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Alexander B. Grannis
Commissioner

April 12, 2010

Mr. Brad Gill, Executive Director
Independent Oil & Gas Association of New York
5743 Walden Drive
Lakeview, NY 14085

Re: Notice of SGEIS Information Needs

Dear Mr. Gill:

The Department requires additional information about proposed high volume hydraulic fracturing and related activities to evaluate comments received on the draft Supplemental Generic Environmental Impact Statement (SGEIS). By copy of this letter, I am also providing this notification directly to the individual industry entities that submitted comments. Written responses are requested by April 30, 2010.

Questions and information requests are set forth on Attachment 1. These reflect topics where additional information is needed for comment responsiveness purposes and to develop generic findings under the State Environmental Quality Review Act.

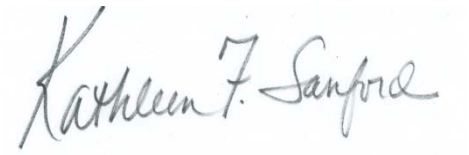
Descriptions in the draft SGEIS of proposed operations incorporate information provided by the four operators that IOGA-NY involved in the pre-dSGEIS effort, along with the service companies and chemical suppliers listed in footnotes 23 and 24, page 5-34. As would be expected, operators provided differing descriptions of the proposed activities. To comprehensively describe anticipated operations, and to identify and evaluate all potential impacts, the dSGEIS used information from all responses to describe either the range of possibilities or worst-case scenarios. Likewise, the responsiveness summary, Final SGEIS and subsequent State Environmental Quality Review Act Findings will incorporate the full range of substantive information provided previously and in response to Attachment 1.

We encourage the recipients of this letter to collaborate, or gather information from other active shale gas developers and service companies that may operate in New York in the future. Of course, doing so is purely at your discretion. Clear, specific, detailed, complete responses which include substantive information and documentation are necessary to support generic mitigation measures or SEQRA findings. Newly suggested methodologies or mitigation measures that are offered without sufficient detail and documentation to evaluate their effectiveness at preventing or mitigating impacts will not be considered in the development of generic SEQRA findings.

The timeliness of the final SGEIS will be substantially affected by the timeliness and completeness of industry's responses. Although additional information needs may be identified as the Department's review proceeds, adherence to the April 30 target date by all parties who intend to provide information in response to Attachment 1 is imperative to keep the process moving forward.

Thank you for your cooperation, and please contact me with any questions.

Sincerely,



Kathleen F. Sanford
Assistant Director

KS/tj
Attachment

cc: Z. Arandjelovic (Epsilon Energy, by postal mail)
J. Cook (Southwestern Oil Company, by postal mail)
P. Hagemeier (Chesapeake Energy Corporation, by email)
M. Henning (Dow Chemical, by email)
G. Hinaman (Argali Exploration Company, by email)
S. Keyes (Norse Energy Corporation, by email)
E. Milito (American Petroleum Institute, by email)
R. Miller (Corning Natural Gas Corporation, by email)
W. Nelson (Texas United Chemical Company, by email)
M. Scheuerman, Esq. (Fortuna Energy Inc., by email)
M. Timbel (Anschutz Energy Corporation, by email)
D. Tuck/M. Watts (Halliburton Energy Services, Inc., by email)
B. Field
J. Maglienti, Esq.

SGEIS Information Needs
April 12, 2010
K. Sanford, NYSDEC Division of Mineral Resources

ATTACHMENT 1

Activity Estimates

1. Please provide an updated estimate of the number of Marcellus wells in New York likely to be drilled and completed annually by high-volume hydraulic fracturing (HVHF). This information is necessary to evaluate comments regarding the following topics:
    a. Potential effects of regional emissions of ozone precursors on ozone nonattainment area state implementation plans (see question 9 under "Air Impacts" for more detail).
    b. Potential stream degradation impacts from stormwater runoff from land disturbance and impervious surfaces (including gravel roads and wellpads).
    c. Existing solid waste landfill capacity relative to disposal of cuttings and salt cake or sludge from treatment facilities.

