Singh, Angela K (DOA)

From: Colombie, Jody J (DOA)
Sent: Monday, August 05, 2013 1:08 PM
To: Singh, Angela K (DOA)
Subject: FW: Hydraulic Fracturing Comments
Attachments: Halliburton Comments 8-5-13001.PDF

Please copy and index

From: Pauli, Barbara M. [mailto:barbara.pauli@klgates.com]
Sent: Monday, August 05, 2013 1:02 PM
To: Colombie, Jody J (DOA); Fisher, Samantha J (DOA)
Cc: Cutler, Louisiana W.
Subject: Hydraulic Fracturing Comments

Please find attached the written comments of Halliburton Energy Services, Inc.

Barbara M. Pauli
Legal Secretary
420 L Street, Suite 400
Anchorage, AK 99501
Phone: 907.777.7655
Fax: 907.865.2443
barbara.pauli@klgates.com
www.klgates.com

K&L GATES

K&L GATES LLP
420 L STREET
SUITE 400
ANCHORAGE, AK 99501-1971
T 907.276.1969 F 907.865.2443

August 5, 2013

Louisiana W. Cutler
907.276.1969
louisiana.cutler@klgates.com

Via E-Docket

Commissioner Cathy Foerster, Chair
Commissioner John Norman
Commissioner Dan Seamount
Alaska Oil and Gas Conservation Commission
333 West 7th Avenue Suite 100
Anchorage, Alaska 99501

Re: *Written comments of Halliburton Energy Services, Inc. regarding proposed changes to Title 20, Chapter 25 of the Alaska Administrative Code (hydraulic fracturing) issued June 19, 2013*

Dear Commissioners:

In our earlier comments on AOGCC's first set of draft hydraulic fracturing ("HF") regulations, Halliburton Energy Services, Inc. (HESI) described the importance of adequate trade secret protection to HF product innovation. HESI also explained the legal basis for protecting trade secrets from disclosure to the public and competitors, and why *express language in AOGCC's regulations is necessary to adequately protect trade secrets* from such disclosure. We provided language for you to consider that would adequately protect our trade secrets by not requiring us to disclose the subset of additive and chemical ingredient information that does constitute trade secrets. Alternatively, we requested that if you are going to require disclosure to AOGCC of our trade secrets, you expressly provide in the regulations that they will not be subject to further disclosure. [1]

Express protection for trade secrets is absent from AOGCC's revised draft regulations. Instead, the revised draft regulations provide that the operator may obtain a waiver or variance (hereafter "waiver") from any of the requirements of 20 AAC 25.283 including (presumably) the HF fluid disclosure requirements. Although the waiver procedure may not have been intended to discourage HF product innovation, that is exactly what will

[1] *See* Exhibit A (HESI's April 1, 2013 Comments and Draft Language).

happen if it is adopted in its present form without express trade secret protection and acknowledgement that some of the chemical ingredients used in HF fluids are proprietary. Further changes to AOGCC's revised draft regulations are necessary to ensure that the most innovative and environmentally beneficial HF products will continue to be used in Alaska.

HESI cannot afford to provide its best products for use in Alaska without adequate trade secret protection. HESI fully supports disclosure of chemicals used in HF operations, protection of the environment and safe HF practices. HESI will not, however, put itself in the position of having to publicly disclose the subset of HF additive information that it considers proprietary. It has invested too much money and too many resources in product innovation and it will not jeopardize the success that it has had to date by releasing proprietary information that may fall into the hands of its competitors.

HESI's goal is ultimately to protect the formulas of the proprietary products it has developed at considerable expense. In order to do so, it is able to publicly disclose the majority of ingredients used in its additives. However, to protect against the possibility that sophisticated competitors would be able to reproduce a formula from a complete list of ingredients, HESI in many cases will keep confidential the exact identity of certain ingredients in an additive. To further protect a proprietary formula, HESI may also keep confidential the concentrations of some of the ingredients in a particular additive. As we explained in our prior comments, people who make apple pie will undoubtedly know that a pie will invariably include apples, flour and sugar, and will know the relative amounts of these ingredients, and a pie maker would readily confirm that these ingredients were used in the making of an apple pie. However, the pie maker would not want to reveal the identities (or amounts) of unusual or novel ingredients that give the pie its distinctive flavor. To that end, HESI reiterates its request that 1) all chemical ingredients intentionally included in additives be disclosed in a single aggregated list without tying them to any particular additive formula, and 2) service providers be allowed to withhold the specific identity of a chemical ingredient, the concentration of a chemical ingredient or both the specific identity and concentration of the chemical ingredient when it is claimed to be entitled to protection as a trade secret.

Disclosure of trade secrets is not necessary to protect the public. In her testimony to Congress last month, Commissioner Foerster again confirmed that there have been no incidents of groundwater contamination due to HF activities in Alaska. Additionally, the latest studies continue to show that any risk that HF poses to drinking water aquifers is minimal.[2] As the Commission has noted on many occasions, groundwater is protected

[2] For example, HESI's consultant, Gradient Corporation, has prepared a study entitled *Probabilistic Human Health Risk Evaluation for Hydraulic Fracturing Fluid Additives* (Apr.

through proper well construction and measures to ensure ongoing well integrity. The public interest in the makeup of the fluids used in HF operations will be served by disclosure of the chemical ingredients in a manner that does not jeopardize the trade secrets of HESI and other service providers as explained in greater detail in our earlier comments. Moreover, HESI has always supported disclosure of trade secrets to health care providers when necessary to respond to a health care emergency, and to regulators when necessary to respond to a spill or to investigate waste. Given the forty year history of using HF in approximately one quarter of all wells drilled in Alaska without any negative impact on anyone's drinking water, there is no need for AOGCC to discourage continued use of the best HF products merely because it is possible that some oil and gas activity may occur closer to population centers in the future than it does now.

Indeed, a failure to provide robust protection for trade secrets could have significant consequences. HESI has conducted studies of the economic impact on gas production in Colorado and in the states in which the Marcellus Shale ("the Marcellus") has been targeted for development if full disclosure requirements forced companies to withdraw proprietary products from these markets. The studies concluded that as much as $29 billion of production could be foregone in Colorado and as much as $41 billion in the Marcellus without the use of production-enhancing proprietary products.[3] The Alaska

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2013). This report evaluates the potential impacts to drinking water associated with the use of HF fluids. The report examines whether it is possible for fluids pumped into a tight formation during the HF process to migrate upward to reach drinking water aquifers and concludes that this is an implausible chemical migration pathway. The report also analyzes the potential human health risks in the event that surface spills of HF fluids or flowback fluid impact either surface water or groundwater. The report concludes that potential human health risks associated with exposure to drinking water (derived from surface water or groundwater) potentially affected by spills of HF fluids or flowback fluids are expected to be insignificant. *See also* Flewelling & Sharma, "Constraints on Upward Migration of Hydraulic Fracturing Fluid and Brine," *Groundwater*, available at http://onlinelibrary.wiley.com/doi/10.1111/gwat.12095/abstract (discussing the physical constraints on upward fluid migration from black shales to shallow aquifers, taking into account the potential changes to the subsurface brought about by HF operations, and concluding that upward migration of brine and HF fluid as a result of HF activity does not appear to be physically plausible); Rutqvist, J., et al., Modeling of fault reactivation and induced seismicity during hydraulic fracturing of shale-gas reservoirs, J. Petrol. Sci. Eng. (2013), available at http://dx.doi.org/10.1016/j.petrol.2013.04.023 (the possibility of hydraulically induced fractures at depth causing activation of faults and creation of new flow paths that can reach shallow groundwater is remote).

[3] *See* Analysis of Economic Impacts of Withdrawal of Proprietary Products From Colorado, 2008; Analysis of Economic Impacts Resulting From Fracturing Stimulation 'Advanced Technology' Within the Marcellus Basin, 2009 (both studies attached as Exhibit B).

government recently revised its production tax and oil and gas permitting statutes and regulations to encourage increased production of oil and gas. Discouraging the use of the best HF products in Alaska is inconsistent with these actions.

Moreover, even in those jurisdictions where oil and gas exploration and production already occurs closer to drinking water sources and large population centers, disclosure of trade secrets in HF fluids is not required. *In fact, no state requires full disclosure of HF ingredients without adequate trade secret protection.* Many jurisdictions do not require any disclosure of proprietary chemicals used in HF fluids to the regulatory agency except when emergency circumstances warrant disclosure.[4] For example, Louisiana promulgated Statewide Order No. 29-B providing that chemical ingredients used in HF fluids that are subject to trade secret protection under OSHA regulations are not subject to disclosure to Louisiana other than the chemical family name. Similarly, Kansas recently proposed HF regulations that expressly exempt trade secrets from disclosure.[5] BLM, which currently requires justification for trade secret protection, recently proposed to instruct operators not to disclose trade secret information to BLM or to FracFocus.[6] In the minority of states where disclosure of trade secrets is required to state agencies, states have expressly provided that chemical ingredients that are trade secrets will not be subjected to further disclosure.[7] Even California, whose HF debate has received national media attention, protects trade secrets under current law. SB 4 (the legislation under consideration in California that reportedly has stricter provisions with respect to HF

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[4] *See e.g.* 2 COLO. CODE REGS 404-1 s. 205A; LA. ADMIN CODE 43:XIX 118; Mississippi Statewide Rules and Regulations, Rule 26; MON. ARM 36.22.608; N. D. ADMIN CODE 43-02.-03.27.1; NMAC 19.16.15.18; OHIO R.C. § 1333.61(D); OKLA. ADMIN. CODE s. 165:10-3-10; 28 PA. CODE § 78.122; Admin. R. S.D. § 74:12:02:19; Tenn. Comp. R. & Regs. § 0400-53-01.03;16 TEX. ADMIN CODE § 3.29; 35 W.Va. Code St. R. secs. 8-5.6, 8-10.1.

[5] Proposed K.A.R. 82-3-1401(c) and (d) (disclosure is required in emergencies (proposed K.A.R. 82-3-1402)).

[6] Proposed 43 CFR 3162.3-3(j)(1). Operators would submit an affidavit stating the information is entitled to be withheld under federal regulation or statute and BLM would retain authority to obtain the information if needed.

[7] *See e.g.* Pa. Code Section 78.122(c) and (d) (chemical constituents claimed to be entitled to trade secret protection will not be disclosed by the Department); 225 Ill. Comp. Stat. 732/1-77(h) (chemical information determined to be a trade secret shall be protected from disclosure); Wyoming Oil and Gas Conservation Commission Regulations, Ch. 3, section 45 (information entitled to trade secret protection not subject to further disclosure). This approach was also adopted by Alberta (Alta. Reg. 12.150).

operations than the regulations under development by California's conservation agency) also expressly provides trade secret protection for HF chemical ingredient information that would be disclosed to state oil and gas regulators.[8]

Alaska does not need to buck this trend. It is significant that every state provides trade secret protection and that economic studies demonstrate that billions of dollars in production could be foregone in Alaska if similar trade secret protection is not provided. Given the forty year history of safe HF operations in Alaska with no disclosure whatsoever, HESI urges the AOGCC to adequately protect trade secrets in its disclosure regulations.[9]

In our first round of comments, we described some of our newest, most innovative and most effective products we have recently developed with proprietary formulas that provide the most protection to the environment and the public. Another HESI initiative that impacts the development of such products is our Chemistry Scoring Index (CSI). CSI ranks the potential human health, physical safety and environmental hazards of individual chemicals used in chemical products throughout the world. For all three, CSI evaluates the presence of hazards in a variety of categories. Each chemical is then scored and weighted to reflect how much of it is used in a particular product. The resulting "hazard score" for each chemical present in the product is added together to obtain a total score for that product which can then be compared to the total score of other products that might be used for a similar application (e.g. biocides, corrosion inhibitors, etc.) Products that score the lowest present fewer intrinsic hazards. HESI takes these scores into consideration in developing future research priorities. HESI is constantly re-evaluating and upgrading its products to achieve maximum production while minimizing any potential impacts on health, safety and the environment. It is precisely this kind of innovation for which HESI must be assured that it has adequate trade secret protection if it is going to continue to market its products for use in Alaska.

Our proposed changes to the revised draft regulations can be found in Exhibit C. A section by section analysis of our proposal is attached as Exhibit D.

In conclusion, we respectfully suggest that AOGCC's revised draft regulations are wholly inadequate to meet our legitimate claim to trade secret protection. We are leaders in the HF chemical disclosure movement around the world and will continue to disclose

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[8] Proposed SB 4, Art. 3, 3160(6)(b)(2)(B), 3160(6)(d)(1)(D), 3160(6)(j).

[9] There is no such protection in AOGCC's current regulations as explained in Exh. A at 5 n.2 (AS 31.05.035 does not apply to trade secrets in fluid formulas).

everything that we can about our HF products and operations that is not proprietary. We will continue our efforts to innovate and reduce the impact of oil and gas production on the environment. We strongly encourage AOGCC to revisit our suggestions and adopt them. We are available at any time to engage in further dialogue with AOGCC about this critical issue.

Very truly yours,

Louisiana W. Cutler
Alaska Bar No. 9106028

Attachments

K&L GATES LLP
420 L STREET
SUITE 400
ANCHORAGE, AK 99501-1971
T 907.276.1969 F 907.865.2443

April 1, 2013

Louisiana W. Cutler
907.276.1969
louisiana.cutler@klgates.com

Via E-Docket

Commissioner Cathy Foerster, Chair
Commissioner John Norman
Commissioner Dan Seamount
Alaska Oil and Gas Conservation Commission
333 West 7th Avenue Suite 100
Anchorage, Alaska 99501

Re: *Written comments of Halliburton Energy Services, Inc. in response to proposed changes in the regulations of the Alaska Oil and Gas Conservation Commission regarding proposed changes to Title 20, Chapter 25 of the Alaska Administrative Code with regard to hydraulic fracturing*

Dear Commissioners:

Halliburton Energy Services, Inc. (HESI) is one of the largest providers of services to the oil and gas industry. We are proud of our successful history of product innovation, which has played a large role in the development and expansion of our nation's energy resources. Through its proposed regulations, we believe that AOGCC seeks to ensure that the history to date of environmentally sound hydraulic fracturing (HF) operations in Alaska continues long into the future in a manner that provides greater transparency to the public about the chemicals used in HF operations. HESI supports this objective. We respectfully request, however, that AOGCC consider changes to four parts of its draft regulations, and provide suggested language to effect these changes in Exhibit A to these Comments.

First, because we strongly believe that some – though certainly not all – of the information that would be disclosed to AOGCC under proposed 20 AAC 25.283(h) constitutes trade secrets and proprietary information under both Alaska and federal law, we request that such information not be disclosed to AOGCC because of our concern that it could eventually be disclosed to our competitors through a public information request. A useful analogy might be your mother's secret apple pie recipe: disclosing that she uses apples, butter and cinnamon might not easily allow another cook to copy her recipe but if

she disclosed the exact proportions of apples, butter and cinnamon, whether she prefers Gala or Granny Smith apples, whether she uses regular or unsalted butter, and whether she grinds her own cinnamon, *plus* her secret ingredient that makes the pie so uniquely tasty and how much of it she uses, her recipe could be easily reproduced by other cooks.

