STRONGER

State Review of Oil & Natural Gas Environmental Regulations

Alaska Oil and Gas Conservation Commission

2015 Hydraulic Fracturing State Review Report

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INTRODUCTION

In 1990, the Interstate Oil Compact Commission (IOCC), later renamed the Interstate Oil and Gas Compact Commission (IOGCC), and the U.S. Environmental Protection Agency (USEPA) jointly published a Study of State Regulation of Oil and Gas Exploration and Production Waste, which contained guidelines for the regulation of oil and gas exploration and production wastes by the IOCC member states (the "1990 Guidelines"). The published guidelines, developed by state, environmental and industry stakeholders, provided the basis for the State Review Process, a multi-stakeholder review of state exploration and production (E&P) waste management programs against the Guidelines. The initial purposes of the State Review Process were to document the successes of states in regulating E&P wastes, and to offer recommendations for program improvement.

In 1999, administration of the State Review process shifted to a non-profit, multi-stakeholder organization named State Review of Oil and Natural Gas Environmental Regulations, Inc. (STRONGER). STRONGER expanded the scope of the Guidelines beyond state regulation of E&P wastes to include issues such as stormwater management, hydraulic fracturing, reused and recycled fluids, air quality, and naturally occurring radioactive material (NORM).

In 2009 STRONGER formed a Hydraulic Fracturing Workgroup to examine issues surrounding hydraulic fracturing and develop guidelines for state programs. The initial Hydraulic Fracturing Guidelines were released in early 2010. After several targeted hydraulic fracturing state reviews, the STRONGER Board agreed to reconvene the Workgroup in 2012 and revise the Hydraulic Fracturing Guidelines in order to address issues that were raised during the first round of reviews. The revised Hydraulic Fracturing Guidelines were released in 2013, and are the basis of this review.

In February 2015 the Alaska Oil and Gas Conservation Commission (AOGCC) volunteered to have its program reviewed by STRONGER. This is the first state review conducted by STRONGER in Alaska. Alaska's initial state review was conducted in 1992 when management of the process was under IOGCC.

This review began with a questionnaire prepared by the STRONGER Board of Directors that was sent to AOGCC. STRONGER intended the questionnaire to capture the status of the AOGCC program relative to the 2013 Hydraulic Fracturing Guidelines. AOGCC prepared a response to the questionnaire, which was then sent to the review team.

The review team consisted of Justin Furnace, Hilcorp, representing Industry; Lois Epstein, The Wilderness Society, representing Environment/NGO; and Tim Baker, Oklahoma Corporation Commission Oil and Gas Division, representing State Government. Jim Erb and Ryan Steadley participated as administrative support. Walt Hufford participated as an official observer of the STRONGER Board. Also participating as official observers were Rob Brumbaugh of the U.S. Bureau of Land Management (BLM), and Timothy Mayers of the U.S. Environmental Protection Agency (USEPA or EPA).

In July 2015 the review team traveled to Anchorage to conduct an interview of AOGCC staff. The interview was an open meeting held on July 30 at the AOGCC office. Josh Kindred of the Alaska Oil and Gas Association attended as an observer. Cathy Foerster, Chair and Commissioner of AOGCC, gave an overview

of the AOGCC program and hydraulic fracturing in Alaska. Following the presentation, Ms. Foerster and Chris Wallace, AOGCC Petroleum Engineer, responded to questions from the review team members and official observers. Following the meeting, and after review of the written materials provided by AOGCC, the team members compiled this review report.

This is the report of the review of the AOGCC program against the STRONGER 2013 Hydraulic Fracturing Guidelines. The report contains the review team's findings and recommendations based on their analysis of the questionnaire and supporting information provided by the state, and information provided during the in-state meeting. Findings and recommendations are noted in a numbered format (e.g., "Recommendation 9.2"; multiple findings and/or recommendations under a single subject are denoted "(a), (b)", etc.) that corresponds to the relevant Hydraulic Fracturing Guidelines section. Appendix A is a glossary of acronyms used in this report. Appendix B contains AOGCC's written response to the STRONGER questionnaire. Appendix C contains the 2013 STRONGER Hydraulic Fracturing Guidelines.

EXECUTIVE SUMMARY

A multi-stakeholder review team has completed an in-depth review of the Alaska Oil and Gas Conservation Commission regulatory program as it pertains to hydraulic fracturing. This scope of this review is limited exclusively to AOGCC's hydraulic fracturing regulations. There are other aspects of oil and gas development oversight and regulation that are under the jurisdiction of the Alaska Department of Environmental Conservation (ADEC) and the Alaska Department of Natural Resources (ADNR). Those aspects of regulation and oversight pertaining to hydraulic fracturing that are not under the purview of AOGCC are not included in this review's recommendations.

During the course of the review, the review team members and official observers were granted full access to staff of the AOGCC, and all questions were answered in a responsive and open manner.

The review team has concluded that the AOGCC is well managed, professional, and meets the criteria of the STRONGER 2013 Hydraulic Fracturing Guidelines. The review team identified a number of program strengths that warrant special recognition. The review team also identified specific recommendations for improvements to the program based on the Guidelines.

KEY FINDINGS

1. Finding 9.2(b)

   AOGCC is commended for its comprehensive program regulatory review with its robust public participation, and the resulting regulatory update prior to large-scale hydraulic fracturing operations occurring in Alaska.

2. Finding 9.2.2(b)

   It is commendable that AOGCC tries to "err on the side of [public] disclosure" and that staff generally respond to state public records requests within 10 business days.

KEY RECOMMENDATIONS

1. Recommendation 9.2.5

   To ensure a full evaluation of the State of Alaska's hydraulic fracturing oversight, the review team recommends that STRONGER endeavor to conduct a review in the future that includes the other agencies with significant hydraulic fracturing oversight responsibilities.

