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Netback



- Econ One (Fall 2006)
 - LNG first on Y-line has higher NPV if LNG 3 years before Canadian leg
 - This was when LNG had inferior netback
- LNG has superior netback, period.
 - ~\$1.00 / mmBtu for 2.7 bcf LNG vs. 4.5 bcf Highway
 - Greater advantage for 3.5 bcf Highway
 - Even greater advantage if market optionality considered

All-Alaska Route Permitted



- Pipeline 100% within existing TAPS corridor
- No foreign issues
- YPC – 20+ years (\$100 million) of permits & process
 - Saves years
 - We know the answer is “yes”

Canadian Delay – Bennet Jones Report



- Environmental (NPA vs. Newer Laws)
 - No legal or even identified right-of-way
 - "likely" pressure for review process similar to Mackenzie Gas Project
- First Nations (40+)
 - Constitutional obligation to consult
 - Legal challenge "likely" and take "several years" to resolve
 - Can be "fatal" since they can stop project until adequate consultation

*Northern
Pipeline Act*

NPA exclusivity to TransCanada

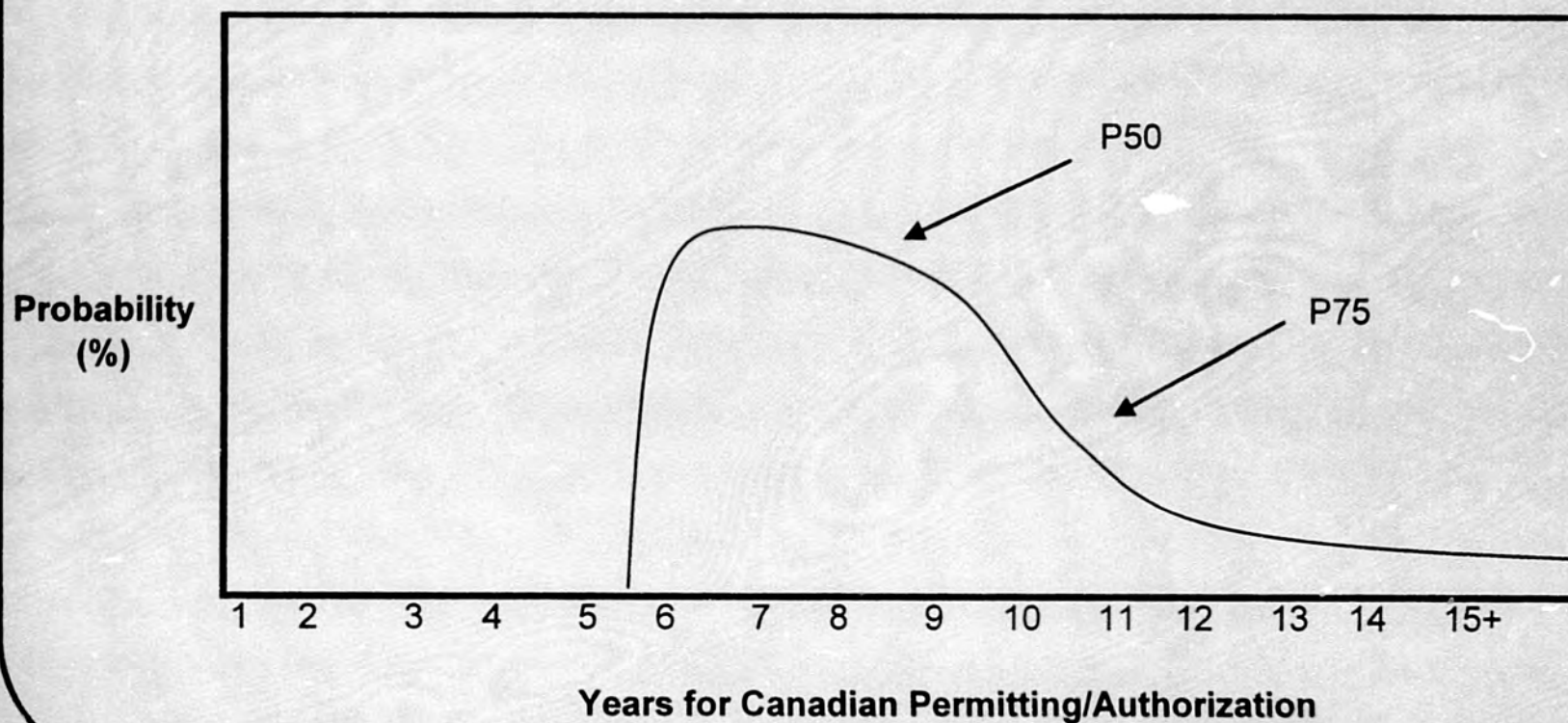
*— therefore Denali must argue
that there is NO exclusivity*

- Mackenzie goes first — *producers repeatedly say this*

Canadian Delay



Hypothetical Timing Profile



Risk



- LNG vs. Pipeline
- Structural vs. Commercial
- Alaska/U.S. vs. Canada
 - LNG - Alaska controls project risks

Risk



- The greatest risk in the project is Alaska's future

Which Project Goes First



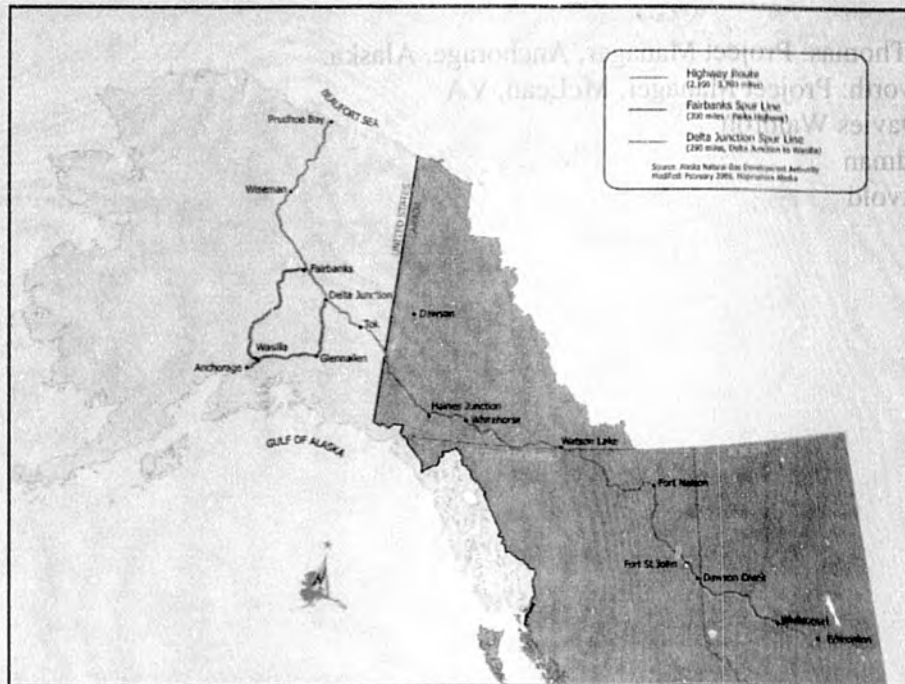
- Administration states Canadian leg should go first
- AGPA states All-Alaska leg should go first
 - David Keane (BG) testified last session that the LNG project would be the enabler for a later Canadian Highway project
- Let market/shippers decide – eliminate no options



Way Forward Options

- Build All-Alaska gas pipeline now
- Pass AGIA but...
- Take control of Alaska's future
 - State contracts for building of All-Alaska gas pipeline now and begin moving Alaska's gas to Alaskan and other markets.

Alaska Natural Gas Needs and Market Assessment: 2008 Update of the Industrial Sector



Prepared by
Science Applications International Corporation

For
Alaska Natural Gas Development Authority (ANGDA)

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Alaska Natural Gas Needs and Market Assessment: 2008 Update of Industrial Sector

1.0 Purpose

The objective of this report is to provide an updated assessment of the potential value of gas-intensive industries in South Central Alaska if a pipeline is constructed that provides Alaska North Slope (ANS) gas to this region. The original study, *Alaska Natural Gas Needs and Market Assessment*, was conducted for the US Department of Energy, National Energy Technology Laboratory, and released in April 2006. The 2006 Study addressed gas supply and demand from all sectors in Central and South Central Alaska, including residential, commercial, power, and industrial needs. Industrial demand included both gas-intensive industries (i.e., LNG, fertilizer, petrochemical, GTL, and LPG), and other industries for which demand is primarily for power. An investment model was applied to assess potential gas-intensive industries, which are particularly sensitive to their feedstock (i.e., gas) prices. Since 2006, oil, natural gas, and product prices have risen considerably, both domestically and internationally, requiring an update to the financial modeling previously performed for gas-intensive industries.

2.0 Key Findings

The results of this study suggest the following key findings:

- The recent rise in natural gas and product prices has improved feasibility of the assessed natural gas-intensive industries in South Central Alaska.
- Under base case price assumptions, petrochemicals and liquid petroleum gas (LPG) are potential sources of large increments of natural gas liquids (NGL) demand. They could provide an additional 127,000 barrels per day (bbl/d) of NGL consumption, 201 million cubic feet per day (MMcf/d) of gas equivalent.
- Both the current liquefied natural gas (LNG) export facility in Nikiski and a greenfield gas-to-liquids (GTL) plant may require sales contracts in premium markets for economic feasibility under the low price scenario. Natural gas demand from these industries is estimated at 375 MMcf/d and 464 MMcf/d for LNG and GTL, respectively.
- The investment climates for all assessed industries will remain highly uncertain given ongoing volatility in energy and product prices.
- The greatest uncertainty is associated with GTL due to the combination of evolving market, costs, and technology.

