

ALASKA GAS LINE AND LNG PROJECT

POSSIBLY THE HARDEST PROJECT IN THE WORLD TO DEVELOP

20 PLUS YEARS AND MORE THAN A \$ BILLION SPENT WORKING THE PROJECT

IF IT HASN'T PENCILED OUT



SHOULD THERE BE A “PLAN B” TO DEVELOP OR CO-DEVELOP?

IS A GAS TO LIQUIDS PROGRAM SENDING LIQUIDS DOWN TAPS AN ANSWER?

IS THE AK LNG PROJECT THE ONLY VIABLE OPTION FOR THE NORTH SLOPE?

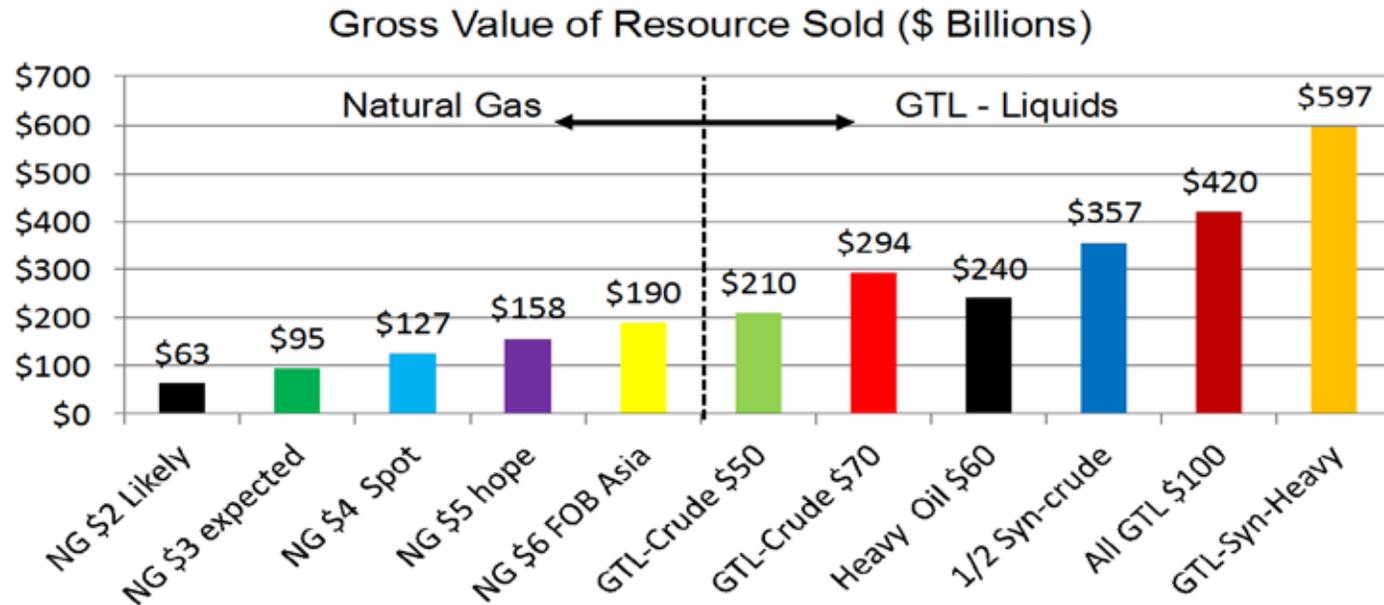
The Administration says yes but reality says NO there are other Options

As a result of the August 24th and 25th AK Legislature Joint Resources Committee hearings at the Anchorage LIO, ANGTL was asked to provide an assessment of the presentations made to the Joint Committee and its thoughts on moving forward.

The chart below shows the relative gross revenue streams that could be expected at various wellhead prices for natural gas and values for the liquid streams if sold as GTL's, syn-crude and diluent was used to help recover heavy crude oil.

NORTH SLOPE NATURAL GAS MARKET OPTIONS

Value of 35 Tcf of North Slope Natural Gas if sold at \$/mmbtu or as Liquid's



ANGTL's Initial Response

1. *The Alaska LNG program is not competitive with other LNG projects around the world;*
2. *GTL's will sell for significantly higher prices on a \$/mmbtu basis than natural gas;*
3. *TAPS, underutilized is a much lower cost option to get energy to the tidewater;*
4. *Higher revenues from the GTL program can pay for a smaller diameter in-state gas pipeline like ASAP, satisfying the political promise to the people.*

TAPS is operating at 25% of capacity so each barrel of GTL's, syn-crude and heavy crude that flows to Valdez adds volume to TAPS and reduces the cost of transport. At \$5.50/bbl TAPS transport rate the cost per mmbtu to get to the tidewater is \$0.92/mmbtu. Far cheaper than the transport tariff for a new gas pipeline to tidewater.