BACKGROUND

The Alaska Oil and Gas Conservation Act of 1955 created the Alaska Oil and Gas Conservation Commission (AOGCC, or the Commission.) With the advent of oil production from the North Slope's Prudhoe Bay region in 1977, the state legislature became concerned with the potential conflict between the state's revenue interest in high production rates on state leases and the state's conservation interest in protecting the total ultimate recovery of the resource. To obviate this concern, the legislature amended AS 31.05 in 1978 to create AOGCC, effective January 1, 1979, as an independent quasi-judicial agency within the executive branch of the state. Initially, the new commission was housed within the Department of Natural Resources, but in 1980 it was transferred to the Department of Commerce and Economic Development. Governor Hickel transferred AOGCC to the Department of Administration on February 17, 1994.[1]

The mission of the Alaska Oil and Gas Conservation Commission is:

> To protect the public interest in exploration and development of Alaska's valuable oil, gas, and geothermal resources through the application of conservation practices designed to ensure greater ultimate recovery and the protection of health, safety, fresh ground waters and the rights of all owners to recover their share of the resource.

AOGCC's regulatory authority is outlined in Title 20, Chapter 25 of the Alaska Administrative Code.[2]

AOGCC oversees oil and gas drilling, development and production, reservoir depletion and metering operations on all lands subject to the state's police powers. It acts to prevent waste, protect correlative rights, improve ultimate recovery and protect underground freshwater.

Through a Memorandum of Agreement with USEPA, AOGCC has primacy for Class II injection wells in Alaska. The three types of Class II injection wells are oilfield waste disposal wells, enhanced oil recovery wells, and hydrocarbon storage wells.

[1] *Excerpted from http://doa.alaska.gov/ogc/WhoWeAre/history.html*

[2] *http://doa.alaska.gov/ogc/Regulations/RegIndex.html*

AOGCC also serves as an adjudicatory forum for resolving certain oil and gas disputes between owners, including the state. It executes statutory mandates consistent with the protection of health, safety and the environment. AOGCC strives for cooperation with industry while maintaining well-defined and essential regulatory requirements.

AOGCC is led by three commissioners appointed by the Governor and confirmed by the legislature, representing petroleum engineering, geology, and the public, respectively. AOGCC has nine inspectors who oversee the North Slope and Cook Inlet regions' conventional, i.e., non-shale, oil and gas operations. Until recently, virtually all oil and gas production has been on state leases, however production recently began on federal lands in the National Petroleum Reserve in the western Arctic.

In recent years, several companies have been interested in unconventional, shale oil development in more southern portions of the North Slope. These companies have conducted exploration activities with the intent of eventually undertaking large-scale shale oil development utilizing directional drilling and hydraulic fracturing.

AOGCC regulates the subsurface and is responsible for well blowout prevention and control, well construction and well integrity. AOGCC does not oversee Alaska's oil and gas pipelines, tanks, non-oil and gas related underground injection activities, surface water discharges, air pollution, and toxic or petroleum spill response/remediation activities, all of which the Alaska Department of Environmental Conservation (ADEC) oversees. AOGCC also does not authorize surface water rights and water usage nor decommissioning, removal, and restoration on state lands leased for oil and gas, which the Alaska Department of Natural Resources (ADNR) oversees. All three state entities are involved in some aspect of hydraulic fracturing operations.

Beginning in 2012, AOGCC proposed changes to its regulations to address current and future hydraulic fracturing operations in Alaska. These regulatory changes went through three rounds of public review.[3] AOGCC amended the following regulations: 20 AAC 25.005[4], 20 AAC 25.280[5], 20 AAC 25.990[6], and added a new section 20 AAC 25.283[7] to define hydraulic fracturing, require notice to nearby owners and operators prior to commencement of hydraulic fracturing, require water sampling and analysis, require disclosure of hydraulic fracturing fluids and additives, increase wellbore integrity, and assure containment of hydraulic fracturing fluids. AOGCC's hydraulic fracturing regulations had an effective date of January 7, 2015.

GENERAL

In recent years, AOGCC conducted an evaluation of current and potential future hydraulic fracturing activities in Alaska and the regulations that applied to such activities. AOGCC proposed three rounds of revised regulations to update

[3] *http://doa.alaska.gov/ogc/frac/fracindex.html*

[4] *http://www.legis.state.ak.us/basis/aac.asp#20.25.005*

[5] *http://www.legis.state.ak.us/basis/aac.asp#20.25.280*

[6] *http://www.legis.state.ak.us/basis/aac.asp#20.25.990*

[7] *http://www.legis.state.ak.us/basis/aac.asp#20.25.283*

Alaska's hydraulic fracturing regulations, focused on preventing the release of fluids to the surface, ensuring well integrity, and containing and isolating hydraulic fracturing fluids within target zones.

Finding 9.2(a)

AOGCC requirements meet the criteria of this section of the STRONGER Hydraulic Fracturing Guidelines.

Finding 9.2(b)

AOGCC is commended for its comprehensive program regulatory review with its robust public participation, and the resulting regulatory update prior to large-scale hydraulic fracturing operations occurring in Alaska.

STANDARDS

AOGCC has established specific permit requirements for hydraulic fracturing under the new (2015) Application for Sundry Approval Form 10-403[8]. These requirements are in addition to the existing requirements for Application for Sundry Approval for permit to drill Form 10-401[9]. The application must include detailed well construction information including surface casing, production casing, intermediate casing, and liner and cementing requirements. These requirements include cement evaluation logs and any other evaluation logs that may be required by the Commission to demonstrate that the casing is set and cemented below the base of the lowermost freshwater aquifer. In addition, each hydrocarbon bearing zone penetrated by a well also must be isolated by casing and cement to the extent required to prevent any cross fluid migration. Well logs are also required to verify proposed well construction and geology.