3.0 Scope and Assumptions

3.1 Gas Pipeline Operation

Natural gas and natural gas liquids (NGL) demand by industry is assessed based on the assumption of a dense-phase wet gas line that delivers ANS natural gas and NGL to South Central Alaska through a spur pipeline that branches off from the proposed Alaska Natural Gas Pipeline (ANGP) that would transport natural gas from the ANS to Canada and the Lower 48 States. The gas-intensive industries assessed in this report are assumed to be located in South Central Alaska due to expected lower operating and capital costs and proximity to export terminals and major trade routes.¹ As determined in the 2006 Study, an NGL-rich stream will generate the greatest level of industrial demand in Alaska.

The route of the pipeline to South Central Alaska is not determined in this update. However, for the purpose of modeling the pipeline tariff, it is assumed that the Alaska Natural Gas Pipeline (ANGP) from ANS to the Lower 48 States is constructed with the spur line branching off in Central Alaska (e.g., Delta Junction, or Fairbanks). As in the 2006 Study's largest wet gas pipeline scenario, pipeline capacity from the ANS to Central Alaska is at least 4.5 Bcfd, and the spur line capacity is approximately 1 Bcf/d, with operations commencing in 2015.

Also as in the 2006 Study, the wet gas spur line is assumed to be enriched with NGL extracted at a separator plant in Central Alaska. Surplus dry gas from the separator (i.e., in excess of South Central needs) is then re-injected into the ANGP for delivery to the Lower 48 States. The extracted NGL are assumed to be transported through a spur line to meet demand from two, new South Central industries: petrochemicals and LPG. The amount of enrichment in the spur line is adjusted based on the main line gas composition to meet the industrial demand for ethane (i.e., the petrochemical industry). In contrast, the LPG industry demand is adjusted based on the average gas composition in the ANGP from the ANS, and the resulting amount of propane and butane in the enriched mixture removed by the Central Alaska separator. Assumed gas composition at the separator inlet and outlet is described in Appendix A.

3.2 Industrial Demand

The potential industries represented in this update are the same as those in the original study's largest wet gas spur line scenario, which calculates petrochemical and GTL demand based on sizing and siting "World Class" facilities. In this study, the GTL complex was sized to a 50,000 bpd capacity, which demand 464 MMcfd. LNG industrial demand is based on retrofit of the current, nearly 40-year old plant in Nikiski and expansion to 3.0 MMTPA, demanding 375 MMcfd. Fertilizer industry demand is based on renovation of the 40-year old Agrium-owned facility in Kenai, and would demand 145 MMscfd. The Agrium facility is currently mothballed due to dwindling supply from the Cook Inlet and associated high feedstock prices. LPG industry

¹ The 2006 Study considered industry at Fairbanks and the North Slope, but found that locating industry in South Central Alaska to be the most economically viable. Residential and commercial gas demand growth were the strongest and anchor customers such as the ConocoPhillips LNG terminal and the Agrium fertilizer plant on the Kenai Peninsular were then operational, providing a ready source of demand.

demand is calculated as the amount of extra propane and butane in the wet gas line, which is determined by the spur line volume and liquids content.

Table 1 shows the gas and NGL capacity and demand for the potential industries considered in this update report. Only the LPG industry capacity and demand differs from the 2006 Study. This Study updates ANS gas composition and reflects the "Rich Gas Case" composition described in the Alaska Gasline Inducement Act (AGIA) Request for Applications (RFA), released in July, 2007.

Table 1: Potential Industry Capacity and Demand for Natural Gas and NGL

Industry	Capacity	Demand as MMcf/d methane equivalent (NGL feedstock)
Fertilizer *	1.25 MMTPA ammonia, 1 MMTPA urea	145
LNG **	3.0 MMTPA	212
GTL	50,000 bpd low sulfur diesel	480
Petrochemical	1.27 MMTPA ethylene	122 (76,000 bpd ethane)
LPG	50,000 bpd LPG	78*** (41,000 bpd propane, 9,000 bpd butane)
Total Potential Demands		1,041

* Assumes upgrade of the existing fertilizer plant

** Assumed expansion of the existing LNG facility at Nikiski

*** Under the "Lean Gas Case" composition described in the AGIA RFA, LPG capacity and demand would be reduced to approximately 24,000 bpd propane and 4,800 bpd butane, which is equivalent to 45 MMcf/d methane.

In both the 2006 Study and this update, it is recognized that pentanes will also be in the spur line gas stream, and will be separated out in South Central Alaska. Pentanes can likely be readily sold for blending into local gasoline, however their quantity and associated total value is quite small compared to the other gas stream components (i.e., approximately 1,400 bpd pentanes versus over 50,000 bpd LPG), thus pentanes are not further considered in this assessment.

3.3 Financial Assumptions

As in the 2006 Study, this update of industrial gas needs is market based and does not include analysis of gas price discounts or special incentives by the state to encourage in-state industrial development. Also as in the 2006 Study, it is assumed that, as a result of the integration of the South Central gas market with Canadian and Lower 48 gas markets, Alaskan gas prices will be based on Lower 48 gas prices adjusted for tariff. Thus, the price of natural gas in South Central Alaska is determined as the market price for natural gas at Henry Hub², minus the difference in estimated tariff rates between Henry Hub and South Central Alaska. In this update report, these

² This is the pricing point for North American natural gas futures on the New York Mercantile exchange. It is located in Erath, Louisiana.

differences are estimated to be \$2.51 and \$3.12 in the "Low" and "High" case scenarios, respectively.

All results presented in this update report are in 2007\$ unless specified otherwise. As in the original study, the financial analysis assumes the following for each industry:

- *Project Life* – 20 years. This is a common industrial project life.
- *Discount Rate* – 12% rate. This varies among industries and projects, and may be relatively low for industries with higher risk (e.g., GTL).
- *Federal and state taxes* – were assumed at the rates of 35% and 4.5% of taxable income, respectively.
- *Cost Adjustment* – to adjust for the higher costs in Alaska compared to the Lower 48, construction and operations costs were multiplied by 1.3 for South Central Alaska.
- *Cost of Capital (during construction)* – 6%.
- *Financing* – all projects were assumed to be equity financed as turn-key projects.

The financial analysis of each industry is designed to determine the netback value of the feedstock (i.e., dry natural gas, ethane, or propane) to each industry. Netback value represents the maximum price for natural gas and NGL that each industry can afford to pay given global price for products, transportation costs, capital and operating costs, discount rate, and taxes.

The industry-specific inputs to the financial analysis for capital and operating costs, and shipping costs are the same values used in the 2006 Study after adjustments based on changes in Producer Price Indices from 2005 to 2007, as published by the Bureau of Labor Statistics. Table 2, below, displays the updated cost assumption for each industry assessed – these costs were held constant in both the high and low market price scenarios.

Table 2: Cost Assumptions for Potential Industries (\$ millions)

Industry	Capital Costs	Low Price Scenario		High Price Scenario	
		Operating Costs	Shipping Costs	Operating Costs	Shipping Costs
Fertilizer *	\$257	\$316	\$55	\$589	\$57
LNG **	\$880	\$642	\$128	\$1,271	\$135
GTL	\$3,112	\$772	\$103	\$1,504	\$108
Petrochemical	\$2,993	\$722	\$80	\$1,046	\$82
LPG	\$844	\$440	\$66	\$740	\$69

* Assumes upgrade of the existing fertilizer plant

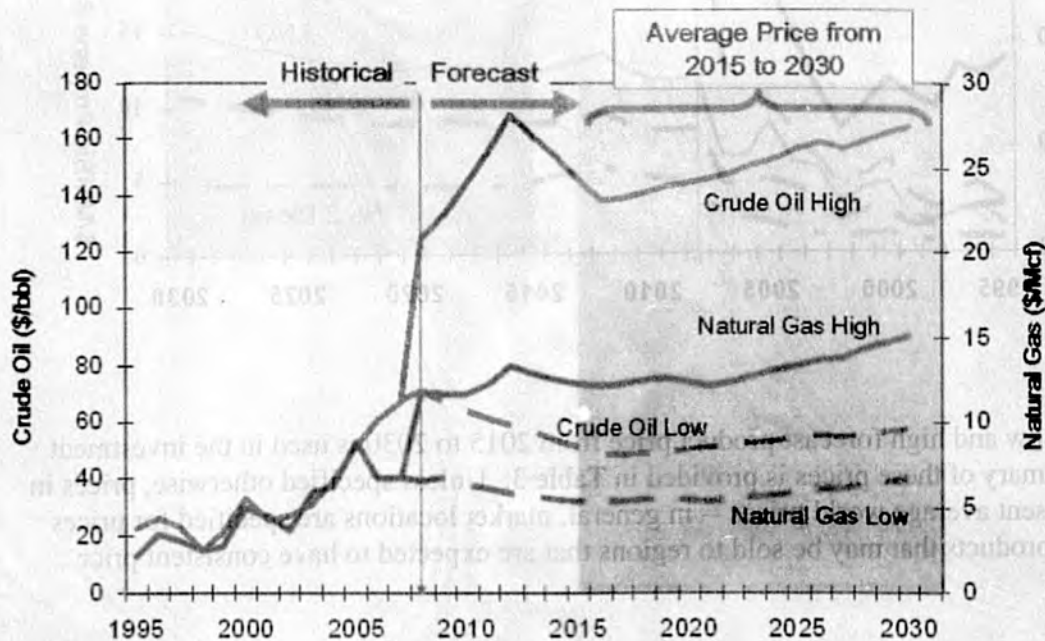
** Assumed expansion of the existing LNG facility at Nikiski

4.0 Methodology

This analysis employs the same investment model adapted to each industry that was used in the 2006 Study. Input parameters include facility specifications (i.e., size, efficiency, etc.), production costs, and projected product prices on world markets. Model outputs include the netback value of gas to each industry. As an example, the value of gas to a fertilizer plant is calculated as the average annual price of fertilizer on the world market minus the average annual cost of transportation, and present value of combined capital and operating costs to convert Alaskan natural gas to a fertilizer.