To be clear: HESI fully supports disclosure of much of the information concerning the fluids it uses in its HF operations and fully supports providing that information to AOGCC. Similarly, we are avid supporters of disclosure on the FracFocus website, routinely provide information about HF operations in Alaska and elsewhere that is then posted to FracFocus, and fully support providing that same information to AOGCC as proposed in the draft regulations. We also have substantial information on our own website about the chemicals and products we advocate using in HF operations which the public can view at http://www.halliburton.com/public/projects/pubsdata/Hydraulic_Fracturing/index.html. What we do not want to disclose is the subset of HF additive information that we consider proprietary. We have invested millions of dollars in research and development of our HF additives and seek to protect that investment. We have spent over a half of a billion dollars in the last decade on HF R&D. In fact, it is a subset of information about our newest, most innovative and most effective products which provide the most protection to the environment and the public that we seek not to have to disclose. For example, HESI's CleanStim® is a recently developed HF fluid system made entirely of ingredients sourced from the food industry that provides exceptional fracturing and environmental performance as compared to traditional formulations. Its development required many months of research and development. Our industry competitors do not know the particular materials used in this fluid system or its concentrations. If this information were disclosed, HESI would lose the investment in its capital, personnel, and technology. As a leader in product innovation, HESI seeks to maintain our competitive edge, especially since there have been no instances of contamination or any other circumstances in Alaska that warrant risking disclosure to our competitors.

We recognize, however, that there could be rare circumstances when our proprietary information and trade secrets would need to be disclosed and we support such disclosure as long as it occurs with adequate protection from further disclosure to our competitors. Therefore, in Exhibit A at 4-5, we provide language that would require disclosure of such information when needed to respond to an emergency and to AOGCC if necessary to investigate waste under AS 31.05.030(b) or AS 31.05.030(e)(1)(E), or to investigate a release under 20 AAC 25.205.

In short, we embrace the goal of additional transparency for HF operations in Alaska but respectfully request that AOGCC not require us to disclose the secret aspects of our HF additive "recipes" lest our competitors obtain that information and copy the products we have put so much effort, time, resources and money into developing.

HESI's second concern is with 20 AAC 25.283(e) as proposed, which would require that HF fluids be confined to the approved formations in order to maximize fluid containment. Although we always strive to confine fluids to the approved formation to the greatest extent possible, given the complex nature of geological formations, achieving this goal is sometimes not possible. Therefore, we request that the final version of 20 AAC 25.283(e) be amended to clarify that hydraulic fracturing shall not result in the transmission of HF fluids beyond the confining zone. *See* Exhibit A at 2.

HESI's third concern is with the detailed pre-fracturing fluid disclosure requirements in 20 AAC 25.283(a)(14). While operators conduct detailed research prior to starting a hydraulic fracture, situations often arise where different additives or additional fluids have to be used once the process is actually undertaken. Because of this need for flexibility, HESI suggests that this section be removed, and that the post-fracturing reporting provided for in 20 AAC 25.283(h) be relied upon instead.

Our final concern is with proposed 20 AAC 25.283(d) which requires the installation of a pressure relief valve(s) and a remotely controlled shut-in device. In many instances the installation of a pressure relief valve on the treating line between pumps and the wellhead is not recommended. Moreover, a remotely controlled shut-in device could be problematic should the valve accidentally close while pumping at high pressure, potentially causing catastrophic events.

The balance of our comments provides you with additional information about our company, why we believe protection of our trade secrets and proprietary information is required under Alaska law, why trade secret protection will not harm the environment or the public, and additional information we hope you will find useful as you consider our request to amend the proposed regulations as provided for in Exhibit A.

I. Introduction and Background Information

A. HESI's HF Operations in Alaska and Elsewhere

HESI pioneered hydraulic fracturing technology for well stimulation in the late 1940s, with the first commercial HF job occurring in 1949. We first came to Alaska in 1986, conducting HF for various North Slope operators in conventional wells from then until 1996. We returned to Alaska in 2010. We have entered into a technology partnership with Great Bear to explore for, develop and produce shale oil on the North Slope. We are also working with Pioneer using HF in oil production operations at Oooguruk.

HESI's extensive HF research and development focuses on understanding the geological, petrophysical and reservoir parameters of hydrocarbon bearing formations and their surrounding layers, the chemistry of the HF fluids themselves, and ultimately, on designing programs that successfully stimulate a formation in the manner desired, while ensuring the integrity of the production and water-bearing zones. As part of these efforts,

we have devoted significant resources to developing more effective and innovative fracture stimulation fluid systems for a variety of subsurface environments which helps to ensure that oil and gas resources are produced in the most efficient manner possible and in accordance with all applicable environmental requirements.

In addition to CleanStim® discussed above, other examples of innovation that are both environmentally sound and production enhancing are CleanStream® and CleanWave℠. CleanStream® is a mobile bacteria control service using UV light which reduces the amount of chemical biocides required and in some cases, eliminates the need for biocide altogether. CleanWave℠ is a water treatment service that reduces the amount of water used as well as bacteria and chemicals, while simultaneously improving reservoir performance. Additionally, HESI has developed fluid systems that facilitate the use of produced water rather than relying solely on fresh water as the base HF fluid. The re-use of produced water can have two benefits: it limits the amount of produced water that must be disposed of, while at the same time limiting the amount of fresh water that must be withdrawn from ground or surface water for HF operations in the first place, thereby minimizing any potential impacts on aquatic ecosystems. These innovations will be especially useful if HF is used in conjunction with shale oil and gas production on the North Slope where fresh water is lacking.

B. Current AOGCC Statutes and Regulations Regarding HF

Under AS 31.05.030(e)(1)(B), AOGCC may regulate the perforating, fracture simulation, and chemical treatment of wells. Additionally, under AS 31.05.030(j)(2)(A), the AOGCC "shall regulate hydraulic fracturing in non-conventional gas wells to ensure protection of drinking water quality."[1]

AOGCC does not currently have any rules regarding disclosure of hydraulic fracturing fluids. Proposed fracturing programs are described in the application for a permit to drill a new well (Form 10-401) or in an Application for Sundry Approvals (Form 10-403) when such work is planned on an existing well. Disclosure of the chemical composition or the anticipated volume of fluid is not currently required for either permit. However, Material Safety Data Sheets (MSDS) are required by federal law to be available on location. In instances where fracturing is proposed in a drilling permit application, volumes may or may not be included because completion interval thickness, permeability and other characteristics that determine required fluid volumes generally are not known before the well is drilled. *See* ALASKA OIL AND GAS CONSERVATION COMMISSION,

[1] AS 31.05.030(j)(2)(A) was originally passed in 2004 as part of House Bill 531. The bill was primarily directed at coal bed methane in the Mat-Su and Kenai Peninsula. STATE OF ALASKA HOUSE RESOURCES COMMITTEE 23RD LEG, HB 531, COMMITTEE MINUTES at number 100 (April 14, 2004).

HYDRAULIC FRACTURING WHITE PAPER, (April 6, 2011) ("AOGCC WHITE PAPER"), http://doa.alaska.gov/ogc/reports-studies/HydraulicFracWhitePaper.pdf.

C. Proposed Regulations

Amongst other changes, AOGCC proposes to add section 20 AAC 25.283, which requires operators to provide additional information regarding HF activities in their Form 10-403. HESI has concerns about four aspects of 20 AAC 25.283 as proposed.

First, under proposed 20 AAC 25.283(h)(2)(A)-(D), an operator is required to file with the AOGCC a description of the amount and type of material pumped during the HF operation, including an identification of the chemical ingredients in the HF fluid as well as the rate or concentration for each additive. This section does not contain any provision that would allow for the protection of proprietary information and/or trade secrets.[2]

Second, in addition to the disclosures required post-fracturing, the regulations require that the operator provide a detailed list of hydraulic fluids to be used, including total volumes planned, trade name and generic name of the principal fluids, and the estimated volume of those principal fluids prior to the start of hydraulic fracturing. 20 AAC 25.283(a)(14)(A)-(D).

The proposed regulations also add requirements for the placement of hydraulic fracturing fluids. Specifically, 20 AAC 25.283(e) requires that "all hydraulic fracturing fluids shall be confined to the approved formation during hydraulic fracturing." In addition, 20 AAC 25.283(a)(13) requires that the operator provide information sufficient to support a determination that any known or suspected faults and fractures will not interfere with containment of the hydraulic fracturing fluid.

Finally, under AOGCC's proposed 20 AAC 25.283(d), a pressure relief valve must be installed on the treating lines and the well must be equipped with a remotely controlled shut-in device.

II. Disclosure of HESI's Proprietary Information and/or Trade Secrets Should Not Be Required Under 20 AAC 25.283(h).

[2] Nor does any other section of AOGCC's existing statutes or regulations protect HESI's HF trade secrets. AS 31.05.035 provides that for exploratory or stratigraphic test wells, proprietary engineering or geotechnical information submitted to AOGCC will be kept confidential for 24 months. HESI's trade secrets in its fluid formulas are neither "engineering" nor "geotechnical" information. Even if AS 31.05.035 did provide trade secret protection for HF fluids, it does not apply to development wells.

As noted above, some of the information that AOGCC would require operators to disclose in proposed 20 AAC 25.283(h) constitutes proprietary information and/or trade secrets.

A. The Alaska Constitution Requires That HESI's Trade Secrets Be Protected.

Article I, sec. 22 of the Alaska Constitution provides: "[t]he right of the people to privacy is recognized and shall not be infringed." The Alaska courts have long held that this explicit guarantee of privacy provides Alaskan corporations and individuals with greater protection than the federal constitution. *Woods & Rohde, Inc. v. State Dep't of Labor*, 565 P.2d 138, 150 (Alaska 1977).[3] Moreover, our Supreme Court has expressly recognized that in certain circumstances, disclosing information violates the right to privacy under Article I, section 22. *International Ass'n of Fire Fighters, Local 1264 v. Municipality of Anchorage*, 973 P.2d 1132, 1134 (Alaska 1999). In order to determine whether the disclosure of particular records violates an entity's right to privacy, the Alaska Supreme Court applies the following test:

(1) Does the party seeking to come within the protection of the right to privacy have a legitimate expectation that the materials or information will not be disclosed?

(2) Is disclosure nonetheless required to serve a compelling state interest?

(3) If so, will the necessary disclosure occur in a manner which is least intrusive with respect to the right to privacy?

International Ass'n of Fire Fighters, 973 P.2d at 1134 (Alaska 1999); *see also Doe v. Alaska Superior Court, Third Judicial District*, 721 P.2d 617, 630 (Alaska 1986).

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[3] In addition to the Court, the Alaska Attorney General's Office has issued opinions recognizing the importance of commercial privacy. *See e.g.* 1980 Op. Att'y Gen. No. 23 at 11 (the "essence of commercial privacy is that certain information must be protected so it cannot be obtained by a competitor for use as a competitive weapon against the commercial concern involved."). The Attorney General noted that commercial privacy would be violated by disclosure when disclosure causes "appreciable economic or competitive harm" to an entity. *Id. See also* 1983 Inf. Op. Att'y Gen (Nov 3; 366-239-84) (records submitted to DOR mining task force were confidential under Article I, sec. 22 of the Alaska State Constitution); 1986 Inf. Op. Att'y Gen. (Dec 8) (data on fish "volume/species mixes, target areas of the state, and market share information" provided by seafood processors and generally used by the processors to formulate business plans fell within the ambit of the Alaska Constitution's privacy protections).

Public disclosure of all the chemical ingredients in HESI's additives with no trade secret protection would violate our right to privacy. HESI has a legitimate expectation that it will not have to disclose a subset of this information because it is proprietary. As noted elsewhere in these Comments, HESI has invested a substantial amount of money in developing its proprietary information and takes a number of steps to ensure the information remains a secret and is not easily accessible by its competitors. Moreover, trade secrets are widely protected under state and federal law such that HESI has a legitimate expectation that its trade secrets would be protected from disclosure.

With respect to the second factor, no compelling state interest exists in such disclosure. Disclosure of our trade secrets is not necessary for the protection of drinking water, especially in Alaska where much oil and gas production occurs on the North Slope where drinking water is not an issue. There have been no instances of drinking water contamination from the use of HF fluids in Alaska. Moreover, a wide range of information concerning the makeup of HF fluids is already publicly available from a variety of sources, including company websites such as Halliburton's, the FracFocus.org website, and various government reports. FracFocus.org contains information regarding chemicals used in hydraulically fracturing tens of thousands of wells across the country, including a number of wells in Alaska. Additional information regarding HF fluids used in Alaska would also be made publicly available if AOGCC's proposed regulations were adopted *with* protection of trade secrets. *See* Exhibit A at 3-5.[4] Moreover, in the event that an emergency occurs in the future, or AOGCC needs HESI's trade secrets to investigate waste or spills, HESI supports disclosure of its trade secrets if necessary for those purposes. *Id.* at 4-5.

Since disclosure must occur in the manner which is least intrusive under the third factor, the full disclosure language in AOGCC's draft regulations would violate HESI's privacy. Rather, disclosure of trade secrets should be limited to instances of emergencies or as needed for waste or release investigations, as provided for in HESI's proposed 20 AAC 25.283(l)-(o). *Id.*

B. Alaska Statutes Require That HESI's Trade Secrets Be Protected From Misappropriation.

Trade secrets are protected from misappropriation under the Alaska Uniform Trade Secrets Act. A.S. §§ 45.50.910 - 45.50.945. AS 45.50.940 provides that a trade secret is information that:

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[4] HESI also suggests amendments to 20 AAC 25.283(h)(2)(B), 20 AAC 25.283(h)(2)(C) and (D), to avoid confusion and possible redundancy about what information will be disclosed. *See* Exhibit A at 3.

> (A) derives independent economic value, actual or potential, from not being generally known to, and not being readily ascertainable by proper means by other persons who can obtain economic value from its disclosure or use; and
> (B) is the subject of efforts that are reasonable under the circumstances to maintain its secrecy.

The first part of the definition asks if the trade secret derives value from its confidentiality, and the second part of the definition asks if the trade secret is actually kept secret. Recently, in *Powercorp Alaska, LLC, v. Alaska Energy Authority*, 290 P.3d 1173 (Alaska 2012), two of three Alaska Supreme Court justices elaborated on this definition by adopting the widely recognized Restatement of Torts six factor test to determine whether information constitutes a trade secret. *Powercorp*, at 1187. The six factors are:

> (1) the extent to which the information is known outside of [the] business; (2) the extent to which it is known by employees and others involved in [the] business; (3) the extent of measures taken by [the business] to guard the secrecy of the information; (4) the value of the information to [the business] and to [its] competitors; (5) the amount of effort or money expended by [the business] in developing the information; (6) the ease or difficulty with which the information could be properly acquired or duplicated by others.