The application must include pressure-test information, a pressure-test plan, and ratings for the casing string, wellhead, blowout preventer, and treating head. The casing string that is to withstand the fracture pressure must be tested to 110 percent of the maximum anticipated pressure differential to which the casing may be subjected. If the casing string fails the test it must be repaired, or a fracturing string (tubing and packer) must be placed in the well, and retested. Pressure relief valves must be installed on the line between the pump and the wellhead to limit the line pressure to the approved test pressure. In addition, all annuli on the well must be monitored and recorded continuously for pressure increases during hydraulic fracturing operations. If a pressure increase occurs beyond the anticipated pressure written in the hydraulic fracturing permit plan, AOGCC must be notified as soon as practicable, but not later than 24 hours following the incident.

The application must include geological and lithological data for the zone to be fractured and overlying confining zones. These data must include location and orientation of suspected faults or fractures that may transect the confining zones, and information sufficient to support a determination that the known or suspected fault will not interfere with the containment of the hydraulic fracturing operation.

[8] *http://doa.alaska.gov/ogc/forms/10-403.pdf*

[9] *http://doa.alaska.gov/ogc/forms/10-401.pdf*

This information must be demonstrated to contain the fluid within ½ mile of the proposed wellbore and/or wellbore trajectory. The placement of all hydraulic fracturing fluids must be confined to the approved formation or formations. While AOGCC does not utilize its own modeling software, it does maintain formation information that is used to ensure the inputs to the individual models are reasonable.

The application must also include each well penetration within one-half mile radius of the well's surface location, wellbore trajectory and fracturing interval, and the source of the information. All wells within the radius must demonstrate sufficient information to support a determination that the well will not interfere with containment of the hydraulic fracturing fluid.

The application must include a plat showing all water wells, if any, located within a one-half mile radius of the well's surface location; identification of each freshwater aquifer, the geological name, and the measured depth of the aquifer.

AOGCC requires a plan for baseline sampling of water wells within a half-mile of the proposed HF well and/or the proposed trajectory of the HF well if freshwater aquifers exist. The baseline water sampling plan must be presented to AOGCC as well as to ADEC. The detailed plan includes approved sample protocols, parameters to be sampled, required certified sample analysis and certification of laboratory procedures, all of which can be found in 20 AAC 25.283(4)[10]. The Commission may require sampling of water wells after hydraulic fracturing is completed. The same protocols will be required as were approved in the baseline water-sampling plan.

Finding 9.2.1

AOGCC requirements meet the criteria of this section of the STRONGER Hydraulic Fracturing Guidelines.

Recommendation 9.2.1

AOGCC should consider whether increased levels of unconventional drilling activity in the future would merit acquiring geologic modeling software.

REPORTING

Prior to beginning hydraulic fracturing operations, operators must submit an Application for Sundry Approvals[11] as per 20 AAC 25.283(a), which includes information on whether hydraulic fracturing will occur, the type of well (e.g., exploratory, development), and the approximate planned date for commencing operations. An approved application allows the operator to perform hydraulic fracturing within 12 months. AOGCC typically receives only 10-15 hydraulic fracturing applications per year. Hydraulic fracturing applications are a small number of overall Sundry applications received by the agency (in 2014, AOGCC processed 1,563 Sundry applications).

There is no expectation that inspectors or staff will be on site to, or remotely will,

[10] *http://www.legis.state.ak.us/basis/aac.asp#20.25.283*

[11] *http://doa.alaska.gov/ogc/forms/10-403.pdf*

monitor hydraulic fracturing activities. However, the AOGCC Sundry process allows AOGCC the ability to require pre-notification of particular activities with sufficient notice to have inspectors or staff able to attend. A pre-notification requirement would be included in the Sundry application approval, should AOGCC deem it necessary.

According to 20 AAC 25.283(a)(1)[12], "all owners, landowners, surface owners, and operators within a one-half mile radius of the current or proposed wellbore trajectory [must be] provided notice of [hydraulic fracturing] operations. The notification will state that upon request, a complete copy of the application is available from the operator, and will include the operator contact information." AOGCC typically processes applications within one week. Any member of the public can request an administrative hearing before the AOGCC commissioners to challenge an AOGCC decision.

As in most other states, an operator is not required to publically disclose an estimate of the types and volumes of chemicals they will use for hydraulic fracturing prior to operations. AOGCC receives this information prior to hydraulic fracturing in the Sundry application, and the public can request it via a public records request to AOGCC. Confidential information will be withheld by AOGCC. After the well has been completed, the chemical ingredients are publically disclosed via FracFocus.[13]

AOGCC requires operators to submit a Report of Sundry Well Operations[14] as per 20 AAC 25.283(h)[15], and must attach information submitted to FracFocus as per 20 AAC 25.283(i)[16], within 30 days after completion of hydraulic fracturing operations. The report must include the total amount and type of each base fluid and each additive pumped. The report must also include the trade name of the base fluid or additive, the supplier, and a description of the purpose of the base fluid or additive. The report must also include the chemical ingredient name of the base fluid and additive, the Chemical Abstract Service (CAS) registry number assigned to each base fluid and additive used, and the actual or maximum concentration of each chemical ingredient in each base fluid and additive used.

AOGCC retains all confidential and non-confidential chemical disclosure information. AOGCC releases non-confidential information upon receipt of a state public records request – generally within 10 business days – and releases confidential information upon receipt of a state public records request and issuance of a judicial order.

Jurisdiction for spill prevention and emergency response resides with ADEC. AOGCC's emergency response is limited to well control. Investigators and first responders must contact transportation carriers or drilling operators, not the state, for Material Safety Data Sheet (MSDS) information. Emergency first responders do not typically request information from AOGCC. However, in the unlikely event of such a request, AOGCC would provide the requested non-confidential information, such as a generic MSDS, without requiring a public records request.

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[12] *http://www.legis.state.ak.us/basis/aac.asp#20.25.283*

[13] *www.fracfocus.org*

[14] *http://doa.alaska.gov/ogc/forms/10-404.pdf*

[15] *http://www.legis.state.ak.us/basis/aac.asp#20.25.283*

[16] *http://www.legis.state.ak.us/basis/aac.asp#20.25.283*

Finding 9.2.2(a)

It is commendable that AOGCC tries to "err on the side of [public] disclosure" and that staff generally respond to state public records requests within 10 business days.