For this update, model input parameters were changed to reflect increases in forecasted gas and oil prices, and related increases in the price of industrial products that would be produced from the modeled industries. Forecast natural gas and oil prices are based on the Energy Information Administration (EIA) forecasts published in the *Annual Energy Outlook 2008* as the "reference" case for Lower 48 prices. The EIA forecast prices for gas and oil are viewed by many energy analysts as conservative, thus this forecast is used as the "low" price scenario in this report. The June 3, 2008 futures prices of natural gas and crude oil on NYMEX for 2012 were used to represent a high price scenario in 2012, with the subsequent high-price scenario forecast through 2030, following the same annual percentage change as in the low price scenario. Historical and forecast prices of Lower-48 natural gas and crude oil are shown in Figure 1.

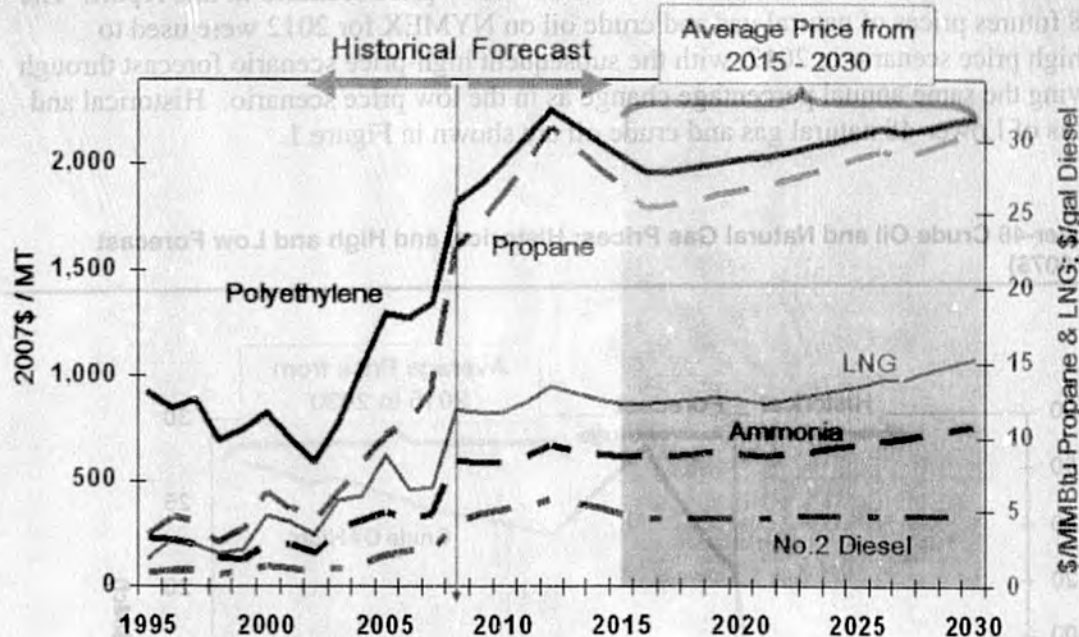
Figure 1: Lower-48 Crude Oil and Natural Gas Prices: Historical and High and Low Forecast Scenarios (2007\$)



As described in the assumptions discussed above, the price of natural gas in South Central Alaska was determined as the market price for natural gas at Henry Hub, minus the difference in estimated tariff rates between Henry Hub and South Central Alaska..

Forecast product prices for each of the modeled industries are based on their historical relationship with natural gas and crude. Historical natural gas prices have a tighter relationship with ammonia and LNG, thus high and low natural gas price forecasts are the basis of the ammonia and LNG price forecasts. Historical crude prices have a tighter relationship with polyethylene, propane, and diesel; thus high and low crude price forecasts are the basis of the product forecasts for petrochemical, LPG, and GTL industries. Figure 2 shows the high scenario forecast of product prices.

Figure 2: High Scenario Product Price Forecast for LNG, LPG, Polyethylene, Ammonia, and Diesel (2007\$)



The average low and high forecast product price from 2015 to 2030 is used in the investment model, a summary of these prices is provided in Table 3. Unless specified otherwise, prices in Table 3 represent average world prices -- in general, market locations are specified for prices representing products that may be sold to regions that are expected to have consistent price premiums.

Table 3: Average Forecast Prices (Model Input): 2015-2030

Commodity	Low Price	High Price
Natural Gas, Henry Hub (\$/MMBtu)	\$6.44	\$13.52
Natural Gas, SC Alaska (\$/MMBtu)	\$3.93	\$10.41
Crude Oil Price (\$/Bbl)	\$52.26	\$150.69
LPG (\$/ton)	\$453	\$1,305
Diesel, North America (\$/MMBtu)	\$11.47	\$33.08
Diesel, Japan (\$/MMBtu)	\$14.14 ^a	\$35.75 ^a
LNG, Southern California (\$/MMBtu)	\$6.09	\$13.17
LNG, Japan (\$/MMBtu)	\$7.05	\$16.74
Ammonia (\$/ton)	\$322	\$676
Polyethylene (\$/ton)	\$1,097	\$2,081

^a Based on the world crude oil forecast plus a \$0.37/gal premium in Japan based on average prices in 2007.

5.0 Industry Investment Analysis Results

5.1 Product Markets

Product markets were re-assessed for this update. Japan is identified as a potentially highly desirable market for Alaskan LNG, diesel from the GTL complex, and LPG. These products have been sold at a significant premium in Japan in recent years. Shipping costs from Alaska to Japan are roughly equivalent to, or less than other suppliers competing for the Japanese market. Potential markets assessed in this study are shown in Table 4 for each assessed product.

Table 4: Potential Markets for Alaskan Industrial Products

Product	Modeled Markets
Fertilizer	US West Coast, China, Japan
LNG	Japan, British Colombia, US / Mexico West Coast, China, Korea
GTL (ULSD)	US West Coast, BC, Japan
Petrochemical	US Gulf, Korea, China
LPG	US West Coast, China, Japan

The previous markets for Alaskan fertilizer, the US west coast and Asia, are good candidates for future markets. As indicated by the netback analysis shown below, Alaskan fertilizer, petrochemical and LPG industries value natural gas well-within, or above the range of forecasted natural gas market prices in South Central. This suggests favorable economics for these

industries, with flexibility in the regions their product may be sold. China and Korea are viewed as likely markets for petrochemical products, both of which are projected to have increasing demand. Price premiums in Japan make it a very desirable market for LPG. Combined with the relatively larger expected growth in LPG demand in China, the Asian market is viewed as a likely market for Alaskan LPG.

Based on the assumptions used in this analysis, Alaskan GTL and LNG industries may be relatively more sensitive to product prices than the other modeled industries. Under the "low" price scenario and associated assumptions, products from Alaskan GTL and LNG industries may require that sales be to regions that place relatively high premiums on their products (i.e., Japan), or their operation may cease to be economically favorable.

The relatively high capital investment required for the modeled GTL complex in conjunction with its relatively high sensitivity to market prices, and the greater risk associated with this less common technology, may make the development of this industry less desirable than some of the other industrial options.

5.2 Netback Results

Based on the assumptions of this updated analysis, the maximum value of natural gas for each of the assessed industries is shown in Table 5. Netback prices that are below the forecast range of South Central natural gas (i.e., the average forecast price for each scenario plus or minus \$0.50) suggest particularly risky investments based on the assumptions applied in this study.

Table 5: Netback price of Natural Gas and Associated Product Prices: 2015-2030

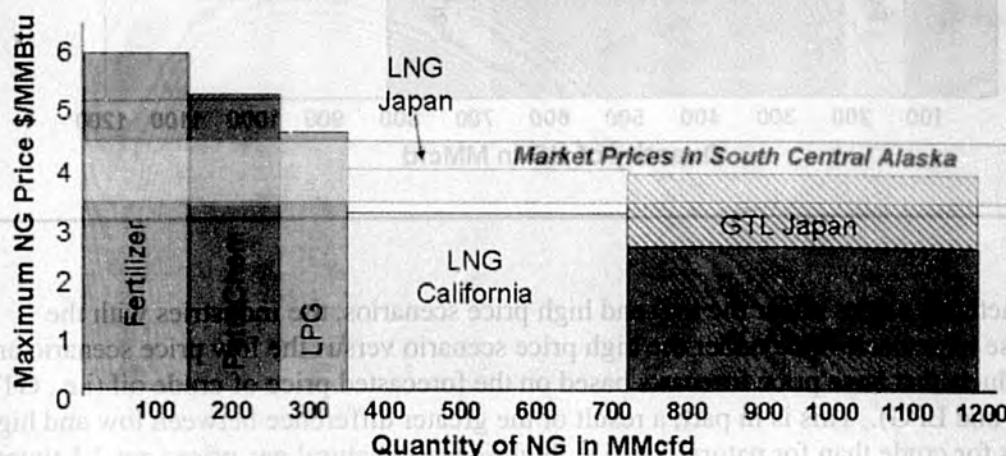
Industry	Low Price Scenario (SC NG Market Price: \$3.43 to \$4.43/MMBtu)		High Price Scenario (SC NG Market Price: \$7.76 to \$8.76/MMBtu)	
	Product Price	Netback (\$/MMBtu)	Product Price	Netback (\$/MMBtu)
Fertilizer *(Ammonia)	\$322 ton	\$5.87	\$676/ ton	\$13.45
LNG , Southern California	\$6.09/ MMBtu	\$3.24	\$13.17	\$9.63
LNG, Japans	\$7.05/ MMBtu	\$4.11	\$16.74/ MMBtu	\$12.87
GTL (Diesel), N. America	\$11.47/ MMBtu	\$2.45	\$33.08/ MMBtu	\$14.89
GTL (Diesel), Japan	\$14.14/ MMBtu	\$3.99	\$35.75/ MMBtu	\$16.43
Petrochemical	\$1,097/ ton	\$5.19	\$2,081. ton	\$20.72
LPG	\$453/ ton	\$4.65	\$1,305/ MMBtu	\$19.92

The two industries that have the lowest increase in netback under the high price scenario (i.e., LNG and fertilizer) have product price forecasts that are based on natural gas prices (which increase less in the high scenario than crude prices), in addition to relatively low capital

investment. In general, when market prices are relatively high, industries with greater capital investment benefit disproportionately more than industries with lower capital investment.