Powercorp at 1187, *citing Secure Energy, Inc. v. Coal Synthetics, LLC*, 708 F. Supp. 2d 923, 926 (E.D. Mo. 2010) (alterations in original) (internal citations omitted).[5]

There are two aspects of HESI's additive formulas that we regard as trade secrets in some instances: (1) the specific chemicals that are included in any specific fluid mixture and (2) the amount of each chemical in that specific fluid mixture. Both the identity of proprietary ingredients in HESI's additives as well as the concentrations of key ingredients easily meet the six factor Restatement test:

- The proprietary constituents and concentrations are generally not disclosed to anyone outside of HESI and are known only to those who are bound by law and/or confidentiality agreements to keep the information confidential. (1st Factor)

[5] Most states have adopted some form of the Restatement test for identifying trade secrets and a number of states have specifically incorporated the Restatement test in their HF fluid disclosure regulations. HESI recommends that the AOGCC adopt the test in its regulations. *See* Exhibit A at 6.

- HESI goes to great lengths to make sure that only those few people who need to know about them do know about them inside the business. (2nd Factor)

- HESI goes to great lengths to guard the secrecy of this product information, carefully limiting access to the information and ensuring that it is not released outside of HESI except where the recipient is under an obligation to keep the information confidential. (3rd Factor)

- HESI's trade secrets are extremely valuable to HESI and certainly would be to HESI's competitors. (4th Factor)

- HESI has spent millions of dollars developing these trade secrets and HF fluids are a key component of HESI's business. (5th Factor)

- HESI's competitors could easily determine the identity and concentrations of HESI's proprietary chemicals and duplicate them if HESI had to disclose them without proper safeguards. (6th Factor)

We believe that protection of our trade secrets is critical to the development and use of ever more effective methods to drill wells, enhance oil and gas production, and protect the environment at the same time. The freedom to innovate while protecting our investment has led to (1) a reduction in overall chemical use; (2) the use of chemicals that provide an extra margin of environmental safety; (3) recycling of wastewater to reduce the use of fresh water and to reduce the amount of wastewater that must be disposed of; (4) reduced truck traffic; (5) less packaging and storage of materials; (6) less reworking of fluids at the well site; and (7) a smaller well pad footprint.

We therefore request that the AOGCC adopt the Restatement test for what constitutes a trade secret in its regulations and provide that trade secrets do not need to be disclosed to AOGCC. *See* Exhibit A at 3-6.

C. Adequate Regulation by AOGCC of HF Does Not Require HESI to Reveal Trade Secrets.

HESI supports the disclosure of all chemical ingredients that are intentionally included in our additives in a single aggregated list. We merely request that the particular ingredients are not tied to particular additives, and that we be able to choose not to disclose the identity of certain of the ingredients which we consider to be proprietary in order to protect our R & D from disclosure to our competitors.

Significantly, there is no demonstrated need for AOGCC, the public or HESI's competitors to obtain this information. Contamination of fresh drinking water is not a concern on the North Slope. A thick layer of soil is underlain by permafrost so there is

no liquid water, other than surface water, to a depth of 1000 to 2000 feet. Below the permafrost, only salt water is present, with very few exceptions. *See* AOGCC WHITE PAPER at *1.

Even where HF occurs in areas of the State where drinking water could be impacted, many studies have concluded that HF operations do not contaminate drinking water wells. In 2004, EPA completed a study of the potential impacts of hydraulic fracturing of coalbed methane (CBM) wells on drinking water supplies. *See* "Evaluation of Impacts on Underground Sources of Drinking Water by Hydraulic Fracturing of Coalbed Methane Reservoirs," EPA Office of Water (June 2004)). As part of this study EPA reviewed information about alleged incidents of drinking water well contamination believed by the affected parties to be associated with hydraulic fracturing or other CBM development activities. Based on its review, the Agency found that, although thousands of CBM wells are fractured annually, there were "no confirmed cases that are linked to fracturing fluid injection in CBM wells or subsequent underground movement of fracturing fluids." *Id.* at ES-1. EPA concluded that hydraulic fracturing of CBM wells poses little or no threat to underground sources of drinking water.[6]

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[6] More recently, the Shale Gas Production Subcommittee of the U.S. Secretary of Energy Advisory Board ("SEAB") recognized in an August 2011 report that "[r]egulators and geophysical experts agree that the likelihood of properly injected fracturing fluid reaching drinking water through fractures is remote where there is a large depth separation between drinking water sources and the producing zone." EPA Administrator Lisa Jackson stated in May 24, 2011 testimony before the House Committee on Oversight and Government Reform that she was "not aware of any water contamination associated with the recent drilling" in the Marcellus Shale. She also stated in an April 30, 2012 interview that "in no case has [EPA] made a definitive determination that the fracing process has caused chemicals to enter groundwater." BLM Director Bob Abbey has likewise stated that BLM has "... not seen evidence of any adverse effect as a result of the use of the chemicals that are part of ... fracking technology." State regulators have reached similar conclusions. S.2248, 112th Cong. § 8 (2012). The New York State Department of Environmental Conservation ("NYSDEC") concluded after extensive study that hydraulic fracturing "does not present a reasonably foreseeable risk of significant adverse environmental impacts to potential fresh water aquifers." The Department cited the statements of regulatory officials from 15 states – including Alaska, Colorado, New Mexico, Pennsylvania, Ohio, Texas and Wyoming – that hydraulic fracturing operations have not led to groundwater contamination. In a 2012 study commissioned by HESI, Gradient reaffirmed the NYSDEC's conclusions that potential groundwater contamination as a result of migration of fracturing fluid from the underlying fracture zone is not plausible. "Human Health Risk Evaluation for Hydraulic Fracturing Fluid Additives," Gradient, at ES-8 (January 10, 2012). Gradient further found that even if groundwater migration was hypothetically assumed, the migration would be extremely slow and would dilute the HF fluid constituent concentrations in the overlying aquifer to concentrations well below health-based standards/benchmarks. *Id.* at ES-9.

The lack of demonstrated impact on drinking water as a result of hydraulic fracturing is due to the nature of HF activities and other factors that weigh against any significant migration of fracturing fluids towards drinking water wells. The majority of HF takes place at depths far below any groundwater sources that could reasonably be considered drinking water sources. Additionally, once HF operations are completed, the well operator begins to pump out groundwater as well as oil or gas, removing as much as 82% of the fracturing fluids in the process. As long as oil or gas continues to be pumped out of the well, any remaining fluids within the capture zone of the well will generally be drawn toward the oil or gas well by the pumping and are unlikely to migrate away from the vicinity of the well.

The studies concluding that there is no negative impact on drinking water have been borne out by Alaska's experience. As AOGCC has noted, "[i]n over fifty years of oil and gas production, Alaska has yet to suffer a single documented instance of subsurface damage to an underground source of drinking water. As long as each well is properly constructed and its mechanical integrity is maintained, hydraulic fracturing should have no potential to damage any fresh groundwater." AOGCC WHITE PAPER at *2. In other words, the key to protection of drinking water is well construction and integrity which AOGCC appropriately and adequately regulates through existing statutes and regulations.

D. HESI's Suggested Changes Are Also Consistent with Federal Law.

Numerous federal laws applicable to HF operations recognize the importance of trade secret protection. For example, Material Safety Data Sheets (MSDSs) are already required by federal law to be available on location. AOGCC WHITE PAPER at *1. MSDSs require the identification of hazardous chemicals in the workplace, but not the disclosure of specific chemical constituents or quantities of such chemical constituents if they are a trade secret. *See* 29 C.F.R. § 1910.1200(i). However, this information must be disclosed to health professionals where there is a written statement of medical need for the information and a written agreement requiring the health professional to maintain the confidentiality of the information. 29 C.F.R. § 1910.1200(i)(2).

One draft 2011 EPA study tentatively reached a different conclusion finding that "constituents associated with hydraulic fracturing have contaminated groundwater at and below the depth used for domestic water supply" in Pavillion, Wyoming. *Draft Investigation of Ground Water Contamination near Pavillion, Wyoming* (December 2011). However, BLM pointed out to EPA that the "two rounds of sampling obtained [by EPA] at these two locations are not statistically valid to arrive at any reliable conclusion given potential reservoir complexities" and that "[t]he degree to which the hydrogeologic environment varies spatially and temporally further complicates this reliability." March 1, 2012 letter from BLM to EPA. In light of this feedback (and criticism from the State of Wyoming and other sources), EPA subsequently conducted an additional round of sampling but has not issued a final report, and has extended the public comment period on its study until September 30, 2013.

Similarly, under the Emergency Planning and Community Right-to-Know Act (EPCRA), 42 U.S.C. §§ 11001-11050, an operator is required to submit an emergency and hazardous chemical inventory form. The operator can withhold from submission to local and state authorities the specific identity of a chemical in order to protect trade secret information. 42 U.S.C. § 11042(a)(1). The operator may be required to provide that chemical information to health professionals upon a specific written request showing that the information is needed for the purposes of diagnosis or treatment. *Id.* § 11043(a), (b). The person receiving the information must agree in a written confidentiality agreement that he or she will not use the information for any purpose other than the health needs identified in the statement of need.

Finally, the Freedom of Information Act (FOIA) also requires that trade secrets and commercial or financial information not be disclosed. 5 U.S.C. § 552(b)(4). The two prongs of the exemption – (1) trade secrets and (2) information that is commercial or financial – have been separately analyzed by the courts. Trade secrets are defined as "a secret, commercially valuable plan, formula, process, or device that is used for the making, compounding or processing of trade commodities and that can be said to be the end product of either innovation or substantial effort." *Public Citizen Health Research Group v. Food and Drug Admin*, 704 F.2d 1280, 1288-89 (D.C. Cir. 1983). HESI conducts extensive research and development in order to create a new or improved HF fluid that can be applied successfully to address market needs. Once a new product is developed, it undergoes extensive modeling and testing in our laboratories. If it performs well, we conduct field tests. If those are also successful, the new fluid is added to our suite of products and made commercially available. Thus, HESI is creating secret formulas that are used in trade commodities and are the end product of innovation and substantial effort.

HESI's formulas are also protected as "commercial or financial information" under the second prong of Exemption Four. To qualify as commercial or financial information, the information must be (1) commercial or financial, (2) from a person, and (3) privileged or confidential. In a leading case with respect to the third prong, *National Parks Conservation Ass'n v. Morton*, 498 F.2d 765 (D.C. Cir. 1974) (*National Parks I*), the D.C. Circuit created the following two part test:

> To summarize, [a] commercial or financial matter is "confidential" for purposes of the exemption if disclosure of the information is likely to have either of the following effects: (1) to impair the Government's ability to obtain necessary information in the future; or (2) to cause substantial harm to the competitive position of the person from whom the information was obtained.

National Parks I, 498 F.2d at 770.

HESI's proprietary information meets these criteria as well. As discussed above, our additive formulas are "commercial" because HESI (a "person" under Exemption Four) markets and sells its HF fluids and additives to customers world-wide. With respect to whether the information is "confidential," HESI clearly has competition for such products, and would suffer substantial harm to its competitive position if the full formula was disclosed because competitors could copy its products, effectively eliminating HESI's competitive and commercial advantage.

In sum, many federal laws provide protection similar to what HESI requests in Exhibit A.

E. If HESI's Trade Secrets are Disclosed to AOGCC, AOGCC Must Ensure that Such Trade Secrets are Protected From Disclosure to HESI's Competitors.

HESI's proposed language in Exhibit A represents an appropriate balance between transparency and trade secret protection because disclosure of HESI's proprietary information would occur in the least intrusive manner, making HESI's proprietary information known only to those who need it to address emergencies, spills and waste. It will also enable AOGCC to avoid reprioritization of its resources to trade secret analysis in response to Public Record Act (PRA) requests, and will help shield AOGCC from potential litigation based on trade secret claims and public record requests. By not taking possession of this information, AOGCC would likely not be a party to any potential litigation over any claimed lack of disclosure by an operator.[7]

If, however, AOGCC determines not to adopt HESI's proposals, AOGCC should ensure that HESI's proprietary information and trade secrets are protected from disclosure to HESI's competitors by adopting explicit language in the regulations protecting HESI's trade secrets from disclosure.[8]

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[7] The Wyoming Oil and Gas Conservation Commission takes possession of trade secret information for HF fluids and was recently sued over its trade secret designations. *Powder River Basin Resource Council, et al. v. Wyoming Oil and Gas Conservation Commission*, Civ. Action 94650, Seventh Judicial District, Wyoming.

[8] This could be accomplished by adding the following subsection after proposed 20 AAC 25.283(h): "(--) if the operator claims that the specific identity of a chemical, the concentration of a chemical, or both the specific identity and concentration of a chemical is a trade secret, the operator of the well must indicate on the Application for Sundry Approvals (Form 10-403) or the Report of Sundry Well Operations (Form 10-404) that the identity of the chemical, the concentration of a chemical or both is claimed to be entitled to trade secret protection. Any information designated as entitled to trade secret protection on the Form 10-403 or the Form 10-404 shall be treated as confidential by AOGCC and shall in no way be construed as publicly available." Additionally, if AOGCC takes this route, it should also consider including the

The PRA prohibits disclosure of records protected from disclosure under federal or state law. AS 40.25.120(a)(4). It would appear that in light of this exception to the PRA, many other State agencies have explicitly protected trade secrets in the agency's possession from public disclosure.[9] Additionally, to date, every state that has adopted HF fluid disclosure regulations provides some form of trade secret protection as well.[10]

III. The AOGCC Should Provide More Flexibility With Respect to Placement of HF Fluids.

Proposed 20 AAC 25.283(e) would require that all HF fluids be "confined to the approved formations during hydraulic fracturing."

Operators have every incentive to contain fractures and fracturing fluid within the approved formation; any fractures that extend outside the approved formation – and any fluids that enter those portions of the fractures – are likely to represent a waste of resources because they will contribute little to oil and gas production. Accordingly, HESI strives to control the propagation of fractures during hydraulic fracturing operations through a variety of techniques, including modeling of the formation being fractured, design of a fracturing operation through selection of appropriate fracturing fluids as well as the determination of fluid volumes and pumping rates and "real time"

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concepts embodied in HESI's proposed language for 20 AAC 25.283(j) – (q) and HESI's proposed definitions in 20 AAC 25.900. *See* Exhibit A to HESI's Comments.