Air Impacts

1. Comments state that the assumption in the air quality modeling of short term simultaneous operations (over any 24 hour period) of one well drilling and one well undergoing completion at a single pad would not occur. This assumption in the draft SGEIS was made based on previous industry responses. It should be understood that the draft SGEIS has considered all possible worst case operations and any limitations on operations will become permit conditions, with case specific analysis required for any deviations. Thus, unless industry unanimously confirms that this simultaneous operation scenario will not occur under any circumstance in Marcellus shale drilling in NY, this assumption will be retained.

2. Comments state that the size of centralized impoundments could be larger than 5 acres and should not be thus limited, but instead a range specified. The 5 acres is approximately the size of the 500ft by 500ft impoundment previously identified by industry as the likely worst case size and has been incorporated in the air quality modeling of additive emissions. It should be understood that the draft SGEIS has attempted to consider the impact of possible worst case conditions and operations and any deviations will need case specific analysis. Thus, industry should provide an upper bound to the size of centralized as well as potential onsite impoundments for flowback water and the associated flowback water quantities these are meant to hold. In addition, the maximum number of pads which could be serviced by a centralized impoundment should be identified, including those outside the 4-mile radius area assumed for one such impoundment.

3. Comments state that a maximum of 20% of the water used for hydraulic fracturing will return during the flowback process and that many of the additive constituents (e.g., methanol) will not fully return in inflow water concentrations. It should be understood that the draft SGEIS has to consider possible worst case conditions, unless actual data is provided to the contrary. Thus, industry should provide all information from previous studies undertaken by industry, contractors or consultants which identifies the percent of flowback water as a fraction of inflow water. The information should be provided for various timesteps after hydraulic fracturing operations, especially over the long term (i.e., months). In addition, any actual data which compares the concentration of a chemical additive constituent or a surrogate in the flowback to the concentration in inflow water should be provided.

4. Comments state that the assumption in the air quality modeling that the concentration of the additives in inflow water are representative of concentrations in flowback impoundments is too conservative and/or more representative data from flowback water should be collected and used in the assessments. The draft SGEIS assumption was necessary because very little information was provided from industry on flowback water concentrations of the specific additive constituents and thus the analysis was based on the conservative

assumption. For air quality modeling to use more representative flowback water concentrations in the emission calculations, industry must provide all available data noted below:

a. The concentration of the following chemicals in flowback water: each of the 13 chemicals identified in Table 6-13 of the draft SGEIS, plus propylene glycol monobutyl ether, dimethyl diallyl ammonium chloride, any other microbiocide to be used in addition to glutaraldehyde, dazomet, tetrakis, cupric chloride-dihydrate, and any other known acute or long-term high toxicity chemical from Table 5-6 of the draft SGEIS proposed for use in additives.

b. For each chemical listed in item (a), a determination whether each was a constituent of the inflow hydraulic fracturing water mix and the corresponding concentration of the chemical in the inflow hydraulic fracturing water mix.

c. The number of samples taken for each of the chemicals listed in item (a), whether these were from a single well or different well locations, and a determination that the samples are representative of Marcellus Shale operations.

d. If the analyses requested in item (a) are not available, industry should indicate whether it plans to obtain this data and, if yes, the proposed schedule and methodology.

5. Comments recommend that the drilling and hydraulic fracturing engines should be treated as intermittent nonstationary sources similar to other construction activities. Industry must provide a detailed description of how long it expects these drilling and hydraulic fracturing engines to be at a single pad over a year period in order to drill and complete 10 wells noted in the comment. This should include a quantification of the "intermittent" nature noted. In recognition that the draft SGEIS is to consider possible worst case conditions and operations, these time frames should include periods when the engines are still on site even if not in operation.