Figure 3 shows gas and NGL volumes as dry gas equivalents on a thermal basis on the x-axis, and the netback price on the y-axis, where netback price is maximum price of dry gas each of the assessed industries can pay while remaining economically viable under the modeled assumptions. The horizontal bar in Figure 3 represents the expected price range of South Central dry gas (i.e., the average low forecast price of \$3.93/MMBtu, plus or minus \$0.50). If South Central gas prices are higher than the maximum (i.e., netback) value for gas shown for a particular industry, then gas consumption from that industry will likely be severely curtailed, or may never develop.

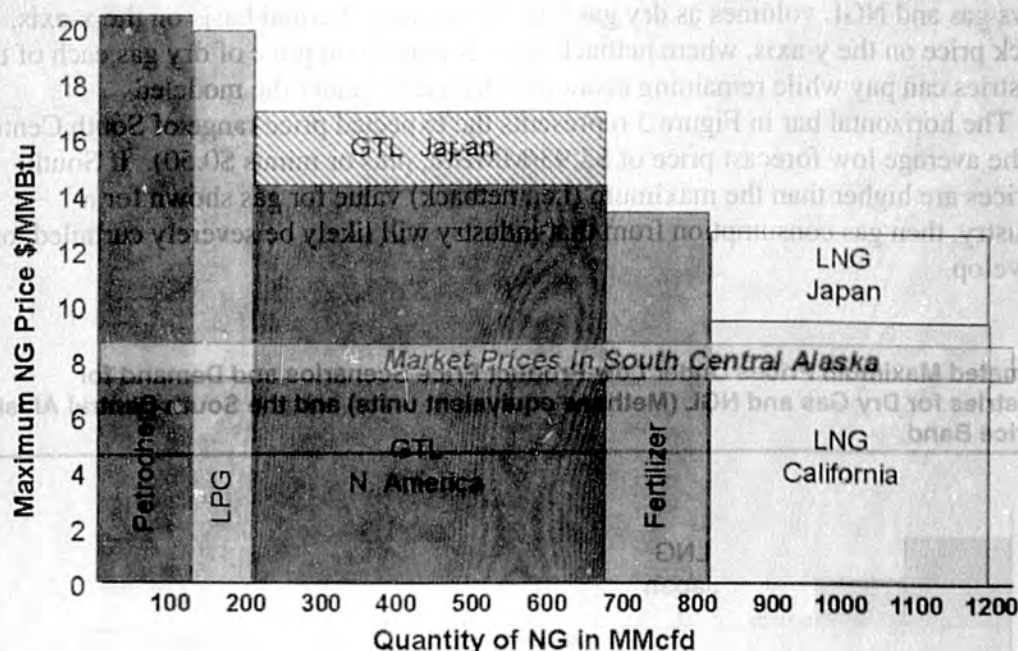
Figure 3: Estimated Maximum Prices Under Low Product Price Scenarios and Demand for Potential Industries for Dry Gas and NGL (Methane equivalent units) and the South Central Alaska Gas Market Price Band.



Source: SAIC

Figure 4 shows a similar graph the high market price scenario. In this case, the horizontal bar represents the expected price range of South Central dry gas with the average high forecast price of \$8.26/MMBtu, plus or minus \$0.50.

Figure 4: Estimated Maximum Prices Under High Product Price Scenarios and Demand for Potential Industries for Dry Gas and NGL (Methane equivalent units) and the South Central Alaska Gas Market Price Band.



Source: SAIC

In comparing netback values under the low and high price scenarios, the industries with the greatest increase in netback value under the high price scenario versus the low price scenario are those with products that have price forecasts based on the forecasted price of crude oil (i.e., GTL, petrochemical, and LPG). This is in part, a result of the greater difference between low and high forecasts prices for crude than for natural gas, i.e., high scenario natural gas prices are 2.1 times greater than low scenario prices, while high forecast prices of crude oil are 2.88 times greater than low forecast prices, as shown in Figure 1.

Because these analyses were conducted using assumptions that are inherently uncertain (i.e., projections of average market prices), none of the maximum price values should be considered accurate. However, the *relative* ranking of the industrial netback values in the South Central Alaska locations is not likely to change with modest assumption adjustments, with the possible exception of GTL. GTL is more sensitive to assumption modifications due to the larger gas demand and the higher uncertainty over project costs. The assumptions used in the GTL industry assessment are considerably more speculative than in other industries as a result of the uncertainty surrounding newer GTL technology and the still-emerging ultra-low-sulfur diesel fuel market.

6.0 Recommendations

There are many options and combinations of options that may have potential for Alaska with the development of ANGP and a spur pipeline. The relative merits of the options are complex and the long-term price forecasts for natural gas and oil and petroleum products on the world market always have a significant degree of uncertainty. Potential industries could be assessed on more detailed levels, with probabilistic analyses that account for cost and market risk to help provide additional insight into the complex interactions of options and economic benefits. Ultimately, these detailed analyses will likely be performed by serious investors. However, some over-reaching concepts are applicable to multiple industries and their integration, and thus may be best studied at an integrated level. Recommended integrated studies, include the following:

- A large-capacity spur pipeline will impact the design and operation of ANGP and could have significant economic impacts on that project. These issues were not analyzed in this study and could be more fully understood by running sensitivities to determine the impact of different-capacity spur pipelines on the value of ANGP.
- The uncertainties surrounding the completion of ANGP and consequently the spur pipeline are well understood. Alternative supply options exist, such as a smaller capacity bullet line from the ANS to Central Alaska. A comparative assessment of the alternative supply options would determine the costs and benefits of each supply option and help identify the optimal strategy for meeting natural gas demand.
- The potential location of various industries at North Slope or Central Alaska (e.g., GTL or petrochemical) may affect the desirability of further industry development in South Central. If industrial development at North Slope or Central Alaska is pursued further, the effects of industries located closer to the wellhead on state-wide industrial development may warrant further assessment.
- The results of this study suggest that the state of Alaska should explore the level of industry interest in investing in Alaska.

Appendix A: Gas Composition of a Dense Phase, Wet Spur Line

The spur line will provide a means to deliver a portion of the stranded natural gas at Alaska North Slope to a market. While the primary component of this gas is methane, it also contains a significant amount of natural gas liquids (NGL), i.e., ethane, propane, butane, and pentane. The economics of sending the stranded Alaska North Slope natural gas to market may depend on the inclusion of NGL because these components have a higher value per volume than methane.³ A non-traditional, high-pressure pipeline allows transport of NGL without development of a separate liquid phase in the line, avoiding the slug flows that occur when a low pressure line includes more NGL than found in dry gas. The pressure of a wet gas line is set based on the NGL composition.

The composition of natural gas components in a wet gas line can vary greatly depending on:

- **Gas source.** There are several different potential sources of natural gas at Alaska North Slope, each source has a different proportion of methane and NGL.
- **Volume of wet gas from which NGL are separated.** The recovered NGL are used to enrich the South Central Spur line.
- **Percent recovery of NGL.** This is determined by the separation technology used for enriching the Spur and used to remove NGL at the end of the Spur (i.e., Anchorage/Nikiski).

This update assesses each of the two gas compositions described in the Alaska Gasline Inducement Act (AGIA) Request for Applications (RFA), released in July, 2007. Separation efficiency assumptions are based on straddle separator plant efficiencies for recently designed plants in Canada, which have 95% separation efficiencies of ethane, and essentially 100% separation efficiencies of all other NGL. Based on recent designs, extraction of individual NGL from the liquid stream is assumed to be 100%.

The volume of gas from which NGL are separated is assumed to be the volume from which sufficient ethane would be removed to enrich the spur line with enough ethane to meet the demand of a world-class ethylene plant that uses ethane as a sole feedstock (i.e., 70,000 to 80,000 bpd ethane). The volume of raw gas that is transferred to the spur pipeline without processing by the straddle separator is assumed to be the volume that would allow the final spur line methane output to meet the projected dry gas demand for residential, commercial, and power sectors in addition to an industrial GTL complex. The propane and butane associated with the gas needed to meet the ethane and methane demand is the supply available for an LPG industry.

Calculations of spur pipeline composition are provided for both the "Rich" and "Lean" gas cases delineated in the AGIA RFA. Assumed demand includes South Central residential, commercial,

³ Michael Baker, Jr., Inc. 2005. Transport of North Slope Natural Gas to Tidewater. Submitted to the Alaska Natural Gas Development Authority (ANGDA), April, 2005.

and power sectors (a combined demand estimated to be 0.26 Bscfd), in addition to continued demand from the Agrium fertilizer plant, expansion of the ConocoPhillips LNG facility, and new development of GTL, petrochemicals, and LPG industries (a combined demand estimated to be 1.18 Bscfd).