[9] *See, e.g.*, 2 AAC 12.770 (Chief Procurement Officer may establish procedures to protect the confidentiality of trade secrets and confidential technical data in public contracts); 3 AAC 48.045 (providing for protection of trade secrets provided to the Alaska Regulatory Commission and petition must show the need for confidentiality outweighs the public interest in disclosure); 3 AAC 107.630 (protection for materials submitted to the Alaska Energy Authority Grant Program); 3 AAC 233.950 (Alaska Science and Technology Foundation will not disclose trade secrets); 6 AAC 93.070 (Western Alaska Community Development Quota Program will not disclose trade secrets if the need for confidentiality outweighs the public interest in disclosure); 8 AAC 61.060 (information submitted to OSHA that employer identifies as a trade secret will not be disclosed); 18 AAC 31.015 (Department of Environmental Conservation will keep trade secrets confidential unless the public interest in disclosure outweighs the privacy interest). Additionally, because the provisions of AS 44.62 (Alaska's Administrative Procedure Act) do not apply to the Alaska Aerospace Corporation, *see* AS 26.27.110(b), it has adopted Article 1.220(a) which states that confidential information, including trade secrets and proprietary information, will be held in strict confidence by the corporation and the corporation shall not disclose the information.

[10] *See e.g.* 2 COLO CODE REGS 404-1 s. 205A; LA. ADMIN CODE 43:XIX 118; OKLA. ADMIN. CODE § 165:10-3-10; 28 PA. CODE § 78.122; 16 TEX. ADMIN CODE § 3.29.

monitoring of various aspects of fracturing operations. However, because of the hydrogeologically-complex nature of many formations, fractures at some well sites may not be completely confined to the "approved formations" in all cases.

Given the many diverse hydrogeological environments that may be faced in hydraulic fracturing operations, AOGCC should provide sufficient flexibility that adequately reflects the complexities of the subsurface environments in which HF take place. In order to accomplish AOGCC's goal of fluid containment while accurately reflecting the difficulties operators face, the language of 20 AAC 25.283(e) should be modified to provide that the placement of all hydraulic fracturing fluids shall not result in the transmission of such fluids beyond the confining zone. Otherwise HESI would have to design stimulation programs more conservatively in order to maximize the likelihood that the stimulation fluids would remain confined to the objective formation, which in turn would result in decreases in production from individual wells. In some cases HESI would not be able to design a stimulation program that would ensure that the stimulation fluids would remain confined to the approved formation and therefore would have to forego stimulating the formation.

Similarly, proposed 20 AAC 25.283(a)(13) requires an applicant to disclose known or suspected faults, and information sufficient to support a determination that any such faults will not interfere with containment of the hydraulic fracturing fluid.[11] We support this requirement but are concerned that it is unclear what level of information would be considered "sufficient" to make such a determination. We therefore request that AOGCC clarify what information it seeks.

IV. Pre-Hydraulic Fracturing Disclosure is Unnecessary

HESI also respectfully requests deletion of 20 AAC 25.283(a)(14). Although detailed research and review of every proposed HF operation is conducted before fracturing begins, operators often end up using different additives or different amounts of fluids than what was originally planned once HF actually begins. As AOGCC has noted, interval thickness, permeability and other characteristics that determine required fluid volumes generally are not known before the well is drilled. AOGCC WHITE PAPER at 1. Based on these potential variables, 20 AAC 25.283(a)(14) imposes an unnecessary and

[11] Thus, this section will address any concerns regarding potential seismic activity or earthquakes although HESI does not believe that HF activities cause significant seismic disturbances that pose a threat to humans or the environment. HESI's research has shown that faults do not contribute significantly to subsurface movement of HF fluids. Similarly, the National Research Council found in Induced Seismicity Potential in Energy Technologies (June 2012) that the process of hydraulic fracturing a well for shale gas recovery does not pose a high risk for inducing felt seismic events.

burdensome requirement especially since disclosure would also occur after HF operations are completed under 20 AAC 25.283(h). Accordingly, HESI respectfully requests that AOGCC eliminate this requirement.

V. Pressure Relief Valves and Remotely Controlled Shut-In Devices Should Not be Required

Finally, HESI requests that 20 AAC 25.283(d) be deleted in its entirety. Proposed subsection (d) requires a pressure relief valve to limit the line pressure, as well as a remotely controlled shut-in device. However, often times a pressure relief valve is not recommended to limit the treating pressure. Rather, the treating pressure is better controlled by pumps with electronic switches that can be set to stop pumping immediately when a maximum pressure is achieved, and are many times more dependable than pressure relief valves. Similarly, a remotely controlled shut-in device may not be appropriate for the fracture and in certain circumstances could be catastrophic in the event the valve accidentally closes while pumping at high pressure. Because pressure relief valves and a remotely controlled shut-in device can potentially create unnecessary risks, HESI respectfully requests that AOGCC eliminate this section.

VI. Conclusion

For the reasons articulated above, HESI respectfully requests that AOGCC adopt the changes to the draft regulations provided for in Exhibit A to HESI's Comments. In addition to the draft regulations discussed above, HESI also recommends definitions for three terms used in the regulations: "hydraulic fracturing treatment," "additive," and "trade secret."

Very truly yours,

L W Cutler

Louisiana W. Cutler, Alaska Bar No. 9106028
Attorneys for Halliburton Energy Services, Inc.

NEW LANGUAGE SHOWN IN RED; DELETED LANGUAGE ~~STRICKEN OUT~~

20 AAC 25.283. Hydraulic Fracturing. (a) Prior to hydraulic fracturing, the operator must submit an Application For Sundry Approvals (Form 10-403) under 20 AAC 25.280. The application shall include;

(1) an affidavit showing that all owners, landowners, surface owners, and operators within one-quarter mile of the wellbore trajectory have been provided a complete copy of the application for hydraulic fracturing;

(2) a plat showing the well location and identifying any water wells located within a one-quarter mile radius of the well's surface location and further identifying any well penetrations (all well types) within one-quarter mile of the proposed wellbore trajectory and fracturing interval and the sources of the information used in identifying such wells;

(3) identification of freshwater aquifers within the one-quarter mile radius;

(4) whether the well is covered by a Freshwater Aquifer Exemption as per 20 AAC 25.440;

(5) water sampling of water wells. Water sampling consists of collection of baseline water data pre-fracture and follow-up water sampling collected at the same location no sooner than 90 days and no later than 120 days after the conclusion of any hydraulic fracturing operations. The sample parameters shall include pH; Alkalinity; Specific conductance; Major cations/anions (bromide, chloride, fluoride, potassium, sulfate, sodium); Total dissolved solids; BTEX/GRO/DRO (Benzene, Toluene, Ethylene, Xylene/Gasoline Range Organics/Diesel Range Organics); TPH (Total Petroleum Hydrocarbons) or Oil and Grease (HEM); PAH's (Polynuclear Aromatic Hydrocarbons including benzo(a)pyrene); Dissolved Methane, Dissolved Ethane, Dissolved Propane; and Metals (arsenic, barium, boron, cadmium, calcium, chromium, iron, magnesium, manganese, selenium). Current applicable EPA-approved sample custody and collection protocols and analytical methods for drinking water must be used and analyses must be performed by laboratories that maintain nationally accredited programs. Copies of all test results, analytical results and sample locations shall be provided to the commission and to the Alaska Department of Environmental Conservation in an electronic data deliverable format within 90 days of collecting the samples;

(6) detailed casing and cementing information;

(7) an assessment of each casing and cementing operation performed to construct or repair the well with sufficient supporting information, including cement evaluation logs and other evaluation logs approved by the commission, to demonstrate that casing is cemented below the base of the lowermost freshwater aquifer and according to 20 AAC 25.030 and that all hydrocarbon zones penetrated by the well are isolated;

(8) pressure test information if available and plans to pressure test the casings and tubing installed in the well;

(9) accurate pressure ratings and schematics for the wellbore, wellhead, BOPE, and treating head;

(10) data for the fracturing zone and confining zones including lithologic description, geological name, thickness and measured depth (MD) and true vertical depth (TVD), and estimated fracture pressures for the fracturing zone and confining zones;

(11) the geologic name and depth (MD and TVD) to the bottom of all freshwater aquifers;

(12) the location, orientation, and a report on the mechanical condition of each well that may transect the confining zones and information sufficient to support a determination that such wells will not interfere with containment of the hydraulic fracturing fluid;

(13) the location, orientation, and geological data of known or suspected faults and fractures that may transect the confining zones, and information sufficient to support a determination that any such faults and fractures will not interfere with containment of the hydraulic fracturing fluid; *[NOTE: HESI respectfully requests that this section be modified to clarify the type of information that would be "sufficient" to make the determination.]*

(14) a detailed copy of the proposed hydraulic fracturing program by stage including

~~(A) the estimated total volumes planned;~~

~~(B) the trade name and generic name of the principle fluids to be used;~~

~~(C) the estimated amount or volume of the principle fluids to be used including viscosifiers, acids, or gelling agents;~~

~~(D) the estimated weight or volume of inert substances, including proppants and other substances injected to aid in well cleanup~~

E) the maximum anticipated treating pressure and information sufficient to support a determination that the well is appropriately constructed for the proposed hydraulic fracturing program; and

(F) the designed height and length of the proposed fracture(s), including the calculated MD and TVD of the top of the fracture(s).

(15) a detailed description of the plan for post fracture wellbore cleanup and fluid recovery through to production operations.

(b) When hydraulic fracturing through production casing or through intermediate casing, the casing must be tested to 110% of the maximum anticipated surface treating pressure. If the casing fails the pressure test it must be repaired or the operator must use a temporary casing string (fracturing string).

(c) When hydraulic fracturing through a fracturing string, the fracturing string must be stung into a liner or run on a packer set not less than 100 ft TVD below the cement top of the production or intermediate casing and tested to not less than 110% of the maximum anticipated treating pressure minus the annulus pressure applied between the fracturing string and the production or intermediate casing.

~~(d) A pressure relief valve(s) must be installed on the treating lines between pumps and wellhead to limit the line pressure to the test pressure determined in (a)13 (E) of this section; the well must be equipped with a remotely controlled shut-in device unless the operator requests and obtains a waiver from the commission.~~

(e) The placement of all hydraulic fracturing fluids shall not result in the transmission of such fluids beyond the confining zone. ~~be confined to the approved formations during hydraulic fracturing~~.

(f) The surface casing valve must remain open while hydraulic fracturing operations are in progress; the annular space between the fracturing string and the intermediate or production casing must be continuously monitored; the pressure in such annular space may not exceed the pressure rating of the lowest rated component that would be exposed to pressure should the fracturing string fail.

(g) During hydraulic fracturing operations, all annulus pressures must be continuously monitored and recorded. If at any time during hydraulic fracturing operations the annulus

pressure increases more than 500 psig the operator must notify the commission as soon as practicable, but no later than twenty-four (24) hours following the incident and shall implement corrective action or increased surveillance as the commission requires. Within fifteen (15) days after the occurrence, the operator shall submit a Report of Sundry Well Operations Form 10-404 giving all details, including corrective actions taken.

(h) The operator shall file with the commission, within 30 days after completion of hydraulic fracturing operations, on a Report of Sundry Well Operations (Form 10-404), a complete record of the work performed and the tests conducted, and a summary of daily well operations as described in 20 AAC 25.070(3). The operator shall also file with the commission a copy of the daily record required by 20 AAC 25.070(1), for each hydraulic fracturing interval. The information will include:

(1) a description of the actual treated interval including measured and true vertical depth of perforations; and

(2) the amount and types(s) of material pumped during each treatment stage and the total amount and types of material pumped including;

(A) a description of the hydraulic fracturing fluid pumped identified by additive type (e.g. acid, biocide, breaker, brine, corrosion inhibitor, crosslinker, de-emulsifier, friction reducer, gel, iron control, oxygen scavenger, pH adjusting agent, proppant, scale inhibitor, surfactant);

~~(B) the chemical ingredient name and the Chemical Abstracts Service (CAS) Registry number, as published by the Chemical Abstracts Service, a division of the American Chemical Society (www.cas.org), for each ingredient of the additive used. The rate or concentration for each additive shall be provided in appropriate measurement units (pounds per gallon, gallons per thousand gallons, percent by weight or percent by volume, or parts per million);~~

(B) each chemical ingredient used in the hydraulic fracturing treatment(s) of the well that is subject to the requirements of 29 Code of Federal Regulations §1910.1200(g)(2), as provided by the chemical supplier or service company or by the operator, if the operator provides its own chemical ingredients, and the Chemical Abstracts Service (CAS) Registry Number, a division of the American Chemical Society (www.cas.org), where applicable; and

(C) a supplemental list of all chemicals and their respective CAS numbers, where applicable, not subject to the requirements of 29 Code of Federal Regulations §1910.1200(g)(2), that were intentionally included in and used for the purpose of creating the hydraulic fracturing treatments for the well.

(i) If the operator claims that the specific identity of a chemical, the concentration of a chemical, or both the specific identity and concentration of a chemical is a trade secret, the operator of the well must indicate on the Application for Sundry Approvals (From 10-403) or the Report of Sundry Well Operations (Form 10-404) that the identity of the chemical, the concentration of a chemical or both is claimed to be entitled to trade secret protection and will not be disclosed. If the identity of the chemical, the concentration of a chemical or both is claimed to be entitled to trade secret protection, the chemical family or other similar description associated with such chemical ingredient shall be disclosed.

(j) A service provider who performs any part of a hydraulic fracturing treatment or a vendor who provides hydraulic fracturing additives directly to the operator for a hydraulic fracturing

treatment shall, with the exception of information claimed to be a trade secret. furnish the operator with the information required by subsection 20 AAC 25.283(h)(2), as applicable.

(k) A vendor, service provider, or operator is not required to disclose chemicals that (i) are not disclosed to it by the manufacturer, vendor or service provider; (ii) were not intentionally added to the hydraulic fracturing fluid; or (iii) occur incidentally or are otherwise unintentionally present in trace amounts, may be the incidental result of a chemical reaction or chemical process, or may be constituents of naturally occurring materials that become part of a hydraulic fracturing fluid.

(l) Operators, service providers and/or vendors shall disclose the specific identity and amount of any chemicals claimed to be a trade secret to a health professional or emergency responder that requests such information provided that the health professional or emergency responder provides:

(1) a written statement of need that the health professional or emergency responder has a reasonable basis to believe that:

(A) the information is needed for purposes of diagnosis or treatment of an individual;

(B) the individual being diagnosed or treated may have been exposed to the chemical concerned; and

(C) knowledge of the information will assist in such diagnosis or treatment

(2) a confidentiality agreement that states:

(A) the health professional or emergency responder shall not use the information for purposes other than the health needs asserted in the statement of need; and

(B) the health professional or emergency responder shall otherwise maintain the information as confidential.

(m) a written statement of need and confidentiality agreement is not required under (l) of this section when a health professional or emergency responder determines that a medical emergency exists and the specific identity and amount of any chemicals claimed to be a trade secret is necessary for emergency treatment. An operator, service provider and/or vendor shall immediately disclose the information to the health professional or emergency responder upon

(1) a verbal acknowledgment by the health professional or emergency responder that such information shall not be used for purposes other than the health needs asserted; and

(2) a verbal acknowledgment that the health professional or emergency responder shall otherwise maintain the information as confidential.