Finding 9.2.2(b)

While AOGCC can require prior notice of commencement of hydraulic fracturing in the Sundry application, prior notice is not required by rule.

Recommendation 9.2.2(b)

AOGCC should consider requiring prior notice of commencement of hydraulic fracturing operations by rule. Should unconventional activity increase in Alaska, requiring prior notice by rule could enhance communication of what is taking place in the field and reduce the risk of non-compliance.

STAFFING AND TRAINING

AOGCC at the time of this report has a total of 29 employees. Seven of these employees are inspectors (noting that at the time of this review AOGCC had just received approval to hire two new inspectors, bringing its total to 9). AOGCC maintains 2-3 inspectors on the North Slope at all times. They also have the ability to accommodate up to 4 inspectors on the North Slope should industry activity warrant an increased presence. They also maintain a similar number of inspectors in the Cook Inlet. AOGCC, at 911 wells per inspector, has one of the lowest ratios of any major oil and gas producing state in the country.

With regard to technical staff and inspectors, AOGCC only hires experienced personnel, which in turn helps them to efficiently and effectively administer their regulatory program. The typical AOGCC technical staff member or inspector will be an individual that has 10-15 years of experience. With the most recent commodity price swing, AOGCC anticipates having a number of qualified candidates apply for open positions. With the typical new hire having a decade or more of experience, training is most often targeted at any area of regulation that new employees may not have field experience in. Also, employees are encouraged to take advantage of training offered by various groups such as the Society of Petroleum Engineers, American Association of Petroleum Geologists, and the Interstate Oil and Gas Compact Commission, among others.

Since 1999, AOGCC has been funded out of fees paid by the industry it regulates rather than via a general revenue allocation, which allows the agency more flexibility in determining its needs based on the level of industry activity.

Finding 9.2.3(a)

AOGCC requirements meet the criteria of this section of the STRONGER Hydraulic Fracturing Guidelines.

Finding 9.2.3(b)

AOGCC is commended for maintaining adequate staffing, and in particular for having a low well-to-inspector ratio.

Finding 9.2.3(c)

AOGCC is commended for maintaining a steady source of funding that allows it to respond to increased industry activity with additional staff hires, and the ability to bring in outside contractors.

PUBLIC INFORMATION

AOGCC is not statutorily charged with public education. However, AOGCC maintains an open door policy where any member of the public is invited to contact the agency with any questions or concerns they might have regarding industry activity.

As it relates to hydraulic fracturing, AOGCC maintains a white paper[17] on its website that was last updated in January 2015. As noted above in the section on Reporting, with regard to notice to landowners near a well that will be hydraulically fractured, the regulations require that notices be sent to landowners within a half-mile radius. Upon request, a full hydraulic fracturing application would be sent to these affected parties, and AOGCC would answer any questions regarding the application. Furthermore, any other interested party may, via public records request, receive a copy of the non-confidential portion of the application. AOGCC typically completes public information requests within 10 days.

Finding 9.2.4(a)

AOGCC requirements meet the criteria of this section of the STRONGER Hydraulic Fracturing Guidelines.

Finding 9.2.4(b)

AOGCC is commended for the open way in which it responds to public inquiries.

COORDINATION

As discussed in other sections, AOGCC, ADEC, and ADNR all have significant oversight responsibilities related to hydraulic fracturing, though each agency largely operates independently regarding hydraulic fracturing operations.

Finding 9.2.5

This STRONGER review only covered AOGCC's authority and actions related to hydraulic fracturing.

[17] *http://doa.alaska.gov/ogc/reports-studies/HydraulicFracWhitePaper.pdf*

Recommendation 9.2.5

To ensure a full evaluation of the State of Alaska's hydraulic fracturing oversight and interagency coordination, the review team recommends that STRONGER endeavor to conduct a review in the future that includes the other state agencies with significant hydraulic fracturing oversight responsibilities.

WATER AND WASTE MANAGEMENT

Alaska has extensive ground and surface water resources, as well as geology that typically allows for injection of wastewater and non-liquid drilling wastes. Additionally, Alaska has abundant pristine and near-pristine surface waters, particularly in the Arctic, which support extensive fish and wildlife populations. These populations, in turn, provide subsistence food resources for remote Alaska Native communities. In parts of Alaska with continuous permafrost (see below), groundwater is not used for drinking water.