6. A supplemental modeling analysis was undertaken by Chesapeake Energy for PM10 and PM2.5 to provide more "refined and realistic" impacts by modifying a number of the modeling assumptions used in the draft SGEIS. Chesapeake notes that the modeling input and output files can be made available upon request. DEC requests that all modeling input and output files be provided, including the study on the effects of using ULSD fuel on particulate emissions (page 24, Appendix 1 of Chesapeake's comments).

7. The draft SGEIS requested that industry identify mitigation measures which should meet the criterion of minimizing impacts to the maximum extent practicable. To that end, Chesapeake, IOGA and NRDC/AKRF have identified a set of mitigation measures for the elimination of modeled exceedences of the particulate matter standards. These include: a) use of cleaner engines, i.e. EPA Tier 4 or higher than EPA Tier 2 with diesel particulate filters (DPF), b) use of clean fuels such as gas and biofuels, and c) manufacturers' guarantee of low emissions for tier 2 and 3 engines. DEC requests that industry provide details on the current use of each of these measures (including DPF) at other well drilling sites and their availability and practical use for drilling and hydraulic fracturing in Marcellus Shale in NY. Also, any additional available mitigation measures for pollutants which are projected to exceed pollutant thresholds, in lieu of using the stack height extension noted in the SQEIS, should be described.

8. Industry comments do not describe any mitigation measures to eliminate the potential projected exceedences of certain thresholds for toxic pollutants due to emissions at the flowback impoundments, short of calling the limitation of public access by fencing unwarranted. Most of the comments relate to questioning the modeling assumptions and approach through certain calculations and claims. Industry should identify specific mitigation measures it can impose in practice to eliminate the impoundment emissions resulting in threshold exceedences, including the elimination or reduction of specific additive constituents when flowback water will be stored in an uncovered impoundment.

9. In order to assess the potential effects of the regional emissions of Ozone precursors (Nox and VOC) on the Ozone nonattainment area SIPs, industry is requested to present an estimate of the total number of wells it expects will be drilled and completed annually in the Marcellus Shale in NY and the corresponding annual emissions of NOx and VOCs. These estimates should include both stationary and mobile sources. Also, IOGA should provide the referenced "mitigation measures" used for the Barnett Shale in the Dallas Fort-Worth nonattainment area.

10. Please provide any available hydrogen sulfide testing data for the Marcellus in the northern tier of Pennsylvania. Please indicate the test duration, the instrumentation that was used, the monitoring frequency and the detection level of the instrument.

Alternatives

1. Describe the specific function in hydraulic fracturing additives of the following chemicals that could be present in concentrations that would exceed Class GA groundwater standards, and discuss the availability of less potentially hazardous alternatives or the status of any efforts to develop alternatives: acrylamide; benzene; toluene; xylene; ethylbenzene; petroleum distillates; kerosene; ethylene oxide; dibromoacetonitrile; 2;2-Dibromo-3 nitrilopropionamide; ethlyene glycol.

2. Provide additional information regarding the use of ultraviolet light as an alternative for controlling bacteria growth. Specifically, has this technology been used in shale wells, particularly in the Marcellus? How effective is the technology at this time? What is the process for using this technology and what equipment is necessary?

Casing and Cement

1. Please specify any API and/or ASTM standards, recommended practices and/or testing requirements (e.g. API SPEC 5B, API RP 5A5, API RP 5C1) for surface, intermediate and production casing implemented by industry for shale development by high-volume hydraulic fracturing in general, and for the Marcellus shale in the northern tier of Pennsylvania in particular.

2. Please specify any API and/or ASTM standards, recommended practices and/or testing requirements (e.g. API RP 5A3) for casing thread compound used for surface, intermediate and production casing jobs that are implemented by industry for shale development by high-volume hydraulic fracturing in general, and for the Marcellus shale in the northern tier of Pennsylvania in particular.

3. Please specify any API and/or ASTM standards, recommended practices and/or testing requirements (e.g. ASTM International C 150) for cement for surface, intermediate and production cement jobs that are implemented by industry for shale development by high-volume hydraulic fracturing in general, and for the Marcellus shale in the northern tier of Pennsylvania in particular.