(n) A vendor, service provider, or operator, as applicable, shall provide the specific identity of a chemical, the concentration of a chemical, or both the specific identity and concentration of a chemical claimed to be a trade secret to the Commission upon receipt of a communication from the Commission stating that such information is necessary to investigate a release reported to the Commission under 20 AAC 25.205 or to investigate any allegation of waste presented to or initiated by the Commission under AS 31.05.030(b) or AS 31.05.030(e)(1)(E). Upon receipt of such a communication from the Commission, such information shall be disclosed by the vendor, service provider, or operator, as applicable, directly to the Commission or its designee and shall in no way be construed as publicly available.

(o) The Commission or its designee may disclose information provided to it under 20 AAC 25.283(n) to the Alaska Department of Environmental Conservation (ADEC) only to the extent

that such disclosure is necessary to allow ADEC to respond to a release and to otherwise carry out its duties and responsibilities under AS 46.03 or AS 46.04, provided that such information shall not be disseminated any further. Any information so disclosed to ADEC shall at all times be considered confidential and shall in no way be construed as publicly available.

(p) Prior to the submission of Form 10-404 under subsection (h), the operator must post the information required by the Interstate Oil and Gas Compact Commission/Groundwater Protection Council hydraulic fracturing web site (http://fracfocus.org/). A hardcopy and electronic copy of this information shall be filed as an attachment with the Form 10-404. (Eff. __/__/__, Register __.)

(q) For purposes of this section "confining zone" means a geological formation or group or part of a formation capable of limiting fluid movement out of an injection zone.

Authority: AS 31.05.030

Additional definitions proposed by HESI

20 AAC 25.990. Definitions

(34) "Hydraulic Fracturing Treatment" means all stages of the treatment of a well by the application of hydraulic fracturing fluid under pressure that is expressly designed to initiate or propagate fractures in a target geological formation to enhance production of oil and natural gas.

(35) "Additive" means any chemical substance or combination of substances, including a proppant, contained in a hydraulic fracturing fluid that is intentionally added to a base fluid for a specific purpose whether or not the purpose of any such substance or combination of substances is to create fractures in a formation.

(36) "Trade Secret" means any formula, pattern, device, or compilation of information that is used in a person's business, and that gives the person an opportunity to obtain an advantage over competitors. The six factors considered in determining whether information qualifies as a trade secret, in accordance with the definition of "trade secret" in the Restatement of Torts, Comment B to Section 757 (1939), as discussed in *Powercorp Alaska, LLC v. Alaska Energy Authority*, 209 P.3d 1173 (Alaska 2012) include:

(A) the extent to which the information is known outside of the company;

(B) the extent to which it is known by employees and others involved in the company's business;

(C) the extent of measures taken by the company to guard the secrecy of the information;

(D) the value of the information to the company and its competitors;

(E) the amount of effort or money expended by the company in developing the information; and

(F) the ease or difficulty with which the information could be properly acquired or duplicated by others.

ANALYSIS OF ECONOMIC IMPACTS RESULTING FROM FRACTURING STIMULATION 'ADVANCED TECHNOLOGY' WITHIN THE MARCELLUS BASIN

Executive Summary

This study evaluates the likely impacts of 'advanced technology' within the Marcellus Shale Gas Basin. The findings indicate that fracturing stimulation 'advanced technologies' create a significant uplift to natural gas production through the year 2030. The 'advanced technology' impact may be as high as $41 billion (2008$) coming directly from increased production. Additionally the benefit is tantamount to an 'efficiency' stimulus. By applying the appropriate economic and environmental technologies originally or during the life of the well 'advanced technologies' result in an estimated economic benefit of $41 billion (2008$) through the year 2030 or upwards of $2 billion (2008$) per year.

This is equivalent to an economic 'efficiency' stimulus which will: 1) increase lease bonuses, royalties, state and local taxes; 2) partially be reinvested into further development of the Marcellus Shale and potentially allow this area to become a net exporter of natural gas thereby saving funds normally spent on imported fuels; 3) partially show up as improved 'retained earnings' for large and small shareholders and reinvested into the economy through normal economic activity; 4) allow for security and stability of indigenous supply for regional populations that is cost competitive; and 5) most importantly, create sustainable local economic stimulus and local jobs.

This analysis does not quantitatively provide an estimate of the number of jobs created locally, regionally, and nationally or estimate the direct, indirect, and induced multiplier impact to the local economies. However, it does provide the basis to consider the positive 'advanced technology' impact on local jobs created and local economic impacts.

Methodology and Assumptions

To determine the impacts of the permit conditions proposed by the New York State Department of Environmental Conservation on natural gas production this analysis models the difference in natural gas production over time with and without adoption of proven fracturing 'advanced technology' for the time period 2009 through 2030 across the Marcellus Basin (including New York, Pennsylvania, West Virginia and Ohio).

No effort is made to extend this analysis across multiple alternative future scenarios and compare them with the base case. The analysis did not attempt to disaggregate the estimated impacts by state. The study focused only on Marcellus shale natural gas.

Typical Marcellus shale decline curves for horizontal wells were utilized. Some of these decline curves have already been published by TPH[1]. This study utilized natural gas prices as estimated by IHS and published by API[2]. Natural gas prices used were represented in 2008 dollars. The API study only published prices through 2018. This study held prices in real terms constant beyond 2018. Income and employment multipliers were available from PWC[3] but were understood to be not specific to the upstream oil and gas industry.

The study assumed a growth market for the Marcellus shale over time, *i.e.*, normal growth in wells drilled commensurate with expected natural gas economics. Given these assumptions cumulative volumes resulting from fracturing stimulation 'advanced technology' were estimated.

This analysis was based upon an estimated 500 TCF of natural gas with a conservative 10% recovery factor. Initial production per well was estimated to be 4.5 MMCFD. First year declines were estimated to be about 75% and re-fracturing was estimated to occur approximately every 11 years. Detailed well decline curves were accumulated to produce a Marcellus shale basin decline curve. The analysis was terminated in 2030.

The study determined the segment of the Marcellus shale that would likely be served by energy service companies which can deliver advanced fracturing stimulation technology. The analysis also assumes the portion of the market served by energy service companies with 'advanced technology' is also the market

where proprietary chemicals are currently used. We have conservatively estimated this portion of the market to be 50%.

Once the portion of the Marcellus gas production likely impacted by 'advanced fracturing technology' was identified, the impact was evaluated. To demonstrate the uplift or increase in production due to the use of 'advanced technologies,' two examples of 'advanced fracturing technologies' are described below.

The first case incorporates studies compiled in four reservoirs comparing the use of proprietary micro-emulsion surfactant fracturing fluids (including Halliburton's GasPerm 1000) vs. alternative fracturing fluids. Micro-emulsion frac fluids mitigate fracture face damage caused by phase trapping, wettability, and relative permeability issues. This advanced fluid system helps create longer effective fracture lengths, returning greater volumes of fracture fluids to the surface and increasing well productivity and reserves. The following list outlines the location and number of wells studied in each area.

Proprietary Micro-Emulsion Benefits vs. Alternatives – Cited Reservoir Studies

Table 1

Formation	Basin	State	Wells	Micro-emulsion Benefits Derived
Lance[4]	Green River	WY	24	Normalized estimated 20 year gas recovery increase of 31% Increase of normalized fracture half length of 59%
Codell[5]	Denver-Julesburg	CO	66	12 month increase in gas production of 25%
Barnett[6]	Ft. Worth	TX	250	6 month increase in gas production of 30% 180 day water recovery increase of 52% Estimated EUR increase of 41%
Marcellus[7]	Appalachian	PA/WV	83	3 month increase in gas production of 20% Normalized estimated 20 year gas recovery increase of 51%

The second 'technology' case history information is presented below in Figures 1 and 2. Figure 1 compares the results of three offset wells with those achieved in wells fractured using Halliburton's Mono-Prop. Mono-Prop is a high conductivity-inducing proppant placed in the formation as a partial monolayer during fracturing operations. In this example, Mono-Prop is considered to be the optimized fracturing stimulation 'technology' (proprietary stimulation) vs. the conventional fracturing stimulation treatments employed on the offset wells (non-proprietary stimulation).

The horizontal axis of the graph shows the % reduction in per well production. In essence the results show a 19%, 22%, and 29% reduction in production when wells are fractured without 'advanced fracturing technology and design' as compared to wells fractured with 'advanced fracturing technology and design'. In addition, another case history provides results that approach a 40% loss.

Figure 1 goes further to show on the vertical axis the % increase in wells required without 'advanced fracturing technology' case in order to provide the same level of natural gas production as with the 'advanced fracturing technology' case. The results indicate that to keep the same production using non-propriety fracturing fluids would require that 24% to 41% more wells to be drilled.

This analysis in no way suggests or assumes that a reduction in production per well would cause an increase in drilling activity. It simply points out the gain in 'economic efficiency' by using 'advanced fracturing technology' for the Marcellus shale.

Figure 1

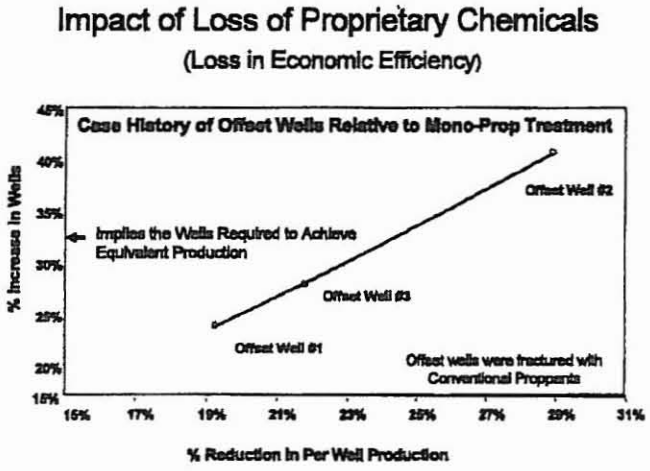
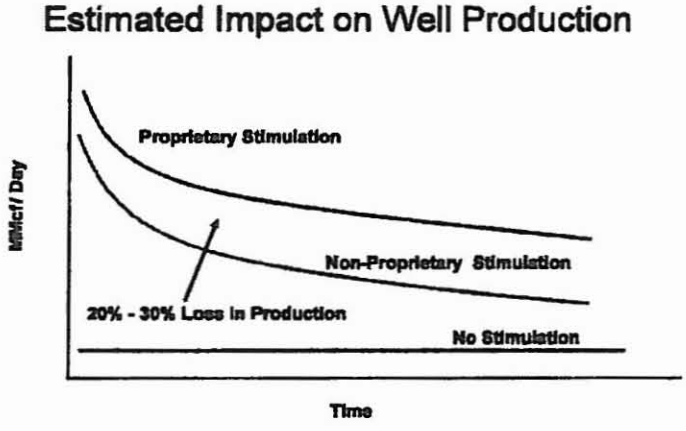


Figure 2 simply summarizes the above fracturing case histories within the context of production both with and without fracturing 'advanced technology' design and treatment. The area of the curve between proprietary stimulation and non-propriety stimulation represents the economic impact of 'advanced technology'. This area ultimately becomes an economic benefit; in other words, fracturing stimulation 'advanced technology' will provide economic uplift to the citizens of Pennsylvania, New York, Ohio, and West Virginia through increased natural gas production and economic efficiency of optimizing reservoir drainage.

Figure 2



Based on the case histories described above it is reasonable to use an average 25% loss in production in this market when fracturing stimulation 'advanced technology' is not leveraged. This implies a 33% additional

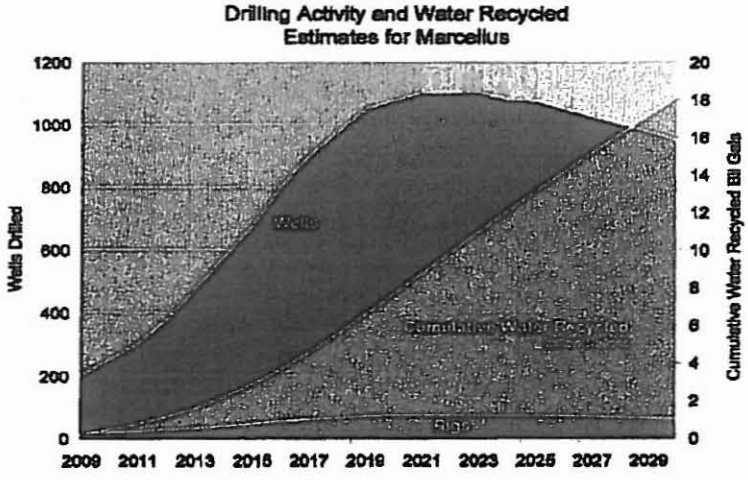
economic uplift for the portion of the market utilizing 'advanced technology' and provides positive benefits for the 'with advanced technology' case.

Figure 3 represents the estimated activity regarding drilling and completing wells and provides the basis of the field decline curve. Based on this level of drilling activity, approximately 38 TCF would be recovered in the 'with advanced technology' case from 2009 through 2030 as compared to 33 TCF in the 'without advanced technology' case. In addition, the 'with advanced technology' case includes technologies that allow for water used in the fracturing process to be reclaimed and reused during the fracturing of subsequent wells. Examples of these technologies include proprietary micro-emulsion surfactants and Opti-KleenWF (Water Frac). Opti-KleenWF is a breaker for existing friction reducers which aids in water recovery. Wells within the Barnett Shale utilizing proprietary micro-emulsion surfactants provided a 52% increase in water recovery. Both micro-emulsion chemicals and Opti-KleenWF have been determined to not only increase production and reserves, but they also facilitate greater frac water recoveries from the well. These additional water recoveries are re-used in the sense that they are combined with additional fresh water in order to serve as the base fluid for fracturing additional wells. While not included in this analysis, new friction reducers are being developed that will also benefit the environment by allowing the re-use of a greater percentage of produced water with higher brine concentrations than previously possible. This technology has the same positive effect as proprietary micro-emulsion surfactants and Opti-KleenWF (less fresh water needed) plus it further reduces the amount of water that must be disposed of.

Accordingly, these 'advanced technologies' yield important non-monetized benefits in the form of enhanced opportunities to recycle flowback fluid. These benefits are quantified in Figure 3. This portion of the analysis is based upon an average of 400,000 gallons of water used per frac stage, 10 frac stages per well drilled, and a 25% recovery factor. (While an 18% average flowback recovery rate is expected for most of Marcellus Shale Gas Basin located in New York, the anticipated average flowback recovery rate for all of the Marcellus Shale Gas Basin (e.g., Pennsylvania, New York, West Virginia and Ohio) is expected to be closer to 25%.)

Given these parameters, Figure 3 shows that the cumulative recycled water from this drilling plan would amount to about 18 billion gallons or about 60,000 acre feet of water that would be available for reuse in lieu of withdrawing fresh water from surface water sources.

Figure 3



Analysis

This analysis shows the impact relative to two cases: with and without fracturing 'advanced technology'. Estimated gas production for the year 2009 through 2030 is shown below for the Marcellus basin.

