns.

X.2. GENERAL

The Workgroup revised the first paragraph under this section, in response to several comments, to include a discussion of potential risks associated with hydraulic fracturing.

X.2.1. Standards

One commenter recommended that the Guidelines clarify when an agency should review the direction and extent of a fracture due to the proximity of ground water. A few commenters recommended that such review should occur when groundwater is vertically separated by a certain distance from the zone to be hydraulically fractured. The Workgroup believes that the revised draft guidelines allow a state flexibility to make such a determination based on listed factors.

One commenter stated that it assumed that the identification of orphaned and abandoned wells would be limited to the state's unplugged abandoned/orphan well list and recommended that the guidelines allow the state flexibility to limit the scope and/or proximity of this requirement. The Workgroup's intent was to recommend that a state program address the identification of potential conduits for fluid migration in the area of hydraulic fracturing, while allowing the state the flexibility to determine how to address the identification of potential conduits. We believe the revised draft guidelines reflect this intent.

Several commenters recommended deletion of the word "faulting" because it is too general and could lead to excessive costly requirements that would provide little to no benefit. The Workgroup revised the language to discuss "potential conduits," which could include faults.

One commenter recommended that the sentence regarding the use of tools and mechanisms for securing integrity and evaluating impacts due to unusual operational changes be revised to ensure that the design of a hydraulic fracturing operation consider unusual changes in the loss or build-up of pressure during hydraulic fracturing. The Work group revised the language to recommend that the state address actions to be taken in response to operational or mechanical changes that may cause concern.

One commenter expressed concern with any recommendation that a state develop standards for the management and monitoring of the extent and direction of fracturing. This commenter stated that current techniques can be very costly and are not exact science. This commenter recommended that the design of the hydraulic fracturing operation consider potential conduits for migration to address unplugged orphaned wells of record. One commenter recommended that the identification of potential conduits for fluid migration be conducted by an independent certified geologist and

include all potential opportunities for migration, not only man-made ones. One commenter also recommended that states require identification of all potential groundwater sources and the performance pre-drilling groundwater assessments to establish their pre-drilling quantity and quality. States should also have guidelines in place to govern and perhaps restrict hydraulic fracturing when circumstances provide that management and monitoring cannot assure the prevention of contamination. The Workgroup revised the language to recommend that the state program address the identification of potential conduits for fluid migration in the area of hydraulic fracturing and the management of the extent of fracturing where appropriate.

One commenter recommended that the guidelines require a state to develop regulations regarding the placement of gas wells in relation to domestic water wells and the monitoring of groundwater contamination. This commenter also recommended that a state require the performance of groundwater analysis and inventory prior to any drilling activities in order to develop baseline data. The Workgroup determined this recommendation to be beyond the scope of its charge.

This commenter also recommended that state programs require operators to complete cement evaluation logs once a well has been completed. The draft guidelines state that state programs should include standards for casing and cementing to meet anticipated pressures and protect other resources and the environment. The Workgroup believes this language is consistent with the existing guidelines and provides the states with flexibility to develop appropriate standards to ensure the integrity of casing and cementing.

One commenter recommended that the guidelines require the use of non-toxic or environmentally friendly drilling fluids. This commenter recommended that the guidelines require the use of compressed air rather than drilling fluids during the initial drilling stage and the use of closed loop systems. Section 5 of the existing guidelines includes a lengthy discussion of waste minimization, including toxicity reduction. The Workgroup made no changes in response to this comment.

One commenter recommended that the guidelines state that drilling permits can be issued only after the operator has demonstrated that it has an appropriate plan for waste disposal. The Workgroup determined that this is beyond the scope of its charge.

X.2.2. Reporting

One commenter expressed concern that agencies would be swamped with data if the state required reporting of all recorded data, because such data is recorded continuously. The Workgroup agreed and changed "pressures recorded" to "fracture pressures recorded."

