

Response to Comments on Appendix G of the Oil and Gas Greenhouse Gas Emissions Reduction Final Report

March 18, 2008

I'd like to thank Bruce Gantner of ConocoPhillips Company, Jennifer Knowlton of Yates Petroleum Corporation, and Reid Smith of BP America Production Company for informative comments on my report *The Economics of New Mexico Natural Gas Methane Emissions Reduction*, Appendix G of the *Oil and Gas Greenhouse Gas Emissions Reductions* final report.

The report contained in the Appendix G (from here on referred to as *the report*) was written to 1) provide an overview of greenhouse gas (GHG) contributors from the natural gas sectors; 2) provide an economic analysis of the sector that contributes the most emissions (or provides the lowest marginal cost of emissions reductions); and 3) provide an overview analysis of incentive schemes. The work was completed between September 2007 and December 2007. Industry participation was requested through NMED (September 21, 2007). The information and analysis provided in the report is based, in large part, on publicly available information and data, as well as from industry sources. The analysis is from an economic point of view and, as such, is based on economic principles and employs standard economic analytical techniques.

Economics is a behavioral science. By observing the preferences of producers in the face of known costs, the economist infers the producers' perceived benefit of their production choices: benefits equal or exceed costs for those things they choose to do, and the rest are non-economic. In other cases, the benefits are known, but the costs are not, in which case it is the perceived cost that the economist seeks. The latter is the case for GHG reduction in the natural gas industry: the benefit is market prices times the gas returned to the production stream, but the costs are unknown. Given the wealth of revenue-increasing scenarios presented by the Natural Gas STAR program, and the low level of participation among the New Mexico natural gas industry, the economist must infer that perceived costs exceed benefits. This is the intriguing problem for GHG reduction in New Mexico; one that can only be addressed with a great deal more data than are available.

ConocoPhillips Comments

1. Economic and Operational Feasibility. Bruce Gantner made an important point that economic and operational feasibility, as well as field acceptance, are all important factors for ConocoPhillips before implementing a basin-wide or state-wide emissions reduction strategy. The analysis in the report focused only on economic feasibility. The intangible of field acceptance and the more tangible operational feasibility are constraints that, on a case-by-case basis, could impact the economic feasibility of a specific strategy. Historically, field practices have adapted to corporate economic interests over time.

2. Methane Emissions from Completions. Anecdote and intuition suggest that completions are a significant source of emissions, as Mr. Gantner indicates, yet the GRI-EPA report – prepared by the natural gas industry – was emphatic that completion

emissions are insignificant. Allowing that completions *are* a significant source of GHG emissions is a two-edged sword: yes, it implies that significant reductions can be achieved through green completions, but it also implies that previous inventories may have been understated. ConocoPhillips' data on green completions are impressive, but an important question remains: are there economy-of-scale considerations that would make this technology impractical for smaller producers? The concerns raised by ConocoPhillips suggests that further investigation is necessary to adequately resolve the issues raised.

3. Emissions from Pneumatic Devices. The data, estimation technique, and assumptions for the estimated reduction from pneumatic devices are included in the report. Obviously, the data and knowledge available to ConocoPhillips, coupled with the assumptions made, results in a large variation in the emission reductions that could be achieved. Further analysis could reduce the gap in these two estimates. However, ConocoPhillips' data suggest that estimates based on the CCAG top-down inventory are at least in the ballpark. Given that there are a number of opportunities for emission reduction beyond pneumatic devices, the implication is that the GHG reduction goals for the production sector are still attainable.

Additional thanks to Mr. Gantner for the list of emission reduction measures being implemented or evaluated by ConocoPhillips.

BP America Production Company

1. Ongoing Efforts in the Industry. In his comments, Reid Smith of BP America Production Company said explicitly and eloquently something that was evident also in Bruce Gantner's comments: significant efforts are already underway in the New Mexico natural gas industry to reduce methane emissions and any mandate must take this into consideration. Thanks, also, to Mr. Smith for acknowledging the importance of data collection.

Yates Petroleum Corporation

1. Natural Gas Processors as "semi-monopolies." Jennifer Knowlton took exception to my statement that natural gas processors are "semi-monopolies with some government regulation." I apologize for not providing the economic definitions to the terms, which may be somewhat different from the definitions considered by Ms. Knowlton. Markets range from perfectly competitive, in which there is a very large number of firms, none of which controls a significant percentage of the market, to monopolies. A monopoly is a single firm that supplies the entire market, resulting in market power which allows the firm to choose the price that maximizes its profits. The price will be greater (all else equal) than that found in the competitive market and provides the firm with *monopoly rents*. Compared with over 500 producers, there are only 25 processing plants in New Mexico - far from a perfectly competitive market and technically an *oligopoly* - a few firms with interdependent market power. The interdependence is reduced by geographic limitations (a well can't transport raw gas to just any plant), contractual limitations and high switching costs. Thus, I used the term *semi-monopoly* to describe this limited oligopoly. It is also true, however, that some producer/processor contracts can make processors more like semi-monopsonies than semi-monopolies. A monopsony is a market in which there is only one buyer.

In the above context, government regulation refers to the tendency of government to regulate some monopoly and semi-monopoly firms, such as utility companies, to limit monopoly rents, thereby benefiting consumers. Natural gas processors are subject to regulation, as Ms. Knowlton points out, but not economic regulation. The use of the word *some* in the report was not intended to imply magnitude.

2. Shut-in wells. The decision to shut-in a well is at the discretion of the producer. The analysis of the number of wells that would be shut-in is simply the number of wells where the cost to produce exceeds the revenue from production over some period of time. For example, between 2001 and 2005, on average, more than 250 wells were shut-in each year by their producers because they were non-economic. I apologize if anything in the report implied that non-economic wells would be shut-in by the State.

3. Analysis Estimates. As pointed out by Ms Knowlton, the report is based on analysis of available data, which are estimates. The public is aware that estimates are the basis for many important decisions that affect them, such as new road construction, the manufacture of flu vaccines, and the Homeland Security threat-level, to name a few. Emission reduction estimates can be improved with more complete data, which could also allow for variation among firm types and sizes. At the NMOGA annual meeting in October I discussed this latter point with the leadership of a few small producers, including Yates Petroleum. All of the participants indicated that they neither measure nor estimate volumes of vented or fugitive gas and have no programs in place to routinely control for fugitive emissions. Their perception is that costs exceed benefits. This position can be neither supported nor refuted without data collection.

While not the specific concern of Ms Knowlton, I would point out that, had time permitted, a range of estimates that included bounds on results would have provided insight into the range of estimated results.

4. Cost-Effectiveness. As Ms. Knowlton rightly points out, emission-reduction measures which are cost-effective for BP and ConocoPhillips may not be applicable to smaller producers. “One-size-fits-all” regulation may not affect all participants equally. Efficient policy must consider this and must also consider the appropriate role of government to provide assistance in making emission-reduction technologies affordable for smaller producers. This, however, is beyond the scope of the report.

My thanks and appreciation to Mr. Gantner, Mr. Smith, and Ms Knowlton for their insightful comments. Hopefully, I have adequately addressed their concerns. Thanks also to Brad Musick and NMED for this opportunity to do so.

Respectfully submitted,

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