Table A1 shows calculations of spur pipeline composition under the Lean Gas Case, in which 930 MMscfd is processed by a straddle plant separator with an ethane removal efficiency of 95%, and 100% removal efficiency of other NGL. Separated NGL are added as enrichment to a 1.4 Bcfd gas spur pipeline. This entire stream is processed by a second straddle separator in Anchorage/Kenai with efficiencies that are the same as those of the first straddle plant.

Table D1: Lean Gas Case, Spur line gas composition and volume.¹ (Assumes ideal gas behavior at 60 F and 14 psia)

Raw Gas Component	Raw Gas* Mole %	1st Straddle Input (930 MMscfd)		1st Straddle NGL Output to Spur		Total Spur Input**		2nd Straddle NGL Output	
		MMscfd	bpd	MMscfd	Bpd	MMscfd	bpd	MMscfd	Bpd
Methane	89.90	836	NA	NA	NA	1,169	NA	0	NA
Ethane	5.80	54	60,666	51	32,150	127	79,457	120	75,484
Propane	1.70	16	26,019	16	10,038	38	24,070	38	24,070
n-Butane	0.10	1	2,254	1	608	2	1,459	2	1,459
i-Butane	0.20	3	4,713	2	1,387	4	3,325	4	3,325
Pentanes	0.10	1	3,189	1	723	2	1,733	2	1,733

* Raw gas mole % based on AGIA RFA, 2007.

** Total spur pipeline input calculated as 1st straddle output plus 1.30 Bcfd gas directly from the main pipeline.

These spur line inputs and straddle plant efficiencies yield roughly 75,000 bpd ethane, meeting the needs of a world class ethylene plant. This line would also supply roughly 25,500 bpd of propane and butane for an LPG industry, and 1,700 bpd pentanes for sale to other users, i.e., for blending into gasoline.⁴ In addition, the spur line would yield approximately 1.2 Bcfd dry gas to meet the dry gas demand of the South Alaskan residential, commercial, power and industrial sectors.

Table A2 shows calculation of spur pipeline composition under the Rich Gas Case scenario, in which 450 MMscfd is processed by a straddle plant separator with an ethane removal efficiency of 95%, and 100% removal efficiency of other NGL. Separated NGL are added as enrichment to a 1.4 Bcfd spur pipeline. This entire stream is processed by a second straddle separator in Anchorage/Kenai with efficiencies that are the same as those of the first straddle plant.

⁴ Pentane is also referred to as "natural gasoline" because it is a major component of gasoline.

Table A2: Rich Gas Case, Spur line gas composition and volume.¹ (Assumes ideal gas behavior at 60 F and 14 psia)

Raw Gas Component	Raw Gas* Mole %	1st Straddle Input (450 MMscfd)		1st Straddle Output to Spur		Total Spur Input**		2nd Straddle NGL Output	
		MMscfd	bpd	MMscfd	Bpd	MMscfd	bpd	MMscfd	Bpd
Methane	86.40	389	NA	0	NA	1,175	NA	0	NA
Ethane	7.10	32	20,046	30	19,043	127	79,626	121	75,645
Propane	3.60	16	10,286	16	10,286	65	41,373	65	41,373
n-Butane	0.30	1	883	1	883	5	3,552	5	3,552
i-Butane	0.40	2	1,342	2	1,342	7	5,397	7	5,397
Pentanes	0.10	0	350	0	350	2	1,406	2	1,406

* Raw gas mole % based on AGAI RFA, 2007.

** Total spur pipeline input calculated as 1st straddle output plus 1.36 Bcfd raw gas.

These spur line inputs and straddle plant efficiencies yield roughly 76,000 bpd ethane, meeting the needs of a world class ethylene plant. This line would also supply roughly 50,000 bpd of propane and butane for an LPG industry, and 1,400 bpd pentanes for sale to other users, i.e., for blending into gasoline.⁵ In addition to the NGL streams, the spur line would yield approximately 1.2 Bcfd dry gas to meet the demand for the South Central Alaskan residential, commercial, power, and industrial sectors.

⁵ Pentane is also referred to as "natural gasoline" because it is a major component of gasoline.

ALASKA STATE LEGISLATURE

Senator Charlie Huggins, Chair
Senate Special Committee on Energy
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Juneau, AK 99801
Phone: 465-3878
Fax: 465-3265



Representative John Harris, Chair
House Rules Subcommittee on AGIA
State Capitol, Room 208
Juneau, AK 99801
Phone: 465-4859
Fax: 465-3799

Third Special Session
Twenty-Fifth Legislature

Carlson Center, Fairbanks Alaska

Friday June 13, 2008

10:00-5:00 p.m.

Joint Meeting AGENDA

Presentations: Review of AGIA Findings and Determination; Natural Gas Pipeline Project as proposed by TransCanada Alaska Company, LLC and Foothills Pipelines Ltd. (TC Alaska) to the State of Alaska.

Administration

➤ -AGIA Training Strategic Plan

Clark "Click" Bishop, Commissioner, DOL
Guy Bell, Administrative Services Director, DOL

➤ Employment Modeling

Conrad Mulligan, Senior Scientist for ARCADIS

➤ Infrastructure Needs for an Alaska Gas Pipeline Project

Frank Richards, Deputy Commissioner, DOT

➤ Explorer View

Kevin Banks, Acting Director, Division of Oil & Gas, DNR

Testimony: By Invitation
Teleconference

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Third Special Session
Twenty-Fifth Legislature

Carlson Center, Fairbanks Alaska
Thursday June 12, 2008
10:00-5:00 p.m.

Joint Meeting AGENDA

Presentations: Review of AGIA Findings and Determination; Natural Gas Pipeline Project as proposed by TransCanada Alaska Company, LLC and Foothills Pipelines Ltd. (TC Alaska) to the State of Alaska.

INSTATE GAS

➤ -AK GASLINE PORT AUTHORITY

Bill Walker, Project Manager & General Counsel
Craig Richards, Attorney

➤ AK NATURAL GAS DEVELOPMENT AUTHORITY

Harold Heinze, ANGDA CEO

➤ ENSTAR NATURAL GAS CO.

Curtis Thayer, Director Corporate & External Affairs
Gene DuBay, Continental Energy Systems,
Senior Vice President & COO
Andrew White, Manager, Business Development &
Revenue Forecasting

Testimony: By Invitation
Teleconference

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Twenty-Fifth Legislature

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Gene DuBay, Continental Energy Systems,
Senior Vice President & COO
Andrew White, Manager, Business Development &
Revenue Forecasting

Testimony: By Invitation
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155:12

ALASKA STATE LEGISLATURE

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Representative John Harris, Chair
House Rules Subcommittee on AGIA
State Capitol, Room 208
Juneau, AK 99801
Phone: 465-4859
Fax: 465-3799

Third Special Session
Twenty-Fifth Legislature

Howard Johnson's Plaza
Anchorage, Alaska

Monday June 16, 2008

9:00-5:00 p.m.

Joint Meeting AGENDA

Presentations: Review of AGIA Findings and Determination; Natural Gas Pipeline Project as proposed by TransCanada Alaska Company, LLC and Foothills Pipelines Ltd. (TC Alaska) to the State of Alaska.

Regulatory Agencies

➤ Federal Energy Regulatory Commission:

Mark Robinson, Director, Office of Energy Projects

Jeff Wright, Dep Dir

➤ Regulatory Commission of Alaska

~~Anthony Price, Commissioner, Chair~~

Janis Wilson, Commissioner

Mark K Johnson, Commissioner

Testimony: By Invitation
Teleconference

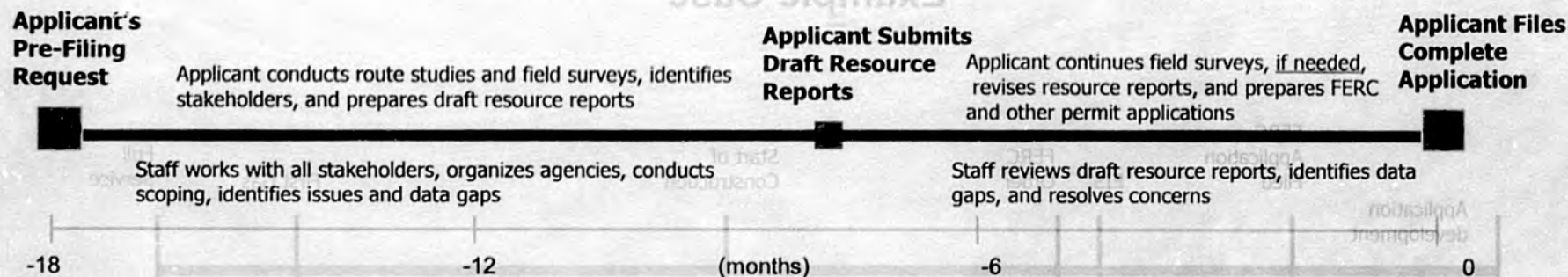
FERC

Alaska Natural Gas Pipeline Project FERC's Environmental Review Process

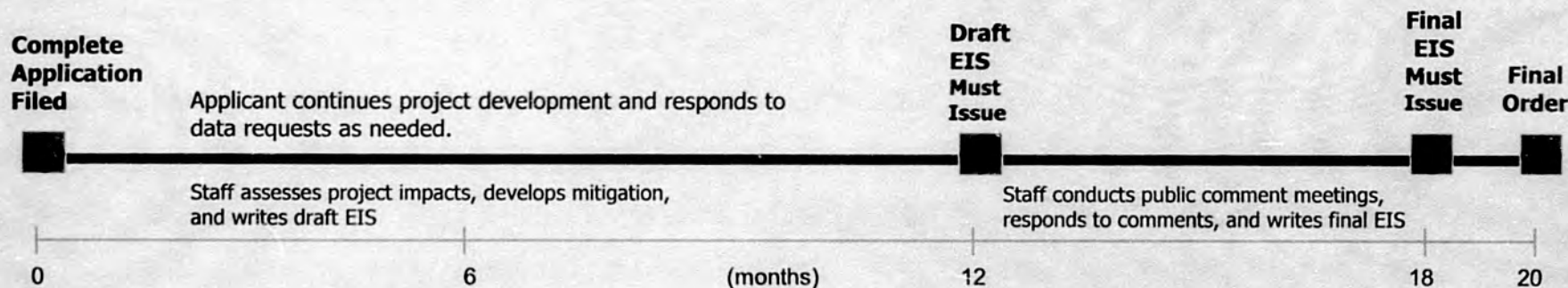


Pre-Filing Review and Application Preparation

[Designed to assist applicant in its preparation of a complete application]