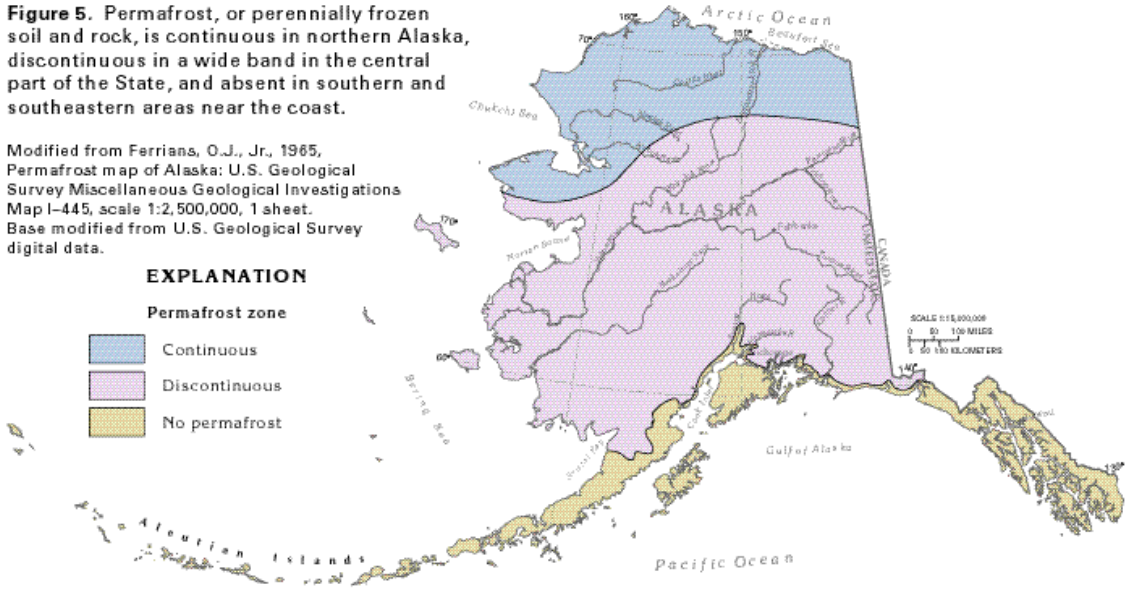

Figure 5. Permafrost, or perennially frozen soil and rock, is continuous in northern Alaska, discontinuous in a wide band in the central part of the State, and absent in southern and southeastern areas near the coast.

Modified from Ferrians, O.J., Jr., 1965, Permafrost map of Alaska: U.S. Geological Survey Miscellaneous Geological Investigations Map I–445, scale 1:2,500,000, 1 sheet. Base modified from U.S. Geological Survey digital data.

AOGCC is not the permitting authority for ground or surface water rights and water usage. Water wells and surface water usage permits are issued by the ADNR Division of Mining, Land, and Water, in cooperation with the Alaska Department of Fish and Game for fish-bearing waters. Operators are responsible for obtaining water rights for ground or surface water from ADNR. Treated wastewater disposed of to the surface is regulated by ADEC via an Alaska Pollutant Discharge Elimination System permit.

AOGCC manages the Class II non-hazardous oilfield waste underground disposal and injection program. USEPA manages the Class I non-hazardous disposal and injection program for Alaska. ADEC manages solid waste permitting, as well as requirements for flowlines at production facilities. Used hydraulic fracturing fluids are Class II eligible and, depending on the DIO, unused hydraulic fracturing fluids may be Class II eligible either as EOR or for waste disposal. NORM testing of hydraulic fracturing fluids is not required under the Class II disposal program. Used and unused hydraulic fracturing fluids are Class I eligible, except for

hydraulic fracturing fluids with diesel fuels, which must be disposed of in Class II wells.

The majority of HF wastes are handled either by Underground Injection Enhanced Recovery (EOR or waterflood), or by Underground Disposal through new or existing permitted wells. Wells receiving these wastes are authorized under an Area Injection Order (AIO) or a Disposal Injection Order (DIO). Monitoring and reporting are requirements of the AIO and DIO, and more recent DIOs have a five-year renewal/reauthorize requirement. Hydraulic fracturing wastes can also be injected into USEPA-regulated Class I wells.

AOGCC regulation 20 AAC 25.283(a)(13)[18] requires the operator provide a detailed description of the plan for post fracture-wellbore cleanup and fluid recovery through to production operations. This would give details on where fluids will be sent for re-use or disposal, and if longer term production testing is being requested.

Finding 9.3

Although AOGCC is not the permitting authority for ground or surface water rights and usage, AOGCC may undertake discussions on water use and wastewater management with the operator during the application process.

Recommendation 9.3

AOGCC should encourage operators to use alternative water sources, such as non-potable groundwater or recycled/treated HF wastewater, when practicable for HF operations.

[18] *http://www.legis.state.ak.us/basis/aac.asp#20.25.283*

Appendix A: Glossary of Abbreviations

- ADEC – Alaska Department of Environmental Conservation
- ADNR – Alaska Department of Natural Resources
- AIO – Area Injection Order
- AOGCC – Alaska Oil and Gas Conservation Commission
- DIO – Disposal Injection Order
- EOR – Enhanced Oil Recovery
- HF – Hydraulic Fracturing
- IOCC – Interstate Oil Compact Commission
- IOGCC – Interstate Oil and Gas Compact Commission
- MSDS – Material Safety Data Sheet
- NORM – Naturally Occurring Radioactive Material
- USEPA – United States Environmental Protection Agency

Appendix B: Completed Questionnaire

General [9.2]

1. Has the state evaluated 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?

Answer 1: Alaska Oil and Gas Conservation Commission (AOGCC) has evaluated the potential risks and the risks are evaluated and detailed by the Operator by their submission of an application as per regulation 20 AAC 25.283 which is effective January 7, 2015. http://doa.alaska.gov/ogc/Regulations/20AAC25-005c13.pdf AOGCC regulations are viewable via the link below. http://doa.alaska.gov/ogc/Regulations/RegIndex.html

2. Has the state developed standards to prevent the contamination of groundwater and surface water from hydraulic fracturing?

Answer 2: AOGCC has robust regulations relating to well construction, surface casing cementing, pressure testing of wellhead and surface lines. AOGCC regulates all wells to high construction and well integrity standards. The new hydraulic fracturing regulations re-affirm the well integrity based on the hydraulic fracturing parameters that the well and surface equipment will be subjected to. These regulations are designed to prevent the release of fluids on surface and to ensure hydraulic fracturing fluids are contained within the target zone and isolated. The Alaska Department of Environmental Conservation (ADEC) regulates the surface water and groundwater and is the first State of Alaska agency contact for spill response activities. ADEC regulates the lease under a spill response plan that takes all oil and gas activities into account. AOGCC regulates the subsurface and is responsible for well blowout prevention and control.

Hydraulic Fracturing Standards [9.2.1]

3. Describe how state standards for casing and cementing meet anticipated pressures associated with hydraulic fracturing to protect other resources and the environment.

