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Department of Revenue

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January 8, 2010

Representative Paul Seaton
345 W. Sterling Highway
Homer, AK 99603

Re: Economic Impacts of Gas to Liquids Technology on State Oil and Gas Revenues

Dear Rep. Seaton:

This letter is intended to respond to the economic modeling questions you raised in your letter dated September 22, 2009 relating to Gas to Liquids technology (GTL) and its potential impacts on future Alaska oil and gas revenues. While your letter was subdivided into 8 different questions that covered a range of topics relating to GTL economics and related policy and legal questions, the Department wanted to first communicate to you its economic modeling analysis before addressing the policy and legal questions in case those change as a result of the preliminary findings discussed in this letter. The Department of Revenue analyzed the differential impacts on state revenues that would accrue from two potential natural gas projects using North Slope natural gas: (1) a natural gas pipeline; and (2) a gas-to-liquids (GTL) conversion, using TAPS to transport the liquids along with the oil. We would like to have a follow up conversation with you after you have had a chance to review the economic modeling information to ensure that the policy and legal questions you want us to address are still relevant and touch on the areas you still have questions about.

Both the GTL and gas pipeline projects are considered major oil and gas development projects, involving years of engineering and permitting, substantial capital outlay, and commitment on the part of the companies holding the leases for the natural gas. For that reason, each of these projects carries a significant amount of risk that should ultimately be taken into consideration, along with the economics, to determine the optimum project to pursue. Both of these projects would be considered megaprojects in any jurisdiction, involving huge amounts of labor, construction materials, and world class planning and logistics. The gas pipeline is arguably one of the world's biggest undertakings for any private company, and there are no GTL projects of the magnitude that has been suggested for this proposal.

Due to the hypothetical nature of both of these proposals, the assumptions used in the economic modeling significantly affect the modeling outcomes. Even though the AGIA license has been awarded to TransCanada, and some preliminary engineering work has been completed, there are still many unknowns about the gas pipeline project. One of the largest unknown is the total cost for the pipeline. In 2007, the Department of Natural Resources contracted with Black and Veatch Corporation to do some early economic modeling of the natural gas pipeline. The Department of Revenue has used that model

in responding to your questions regarding the economics of the gas pipeline. It is evident from our use of the Black & Veatch model, however, that the most important gas pipeline economic criteria have yet to be finally determined. In addition to the total cost of the gas pipeline, there are unknowns about the value to be placed on the components of the natural gas, where and how much gas will be sold, and how much will be charged back to the wellhead for processing. As a result of these unknowns, the likely gas tariff is also undetermined. In order to respond to your questions, we must make a number of assumptions to utilize the Black & Veatch natural gas pipeline model.

There are even more unknowns associated with our analysis of a GTL proposal. We gathered as much information as we could about GTL processes and projects around the world and talked to several experts in the GTL field. We were informed by all of the experts that there is not currently a GTL plant of the magnitude posed to us in your request. At the present time, the largest operational GTL plant—Oryx in Qatar—produces only 34,000 barrels of oil equivalent (BOE) per day. Another project in Qatar that is nearing completion—Pearl—will produce 140,000 BOE per day from 1.6 bcf of natural gas. These differ substantially from the proposed project in your request, namely using roughly 4 bcf per day to produce up to 533,000 BOE per day. As a frame of reference, GTL experts from Gaffney Cline Associates told us that the facility footprint to convert 2 bcf per day of gas was the same size as 900 football fields. Shell's Pearl project, which is less than a third the size proposed in your request, employed 40,000 people on site.

GTL experts at Gaffney Cline also informed us about the conversion efficiency of GTL, indicating that 60% efficiency is considered very good in the industry. They were not aware of any methodology currently used to halt the conversion process at a stage where only 20% of the natural gas is consumed (80% efficiency). They did mention that GTL plants generate large amounts of heat and water, which may be of use to farms or population centers near the plants. They also indicated that recent technological advances have made possible the use of CO_2 in the conversion process, but that the technology is not in the commercial stage yet. We also interviewed Dr. Chukwu who explained the basis of his GTL research at the University of Alaska, Fairbanks, and he indicated that discussions regarding partial processing of GTL liquids were still theoretical at this stage.