4. Please specify any API and/or ASTM standards, recommended practices and/or testing requirements (e.g. API SPEC 10D) for bow-spring centralizers used for surface, intermediate and production casing/cement jobs that are implemented by industry for shale development by high-volume hydraulic fracturing in general, and for the Marcellus shale in the northern tier of Pennsylvania in particular.

5. Based on experience elsewhere, particularly in the Marcellus Shale in the northern tier of Pennsylvania, please indicate whether industry proposes to use radial cement bond logs, instead of conventional cement bond logs, on wells in New York that will be subject to high-volume hydraulic fracturing. Explain why or why not.

6. The Department currently requires the running of centralizers on production casing “at the base and at the top of the production interval if casing is run and extends through that interval, with one additional centralizer every 300 feet of the cemented interval.” Based on experience elsewhere, particularly in the Marcellus Shale in the northern tier of Pennsylvania, please indicate whether industry proposes to run centralizers more frequently in the lateral

portion of HVHF wells, and why or why not. Is there a standard interval used to centralize casing set in a lateral section of a HVHF well? If "yes," please provide the reference or study used to support the identified standard interval.

Centralized Facilities

1. IOGANY commented that centralized flowback impoundments would service an area larger than the area described in the dSGEIS (four-mile radius). State a size range for the area that would be served by a centralized flowback impoundment and describe the practical limitations, if any, on the distance between a well pad and centralized impoundment.

2. IOGANY states that centralized flowback impoundments may be larger than 5 acres. Please state a proposed size range for centralized impoundments.

3. IOGANY states "Therefore, CFIs are subject to multiple approvals. A streamlined approval process should be established that allows coordination between the various agencies and does not require duplicate permit applications and is commensurate with the temporary nature of the facility (i.e. less than 6-months)." Please elaborate on the noted 6-month time frame. Is IOGANY suggesting that a centralized flowback impoundment would only have a life of 6 months? Please provide the anticipated maximum duration of use for a centralized flowback water impoundment.

4. Describe the proposed delivery of water to and from a centralized flowback water impoundment. Based on experience to date, is delivery proposed to be by temporary piplines, by truck, or a combination of both? For temporary pipelines, state the anticipated maximum duration of use of any individual pipeline.

5. Describe the proposed day-to-day operation of a centralized impoundment, including:

    a. the presence and activities of on-site staff and
    b. how leakage is monitored and managed.

6. State a size range for an area that would be served by a centralized compressor station and describe the practical limitations, if any, on the distance between a well pad and a centralized compressor station.

Drill Cuttings Characterization

1. Provide any available Marcellus cuttings data and analysis, particularly for wells in the northern tier of Pennsylvania, along with the following:

    a. Identify the drilling mud composition and disposal method for each cuttings sample analyzed.

2. Describe whether or how cuttings derived from oil- or polymer-based mud drilling will be separated from cuttings derived from air or fresh water mud drilling if used at the same well, and whether different disposal methods would be proposed for cuttings from the same well if more than one drilling fluid is used.

Flowback Water Characterization

1. An operator commented that the dSGEIS is incorrect in stating on page 7-59 that "concentrations of TDS in the return and process water increase over the life of the well." The comment stated that "once the flowback process is complete, after a few months of production, the TDS levels tend to stabilize for the lifespan of the well and do not continue to increase." Please state the TDS concentration at which stabilization occurs, and provide supporting production-phase data and analysis from Marcellus wells in the northern tier of Pennsylvania.

Flowback Water Reuse/Recycling

1. Press reports and presentations by representatives of the Susquehanna River Basin Commission assert flowback water recycling rates as high as 100% associated with Marcellus Shale development in Pennsylvania. Describe the methodologies used to achieve this, including:

    a. Fluid storage and handling at every stage in the process,

    b. Any on-site treatment process, including equipment and methodology,

    c. Volume, description, composition and disposal of any residual waste fluid and/or solids, including concentrations, handling and disposal of naturally occurring radioactive materials, and

    d. The types of additives necessary for the reuse of flowback. Provide a pie chart depicting a typical fracturing fluid composition (by weight) where recycled flowback is utilized and provide an explanation for any differences in this pie chart from that requested below, under " Hydraulic Fracturing Additives – Composition and Management ."