Table 2 represents the 'with advanced technology' case, Table 3 represents the 'without advanced technology', and Table 4 represents the economic benefit resulting directly from increased production. The Total numbers represent the sum across all years. Since production is represented in BCFD then the figure for each year would need to be multiplied by 365 to convert to a yearly total.

Table 2

With Technology Growth Market Environment			
Year	Gas Production BCFD	Gas Price 2008$/MCF	Est. Wellhead Revenue Per Day for Natural Gas Marcellus (Mil $2008)
2009	0.49	4.41	2.14
2010	0.73	6.11	4.45
2011	0.98	6.67	6.60
2012	1.26	7.28	9.16
2013	1.63	7.78	12.70
2014	2.04	8.33	16.99
2015	2.47	8.53	21.08
2016	2.89	8.67	25.07
2017	3.47	8.63	29.93
2018	3.90	8.64	33.72
2019	4.70	8.64	40.59
2020	5.17	8.64	44.67
2021	5.61	8.64	48.43
2022	6.01	8.64	51.89
2023	6.43	8.64	55.59
2024	6.81	8.64	58.84
2025	8.64	8.64	74.69
2026	7.60	8.64	65.63
2027	7.93	8.64	68.53
2028	8.21	8.64	70.90
2029	8.46	8.64	73.09
2030	8.61	8.64	74.36
	104.10		899.86

Table 3

Without Technology Growth Market Environment			
Year	Gas Production BCFD	Gas Price 2008$/MCF	Est. Wellhead Revenue Per Day for Natural Gas Marcellus (Mil 2008$)
2009	0.43	4.41	1.88
2010	0.64	6.11	3.90
2011	0.84	6.67	5.78
2012	1.10	7.28	8.01
2013	1.43	7.78	11.11
2014	1.79	8.33	14.87
2015	2.16	8.53	18.45
2016	2.61	8.67	22.64
2017	3.04	8.63	26.19
2018	3.42	8.64	29.51
2019	4.11	8.64	35.50
2020	4.52	8.64	39.09
2021	4.90	8.64	42.37
2022	5.25	8.64	45.40
2023	5.63	8.64	48.64
2024	5.98	8.64	51.49
2025	7.56	8.64	65.35
2026	6.65	8.64	57.42
2027	6.94	8.64	59.96
2028	7.18	8.64	62.04
2029	7.40	8.64	63.95
2030	7.53	8.64	65.07
	91.09		776.62

Table 4

Estimated Impact of Technology			
Year	Gas Production BCFD	Gas Price 2008$/MCF	Est. Wellhead Revenue Per Day for Natural Gas Marcellus (Mil 2008 $)
2009	0.06	4.41	0.27
2010	0.09	6.11	0.56
2011	0.12	6.67	0.83
2012	0.16	7.28	1.14
2013	0.20	7.78	1.59
2014	0.26	8.33	2.12
2015	0.31	8.53	2.64
2016	0.37	8.67	3.23
2017	0.43	8.63	3.74
2018	0.49	8.64	4.22
2019	0.59	8.64	5.07
2020	0.65	8.64	5.58
2021	0.70	8.64	6.05
2022	0.75	8.64	6.49
2023	0.80	8.64	6.95
2024	0.85	8.64	7.36
2025	1.08	8.64	9.34
2026	0.95	8.64	8.20
2027	0.99	8.64	8.57
2028	1.03	8.64	8.86
2029	1.06	8.64	9.14
2030	1.08	8.64	9.30
	13.01		111.23
Est. Value of Foregone Gas Production Billion 2008$			41

Conclusion

This study provides insight into the significance of the economic impacts resulting from fracturing stimulation 'advanced technology'. The results suggest a 'major and significant' economic impact will likely occur when 'advanced technology' is adopted and implemented. It also points out the importance of protecting the intellectual property rights of the energy service companies that invest and develop new fracturing stimulation 'advanced technology'.

In particular, if state or federal regulation is adopted which requires complete disclosure of chemical formulas to the public at large, i.e., beyond what is required to ensure public safety, welfare, and environmental sustainability then loss of intellectual property will occur. Service Companies spend hundreds of million of dollars annually to develop proprietary chemicals that are designed to maximize the recovery of oil and gas resources. This analysis indicates the "economic impact" resulting from advanced

fracturing stimulation is highly significant. It also emphasizes the importance for operators, service companies, state and federal regulators, and all citizens to work together to find a pathway forward that protects the environment, the safety and welfare of citizens, and ensures the integrity of intellectual property rights.

The full estimated economic impact of $41 billion (2008$) resulting from the use of fracturing stimulation 'advanced technology' will provide incremental direct, indirect and induced economic impacts and provide employments opportunities for Pennsylvania, New York, Ohio, and West Virginia.

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1 TPH Energy Research, Exhibit 24: Horizontal Type Curve Data; Exhibit 25 COG Horizontal Marcellus Type Curve; Chesapeake Energy; Chesapeake General Type Curve – November 2008

2 IHS Global Insight on Behalf of API: Measuring the Economic and Energy Impacts of Proposals to Regulate Hydraulic Fracturing 2009

3 PWC PriceWaterhouseCoopers: The Economic Impacts of the Oil and Natural Gas Industry on the U.S. Economy: Employment, Labor Income and Value; September 2009

4 Crafton, J.W., Penny, G.S., and Borowski, D.M. 2009: Micro-Emulsion Effectiveness for Twenty Four Wells, Eastern Green River, Wyoming. Paper 123280 presented at the SPE Rocky Mountain Petroleum Technology Conference, Denver, CO, USA, 14-16 April.

5 Paterniti, M. 2009: ME Surfactant Increases Production in the Codell Formation of the DJ Basin. Paper 116237 presented at the SPE Rocky Mountain Petroleum Technology Conference, Denver, CO, USA, 14-16 April.

6 Zelenev, A.S., September 8, 2009: Essentials of Microemulsion Technology: Overview. Presentation based on updated data initially studied in SPE paper100434, authored by Penny, G.S., Pursley, J.T., and Clawson, T.D.: Field Study of Completion Fluids To Enhance Gas Production in the Barnett Shale presented at the 2006 SPE Gas Technology Symposium, Calgary, Alberta, Canada, 15-17 May 2006.

7 Crafton, J.W, October 31, 2009: MA844-W Micro-Emulsion Effectiveness for 83 Marcellus Shale Wells, Pennsylvania and West Virginia. Paper presented at the SPE Horizontal Well Stimulation Conference, Pittsburgh, PA, USA, 17-18 November 2009.

ANALYSIS OF ECONOMIC IMPACTS OF WITHDRAWAL OF PROPRIETARY PRODUCTS FROM COLORADO

I. Executive Summary

This study was conducted to evaluate the likely impacts of the Draft Rules for Oil and Gas Development in Colorado resulting from certain legislative changes in statutory provisions governing oil and gas well drilling and operations. Specifically this study was undertaken to estimate the impacts of proposed rules which would require energy service companies to reveal the chemical formulation of all products used at the well site.

The findings of this effort indicate a strong probability of a significant loss in natural gas production over time within the state of Colorado if the proposed rules require full disclosure of chemical formulation of products which are proprietary and force oil service companies to withdraw these products from Colorado in order to maintain the proprietary nature of the formulations. This estimate may be as high as $29 billion dollars of production foregone depending upon the percentage of gas production coming from new wells drilled which is the type of production most likely to be impacted by the unavailability of proprietary stimulation fluids and other proprietary products.

II. Methodology and Assumptions

To determine the impacts of the proposed rules on natural gas production we attempted to understand the difference in natural gas production over time with and without the proposed rules for implementation of the legislation.

No additional effort was made to estimate alternative future scenarios and compare them with the base case. This would require extensive detailed basin analysis combining probable decline curves by basin. Some of these curves have already been modeled by ICF[1] (see ICF International), which undertook its study relative to assumed bracketed reductions of gas well drilling of 10, 20 and 30 percent.

We also focused our efforts only on natural gas. We estimate that approximately 90% of total production on a barrel oil equivalent basis comes from natural gas within Colorado.

We assumed a market environment in equilibrium over time, *i.e.*, production decline offset by production from new wells drilled, stable hydrocarbon prices, access to markets, etc. Given these assumptions we estimate the cumulative volumes lost and value foregone, due to the legislation's proposed rules, of natural gas production over time.

Our analysis focused on mapping the segments of production that would be impacted by the proposed rules. Existing production is defined by our analysis to include production from existing wells and production from new wells drilled. It can be argued and supported that both existing production and new well production are impacted by the implementation of the proposed rules. However, for the purpose of this analysis, we took a conservative approach and identified the production from new wells drilled as the segment impacted.

Next we determined the sub-segment of the new well production currently served by energy service companies which would suffer if intellectual property (IP) rights were lost. We also identified the sub-segment of the new well production which is served by energy service companies which may be indifferent to IP rights. We then determined the portion of the market whereby proprietary chemicals are currently used and the portion of the market whereby proprietary chemicals are not predominately used.

This process enabled us to systematically map the gas production which will be impacted by the proposed rules. This "gas production impacted" will be adversely affected assuming energy service companies remove proprietary products due to proposed rules which require revealing chemical formulation. No other provisions of the proposed regulations were evaluated.

Mapping the "gas production impacted" of existing natural gas production provided the basis for estimating the impact with and without the proposed rules and focused our effort on these two conditions solely as a result of the proposed regulatory requirements.

Once the "gas production impacted" was identified, the impact of removing IP protection was evaluated relative to the information presented in figures 1 and 2. Figure 1 shows Halliburton case history information that compares three offset wells with results achieved by fracturing using Mono-Prop. Mono-Prop is considered to be the optimized fracturing treatment (proprietary stimulation) and was compared with three offset wells without an optimized fracturing treatment (non-proprietary stimulation).

The horizontal axis of the graph shows the % reduction in per well production. In essence the results show a 19, 22, and 29% reduction in production when wells are fractured without a proprietary fracturing design as compared to wells fractured using proprietary products. In addition, another case history provides results that approach a 40% loss. However, figure 1 goes further to show on the vertical axis the % increase in wells required for the non-proprietary stimulation case in order to provide the same level of natural gas production as the proprietary stimulation case. The results indicate that to keep the same production using non-propriety fracturing fluids would require that 24% to 41% more wells to be drilled.

This analysis in no way suggests or assumes that a reduction in production per well would cause an increase in drilling activity. It simply points out the loss in 'economic efficiency' by using non-optimized fracturing design and demonstrates that the legislation and the proposed rules as currently understood would have a significant cost in lost production resulting in foregone economic value to the state of Colorado.

Figure 1

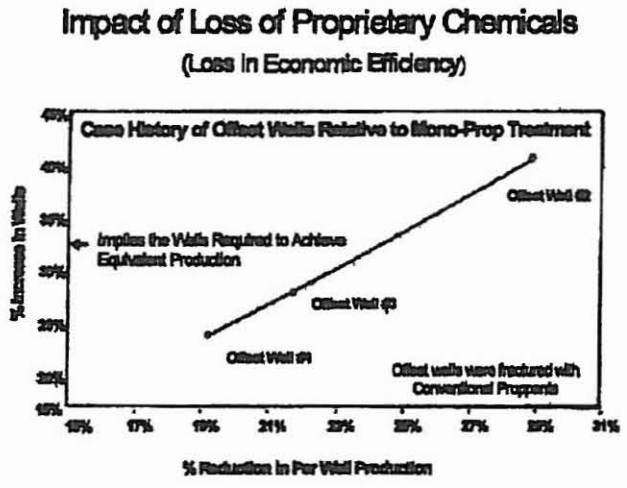
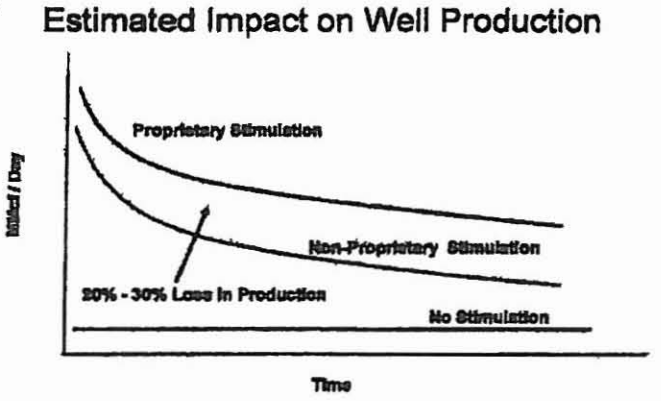


Figure 2 simply summarizes the above fracturing case histories within the context of with and without optimized fracturing treatments. The area of the curve between proprietary stimulation and non-propriety stimulation represents the loss in production. This area ultimately becomes an economic externality; in other words, proposed rules to implement legislation will cause costs to the citizens of Colorado through lost natural gas production and foregone value produced.

EXHIBIT 10
HESI

Figure 2



III. Analysis

Our analysis shows the impact relative to two cases: without and with the proposed regulation. Gas production for the year 2007 as shown below is based upon the ICF report: table 6, year - 2007, column - Total for DJ, Piceance, Raton, and San Juan basins.

The Without Regulation case assumes that gas production from new wells drilled equals production decline, stable hydrocarbon prices, access to markets, and production constant over time. Gas production from new wells drilled is 26% of total production.

The With Regulation case follows the Without Regulation assumptions and defines the natural gas production from new wells as 'natural gas impacted'. Sixty percent of the 'natural gas impacted' represents the 'proprietary chemical' market; 85% of this market is served by service companies whose proprietary chemical formulations would be jeopardized by the proposed regulations. This number represents about 16.8% of the total natural gas production.

Based on the case histories shown in figures 1 and 2 we believe there is an average 25% loss in production in this market for not using proprietary chemicals. This results in a 3.3% additional decline curve for the With Regulation case which when evaluated on a cumulative basis reduces 2007's gas production of 3.7 BCFD to about 2.4 BCFD for the year 2020.

Figure 4 represents the Without Regulation case, Figure 5 represents the With Regulation case, and Figure 6 represents the difference given 26% of gas production coming from new wells drilled. The Total numbers represent the sum across all 14 years. Since production is represented in BCFD then the figure for each year would need to be multiplied by 365 to convert to a yearly total.