Answer 3: AOGCC regulation 20 AAC 25.283(a)(12)(E) requires the operator to identify the “maximum anticipated treating pressure and information sufficient to support a determination that the well is appropriately constructed for the proposed hydraulic fracturing program”. AOGCC regulation 20 AAC 25.283(a)(5) and (6) specifically requires the operator to evaluate the wells casing and cementing operation performed to construct or repair the well. AOGCC regulation 20 AAC 25.283(a)(7) requires the operator provide the pressure test information for casing and tubing, while (8) requires accurate pressure ratings and schematics for the wellbore, wellhead, BOPE, and treating head. AOGCC regulation 20 AAC 25.283(a)(10) requires the operator to report on the mechanical condition of each well that may transect the

confining zones, and information sufficient to support a determination that the well will not interfere with containment of the hydraulic fracturing fluid within the one-half mile radius of the proposed wellbore trajectory.

4. Discuss how the program identifies and, where deemed appropriate, manages risks associated with potential conduits for fluid migration in the area of hydraulic fracturing.

Answer 4: AOGCC has identified potential conduits and management of risks in the regulations such as:

(a) [20 AAC 25.283(a)(6)]the actual well casing and cementing operation;
(b) [20 AAC 25.283(a)(7)] testing of casing and tubing integrity;
(c) [20 AAC 25.283(a)(8)] surface equipment and wellbore pressure ratings;
(d) [20 AAC 25.283(a)(9)] geology (confining zones and fracturing zones);
(e) [20 AAC 25.283(a)(10)] surrounding wells casing and cementing operation and an evaluation that these surrounding wells will not interfere with containment of the hydraulic fracturing fluid;
(f) [20 AAC 25.283(a)(11)].faults and fractures and the evaluation that these will not interfere with containment of the hydraulic fracturing fluid; and
(g) [20 AAC 25.283(a)(12)] hydraulic fracturing fluid, volumes, pressures, fracture geometry and the evaluation that the well is appropriately constructed for the proposed hydraulic fracturing program.

5. Describe program requirements that address actions to be taken in response to unanticipated operational or mechanical changes encountered during hydraulic fracturing that may cause concern.

Answer 5: AOGCC regulation 20 AAC 25.283(b) through (f) require the pressure testing of the well components and the installation of pressure relief valves or risk mitigations on the surface treating line and well annuli.

20 AAC 25.283(g) requires the operator to monitor and record the annulus pressures continuously. If at any time the annulus pressure increases more than 500 psig above those anticipated pressure increases caused by pressure or thermal transfer, the operator shall:

(1) notify the AOGCC as soon as practicable, but not later than 24 hours;
(2) implement corrective action or increased surveillance as the AOGCC requires; and
(3) submit a report to AOGCC of the events within 15 days providing all information including corrective actions.

6. Briefly describe how surface controls associated with hydraulic fracturing, such as dikes, pits or tanks, meet Sections 5.5 and 5.9 of the guidelines.

Answer 6: AOGCC does not regulate dikes, pits or tanks. ADEC regulates surface controls such as surface pits and tanks, and regulates under 18 AAC 75. ADEC also permits surface discharges under the NPDES discharge (now under Alaska regulation called APDES).

7. Briefly describe how contingency planning and spill risk management procedures related to hydraulic fracturing meet Section 4.2.1 of the guidelines.

Answer 7: AOGCC is not responsible apart from the regulations designed to prevent a surface spill based on testing the well and equipment to the maximum anticipated pressures. ADEC regulates contingency planning and

spill risk management at the rigsite under 18 AAC 75. ADEC also permits under the NPDES discharge (now under Alaska regulation called APDES). ADEC regulations detail the spill response and contingency planning, the first responder contact information, financial responsibility, and volumes that determine spill notification and response. ADEC regulation 18 AAC 75.300 requires an operator of a regulated facility to notify ADEC immediately by telephone of a release of hazardous substance, a discharge or release of oil to water, or discharge or release of oil in excess of 55 gal to land outside a secondary containment, or within 48 hours if oil release is in excess of 10 gal but less than 55 gal, or in excess of 55 gal if to secondary containment. Discharges or release of 1 to 10 gal oil to land must be reported to the department on a monthly report. AOGCC has regulation 20 AAC 25.205(a) requiring an operator to immediately notify AOGCC of any uncontrolled release exceeding 10 bbl of oil or 1,000 mscf of gas.

8. Briefly discuss how hydraulic fracturing waste characterization requirements, including, as appropriate, testing of fracturing fluids, are consistent with Section 5.2 of the guidelines.

Answer 8: AOGCC regulation 20 AAC 25.283(a)(13) requires the operator provide a detailed description of the plan for post fracture wellbore cleanup and fluid recovery through to production operations. This would give detail on where fluids will be sent for re-use or disposal, and if longer term production testing is being requested. AOGCC manages the Class II non-hazardous oilfield waste underground disposal and injection program. EPA Region 10 manages the Class I non-hazardous disposal and injection program for Alaska. ADEC manages the APDES discharge permitting for the state. ADEC manages the solid waste permitting for the state in conjunction with city/borough landfills. Used hydraulic fracturing fluids are Class II eligible, and depending on the Disposal Injection Order, unused hydraulic fracturing fluids may be Class II eligible either as EOR or for waste disposal. NORM testing of hydraulic fracturing fluids is not required under the Class II disposal program. Used and unused hydraulic fracturing fluids are Class I eligible. Hydraulic fracturing fluid chemical disclosure is required as per 20 AAC 25.283(a)(12)(plan) and 20 AAC 25.283(h) actual.

9. Briefly describe how 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, are promoted for hydraulic fracturing.

Answer 9: Not promoted directly by AOGCC regulations except for injection and disposal of wastes. The remoteness and therefore increased transportation and storage costs promote and reward operator minimization efforts.

10. Briefly describe how the tracking of hydraulic fracturing waste disposed at commercial or centralized facilities meets the requirements of Section 5.10.2.3 of the guidelines.