2. IOGANY commented that the SGEIS should consider use of on-site (i.e., at the well pad) reserve pits as large as 2 million gallons to promote water recycling. More information is needed for the Department to consider and respond to this comment. The following information must be provided:

    a. Proposed dimensions for a 2-million gallon pit (length, width, depth), including internal dimensions if the pit will be segmented,

    b. Full description of proposed liner, monitoring and leak detection systems,

    c. Detailed description of installation practices that will prevent liner damage during installation,

    d. Detailed description of proposed operation for recycling. Describe all mechanical activities that could occur above the liner system, and how they will be conducted to prevent liner damage,

    e. Detailed description of treatment systems associated with reserve pit use for recycling, including description of any waste that is generated and how the waste is managed,

    f. Detailed description of proposed pit closure and site reclamation,

    g. Explain whether it is proposed that the pit's use in a recycling plan would be limited to the well pad where it is located, or if it is proposed that such a pit would service other well pads. State the anticipated maximum duration of use for each case, including overall duration and the percentage of time that the pit would contain fluid,

    h. Explain whether this pit would be separate from, or the same as, the drilling reserve pit used to contain drilling fluids and cuttings. If cuttings will be contained in the same pit that is used for flowback water recycling, then explain how cuttings will be managed, including whether cuttings would remain in the pit for the entire duration of its use or whether they would be intermittently removed. If cuttings would be intermittently removed while the pit is still in active operation for fluid recycling, describe how this would be done without damaging the pit liner system, and

i. Provide a detailed explanation of the comment that "[P]its are markedly more flexible and make it easier to condition, treat and ultimately recycle flowback water." Identify the constraints or problems associated with tanks that are solved by using pits instead.

Greenhouse Gas

1. Of the greenhouse gas mitigation measures identified in the dSGEIS on pages 7-91 through 7-95, what measures does industry propose to implement with respect to high-volume hydraulic fracturing in New York? For each measure explain why its implementation is or is not proposed. Please identify and describe in detail any additional mitigation measures that are proposed.

Hydraulic Fracturing Additives – Composition and Management

1. Halliburton Energy Services, Inc. (HESI) states that DEC should correct statements in the draft SGEIS regarding the number of products that are typically used at a well site and states that the fracturing fluids anticipated to be used in New York's Marcellus Shale would rarely, if ever, include an additive from each of the 12 classes of additives. HESI states that the fracturing fluid system to be used in any frac job in the Marcellus would typically include no more than four or five different additives and in some cases would include as few as three. Specify which 3 to 5 additives would be present and provide a pie chart depicting a typical frac fluid composition (by weight) for Marcellus wells in the northern tier of Pennsylvania, similar to that depicted in Figure 5-3. If fracturing fluid used in New York is expected to be significantly different from what is currently used in Pennsylvania, provide a separate pie chart for New York as well as an explanation of why the composition difference is expected.

2. Comments include a recommendation to revise Proposed Supplementary Permit Condition 33c in Appendix10. Further detail is necessary regarding the security measures taken to restrict access to the chemical additives while they remain on an unattended site.

Naturally Occurring Radioactive Materials

1. Many comments were received on the topic of naturally occurring radioactive materials in the Marcellus Shale. Provide any available NORM data and analysis from Marcellus operations in the northern tier of Pennsylvania, including drill cuttings, flowback water, production brine, treatment plant sludge and scale buildup on piping and other equipment. Document and describe the sampling and analysis methodology used.

Well Development Patterns

1. IOGANY states that other well patterns may be considered for HVHF wells. Please provide a discussion that describes potential wellbore configurations, and a schematic of each configuration.