Statutory Time Limits for Environmental Review and FERC Action



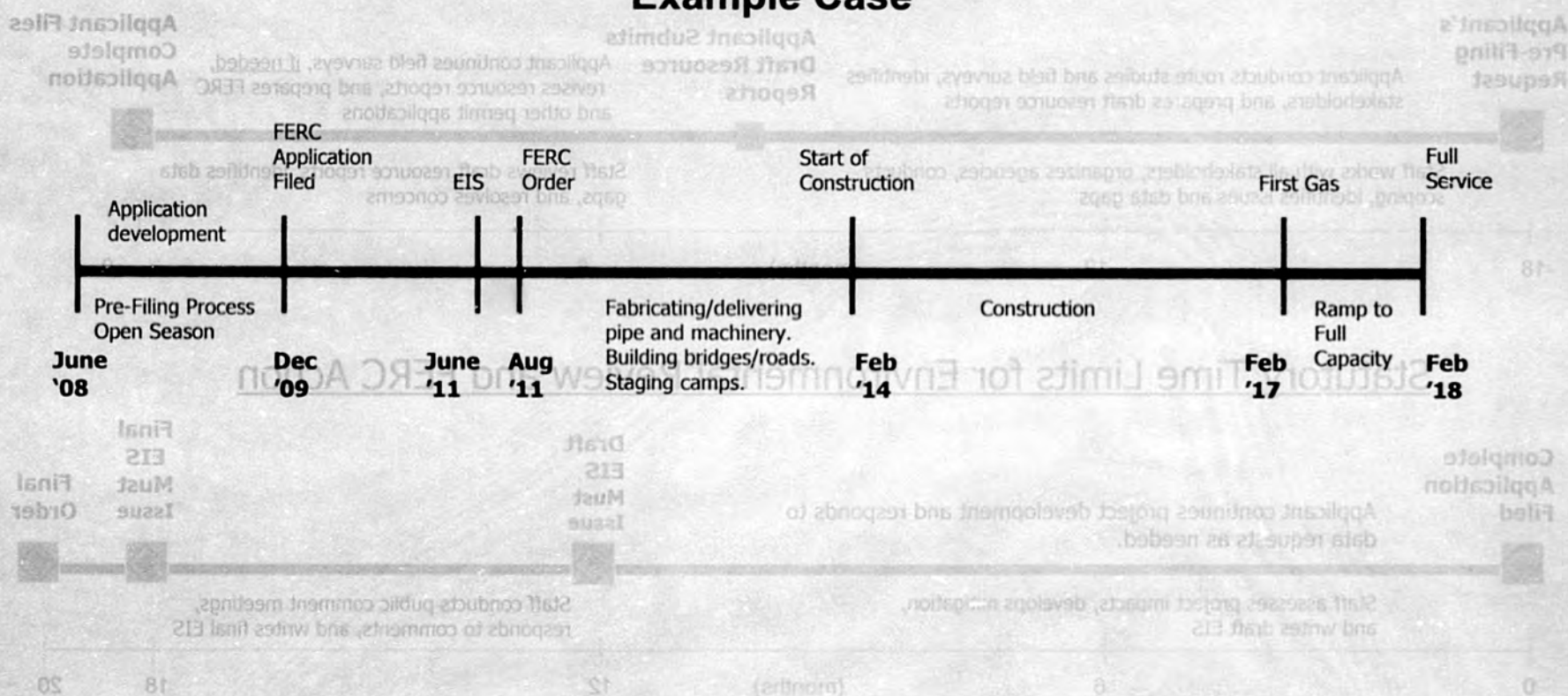
Office of Energy Projects



Alaska Pipeline Timeline



Example Case



FERC

Alaska Natural Gas Pipeline Project FERC's Environmental Review Process

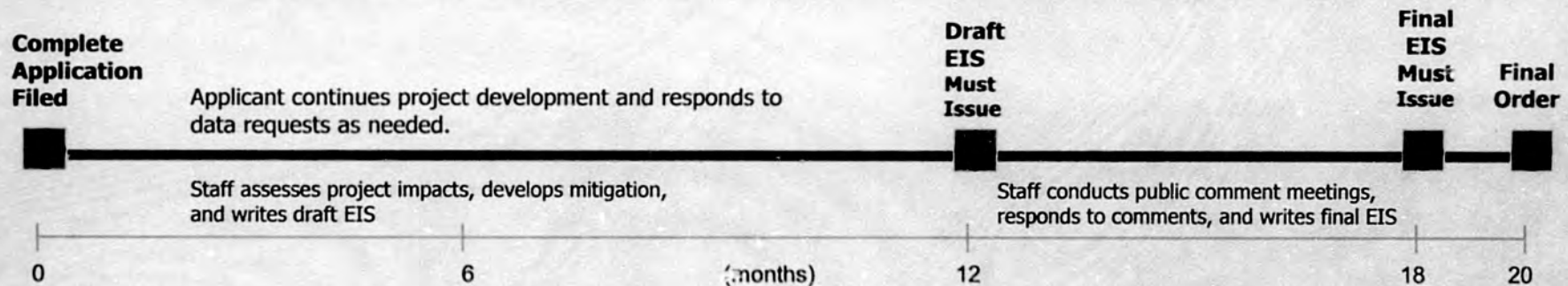


Pre-Filing Review and Application Preparation

[Designed to assist applicant in its preparation of a complete application]



Statutory Time Limits for Environmental Review and FERC Action



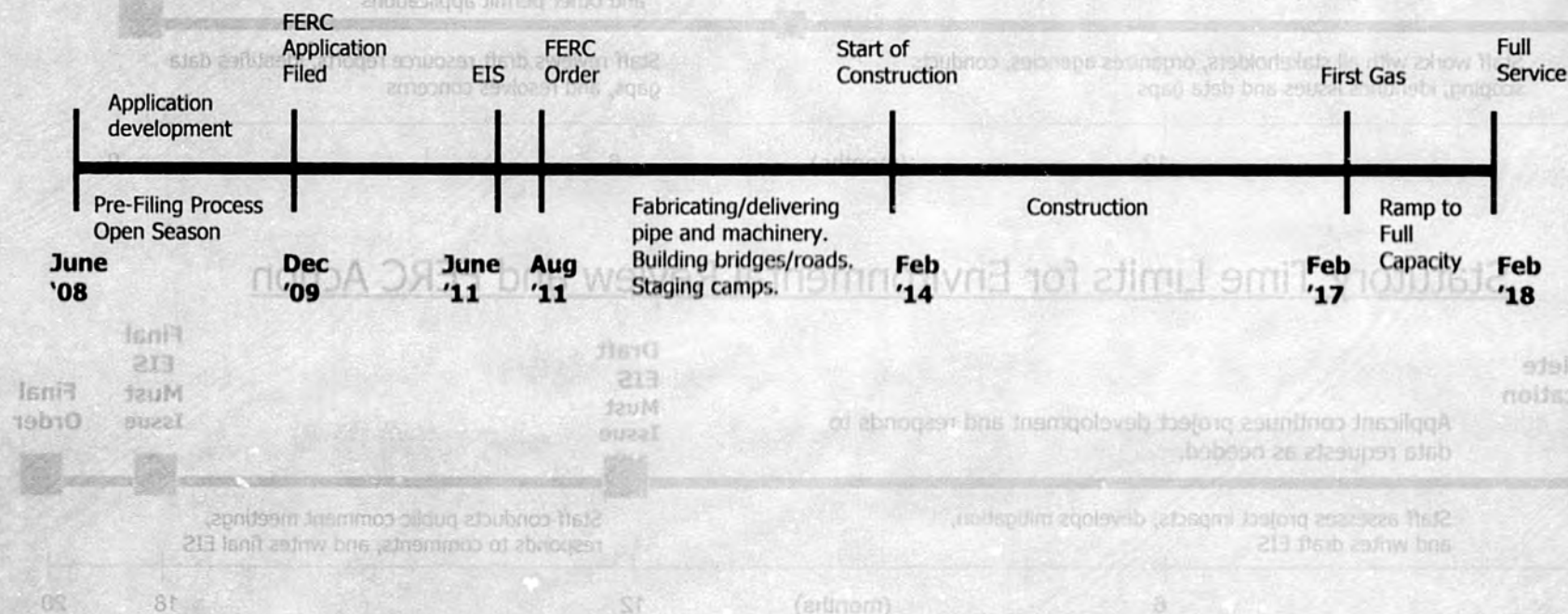
Office of Energy Projects



Alaska Pipeline Timeline



Example Case



request for pre-filing - FERC will set its own
6-16-2008 schedule on pre-filings & filings

handed



DENALI™

the alaska gas pipeline

June 15, 2008

Kimberly D. Bose, Secretary
Federal Energy Regulatory Commission
888 First Street, N.E., PJ-11
Washington, DC 20426

Re: Docket No. PF08 - ____ - 000
Pre-filing Process
Denali - The Alaska Gas Pipeline Project

Dear Ms. Bose:

Denali - The Alaska Gas Pipeline LLC ("Denali") has been formed to pursue a project (the "Denali Project") to construct and operate an Alaska natural gas transportation system as defined by Section 103 of the Alaska Natural Gas Pipeline Act ("ANGPA"). This letter requests approval to use the pre-filing procedures pursuant to 18 CFR 157.21(b) and consistent with 157.21(d) and (f) as otherwise specified by Commission staff during our initial consultation on the Denali Project.

