ALPHA GEOSCIENCE

Geology
Hydrology
Remediation
Water Supply

January 14, 2010

Ms. Kathy F. Sanford
Chief, Permits Section
Division of Mineral Resources
625 Broadway
Albany, New York 12233

Re: Review of HESI Chemistry Scoring Index

Dear Kathy:

Alpha Geoscience (Alpha) prepared this letter report in response to a December 30, 2009 report by Gradient entitled *Review of Halliburton Energy Services, Inc. (HESI) Chemistry Scoring Index.* The Gradient report was submitted as Exhibit 14 of a December 31, 2009 report titled *Comments of Halliburton Energy Services, Inc. on the Draft Supplemental Generic Environmental Impact Statement (dSGEIS) on the Oil, Gas and Solution Mining Regulatory Program.* Alpha personnel also attended a meeting on March 31, 2010 during which HESI personnel presented the proposed Chemistry Scoring Index (CSI) system to regulatory personnel and responded to questions.

The purpose of the CSI reportedly is to provide a method to evaluate the chemical hazards of hydraulic fracturing fluid additives without disclosing the additive formula. This would be achieved by using a CSI system that compares potential, new additives to existing additives that already have received regulatory approval. In essence, the CSI proposes the following:

- No further disclosure should be required for an additive product that is not listed in Table 5.3 of the SGEIS, but which consists entirely of chemicals listed in Table 5.6 of the SGEIS because the SGEIS covers use of such chemicals. *(HESI comments, p. 75)*

- An as-yet-unidentified third party would receive the product formula from the service company and/or suppliers, and would use the CSI to assign a numerical score based on environmental, physical safety and human health hazards for an additive product which contains chemicals not listed in Table 5.6, but which is proposed for use in New York. The third party would inform the New York State Department of Environmental Conservation (NYSDEC) of the product's score. *(HESI comments, p. 76, & presentation)*

- A product would be considered "covered" by the SGEIS, and no additional disclosure would be necessary, if the product's score is equal to or below the scores for products in the same usage category listed in Table 5.3 of the SGEIS. The service company or supplier would disclose the chemical identities of the constituents in the event of a spill

or similar release, or if there is a demonstrated medical need for the information. *(HESI comments, pp. 76-77, & presentation)*

- The service company or supplier would disclose the chemical identities of the constituents of the product to the NYSDEC, but not the concentrations of the constituents if the product's score is higher than the scores for products in the same usage category listed in Table 5.3 of the SGEIS. HESI proposes that this disclosure requirement be waived "in those cases where the disclosure requirements are triggered solely by the use of a ranking for the new product" upon a demonstration that "certain key overriding factors, such as the fact that the product will provide benefits in terms of enhanced performance or sustainability, outweigh any need for information concerning the makeup of the product beyond what is already contained in the MSDS for the product." *(HESI comments, pp. 76-77)*

HESI personnel provided detail on the CSI process during the March 31 meeting. HESI apparently developed the CSI for global, industry-wide applicability to assess the relative hazards and toxicity of new additive products. The CSI is based, at least in part, on guidelines developed by the Interstate Oil and Gas Compact Commission. The CSI has been used internally by HESI to compare potential hazards and was proposed as a tool to augment regulations. HESI offered to work with the NYSDEC to modify the CSI to make it suitable for agency purposes.

RESPONSE

This response is based on Alpha's review of HESI's comment report, the Gradient report, information provided by HESI at the March 31 meeting, and discussion of the proposed CSI with NYSDEC personnel.

It was apparent during the March 31 meeting that a certain degree of interpretation and assumptions are used when applying the CSI weighting criteria to individual compounds. The weighting criteria appear to be predetermined and somewhat subjective within each component (e.g., environment, health, safety), and may not accurately represent the potential hazard identified by a regulatory agency or the public for any particular chemical. These issues raise concern over the defensibility of the CSI, particularly when applied to new products for which toxicity data may not exist. Furthermore, it was emphasized during the meeting that the CSI is a method by which to rank only the relative hazards of chemicals, does not consider or assess risk, and does not incorporate product performance considerations.

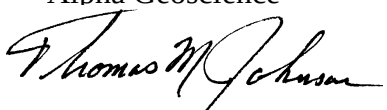
NYSDOH and NYSDEC staff at the meeting had many questions about the scoring system, particularly regarding oversight, decision-making processes, and scoring of chemicals without available hazard studies or information. Additional questions pertained to relying on a chemical's total score for environmental purposes without information about the contribution of each component (environmental, health, safety), and without consideration of risk factors associated with the product's use (e.g., depth of fracturing). NYSDOH staff also expressed

concern about availability of chemical information in the event of a spill or release, to which HESI replied that Material Safety Data Sheets are always available as are emergency response measures for containment.

It is Alpha's opinion that the CSI has merit in ranking chemicals on a comparative basis to evaluate potential hazard; however, many of the uncertainties, assumptions, and interpretations which are inherent in the system raise concerns with respect to regulatory enforcement and defensibility. It is possible, if not probable, that technical and possible legal challenges to the CSI would occur if the system was used by the NYSDEC in its current form to approve the use of new additive products. Furthermore, CSI implementation as proposed by Halliburton would require agreement among government agencies and industry regarding the mechanics of the scoring system, selection of a third-party to receive data and assign product scores, oversight and other logistics.

HESI proposed to incorporate the CSI into the post-SGEIS well permitting process; however, the uncertainties related to application of the CSI and the potential challenges that would need to be resolved to successfully use the CSI have the potential to hinder the permitting process in New York. It is Alpha's opinion and recommendation that the CSI not be incorporated into the post – SGEIS permitting process at this time, or in its current form.

Sincerely,
Alpha Geoscience



Thomas M. Johnson
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