EXHIBIT 10
HESI

Figure 4

Without Regulation Flat Market Environment

Year	Gas Production BCFD	Gas Price $/MCF	Est. Wellhead Revenue Per Day for Natural Gas Colorado ($Mil)
2007	3,709	$8.00	$30
2008	3,709	$8.00	$30
2009	3,709	$8.00	$30
2010	3,709	$8.00	$30
2011	3,709	$8.00	$30
2012	3,709	$8.00	$30
2013	3,709	$8.00	$30
2014	3,709	$8.00	$30
2015	3,709	$8.00	$30
2016	3,709	$8.00	$30
2017	3,709	$8.00	$30
2018	3,709	$8.00	$30
2019	3,709	$8.00	$30
2020	3,709	$8.00	$30
Total	51,926		$416

Figure 5

With Regulation Flat Market Environment

Year	Gas Production BCFD	Gas Price $/MCF	Est. Wellhead Revenue Per Day for Natural Gas Colorado ($Mil)
2007	3,709	$8.00	$30
2008	3,688	$8.00	$29
2009	3,497	$8.00	$28
2010	3,352	$8.00	$27
2011	3,241	$8.00	$26
2012	3,134	$8.00	$25
2013	3,030	$8.00	$24
2014	2,929	$8.00	$23
2015	2,832	$8.00	$23
2016	2,738	$8.00	$22
2017	2,648	$8.00	$21
2018	2,560	$8.00	$20
2019	2,476	$8.00	$20
2020	2,393	$8.00	$19
Total	47,094		$337

Figure 6

Estimated Impact of Regulation Resulting in Intellectual Property Lost

Year	Gas Production BCFD	Gas Price $/MCF	Est. Wellhead Revenue Per Day for Natural Gas Colorado ($Mil)
2007	0.000	$8.00	$0
2008	(0.129)	$8.00	(1.0)
2009	(0.212)	$8.00	(1.5)
2010	(0.357)	$8.00	(2.5)
2011	(0.468)	$8.00	(3.7)
2012	(0.575)	$8.00	(4.6)
2013	(0.679)	$8.00	(5.4)
2014	(0.780)	$8.00	(6.2)
2016	(0.877)	$8.00	(7.0)
2016	(0.971)	$8.00	(7.8)
2017	(1.061)	$8.00	(8.5)
2018	(1.149)	$8.00	(9.2)
2019	(1.234)	$8.00	(9.9)
2020	(1.316)	$8.00	(10.5)
Total	(9.892)		(78.7)
Est. Value of Foregone Gas Production = $ 29 Bil			

IV. Conclusion

This study was done to gain insight into the significance of economic impact and externalities which could likely result from the proposed chemical inventory requirements of the rules proposed to implement the requirements of H.B. 1298 and H.B. 1341. The results of the analysis suggest a 'major and significant' impact will likely occur if the rulemaking process does not carefully analyze potential unintended consequences of the rules. In essence, if the proposed rules determine that complete disclosure of chemical formulas must occur then this will result in a loss of intellectual property. Service Companies spend hundred of million dollars annually to develop proprietary chemicals that are designed to maximize the recovery of oil and gas resources. However, these chemical products will likely be taken off the market in the presence of the proposed rules in order to protect the intellectual property rights of the company that develops these products.

The full estimated impact of up to $29 billion of production foregone will also result in impacts to employment, income, and tax revenues in the State of Colorado. This study has not attempted to evaluate those additional impacts. The conclusion of our analysis ends with a simple finding...the potential impact of one single chemical inventory provision of the proposed rulemaking is significant.

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[1] Initial Study of the Potential Impacts of New Well Permitting Rules for the State of Colorado, May 12, 2008

HESI'S REQUESTED CHANGES TO AOGCC'S JUNE 19, 2013 DRAFT HYDRAULIC FRACTURING REGULATIONS

NOTE: REQUESTED CHANGES SHOWN IN UNDERLINE/STRIKE OUT

20 AAC 25.283. Hydraulic Fracturing. (a) Prior to hydraulic fracturing, the operator must submit an Application For Sundry Approvals (Form 10-403) under 20 AAC 25.280. The application shall include;

(1) an affidavit showing that all owners, landowners, surface owners, and operators within a one-half mile radius of the wellbore trajectory have been provided notice of 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;

(2) a plat showing the well location and identifying any water wells located within a one-half mile radius of the well's surface location and further identifying any well penetrations (all well types) within one-half mile of the proposed wellbore trajectory and fracturing interval and the sources of the information used in identifying such wells;

(3) identification of freshwater aquifers within the one-half mile radius;

(4) whether the well is covered by a Freshwater Aquifer Exemption as per 20 AAC 25.440;

(5) water sampling of water wells. Water sampling consists of collection of baseline water data pre-fracture (but not more than 90 days prior) and follow-up water sampling collected at the same location no sooner than 90 days and no later than 120 days after the conclusion of any hydraulic fracturing operations. The sample parameters shall include pH; Alkalinity; Specific conductance; arsenic; barium; bicarbonate; boron; bromide; cadmium; calcium; carbonate; chloride; chromium; fluoride; hydroxide; iodide; iron; lithium; magnesium; manganese; potassium; radium; selenium; silicon; sodium; strontium; sulfate; Total dissolved solids; BTEX/GRO/DRO (Benzene, Toluene, Ethylene, Xylene/Gasoline Range Organics/Diesel Range Organics); TPH (Total Petroleum Hydrocarbons) or Oil and Grease (HEM); PAH's (Polynuclear Aromatic Hydrocarbons including benzo(a)pyrene); Dissolved Methane, Dissolved Ethane, and Dissolved Propane. Current applicable EPA-approved sample custody and collection protocols and analytical methods for drinking water must be used and analyses must be performed by laboratories that maintain nationally accredited programs. Copies of all test results, analytical results and sample locations shall be provided to the commission and to the Alaska Department of Environmental Conservation in printed form and in an electronic data deliverable format that is acceptable to the commission within 90 days of collecting the samples;

(6) detailed casing and cementing information;

(7) an assessment of each casing and cementing operation performed to construct or repair the well with sufficient supporting information, including cement evaluation logs and other evaluation logs approved by the commission, to demonstrate that casing is

cemented below the base of the lowermost freshwater aquifer and according to 20 AAC 25.030 and that all hydrocarbon zones penetrated by the well are isolated;

(8) pressure test information if available and plans to pressure test the casings and tubing installed in the well;

(9) accurate pressure ratings and schematics for the wellbore, wellhead, BOPE, and treating head;

(10) data for the fracturing zone and confining zones including lithologic description, geological name, measured depth (MD) and true vertical depth (TVD), measured and true vertical thickness, and estimated fracture pressures for the fracturing zone and confining zones;

(11) the geologic name and depth (MD and TVD) to the bottom of all freshwater aquifers within the one-half mile radius of the proposed wellbore trajectory;

(12) the location, orientation, and a report on the mechanical condition of each well that may transect the confining zones and information sufficient to support a determination that such wells will not interfere with containment of the hydraulic fracturing fluid within the one-half mile radius of the proposed wellbore trajectory;

(13) the location, orientation, and geological data of known or suspected faults and fractures that may transect the confining zones, and information sufficient to support a determination that any such faults and fractures will not interfere with containment of the hydraulic fracturing fluid within the one-half mile radius of the proposed wellbore trajectory;

(14) a detailed copy of the proposed hydraulic fracturing program including, but not limited to, the pumping procedure by stage where applicable, with a chemical disclosure based on the total amounts and volumes per well including;

(A) the estimated total volumes planned;

(B) the trade name, generic name, and purpose of all base fluid(s) and additives to be used. The estimated or maximum rate or concentration of each additive shall be provided in appropriate measurement units;

(C) the chemical ingredients ~~name~~ and, where applicable, the Chemical Abstracts Service (CAS) Registry number for the chemical ingredients, as published by the Chemical Abstracts Service (a division of the American Chemical Society, see www.cas.org) intentionally included in all additives without tying the chemical ingredients to any particular additive., ~~for each base fluid and each additive used.~~ The list shall also include the ~~actual~~estimated or maximum concentration of ~~each~~the chemical ingredients in the hydraulic fracturing fluid ~~ingredient in each base fluid and additive used shall be~~ provided in percent by mass. If the specific identity of a chemical ingredient, the concentration of a chemical ingredient, or both the specific identity and concentration of a chemical ingredient is claimed to be entitled to trade secret protection, the operator of the well must indicate on the Application for Sundry Approvals (From 10-403) or the Report of Sundry Well Operations (Form 10-404) that the identity of the chemical, the concentration of a chemical or both is claimed to be entitled to trade secret protection and will not be disclosed. If the identity of the chemical ingredient is

claimed to be entitled to trade secret protection, the chemical family or other similar description associated with such chemical ingredient shall be disclosed. ~~In addition, the actual or maximum concentration of each chemical ingredient in the hydraulic fracturing fluid shall be provided in percent by mass.~~ An operator is not required to disclose chemical ingredients that (i) are not disclosed to it by the manufacturer, vendor or service provider; (ii) were not intentionally added to the hydraulic fracturing fluid; or (iii) occur incidentally or are otherwise unintentionally present in trace amounts, may be the incidental result of a chemical reaction or chemical process, or may be constituents of naturally occurring materials that become part of a hydraulic fracturing fluid. Freeze-protect fluids pumped before and/or after hydraulic fracturing should not be included;

~~(D) the estimated weight or volume of inert substances, including proppants and other substances injected;~~

(E) the maximum anticipated treating pressure and information sufficient to support a determination that the well is appropriately constructed for the proposed hydraulic fracturing program; and

(F) the designed height and length of the proposed fracture(s), including the calculated MD and TVD of the top of the fracture(s) accompanied by a description of the methods and assumptions used to determine designed fracture height and length.

(15) a detailed description of the plan for post fracture wellbore cleanup and fluid recovery through to production operations.

(b) When hydraulic fracturing through production casing or through intermediate casing, the casing must be tested to 110% of the maximum anticipated pressure differential to which the casing may be subjected. If the casing fails the pressure test it must be repaired or the operator must use a temporary casing string (fracturing string).

(c) When hydraulic fracturing through a fracturing string, the fracturing string must be stung into a liner or run on a packer set not less than 100 ft MD below the cement top of the production or intermediate casing and tested to not less than 110% of the maximum anticipated pressure differential to which the fracturing string may be subjected.

~~(d) A pressure relief valve(s) must be installed on the treating lines between pumps and wellhead to limit the line pressure to the test pressure determined in (a)14 (E) of this section; the well must be equipped with a remotely controlled shut-in device unless the operator requests and obtains a waiver from the commission.~~

(e) The placement of all hydraulic fracturing fluids shall not result in the transmission of such fluids beyond the confining zone ~~be confined to the approved formations during hydraulic fracturing~~.

(f) If the surface casing annulus is not open to atmospheric pressure, then the surface casing pressures shall be monitored with a gauge and pressure relief device while hydraulic fracturing operations are in progress; the annular space between the fracturing string and the intermediate or production casing must be continuously monitored; the

pressure in such annular space may not exceed the pressure rating of the lowest rated component that would be exposed to pressure should the fracturing string fail.

(g) During hydraulic fracturing operations, all annulus pressures must be continuously monitored and recorded. If at any time during hydraulic fracturing operations the annulus pressure increases more than 500 psig above those anticipated increases caused by pressure or thermal transfer, the operator must notify the commission as soon as practicable, but no later than twenty-four (24) hours following the incident and shall implement corrective action or increased surveillance as the commission requires. Within fifteen (15) days after the occurrence, the operator shall submit a Report of Sundry Well Operations Form 10-404 giving all details, including corrective actions taken.

(h) The operator shall file with the commission, within 30 days after completion of hydraulic fracturing operations, on a Report of Sundry Well Operations (Form 10-404), a complete record of the work performed and the tests conducted, and a summary of daily well operations as described in 20 AAC 25.070(3). The operator shall also file with the commission a copy of the daily record required by 20 AAC 25.070(1), for each hydraulic fracturing interval. The information will include;

(1) a description of the actual treated interval including measured and true vertical depth of perforations;

(2) the amount and type(s) of base fluid(s) and additives pumped during each treatment stage;

(3) the total amount and type(s) of base fluid(s) and additives pumped including;

(A) a description of the hydraulic fracturing fluid pumped identified by base fluid(s) and additives including trade name, supplier, and a brief description of the purpose (*e.g.,* acid, biocide, breaker, brine, corrosion inhibitor, crosslinker, de-emulsifier, friction reducer, gel, iron control, oxygen scavenger, pH adjusting agent, proppant, scale inhibitor, surfactant); and

(B) a single aggregated list of the chemical ingredients and, where applicable, the Chemical Abstracts Service (CAS) Registry number for the chemical ingredients, as published by the Chemical Abstracts Service (a division of the American Chemical Society, see www.cas.org) intentionally included in all additives without tying the chemical ingredients to any particular additive formula. The list shall also include the actual or maximum concentration of the chemical ingredients in the hydraulic fracturing fluid provided in percent by mass. If the specific identity of a chemical ingredient, the concentration of a chemical ingredient, or both the specific identity and concentration of a chemical ingredient is claimed to be entitled to trade secret protection, the operator of the well must indicate on the Application for Sundry Approvals (From 10-403) or the Report of Sundry Well Operations (Form 10-404) that the identity of the chemical ingredient, the concentration of a chemical ingredient or both is claimed to be entitled to trade secret protection and will not be disclosed. If the identity of the chemical ingredient is claimed to be entitled to trade secret protection, the chemical family or other similar description associated with such chemical ingredient shall be disclosed. ~~the chemical ingredient name and the CAS registry number, as published by the Chemical Abstracts~~

~~Service (a division of the American Chemical Society, see www.cas.org), for each base fluid and each additive used. The actual or maximum concentration of each chemical ingredient in each base fluid and additive used shall be provided in percent by mass. In addition, the actual or maximum concentration of each chemical ingredient in the hydraulic fracturing fluid shall be provided in percent by mass.~~ An operator is not required to disclose chemical ingredients that (i) are not disclosed to it by the manufacturer, vendor or service provider; (ii) were not intentionally added to the hydraulic fracturing fluid; or (iii) occur incidentally or are otherwise unintentionally present in trace amounts, may be the incidental result of a chemical reaction or chemical process, or may be constituents of naturally occurring materials that become part of a hydraulic fracturing fluid. Freeze-protect fluids pumped before and/or after hydraulic fracturing should not be included;

(i) Prior to the submission of Form 10-404 under subsection (h), the operator must post the information required by the Interstate Oil and Gas Compact Commission/Groundwater Protection Council hydraulic fracturing web site (www.fracfocus.org). A printed copy and electronic copy of this information in a format acceptable to the commission shall be filed as an attachment with the Form 10-404.

(j) Upon written request of the operator, the commission may modify a deadline in this section upon a showing of good cause, approve a variance from any other requirement of this section if the variance provides at least an equally effective means of complying with the requirement, or approve a waiver of a requirement of this section if the waiver will not promote waste, is based on sound engineering and geoscience principles, will not jeopardize the ultimate recovery of hydrocarbons, will not jeopardize correlative rights, and will not result in an increased risk to health, safety, or the environment, including freshwater. Additionally, a service provider or vendor may request a waiver from the requirements imposed on an operator in 20 AAC 25.283(a)(14)(C) and 20 AAC 25.283(h)(3)(B) if the service provider or vendor claims that the specific identity of a chemical ingredient, the concentration of a chemical ingredient, or both the specific identity and concentration of a chemical ingredient is a trade secret that cannot be disclosed. If such a waiver is requested because the identify of a specific chemical ingredient is considered a trade secret, the service provider or vendor shall provide the chemical family or other similar description associated with the chemical ingredient in the waiver request.