ANGTL has been promoting a GTL option since 1998 so our opinion is somewhat biased towards GTL's. That said, ANGTL's opinion is based upon considerable effort in evaluating the issues that impact any project that will remove natural gas from the oil reservoirs and potentially the impact the recovery of North Slope heavy crude oil. AOGCC has ruled that as much as 3.6 bcf/d can be removed from the Prudhoe Bay Unit (PBU). While removing PBU gas may not materially impact ANS crude recovery it may adversely affect recovery of North Slope heavy crude oil.

It is estimated that the North Slope has at least 3 billion barrels of recoverable ANS type crude and approximately 12 billion barrels in place of heavy crude. The recoverable volume of this heavy crude is a major point of discussion. Assuming a range of \$50 to \$100 per barrel for the ANS crude expected revenues would range from \$150 billion to \$300 billion. One has to assume that the value of crude oil will rise as the value of natural gas rises although there are many who believe that the abundance of shale gas across the world will tend to keep the value of natural gas compared to crude oil lower than normal, if there is a normal delta anymore.

Across the North Slope at a shallower level than the typical ANS crude is a vast supply of heavy oil. Unfortunately, much of this heavy oil is shallow enough that traditional methods such as heat used to produce this heavy crude oil is not an option due to the overlying perma frost. BP in 2011 experimented with a process called CHOPS in one reservoir but determined that the costs were too high for economic recovery. In other heavy oil reservoirs around the world others have used a diluent to recovery this heavy oil. BP did not use this process possibly because it did not have access to large volumes of diluent on the North Slope. BP may not have realized that the GTL process can make different grades of products. One is called Fischer-Tropsch (F-T) naphtha, an optimal diluent. We would recommend that up to 50% of the output of a GTL plant be used to aid in the extraction of this heavy crude oil. Without the use of a diluent it may be impossible to recover this 12-billion-barrel heavy crude oil resource.

The advantage of using the F-T naphtha as a diluent is twofold. If you let the F-T naphtha (diluent) stay with the heavy oil it will aid in its transport down TAPS to Valdez. When this crude stream reaches the refinery the F-T naphtha is recovered and one would expect to receive an ANS crude price as a minimum. In addition, if one uses batch pigging to move the ANS, GTL's and heavy crude oil to Valdez it will be possible to receive the highest value for each product. Clearly making products on the North Slope and sending them down TAPS generates more revenue than sending natural gas to Nikiski to make LNG for export. One would think that the Administration and Legislature would look at this option then use some of the additional revenue to support a smaller in state gas line running down the rail belt - ASAP.

SUMMARY

Alaskan's have dreamed of a gas pipeline to market for over 30 years but the cold cruel facts are that the Prudhoe Bay Unit gas is poor quality, high CO₂ and located a minimum of 800 miles from any potential market. People talk of 35 trillion cubic feet of natural gas and it sounds like a giant number until you realize that the single North field in Qatar has over 900 trillion cubic feet. There are numerous gas fields around the world with greater gas reserves, in less hostile environments, with lower labor costs to develop and can be operated at a fraction of the costs of the Alaska North Slope.

Pigs can't fly and you can't make the Alaska Gas Line and LNG export plant competitive (even with lipstick) with other LNG projects around the world. If there was a shortage of natural gas you could net back a reasonable value for the North Slope natural gas but shale gas at a minimum in the Lower 48 will keep that from happening for the next 25 to 50 years.

Alaskan's were lucky that the Prudhoe Bay field had so much associated natural gas. Because of the ability to use this natural gas to maintain the pressure in the oil reservoir for the past 30 years' billions of barrels of incremental ANS oil have been produced. It may be that this same natural gas or at least some portion of it can be used to help recover the billions of barrels of heavy crude oil overlying the traditional North Slope oil reservoirs. Maybe AOGCC should lead the way in recommending using some of this same natural gas to help in the recovery of the North Slope heavy crude oil.

A gas pipeline to tidewater or to lower 48 gas markets has never penciled out over the past 10 years despite the State of Alaska and North Slope oil majors spending over \$1 billion working on the problem. **Maybe it's time to look at a "Plan B"**.

Gas to Liquids has been an option for the past 20 years. It's not necessarily the favorite of the fully integrated oil company as GTL's are far superior in quality than petroleum based products. It's never been the favorite of Alaska Administration's from Tony Knowles forward because it's not a gas pipe line down the rail belt. However, the same 35 Tcf of proven gas reserves can be converted into over 4.2 billion barrels of liquid products using existing technology. Even if you sold the liquids as crude oil at \$50/bbl, you would generate more revenue than selling natural gas at the wellhead on the North Slope for \$6/mmbtu, a natural gas price one would only see if crude oil was well north of \$100/bbl.

It's time to stop the madness and begin looking in earnest at other possible alternatives for North Slope natural gas resources.

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