Prepared for Rep. Samuels in response to a question from Sen. Huggins as to "what parameters were used" with respect to Mr. Van Meurs' statement on 10/18/07 to the LB&A Committee that the Alaska Gas Pipeline is no longer economical. Please note - Mr. Van Meurs is no longer under contract as a consultant to the LB&A Committee.

Why is the Gas Pipeline no longer economic?

Pedro van Meurs

October 27, 2007

Previous work

This judgment is based on a simple extrapolation of my earlier report on the economics of the pipeline prepared April 17, 2006. I will send the report separately for reference.

Following is a quote from the Executive Summary of this report regarding project economics under the proposed Stranded Gas Contract (in italics):

Why do we need a stranded gas contract?

The last three decades have proven that oil and gas price predictions are notoriously unreliable. In the late 70's an energy crisis was predicted with oil prices going up to very high levels. Then prices crashed in the mid 1980's. Only three years ago, the average long term oil price forecast was $ 25 per barrel, but they now exceed $ 60 per barrel. There is a significant possibility that oil and gas prices may be substantially lower again at some time in the future.

Therefore, a very large project with a very long lead time, requiring $ 20 billion or more, needs to be evaluated on the basis of a variety of possible scenarios of gas prices and costs.

In this study the following forecasts for the Chicago gas prices (2006 $) were used as representative of the currently prevailing conditions of major oil company views about the future:

- ***A low forecast of $ 3.50 per MMBtu (the "stress price")***
- ***An average forecast of $ 5.50 per MMBtu, and***
- ***A high forecast of $ 8.50 per MMBtu***

Currently, major oil companies use low price forecasts of $ 20 - $ 25 per WTI in order to test the economics of investment projects. This corresponds with the low forecast of $ 3.50 per MMBtu in Chicago. Therefore, extensive analysis was done on the Alaska Gas Project based on this stress price.

Also cost sensitivity was done based on 90% to 150% of capital and operating costs.

Furthermore, economics was done for a project ending in Alberta and in Chicago.

At this time it appears that a share of the gas can be delivered to Alberta without need for further pipelines based on an estimated take-away capacity of 2 Bcf/day in 2015. For the remaining gas, take-away capacity needs to be secured in order to deliver the gas to the Chicago area. This means the actual economics of the project will be somewhere between the Alberta and Chicago economics. Profitability indicators for a project ending in Chicago are lower than a project ending in Alberta. This is because of the much higher midstream investment that is required.

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Seven profitability indicators were used to evaluate the Alaska Gas Project from the perspective of the investors:

- ***The internal rate of return ("IRR")***
- ***The net present value discounted at 10% ("NPV10")***
- ***The profitability ratio discounted at 10% ("PFR10")***
- ***The undiscounted net cash flow ("NCF")***
- ***The NPV10 per barrel equivalent ("NPV10/BOE")***
- ***The NPV10 over undiscounted capital expenditures ("NPV10/Capex"), and***
- ***The NCF per barrel equivalent ("NCF/BOE")***

The importance of each of these profitability indicators is explained in more detail in the main report.

PFC Energy did a study on 60 competing oil and gas projects around the world requiring a capital investment of more than one billion dollars.

Based on this study each profitability indicator (in real 2006 $) was calibrated in such a manner that each target represented a value whereby 20% of the projects were less attractive and 80% of the projects were more attractive.

A project is unattractive when many of the indicators are below the targets or when some of the indicators are substantially below the targets. It should be noted that these targets only apply to the stress price of $ 3.50 per MMBtu in Chicago. At higher prices companies would select higher targets.

The following table illustrates the target values and whether the target values are being achieved. Values in "bold" mean that the target is not being achieved.

Minimum Criteria and the Alaska Gas Project in real 2006 $
At $ 3.50 stress price - no cost overruns

		Target	**Status Quo Alberta**	**Status Quo Chicago**	**ASGFC Alberta**	**ASGFC Chicago**	**A+GTP Alberta**	**A+GTP Chicago**
IRR	(%)	13%	**11.8%**	**10.5%**	13.5%	**11.9%**	14.0%	**12.2%**
NPV10	($ million)	2500	**1685**	**664**	2786	**2209**	3098	2520
PFR10	($/$)	1.15	1.18	**1.05**	1.35	1.19	1.39	1.21
NCF	($ billion)	20	50.8	62.5	50.2	60.5	50.7	61.0
NPV10/BOE	($/barrel eq)	0.33	**0.23**	**0.09**	0.38	**0.30**	0.42	0.34
NPV10/Capex	($/$)	0.12	**0.09**	**0.02**	0.17	**0.10**	0.19	**0.11**
NCF/BOE	($/barrel eq)	2.50	6.90	8.49	6.83	8.22	6.90	8.29

The table illustrates how under the Status Quo option and the low price of $ 3.50 per MMBtu the Alaska Gas Project would not be viable. Many profitability indicators are below the targets and the IRR and NPV10 are well below minimum requirements, in particular for the Chicago Project. It is therefore highly unlikely that investors would go forward with this project under Status Quo fiscal terms.

The main focus of the stranded gas contract is to improve significantly the economics under the stress price.

This is mainly being achieved by taking the royalty and production tax gas in kind and assuming directly the shipping and marketing obligations of the gas. In order to balance this commitment the State participates directly in the midstream project for 20%.