(k) Service providers and/or vendors shall disclose the specific identity and amount of any chemical ingredients claimed to be a trade secret to a health professional or emergency responder that requests such information provided that the health professional or emergency responder provides:

(1) a written statement of need that the health professional or emergency responder has a reasonable basis to believe that:

(A) the information is needed for purposes of diagnosis or treatment of an individual;

(B) the individual being diagnosed or treated may have been exposed to the chemical concerned; and

(C) knowledge of the information will assist in such diagnosis or treatment; and

(2) a confidentiality agreement that states:

(A) the health professional or emergency responder shall not use the information for purposes other than the health needs asserted in the statement of need; and

(B) the health professional or emergency responder shall otherwise maintain the information as confidential.

(l) A written statement of need and confidentiality agreement is not required under (k) of this section when a health professional or emergency responder determines that a medical emergency exists and the specific identity and amount of any chemical ingredients claimed to be a trade secret is necessary for emergency treatment. A service provider and/or vendor shall immediately disclose the information to the health professional or emergency responder upon

(1) a verbal acknowledgment by the health professional or emergency responder that such information shall not be used for purposes other than the health needs asserted; and

(2) a verbal acknowledgment that the health professional or emergency responder shall otherwise maintain the information as confidential.

(m) A vendor and/or service provider shall provide the specific identity of a chemical ingredient, the concentration of a chemical ingredient, or both the specific identity and concentration of a chemical ingredient claimed to be a trade secret to the Commission upon receipt of a written communication from the Commission stating that such information is necessary to investigate a release reported to the Commission under 20 AAC 25.205 or to investigate any allegation of waste presented to or initiated by the Commission under AS 31.05.030(b) or AS 31.05.030(e)(1)(E). Upon receipt of such a communication from the Commission, such information shall be disclosed by the vendor and/or service provider directly to the Commission or its designee and shall in no way be construed as publicly available.

(n) The Commission or its designee may disclose information provided to it under 20 AAC 25.283(m) to the Alaska Department of Environmental Conservation (ADEC) only to the extent that such disclosure is necessary to allow ADEC to respond to a release and to otherwise carry out its duties and responsibilities under AS 46.03 or AS 46.04, provided that such information shall not be disseminated any further. Any information so disclosed to ADEC shall at all times be considered confidential and shall in no way be construed as publicly available.

(Eff. __/__/__, Register __.)

Authority: AS 31.05.030

20 AAC 25.990. Definitions.

(3) "Additive" means any chemical substance or combination of substances, including a proppant, contained in a hydraulic fracturing fluid that is intentionally added to a base fluid for a specific purpose whether or not the purpose of any such substance or combination of substances is to create fractures in a formation.

(14) "Chemical Ingredient" means a discrete chemical constituent with its own specific name or identity, such as a CAS registry number, that is intentionally contained in an additive.

(34) "Hydraulic fracturing" means the treatment of a well by the application of hydraulic fracturing fluid under pressure for the express purpose of initiating or propagating fractures in a target geologic formation to enhance production of oil and/or natural gas.

(35) "Hydraulic fracturing fluid" means the fluid, including the applicable base fluid and all additives, used to perform a particular hydraulic fracturing treatment.

(73) "Surface owner" means any person who holds record title to the surface of the land as an owner.

(74) "Trade Secret" means any formula, pattern, device, or compilation of information that is used in a person's business, and that gives the person an opportunity to obtain an advantage over competitors. The six factors considered in determining whether information qualifies as a trade secret, in accordance with the definition of "trade secret" in the Restatement of Torts, Comment B to Section 757 (1939), as discussed in *Powercorp Alaska, LLC v. Alaska Energy Authority*, 209 P.3d 1173 (Alaska 2012) include:

(A) the extent to which the information is known outside of the company;

(B) the extent to which it is known by employees and others involved in the company's business;

(C) the extent of measures taken by the company to guard the secrecy of the information;

(D) the value of the information to the company and its competitors;

(E) the amount of effort or money expended by the company in developing the information; and

(F) the ease or difficulty with which the information could be properly acquired or duplicated by others.

SECTIONAL ANALYSIS OF HESI'S REQUESTED CHANGES TO AOGCC'S JUNE 19, 2013 DRAFT HYDRAULIC FRACTURING REGULATIONS

20 AAC 25.283(a)(14)(C)

This section is amended to require disclosure of a single aggregated list of chemical ingredients intentionally included in additives without tying any of the ingredients to a particular additive in order to protect trade secrets. As currently drafted, 20 AAC 25.283(a)(14)(C) would jeopardize trade secrets because it would greatly facilitate the ability of competitors to determine the complete formulas of HF products through standard "reverse engineering" practices. Instead, by requiring the disclosure of chemical ingredients "without tying chemical ingredients to any particular additive," it will be clear that chemical ingredients do not have to be reported by additive. Allowing this type of aggregated reporting of the ingredients in the overall mixture of fluids used to hydraulically fracture a well provides information to the agency about the chemicals being used while helping to protect trade secrets by shielding the formulas of particular products. Furthermore, chemical concentration information would also be provided in the fracturing fluid as a whole, but not concentrations of ingredients within particular additives because this information would again reveal information about proprietary formulas. However, specific chemical concentrations could be withheld if claimed to be entitled to trade secret protection.

Inclusion of the phrase "intentionally included" is also important because without it, operators and service providers will potentially have to sample and analyze all additives used in a hydraulic fracturing treatment and report trace impurities, which would result in increased costs with little or no added environmental benefit. No state requires this level of detail to be reported.

Our proposed language would also require disclosure of the chemical family name if the identify of a specific chemical ingredient is claimed to be a trade secret.

A theoretical example of what would be disclosed assuming that certain chemical ingredients and concentration levels are claimed to be entitled to trade secret protection is provided at the end of this sectional analysis.

Finally, an operator would not have to disclose chemical ingredients that have not been disclosed to it, were not intentionally included in the HF fluid, or that occur incidentally, unintentionally, or naturally.

20 AAC 25.283(a)(14)(D)

The requirement to provide "the estimated weight or volume of inert substances, including proppants and other substances injected ..." in (a)(14)(D) is deleted because it

is potentially duplicative of other disclosure requirements as well as ambiguous and confusing. It is unclear what substances – aside from proppants – are required to be reported here given that "inert substances" is not defined and is not a term that is typically used in the industry.[1] For example, it is not clear whether some ingredients found in additives could be considered inert for purposes of this subsection. At the same time, disclosure of the estimated amounts of proppants to be used is already covered in 20 AAC 25.283(a)(14)(C) because the definition of "additive" in 20 AAC 25.990(3) includes proppants. Therefore, as applied to proppants, this subsection is redundant. At the very least, AOGCC should clarify which "other substances" it has in mind. For example, the original draft regulations required disclosure of "the estimated weight or volume of inert substances, including proppants and other substances injected *to aid in well clean up*".

20 AAC 25.283(d)

20 AAC 25.283(d) is deleted because often times a pressure relief valve is not recommended to limit the treating pressure. Rather, the treating pressure is better controlled by pumps with electronic switches that can be set to stop pumping immediately when a maximum pressure is achieved, and are many times more dependable than pressure relief valves. Similarly, a remotely controlled shut-in device may not be appropriate for the fracture and in certain circumstances could be catastrophic in the event the valve accidentally closes while pumping at high pressure. In sum, pressure relief valves and a remotely controlled shut-in device can potentially create unnecessary risks.

20 AAC 25.283(e)

This section is amended to provide that "placement of hydraulic fracturing fluids shall not result in the transmission of such fluids beyond the confining zone." Operators and service providers do all they can to contain fractures and fracturing fluid within the approved formation but because of the hydrogeologically-complex nature of many formations, fractures at some well sites may not be completely confined to the "approved formations" in all cases. Without this change, in some cases HESI would not be able to design a stimulation program that would ensure that the stimulation fluids would remain confined to the approved formation and therefore would have to forego stimulating the formation. The alternative language proposed would still ensure that any drinking water

[1] "Inert substances" can have different meanings in different contexts. For example, an "inert substance" in chemical terms is one that does not react with other chemicals. However, under the Federal Insecticide, Fungicide and Rodenticide Act, an "inert ingredient" is any chemical that is not an active ingredient, i.e., on that serves some function other than killing pests. *See* 7 U.S.C. § 136(m).

sources are protected because the fracturing fluids would not be allowed to pass through the confining zone that separates drinking water aquifers from deeper formations.

20 AAC 25.283(h)(3)(B)

See discussion above regarding 20 AAC 25.283(a)(14)(C).

20 AAC 25.283(j)

This section is amended to provide that a service provider or vendor may request a waiver from the requirements of 20 AAC 25.283(a)(14)(C) or 20 AAC 25.283(h)(3)(B) when necessary to protect its trade secrets. Since the operators do not have the information that is claimed to be entitled to trade secrets, AOGCC should allow the service providers and vendors to obtain these waivers directly from AOGCC.

This amendment is not necessary if AOGCC adopts all of the changes HESI proposes for sections 20 AAC 25.283(a)(14) and 20 AAC 25.283(h)(3)(B).

20 AAC 25.283(k)

This section requires service providers or vendors to provide chemical information claimed to be entitled to trade secret protection to health care providers upon a written statement of need for the information and the execution of a confidentiality agreement.

20 AAC 25.283(l)

This section requires service providers or vendors to provide chemical information claimed to be entitled to trade secret protection to health care providers in an emergency upon verbal acknowledgement that the information will not be used for any other purpose and that the health care provider will keep the information confidential.

20 AAC 25.283(m)

This section requires service providers or vendors to provide chemical information claimed to be entitled to trade secret protection to AOGCC in order to respond to a spill or to investigate waste.

20 AAC 25.283(n)

This section allows AOGCC to disclose information provided to it in 20 AAC 25.283(m) to ADEC when needed to respond to a spill or to otherwise carry out ADEC's duties under AS 46.03 or AS 46.04.

20 AAC 25.283(990)(74)

This section defines "trade secret" as that term is defined in the Restatement of Torts and Alaska case law construing what constitutes a trade secret under the Alaska Uniform Trade Secrets Act. It is necessary to expressly provide for a definition of "trade secret" in AOGCC's regulations because the Alaska Uniform Trade Secrets Act does not apply directly to AOGCC.

Example of a hydraulic fluid product component information disclosure report to AOGCC if HESI's Proposed Language for 20 AAC 25.283(a)(14) and 20 AAC 25.283(h)(3)(B) is adopted:

Fracture Date	8/5/2013
State:	Alaska
County:	Alaska
API Number:	xxxxxxxxx
Operator Name:	OPERATOR
Well Name and Number:	XXXXX
Longitude:	XXXXXXXXX
Latitude:	XXXXXXXXX
Long/Lat Projection:	XXXXXXXXX
Production Type:	Oil
True Vertical Depth (TVD):	6,000
Total Water Volume (gal)*:	600,000

Hydraulic Fracturing Fluid Composition:

Trade Name	Supplier	Purpose	Ingredients	Chemical Abstract Service Number (CAS#)	Maximum Ingredient Concentration in HF Fluid (% by mass)**	Comments
4% KCl Water	Operator	Base Fluid			78.054	
CERAMIC PROP PLUS	Halliburton	Proppant				
CL-31 Crosslinker	Halliburton	Crosslinker				
MO-67	Halliburton	pH Control Additive				
CL-22 UC	Halliburton	Crosslinker				
CLA-WEB	Halliburton	Additive				

BE-7	Halliburton	Biocide				
LoSurf-300D	Halliburton	Non-Ionic Surfactant				
MC S-2263	Halliburton	Scale Inhibitor				
LVT-200	Operator	*3rd Party Additive				
Scale Inhibitor LO65	Operator	Scale Inhibitor				Density = 9.986
OPTIFLO-II DELAYED RELEASE BREAKER	Halliburton	Breaker				
SP BREAKER	Halliburton	Breaker				
WG-36 GELLING AGENT	Halliburton	Gelling Agent				
BE-6 MICROBIOCIDE	Halliburton	Biocide				
			1,2,4 Trimethylbenzene	95-63-6	0.0059011	
			2-Bromo-2-nitro-1,3-propanediol	52-51-7	0.0014122	
			Acrylate Polymer	Confidential Business Information	0.00089935	
			Aluminum Silicate	1302-76-7	20.63729	
			Amine Salts	Confidential Business Information	4.77088	
			Amine Salts	Confidential Business Information	4.77088	
			Ammonium persulfate	7727-54-0	0.022137	
			Ammonium salt	Confidential Business Information	0.025924	
			Bentonite, benzyl(Hydrogenated tallow alkyl) dimethylammonium stearate complex	121888-68-4	0.0095706	

	Borate salts	Confidential Business Information	0.053961
	Crystalline silica, cristobalite	14464-46-1	5.6185
	Crystalline silica, quartz	14808-60-7	0.0024914
	Cured Acrylic Resin	Confidential Business Information	0.0073144
	Diatomaceous earth	61790-53-2	6.19119
	Ethanol	64-17-5	0.035615
	Formaldehyde	50-00-0	0.020637
	Guar gum	9000-30-0	0.17371
	Heavy aromatic petroleum naphtha	64742-94-5	0.017801
	Hexamethylenetetramine	100-97-0	0.0020637
	Iron Oxide	1309-37-1	1.03186
	Mullite	1302-93-8	18.728
	Naphthalene	91.20.3	0.0029732
	Oxyalkylated Phenolic Resin	Confidential Business Information	0.0065392
	Phenol	108-95-2	0.20637
	Phenol/formaldehyde resin	9003-35-4	1.0319
	Phosphoric Acid	15827-60-8	0.0050235
	Poly(oxy-1,2-ethanediyl), alpha-4-nonylpenyl-omega-hydroxy-branched	127087-87-0	0.0029759
	Potassium formate	590-29-4	0.048971
	Potassium hydroxide	1310-58-3	0.0018734

	Potassium metaborate	13709-94-9	0.022426
	Quaternary Amine	Confidential Business Information	0.0023854
	Quaternary Amine	Confidential Business Information	0.00047709
	Quaternary Amine	Confidential Business Information	4.77088
	Silica, amorphous – fumed	7631-86-9	5.6185
	Silica Gel	112926-00-8	0.0019141
	Sodium carboxymethyl cellulose	9004-32-4	0.00089935
	Sodium chloride	7647-14-5	0.0043558
	Sodium glycollate	2836-32-0	0.000089935
	Sodium hydrochlorite	7681-52-9	0.0074438
	Sodium hydroxide	1310-73-2	0.029868
	Sodium persulfate	7775-27-1	0.0025122
	Sodium sulfate	7757-82-6	2.7627
	*Supplied by Operator	NA	0.058951
	*Supplied by Operator	NA	0.046011
	Surfactant Mixture	Confidential Business Information	0.0019141
	Surfactant Mixture	Confidential Business Information	0.0019141
	Titanium dioxide	13463-67-7	1.0319
	Water	7732-18-5	0.21474