This request is being submitted much earlier in the process than is normally the case with major pipeline projects. Because of the scope of the Denali Project, project design and application development will require a much longer time period (approximately 36 months) than is typically the case. Taking into account the extended pre-application period, and because Denali was only recently formed and is still being staffed, we have not initiated a number of the activities that are normally required in Section 157.21(d), nor will we meet the timelines contemplated by Section 157.21(f). However, as was suggested by Commission staff during our initial consultation on the Denali Project, initiating the pre-filing process now will be beneficial by enabling Denali and the Commission to exchange information and coordinate planning and activities to insure a timely and efficient application development and review process.

As required by Section 157.21(b)(1), Denali provides the following information in support of this request.

- 1. A description of the schedule desired for the project including the expected application filing date and the desired date for Commission approval, including at least six months of pre-filing review (Section 157.21(d)(1)).**

6-12-2008
The current estimated schedule for the Denali Project is attached as Exhibit A. Assuming a successful open season within that schedule, Denali would expect to submit its complete application to the Commission in August 2011. Consistent with the expedited process contained in Section 104(d) of ANGPA, Denali would desire Commission approval no later than August 2013.

2. An explanation of why the prospective applicant is requesting to use the pre-filing process under this section (Section 157.21(d)(3)).

Denali submits this request to use the Commission's pre-filing process under Section 157.21 in order to engage the Commission early in the process and facilitate staff involvement in the environmental data collection and in the development of and participation in Denali's Public Participation Plan.

The Denali Project will be one of the largest construction projects in North American history, making early engagement between Denali and Office of Energy Projects particularly valuable, even before development of all of the information normally available at the time of a pre-filing request.

It is important to note that at this early point, Denali is not in a position to supply all of the information required by Section 157.21(d), or to meet the timelines contemplated by Section 157.21(f). As a result, Denali requests that the staff and Denali jointly develop modifications to the normal informational and scheduling procedures in order to reflect and accommodate the Denali Project schedule attached in Exhibit A.

3. A detailed description of the project, including location maps and plot plans to scale showing all major project components. The maps and plot plans should not include CEI material (Section 157.21(d)(4)).

The plans for the Denali Project include (i) transmission pipelines to transport gas from where produced to connections with other portions of the Denali system, (ii) a stand-alone gas treatment plant (GTP) on the Alaska North Slope where gas will be processed to remove impurities, as appropriate, and the residue gas chilled, and (iii) a 48 to 52 inch pipe capable of transporting approximately 4.0 bcf/d of gas at approximately 2,500 psi. The pipeline will generally follow the Dalton Highway south to Fairbanks where it will follow the Alaska Highway southeast to the Canadian border.

At the Canadian border, the pipeline will connect to a pipeline to be constructed by Denali affiliates in Canada that would be capable of transporting natural gas from the Canadian border into Alberta. If additional capacity is needed to accommodate the delivery of the gas into the U.S., the Canadian affiliates may also construct a pipeline from Alberta southeast to the U.S. border, in which case, the Project would include a pipeline from the U.S. border across parts of North Dakota, Minnesota, Iowa and Illinois to the Chicago area.

A general map of the preliminary pipeline route is attached as Exhibit B. At this early stage of the process, the Denali Project is not able to provide plot plans. These plot plans will be provided when available.

4. A list of the relevant federal and state agencies in the project area with permitting requirements (Section 157.21(d)(5)).

A preliminary list of the federal and state agencies in the Denali Project area with permitting responsibilities is attached as Exhibit C. This list will be supplemented as the detailed route is developed and additional information becomes available.

5. A statement indicating that those agencies are aware of the prospective applicant's intention to use the pre-filing process (including contact names and telephone numbers) (Section 157.21(d)(5)(i)).

Denali is notifying the agencies listed in Exhibit C that it has submitted to FERC a request to commence the pre-filing process by providing them with a copy of this letter.

6. A statement indicating that those agencies have agreed to participate in the process (Section 157.21(d)(5)(ii)).

In June 2006, a Memorandum of Understanding (MOU) related to the Alaska Natural Gas Transportation Project was entered into by federal agencies regarding regulatory and other responsibilities relevant to an Alaska natural gas transportation project such as the Denali Project. As part of the MOU, the signatory agencies committed to participate in and work within a pre-filing time frame set by the Commission to identify and seek to resolve issues at the earliest stages of project development for an Alaska natural gas transportation project.

Potentially, there are some federal agencies with jurisdiction over portions of the project that are not a signatory to the MOU. Alaska state agencies also will have jurisdiction over some aspects of the Denali Project. Denali will supplement this statement as it identifies

and engages these additional agencies on their agreement to participate in the pre-filing process.

7. A statement indicating how the applicant has accounted for agency schedules for issuance of federal authorizations (Section 157.21(d)(5)(iii)).

Denali has not yet begun the agency involvement process. Denali will account for agency schedules for federal authorizations as the agency involvement process unfolds, and once completed, will supplement this statement.

8. A statement indicating when the applicant proposes to file with these agencies for their respective permits or other authorizations (Section 157.21(d)(5)(iv)).

Denali has not yet initiated the agency involvement process and, because of the extended initial preparation and design phases, is not yet able to provide this statement. Denali will supplement this statement as it identifies when it proposes to file with the relevant agencies for the appropriate permits or other authorizations.

9. A list and description of the interest of other persons and organizations who have been contacted about the project (including contact names and telephone numbers) (Section 157.21(d)(6)).

Although Denali has not yet developed a stakeholder engagement plan, Denali has contacted landowners and agencies along that portion of the pipeline corridor where Denali intends to conduct preliminary field studies in the summer of 2008. A list and description of the interest of such persons (including contact names and telephone numbers) is attached as Exhibit F. This request will be supplemented with a list and description of other persons and organizations that have been contacted about the Denali Project (including contact names and telephone numbers).

10. A description of what has already been done, e.g. contacting stakeholders, agency consultations, project engineering, route planning, environmental and engineering contractor engagement, environmental surveys/studies, and open houses (Section 157.21(d)(7)).

Contacting stakeholders and agency consultations:

Denali will engage in preliminary field studies along portions of the anticipated pipeline corridor during the summer of 2008. Preparation

for the 2008 preliminary field studies required initiation of the following activities.

Landowner contacts:

ConocoPhillips, whose affiliate is one of the members of Denali, began contacting landowners along the portion of the preliminary route not co-located with TAPS (primarily from Delta Junction, Alaska to the US/Canada border) on behalf of the Denali Project in April 2008. These contacts continue at this time, and are made for the purpose of obtaining access and permission to conduct preliminary field studies.

Agency Consultations:

Also as part of obtaining access approvals for the preliminary field studies, a number of state and federal agencies have been contacted to discuss required permits for this activity. A list of these contacts is provided in Exhibit D.

Project Engineering, Route Planning, Contractor Engagement, Surveys and Studies:

The Denali Project will use and build upon a study conducted by the Alaska Gas Producers Pipeline Team (AGPPT) in 2001 and 2002.

Open Houses:

Open houses have not yet been scheduled for the Denali Project.

11. Identification of the environmental and engineering firms and sub-contractors under contract to develop the project (Section 157.21(d)(7)).

At this time, a number of environmental and engineering firms and sub-contractors are under contract specifically to assist with the 2008 preliminary summer field studies (Exhibit E). Exhibit E will be amended and supplemented to identify contractors and sub-contractors for future environmental and engineering work after those contracts are completed.

12. Proposals from at least three prospective third-party contractors from which Commission staff may make a selection to assist in the preparation of the requisite NEPA document, or a proposal for the submission of an applicant-prepared draft Environmental Assessment, as determined through the initial consultation (Section 157.21(d)(9)).

Denali commits to fund a third party contractor to assist the Commission in the development of the Environmental Impact Statement required under NEPA. Denali will initiate the selection

process for the contractor under the direction of Commission staff. We expect this will occur before the end of 2008.

13. Acknowledgement that a complete Environmental Report and complete application are required at the time of filing (Section 157.21(d)(10)).

In accord with Section 157.21(d)(10), Denali acknowledges that a complete Environmental Report and complete Certificate Application are required at the time of filing.

14. A description of a Public Participation Plan which identifies specific tools and actions to facilitate stakeholder communications and public information, including a project website and a single point of contact (Section 157.21(d)(11)).

Denali is committed to stakeholder communications and effective public outreach and is currently developing a Public Participation Plan that identifies the specific tools and actions used to facilitate stakeholder communications and public information. At this time, Denali has established a project website, but has not yet established a single point of contact. This request will be supplemented at the time the Public Participation Plan is completed.

All requests from, and responses to, federal and state permitting agencies will be appropriately addressed and responded to by Denali. As the lead agency, FERC will be copied by Denali on all pertinent correspondence.

At a minimum, the plan will include Denali's commitment to:

- Host public open houses;
- Distribute periodic news letters to affected landowners and interested stakeholders;
- Meet regularly with elected officials and community leaders in the project area;
- Maintain a stakeholder contact and public/agency correspondence log; and
- Post information in local newspapers and at local libraries.

The Denali Project website can be accessed at:

<http://www.denali-thealaskagaspipeline.com/>.

Once the Public Participation Plan is complete, this website will be expanded to include all the pertinent information on the Denali Project.