Answer 10: Currently Alaska has not approved a commercial/3rd party facility. Facilities are operated by the individual operator on their oil & gas lease. The Class II program and regulations at 20 AAC 25.252(underground disposal order) and 20 AAC 25.402 (enhanced recovery) place stringent requirements on the operator to ensure only authorized fluids are injected with significant enforcement and penalties issued for violations. Reporting on Class II volumes

is monthly. Centralized Class I disposal locations track waste source and volumes on manifests, test for hazardous characteristics such as toxicity and are reported to EPA and AOGCC quarterly.

11. Briefly describe how procedures in place for receipt of complaints related to hydraulic fracturing are consistent with Section 4.1.2.1.

Answer 11: AOGCC utilizes the Risk Based Data Management System (RBDMS) for compliance tracking of such things as final reports. Technicians run compliance reports and flag missing or late submissions. AOGCC has a procedure in place for investigation for possible enforcement action. Any complaint received is tracked by the AOGCC Docketing system and investigated (field and/or office staff as appropriate) by interviews or data gathering etc. AOGCC has Inspectors that perform routine and surprise inspections and investigations that can lead to enforcement actions. AOGCC inspectors have the right by statute Sec 31.05.027 and Sec 31.05.030 and regulation to assert authority over all facilities within the jurisdiction of the State of Alaska police powers. Where violations are found, AOGCC has the ability/authority to take a range of enforcement actions including imposing financial penalty, ensuring corrective actions, and/or additional monitoring and reporting requirements.

Reporting Associated with Hydraulic Fracturing [9.2.2]

12. Describe any required notification prior to, and reporting after completion of, hydraulic fracturing operations.

Answer 12: Sundry application for hydraulic fracturing is the only notification required prior to the work as per 20 AAC 25.283(a). An approved application allows the operator to perform the hydraulic fracture within 12 months. Reporting after the job is required by regulation 20 AAC 25.283(h) within 30 days after completion – including a FracFocus submission requirement.

13. Is notification sufficient to allow for the presence of field staff to monitor hydraulic fracturing activities?

Answer 13: AOGCC currently have no expectation that inspectors or staff be notified to be on site (or remotely) to monitor hydraulic fracturing activities. However, the AOGCC Sundry process allows the AOGCC the ability to require pre notification of particular activities with sufficient notice to have inspectors or staff able to attend. This could be instigated during a hydraulic fracturing operation where the actual program has a higher potential to deviate from the approved plan and may be a preemptive for a potential investigation.

14. Describe reporting requirements for hydraulic fracturing activities and whether they include the identification of materials used, aggregate volumes of fracturing fluids and proppant used, and fracture pressures recorded.

Answer 14: AOGCC reporting is required within 30 days of completion. As per 20 AAC 25.283(h) the reporting is very detailed including the actual volumes and compositions of the hydraulic fracturing fluids, and pressures. FracFocus reporting is also required.

15. Describe any mechanisms for disclosure of information on chemical constituents used in hydraulic fracturing fluids to the state in the event of an investigation or to medical personnel in the event of a medical emergency.

Answer 15: AOGCC will hold all confidential and non-confidential chemical disclosure information including all CAS numbers. Transportation carriers are required by Federal Department of Transportation requirements to have MSDS of all chemicals in transit. Operators are required by OSHA and potentially lease agreements (C-Plan) to have MSDS of all chemicals on site. First responders in an emergency would contact the transportation company or the Operator for the MSDS data. AOGCC will release non confidential information upon receipt of a public records request. AOGCC will release confidential information upon receipt of a public records request and issuance of a judicial order.

16. Briefly describe how hydraulic fracturing information submitted that is of a confidential business nature, is treated consistent with Section 4.2.2 of the guidelines?

Answer 16: AOGCC heard significant testimony from all parties on the subject of confidentiality and specifically trade secrets of the hydraulic fracturing chemicals and components. The regulations are codified under 20 AAC 25.283(k) which is consistent with existing State of Alaska Statutes and AOGCC confidentiality provisions. Basically, the process is AOGCC will receive confidential information separately marked as confidential with supporting documents. AOGCC will review the material and keep it confidential. Upon a public records request, AOGCC will engage with the company in determining if the material still satisfies AOGCC determination of confidentiality, and will notify the party of any appeal(s) requested so that the company can continue to defend its' trade secret and confidentiality claim. Staffing and Training [9.2.3]

17. Briefly discuss if, in addition to the personnel and funding recommendations found in Section 4.3 of the guidelines, state staffing levels sufficient to receive, record and respond to complaints of human health impacts and environmental damage resulting from hydraulic fracturing.

Answer 17: ADEC is the primary reporting and investigating agency for all surface leaks or spills and this would include hydraulic fracturing fluids. AOGCC receives and processes approx. 10 to 15 hydraulic fracturing applications per year and most are performed within 6 months of application. This is a small number in comparison to the overall sundry (workover) applications processed by AOGCC per year (1563 applications for 2014). To date there have not been any complaints to AOGCC of human health impacts or environmental damage resulting from hydraulic fracturing. AOGCC is funded by an annual regulatory cost charge levied to the oil and gas operators within the state based on their annual production and injection. AOGCC budget is estimated annually and the regulatory cost charge is adjusted to meet the budgetary requirement.

18. Describe staff training to stay current with new and developing hydraulic fracturing technology.

Answer 18: AOGCC staff are members of, and therefore have access to training and information provided by various groups including Society of Petroleum Engineers (SPE), American Association of Drilling Engineers (AADE), Alaska Geological Society (AGS), American Association of Petroleum Geologists (AAPG), Ground Water Protection Council (GWPC), and Interstate Oil and Gas Compact Commission (IOGCC). Staff have the opportunity to complete

specific training and are active with workgroups either directly or keeping appraised of initiatives by the member groups. AOGCC has the ability to hire 3rd party consultants or subject matter experts for training as needed.