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The ASGFC option would result in acceptable profitability indicators for Alberta Project. The Chicago Project would be a very weak project with a very low IRR and modest NPV10. Economics somewhere between the Alberta and Chicago Projects create a viable project. Therefore, the ASGFC option results in acceptable conditions at the stress price.

By providing additionally the PPT credits on the GTP and lateral lines the profitability indicators improve enough to make also the Chicago Project more attractive. Therefore, the ASGFC+GTP option would create economics under the stress price that are well in excess of minimum requirements.

What about cost overruns?

The table below shows the same table as above but now with a 10% cost overrun for capital and operating expenditures.

Minimum Criteria and the Alaska Gas Project in real 2006 $
At $ 3.50 stress price - 10% cost overruns

		Target	**Status Quo Alberta**	**Status Quo Chicago**	**ASGFC Alberta**	**ASGFC Chicago**	**A+GTP Alberta**	**A+GTP Chicago**
IRR	(%)	13%	**10.9%**	**9.6%**	**12.5%**	**11.0%**	13.0%	**11.3%**
NPV10	($ million)	2500	**924**	**-519**	**2128**	**1171**	**2471**	**1514**
PFR10	($/$)	1.15	**1.09**	**0.97**	1.25	**1.09**	1.29	**1.12**
NCF	($ billion)	20	49.7	60.8	49.0	58.6	49.6	59.1
NPV10/BOE	($/barrel eq)	0.33	**0.13**	**-0.07**	**0.29**	**0.16**	0.34	**0.21**
NPV10/Capex	($/$)	0.12	**0.05**	**-0.02**	0.12	**0.05**	0.14	**0.06**
NCF/BOE	($/barrel eq)	2.50	6.76	8.27	6.67	7.96	6.74	8.03

Under the stress price and a 10% cost overrun both the Status Quo and ASGFC options are unattractive. The ASGFC+GTP option is very marginal.

This indicates that cost overruns are a very serious risk.

This also illustrates that even with a stranded gas contract it remains essential for the investors to lower costs and take extensive preparatory steps in order to avoid such cost overruns.

What is also clear from the table is that under these conditions the main attraction of the project is the very large net cash flow and the attractive NCF/BOE results.

The profitability "anchor" of the Alaska Gas Project is therefore the attractive net cash flow.

However, this makes fiscal stability essential. Investors have to be able to count absolutely on the attractive net cash flow in order to pull the project through under possible dismal downside conditions.

Gas Line no longer economic: Current Situation

The economics of the gas line have deteriorated very significantly since the report. The April 17, 2006 report was based on a total costs for the line of $ 20 billion to Chicago in 2003 dollars. In 2005 and 2006 this number was already subject to considerable cost escalation as was reported by me to the Legislature.

The above mentioned report already included cost escalation analysis up to 50%. It was already concluded at that time that a cost escalation of 50% would make the project totally uneconomic.

Cost escalation of the MacKenzie Gas Line is reported to have been in excess of 100%. This is mainly due to the considerable stress experienced in Alberta due to the boom in oil sands development. However, also on a world wide basis, there have been considerable increases in costs, in particular in steel prices.

If we assumed a cost escalation of 100% also for the Alaska Gas Line, the pipeline would cost today probably about $ 40 billion. It is possible that the cost escalation for the Alaska Gas Line is less, but this remains to be evaluated.

The forecast of gas prices has not changed in the same manner. In order to create the same economics as presented in the April 17, 2006 report, we need to essentially double the gas prices. In other words, we need to believe in a stress price of US $ 7 per MMBtu, an average price of US $ 11 per MMBtu and a high price of US $ 17 per MMBtu.

As can be easily noted, current market developments are well below this required gas price range. In effect, the Henry Hub is today about US $ 6 - 7 per MMBtu and this seems a reasonable average gas price forecast, with considerable possibility for lower prices in the future. Therefore, today a stress price of US $ 4.50 per MMBtu would be more appropriate.

It is clear from the previous economic analysis that a $ 40 billion line would be totally uneconomic under a stress price of US $ 4.50 per MMBtu or even US $ 5 per MMBtu. Even if escalation proves to be somewhat less, the line would be uneconomic.

However, also troubling for the gas line project is that North American gas prices have now clearly disassociated from crude oil prices, which means on a Btu equivalent basis they have become much lower than crude oil prices. It means that the oil project portfolio of the major oil companies is now considerably more attractive compared to the Alaska gas line than before, resulting, for instance, in the boom in oil sands development.

I do not see much future in LNG from Alaska. The reason is very simple. The world LNG trade related to North America is now becoming a Henry Hub based market. For instance, spot cargoes from Australia are reaching the US Gulf based on Henry Hub less re-gasification costs. Regular cargoes from Qatar, Egypt and other locations are now Henry Hub based. If Australia and the Middle East have no problem delivering to the US Gulf for Henry Hub, than they will have no problem competing with Alaska in Asia.

Therefore, the only rational market for Alaska LNG remains the US West Coast. As was analyzed extensively before, this option is even less attractive than the Alaska gas pipeline.

For these reasons, I believe that the only realistic option today is Gas to Liquids.

Of course, I hope for Alaska that I am wrong on my views and that there are opportunities or factors that I did not consider.