Until the Denali organization is staffed and a single point of contact is established, please contact both Lisa Pekich at ConocoPhillips (907-265-1173) and Gary "Gus" Gustafson at BP (907-339-4918). Once the organization is staffed, a single point of contact for stakeholder communications and public information will be established and the contact information for that person will be substituted.

In summary, we look forward to working closely and cooperatively with the Commission staff during the pre-filing process. Thank you for your timely consideration of this request.

Sincerely,



Bud E. Fackrell, President
Denali - The Alaska Gas Pipeline LLC

Cc: Mark Robinson, FERC
Lauren O'Donnell, FERC
Mike Boyle, FERC

Attachments:

- Exhibit A - Denali Project Success Case Schedule
- Exhibit B - General Denali Project Map
- Exhibit C - State and Federal Agencies with Permitting Responsibilities
- Exhibit D - List of Agency Consultations (2008 Summer Field Studies)
- Exhibit E - List of Environmental/Engineering Contractors (2008 Summer Field Studies)
- Exhibit F - List of Contacts for Preliminary 2008 Field Studies

presented 6/16/2008
4 PM

ANCH AGIA License hearings

SENK &
HRLS

Regulatory Commission of Alaska

Mark K. Johnson

Janis W. Wilson

Commissioners

© Howard Johnson Plaza

RCA Regulates:

Utilities

- ◆ Natural gas distribution
- ◆ Natural gas pipelines
- ◆ Electric power generation, transmission, and distribution
- ◆ Water and sewer
- ◆ Telephone
- ◆ Solid waste

Pipelines

- ◆ Crude oil pipelines
- ◆ Petroleum product pipelines
- ◆ Natural gas pipelines

Federal v. State Authority Oil Pipelines

FERC regulates:

- ◆ **Interstate Deliveries** – oil flowing from one state to another directly or indirectly

RCA regulates:

- ◆ **Intrastate Deliveries** – oil flowing from one place in Alaska to another place in Alaska where it is consumed

Federal v. State Authority Gas Pipelines

FERC regulates - Both interstate and intrastate deliveries on an interstate gas pipeline

RCA regulates - A spur line off of an interstate gas pipeline

Clear Authority in Federal Statute for RCA Regulation

- ◆ Alaska Natural Gas Pipeline Act, Section 108(a)
- ◆ (a) Local Distribution – Any facility receiving natural gas from an Alaska natural gas transportation project for delivery to consumers within the State –
 - (1) shall be deemed to be a local distribution facility within the meaning of section 1(b) of the Natural Gas Act (15 U.S.C. 717(b) [a facility regulated by a state commission as to rates and services];
 - (2) shall not be subject to the jurisdiction of the Commission [FERC].

RCA Pipeline Authority

Issue and oversee "certificates of public convenience and necessity"

Ensure safe and adequate service and facilities

Approve shipping rules and rates

Conduct audits and oversee finances and management

SCOMM

155:13

ALASKA STATE LEGISLATURE

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Third Special Session
Twenty-Fifth Legislature

Howard Johnson Plaza, Anchorage

Tuesday June 17, 2008

9:00-5:00 p.m.

Joint Meeting AGENDA

Presentations: Review of AGIA Findings and Determination; Natural Gas Pipeline Project as proposed by TransCanada Alaska Company, LLC and Foothills Pipelines Ltd. (TC Alaska) to the State of Alaska.

Point Thompson Unit

➤ Background of the Point Thompson Unit; Litigation History & Status

Nan Thompson, Units Manager, Div. of Oil & Gas, DNR

Steve Moothart, Petroleum Geologist, Div. of Oil & Gas, DNR

Anil Chopra, Reservoir Engineering Advisor, PetroTel

➤ Alaska Oil & Gas Conservation Commission

Cathy Foerster, ^{Engineering} Commissioner

➤ ExxonMobil Alaska

Craig Haymes, Production Manager

➤ Chevron North America Exploration & Production

John P. Zager, General Manager, MidContinent/Alaska Business

Vince LeMieux manager - " Unit "

Testimony: By Invitation, Teleconference

*Julie
Houli
du 076*

presented - 6-17-2008 Tuesday 4 PM Anch AK
AGIA License Hearings SENR/HRLS



Global Upstream and Gas

Chevron - Alaska Area Point Thomson Testimony to the Alaska Legislature

John Zager
General Manager, Alaska

Vince LeMieux
Manager, Alaska New Ventures

Anchorage, Alaska
June 17, 2008

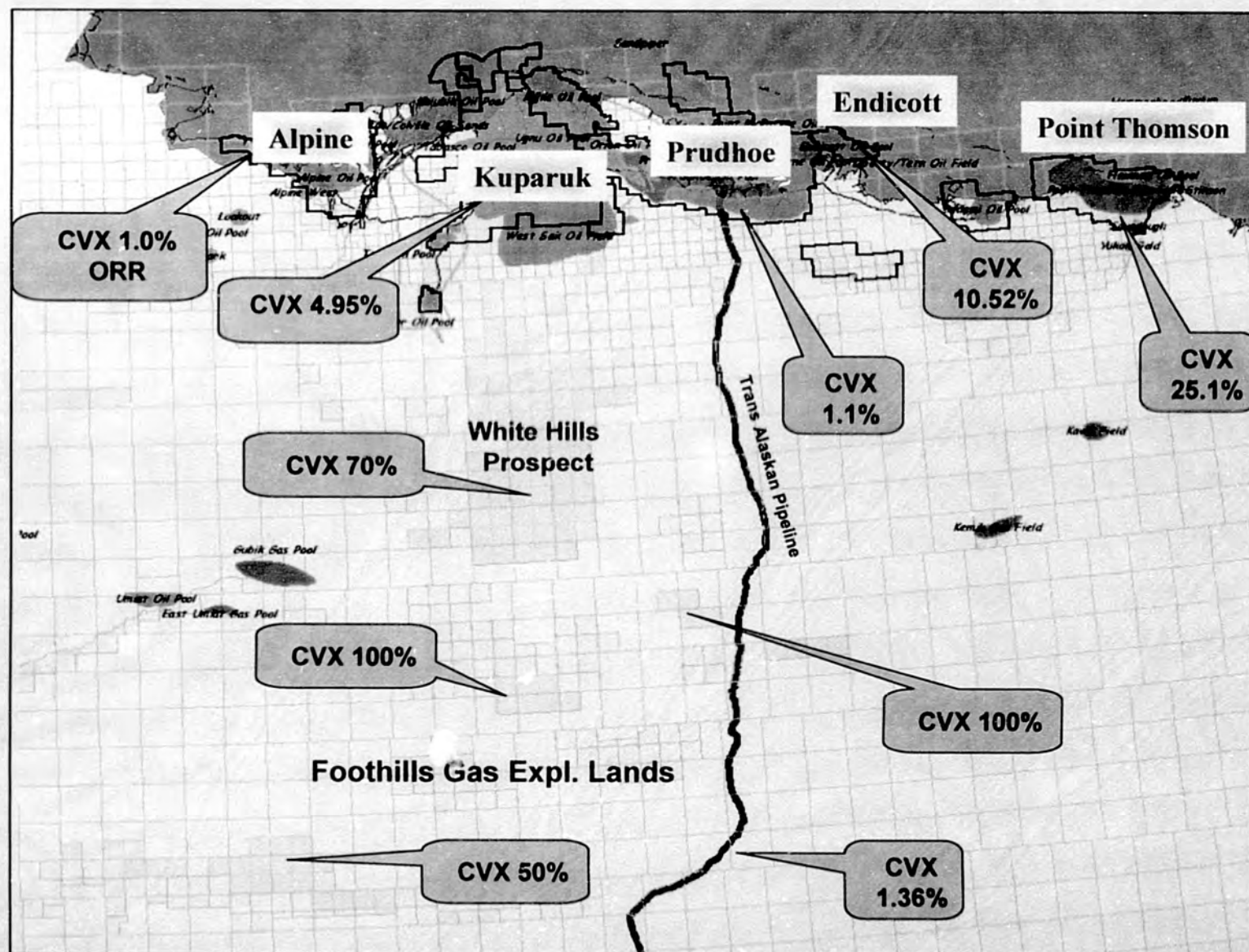
Chevron has standing in the commercialization of North Slope gas



Working interests (WI) in established North Slope fields (PBU, KRU, DIU) and an overriding royalty interest in Alpine

- Active exploration, development and operation of oil and gas assets on the North Slope:
 - Completed the first season of our exploration program in our White Hills Prospect; and
 - Working on exploration of gas prospective leases in the Foothills area.
- Chevron is a 25% WI in the Point Thomson leases. Unique to Chevron, Point Thomson is its major source of North Slope gas.
- We have proposed an aggressive plan to begin production (POD), starting with gas cycling, condensate production and preparation of the field for major gas sales.
 - At a minimum the DNR decision will delay development through loss of 2008-09 drilling season.
 - It currently appears that the DNR is set on preventing development in favor of litigation by terminating the unit.

Chevron North Slope Assets





Point Thomson: Fact or Fiction?

- #1: "Point Thomson is not needed for a gas pipeline."
- #2: "The lessees are warehousing Point Thomson."
- #3: "DNR rejected the plan of development on its merits."
- #4: "The lessees are not doing any work on Point Thomson."
- #5: "Point Thomson is 'wildly economic'."



Point Thomson: Fact or Fiction

#1: "Point Thomson is not needed for a gas pipeline."*

Fact:

- There are insufficient proven reserves available to back a commercially viable 4.5 BCFD gas pipeline without Point Thomson.
- Will anyone commit FT (ship-or-pay) for the 'yet to find' (YTF) resources? Without Point Thomson, this is a significantly bigger number.
- A Prudhoe Bay-only pipeline delivers less value to the State and Producers through higher tariff rates and the loss of oil resulting from blowing down Prudhoe Bay.

* This contradicts the previous administration position.