Public Information [9.2.4]

19. Briefly describe how the state agency provides 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.

Answer 19: Education is not a primary function of the AOGCC. However, in addition to making its employees available to answer questions, the AOGCC has a comprehensive website where well information is readily available. The web pages provide links to IOGCC and GWPC that are resources for general knowledge for the public. AOGCC recently updated a Hydraulic Fracturing White Paper designed to disseminate Alaska hydraulic fracturing information to the public. AOGCC hydraulic fracturing regulations provide for notification of affected parties within ½ mile of the proposed hydraulic fracturing operation. The full application is available to those affected/interested parties and the AOGCC is available to answer any additional questions or concerns at any point. Public records requests are an alternative method of obtaining specific information. http://doa.alaska.gov/ogc/reports-studies/HydraulicFracWhitePaper.pdf

Water and Waste Management Associated with Hydraulic Fracturing [9.3]

20. Fundamental differences exist from state to state, and between regions within a state, in terms of geology and hydrology. Describe how the state evaluated and addressed, 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.

Answer 20: AOGCC is not the permitting authority for surface water rights and water usage. However, water wells and surface water usage permits are issued by the State of Alaska Department of Natural Resources, Division of Mining, Land, and Water.

21. Describe how the availability and use of alternative water sources for hydraulic fracturing, including recycled water, is encouraged.

Answer 21: AOGCC does not regulate surface water use. However, AOGCC may undertake discussions on water use with the operator during the application process. The operator is responsible for obtaining water rights either surface or recycled primarily with the ADEC wastewater permitting or from the surface owner via a permit from the DNR, Division of Mining, Land, and Water or from the Native Corporation.

22. Briefly describe how waste associated with hydraulic fracturing is managed consistent with Section 4.1.1. and Section 7 of the guidelines.

Answer 22: AOGCC underground disposal wells can accept hydraulic fracturing fluids returned from downhole. Wells receiving these wastes are authorized under the specific Area Injection Order (AIO) or Disposal Injection Order

(DIO). Monitoring and reporting are requirements of the AIO and DIO and the more recent DIO's have a 5 year renewal/reauthorize requirement. HF wastes can also be injected into EPA regulated Class I wells. Alternative waste disposal or re-use are as detailed in Answer 8.

23. Discuss how the state encourages 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.

Answer 23: AOGCC is the authority for disposal of source water and hydraulic fracturing wastes. AOGCC is seeing a constant 10 to 20 wells a year being hydraulically fractured, with relatively small volumes used. The majority of the wastes are handled by either Underground Injection Enhanced Recovery (waterflood) or by Underground Disposal through new or existing permitted wells. Additional State, Federal and Native agencies (such as ADEC, DNR, DOT, Fish and Game, US Coast Guard, US Army Corps of Engineers, EPA, and BLM) would be engaged with the operator yearly over development plans to ensure adequate capacity and infrastructure.

Other

24. Please provide any additional information pertaining to the hydraulic fracturing program that you feel would be beneficial to the review team in the preparation of the review report. This should include any 'above and beyond' program functions that may be of interest to other states

Appendix C: 2013 STRONGER Hydraulic Fracturing Guidelines

9.1. 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, or the proper management or disposal of waste and other fluids associated with hydraulic fracturing.

9.2. 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. State programs for hydraulic fracturing should ensure establishment and maintenance of well control; protection of groundwater zones, other mineral resources; and isolation of zones capable of corroding casing or interfering with cement integrity.

9.2.1. Standards

State programs for hydraulic fracturing should include standards for casing and cementing to meet anticipated pressures and protect resources and the environment. The state should have the authority as necessary to require the conduct or submittal of diagnostic logs or alternative methods of determining well integrity. 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 should require monitoring and recording of annular pressures during hydraulic fracturing operations. The program also should address actions to be taken by the operator in response to operational or mechanical changes that may cause concern, such as significant deviation from the fracture design and significant changes in annular pressures.

State programs for hydraulic fracturing should consider baseline groundwater monitoring protocols that address appropriate factors which may include distance/radius from the well, timing/frequency of testing, test parameters, reporting and management of and access to data, existing/new development or existing production in area, responsibility for sample collection, testing, cost, location/gradient, surface owner consent, laboratory accreditation, and remedial actions. The state should have the authority to require the conduct and submittal of evaluation logs as

necessary to determine well integrity.

Surface controls, such as dikes, pits or tanks, should meet Sections 5.5 and 5.9 of the guidelines. In addition to pit technical criteria for authorization, construction, operation, pit integrity monitoring, and closure contained in Section 5.5 of the guidelines, states should address unique characteristics of impoundments associated with hydraulic fracturing, including the use of centralized and commercial facilities, operatorship, size, location, duration, and characteristics of contained fluids. States should consider erosion and safety issues associated with fresh water impoundments associated with hydraulic fracturing.

Contingency planning and spill risk management procedures that meet Section 4.2.1 of the guidelines should be required. Waste characterization 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.

9.2.2. 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 requirements for public disclosure of information on type and volume of base fluid and additives, chemical constituents, and actual or maximum concentration of each constituent used in fracturing fluids. States are encouraged to require disclosure of such information on a publicly accessible location, such as an internet website. The state should have the authority as necessary to require the conduct or submittal of diagnostic logs or alternative methods of determining well integrity. State programs should contain mechanisms for disclosure of chemical constituents used in fracturing fluids to the state in the event of an investigation and to medical personnel on a confidential basis for diagnosis and/or treatment of exposed individuals. Where information submitted is of a confidential nature, it should be treated consistent with Section 4.2.2 of the guidelines.

9.2.3. 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.

9.2.4. 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.

9.2.5. Coordination

In addition to coordination as contained in Section 4.4 of the guidelines, states should consider interstate coordination of regional multi-state issues such as source water, transportation and waste management related to hydraulic fracturing.

9.3. 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 use of alternative water sources, including recycled water, acid mine drainage and treated wastewater, 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/wastes, including transportation (by pipeline or otherwise), recycling, treatment and disposal. State programs should address the integrity of pipelines for transporting and managing hydraulic fracturing fluids off the well pad.