Modeling Assumptions

We assumed that the GTL project would require 10 years of engineering, permitting, and construction and the first train would become operational in 2020, capable of converting 1 bcf/day of natural gas. After four years, the second train would be operational, and the third and fourth trains would become operational in succession, two years after the previous train. By 2028, all four trains would become operational, capable of converting 4 bcf/day. At 60% efficiency, peak production would be 400,000 BOEs per day; at 80% efficiency, peak production would be 533,000 BOEs per day. We assumed this level of production until 2050, when a cumulative total of about 38 trillion cubic feet would have been consumed, an amount that approximates total known accumulations at the Prudhoe Bay and Point Thomson fields.

We assumed total capital costs of $40 billion for the GTL project, which we were informed was a conservative price, potentially on the high side. We assumed operating costs of $5 per BOE, which is

the industry average. Per your request, we assumed the costs for the GTL plant and the operation of it was upstream of the point of production and that the costs were deductible under ACES as currently written. We assumed there would be no major modifications made to TAPS to accommodate the gas liquids, and received confirmation from industry experts that sending GTL products down TAPS would not present sufficient obstacles to endanger the project's success. We kept oil and gas prices, as well as costs in real 2009 dollars.

For the purposes of this modeling, we assumed that GTL products and oil had an equal value. We also assumed that the TAPS tariff would be unaffected by the additional barrels flowing down the pipeline. Our intention was to be conservative in our approach to the modeling, and although these are valid considerations, we determined that they were secondary to the larger aspects of the projects. Should the GTL option be examined in a more thorough context—such as that prepared by Black and Veatch for the gas pipeline project—we suggest that these two elements be researched and evaluated for contribution to the project's economic viability. We anticipate that GTL products of diesel and naptha could be valued at a premium of up to 50% over the value of ANS crude oil. Further, our preliminary research shows that the addition of 100,000 barrels of oil down TAPS may lower the tariff by up to $0.50 per barrel. These are important considerations to take into account should a more detailed analysis of the proposal be warranted.

We also did not consider property tax impacts or corporate income tax impacts in this analysis. Under either a GTL project or Alaska gas pipeline project, there would be impacts to both of these taxes, and they would likely be very similar under each. The GTL model runs also assume that the gas used in the conversion process is free from all taxes and royalties and that the only state revenues are the resulting tax and royalty on the syncrude oil product.

Preliminary Model Results

We tested both the GTL and gas pipeline projects at oil prices and oil/natural gas parities as follows:
$40 oil price with parities of 6, 10, and 15
$70 oil price with parities of 6, 10, and 15
$100 oil price with parities of 6, 10, and 15

We tested the GTL project at efficiencies of 60% and 80%.

Our preliminary model results show that with efficiencies of 60%, the net present value at 5% discount rate (NPV5) of state royalty and tax revenue is greater under the natural gas pipeline than it is under the GTL project, as modeled, at all oil prices and parties. Using an 80% efficiency, the only case in which the GTL project yields higher state revenues than a gas pipeline is at $100 oil price with a parity of 15. A $100 oil price and parity of 15 would indicate a natural gas price of $6.67 per mmBTU.

An important difference in the effect of the costs of a GTL plant versus a gas pipeline under the ACES tax law is the timing of deductibility of the costs. Early in the GTL project's life, the expenditures made to build the GTL plant will be applied to the total tax liability otherwise paid to the state for the taxpayers' oil production tax. In some cases, such as when oil is priced at $40 per barrel, this could

result in a zero tax liability combined with a net payment due from the state to pay for capital credits. This puts the state at risk of little to no production tax revenue in one or more years. The schedule we assumed for the GTL plant of 8 years to completion, means that there would be 8 years that the state would have to endure substantially lower production tax revenues. This contrasts with the gas pipeline, where the costs are amortized over the life and carrying capacity of the pipeline, in the form of a tariff. Pipeline tariffs are downstream costs under ACES and are not immediately expensed against the production tax, but rather become part of the netback or value at the point of production once gas begins to flow in the gas pipeline.

It is possible that the negative effects of the immediate deductibility of GTL costs could be mitigated through legislation that required amortization of the cost of the GTL project over a longer time period. Additionally, analysis that takes into account the value of extending the life of TAPS (a major undertaking) would likely improve the economics of the GTL plant over the gas pipeline.

We hope that this preliminary economic comparative analysis of state revenues from a GTL project and gas pipeline project are informative and can serve as a starting point for isolating and giving sharper focus to the policy and legal questions it will undoubtedly generate. We want to make sure that we adequately address your remaining policy and legal questions and will await your call as a follow up to this letter.

Sincerely,

Marcia Davis
Deputy Commissioner, Dept. of Revenue

Cc: Louie Flora
Patrick Galvin, Commissioner
Jonathan Iversen, Tax Director