One commenter expressed concern that mandatory state agency witnessing of hydraulic fracturing operations would result in field staff attempting to direct hydraulic fracturing operations. This commenter recommended that states have the flexibility to determine which hydraulic fracturing operations should require notice rather than all operations. The Workgroup's intent was to provide states with flexibility. The language in the revised draft guidelines states that the notification should be sufficient to <u>allow</u> for field staff to monitor activities (emphasis added).

Several commenters recommended that the guidelines include explicit language to the states regarding implementation of compliance and monitoring actions, assessment of penalties for noncompliance, and reporting procedures that address problems and contamination incidents. These concerns are addressed in Section 4.1.2 (Compliance Evaluation), 4.1.3 (Enforcement), and Section 4.2.1. (Contingency Planning and Spill Risk Management) of the existing guidelines.

One commenter recommended that the guidelines promote a more coordinated effort when numerous entities are involved in oil and gas development and that the guidelines include references when federal public lands are involved, when state lands are involved, and when private property is involved. The Workgroup believes that this concern is addressed in Section 1.3.1 (Strategies for Maintaining a Successful Relationship Between State and Federal Agencies), Section 3.1 (General), Section 4.2.1.3 (Interagency Coordination), Section 4.4 (Coordination among agencies) and Section 4.2.2 (Public Participation) of the existing guidelines.

Several commenters found the draft guidelines insufficient with respect to disclosure of chemical constituents used in fracturing fluids. These commenters recommended that state programs require full disclosure of chemical constituents used in fracturing fluids without regard to whether or not there is an emergency or an investigation. The Workgroup believes that the language included in the draft guidelines is adequate and provides the states with flexibility.

X.2.3. Staffing and Training

One commenter recommended that the guidelines include standards for state investigation and enforcement activities, that the states have independent hydrological expertise available to investigate complaints, and that states have citizen suit provisions. Section 4.1.2 of the existing guidelines covers compliance investigation and Section 4.1.3 covers enforcement. In addition, this recommendation is beyond the scope of the workgroup's charge.

One commenter recommended that state agency staffing levels be sufficient to review permit applications including proposed hydraulic fracturing operations. The Workgroup made no change to the draft guidelines because the recommended sentence implies that a permit would be required, which may not be necessary.

X.3. Water and Waste Management

The Workgroup revised the language in this section to address the comments regarding negative language.

One commenter recommended revision of the language regarding the volumes of water used during a hydraulic fracturing operation to include a discussion of all uses of water. The Workgroup agreed and revised the language.

One commenter recommended that the guidelines require states to establish regulatory guidelines that promote the use of recycled water for hydraulic fracturing and recycling of fracturing fluids. Section 5 of the existing guidelines discusses waste minimization. The Workgroup replaced the work "promote" with "encourage."

This commenter also recommended that the state require that quantitative aquifer characterization be performed to evaluate water supply levels, and that a maximum permitted depletion be established to maintain existing beneficial use, prior to any potential drawdown for drilling and hydraulic fracturing. The Workgroup believes that the language it included in this section recommending that the state evaluate and address, where necessary, the availability of water for hydraulic fracturing in the context of all competing uses and potential impacts resulting from water use is adequate.

One commenter stated that there is no reason for flowback fluid to be treated differently from other produced fluids. Hydraulic fracturing flowback fluid can be different from other produced fluids in

that the flowback can be returned to the surface in large volumes. In addition, the draft guidelines state that "wastes associated with hydraulic fracturing should be managed consistent with Section 4.1.1 and Section 7 of the guidelines."

This commenter also recommended that each state require that adequate capacity and infrastructure be in place for the transportation, recycling, and appropriate disposal of source water and hydraulic fracturing wastes. The Workgroup believes that the language in this section is adequate.

In response to one commenter, the Workgroup included a reference to Section 7 (Naturally Occurring Radioactive Materials).

The Workgroup was grateful for, and encouraged by, the comments provided on the draft guidelines.

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