



Volume 2: Alaskan Goals and Priorities for the Natural Gas Pipeline

Natural Gas and Alaska's Future



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FOREWORD

This is the second volume of an ongoing study of Alaskan natural gas by the State / National Affairs Committee of the Anchorage Chamber of Commerce. The first volume focused on presenting the facts about natural gas and its development in Alaska. Originally we planned for this volume to address economic and policy issues relating to Alaskan natural gas and the ways it could or should be developed. However, as our analysis continued, it became apparent that we should first identify the goals and objectives that we believe Alaskans should expect from the Gas Pipeline, and that we should set priorities among these goals and objectives. The present volume does this, with Chapter 1 identifying the various goals and objectives for the Gas Pipeline and Chapter 2 ranking them according to their priority and importance.

We now intend to prepare at least one other volume in this report, which will address issues surrounding the various proposals for the Gas Pipeline, which will no longer be going into this "Volume 2." It is possible that the new "Volume 3" will be issued in parts, addressing new issues as they emerge in the ongoing public discussion about the Gas Pipeline. We also plan to develop recommendations to the Board of Directors of the Anchorage Chamber of Commerce about the fiscal contract(s) under the Alaska Stranded Gas Development Act that may be developed for the Gas Pipeline and released to the public in due course. These recommendations may end up taking form as "Volume 4" of this report.

As in Volume 1 regarding footnotes: Generally, footnotes that document the sources of factual statements appear in the "Endnotes" at the back of this volume. Several times we felt it necessary to provide credible documentation of a factual statement with a footnote on the same page when the fact is at odds with popular belief. Footnotes that we believe would be helpful for readers in explaining or illustrating factual statements in the text usually appear at the bottom of the same page. In a few instances where particularly specialized or arcane points are involved, the explanations and illustrations have been placed in the "Endnotes" for the sake of the majority of readers who might find the additional information irrelevant or distracting, rather than helpful.

We again wish to express our thanks to the staff of the Anchorage Chamber of Commerce for their assistance and support — especially to Emily Ford, the staff liaison to the Committee, and to Stacy Schubert, president of the Anchorage Chamber. Any errors or omissions that may be found in this report are not because of them. We also wish to thank Alaska Regional Hospital, CH2MHILL, and the law firm of Dorsey & Whitney LLP for their generous kindness in hosting the Committee's meetings.

State / National Affairs Committee
Anchorage Chamber of Commerce
25 January 2006

CHAPTER 1. IDENTIFYING GOALS FOR THE GAS PIPELINE

There are many potential goals and objectives that a Gas Pipeline* could achieve for Alaskans and their state and local governments. Some of these goals and objectives may have potential conflicts with other goals or objectives, while others may be inherently in conflict with each other and the less important ones will need to be sacrificed or compromised for the sake of the more important.

In this first chapter we simply list various goals and objectives† for a Gas Pipeline, and we point out where and to what extent they might conflict with, or reinforce, one another. This way, when we get to assigning priorities to them in the second chapter, we can start to understand some of the trade-offs and compromises that need to be made when there are conflicts between high and low priority goals. Some of those conflicts may lead to a re-evaluation of the priorities between conflicting goals.

Goal: Getting a Gas Pipeline built

It should be obvious, but it bears repeating: If there isn't a Gas Pipeline,‡ all the other goals and priorities for it are moot.

Goal: Getting a Gas Pipeline built sooner rather than later

This seems to be about as obvious as the first, and in some ways it is. But it is not as absolute, nor is it as simple as it first seems.

In terms of being an absolute goal, it is generally true that getting a Gas Pipeline built sooner is better than getting one later, but it is not always better. What if the choice were between getting a Pipeline quickly that is inferior for the State and Alaskans, versus getting one a little later that would be great for us? Suppose, for instance, Company X could build a Pipeline by 2014 with a capacity of 4.5 Bcf/d, while Company Y could build a Pipeline by 2010 with a capacity of only 2.5

* As in the first volume of this report, we use the term "Gas Pipeline" to refer generically to any pipeline project to develop North Slope natural gas and transport it to market, regardless of what route it may take, so long as its transmission capacity from the Slope is 2,000,000,000 cubic feet a day (2 billion cubic feet a day, or 2 Bcf/d) or more. This 2 Bcf/d threshold is chosen in order to make a clear distinction between a "Gas Pipeline" and the so-called "Bullet Line" (with about 1 Bcf/d capacity) from the Slope to tidewater at Cook Inlet or Prince William Sound that the Alaska Natural Gas Development Authority has been looking at.

† This listing is intended merely to be illustrative of the major issues, not an exhaustive or complete catalogue of all issues that a Gas Pipeline presents. Also, the listing in this chapter does not reflect any ranking, expressed or implied, of the goals.

‡ This basic question of having a Gas Pipeline or not having one is separate from the issue of whether the oil companies on the North Slope have any kind of legal duty or other obligation to build it. Those who believe such a duty exists still have to agree that the priority is in getting a Gas Pipeline built, particularly if the courts were to say there is no such duty or the duty is being met.

Bcf/d. Which project is better for Alaska? If the only differences between the two projects are capacity and completion dates, we think the larger project would probably be better for Alaska despite the extra four years to get it.* Would we still think the larger project is better if it would take 10 extra years to get it instead of four? Probably not, because 10 extra years is just too long to wait — especially since it couldn't be guaranteed that after those 10 years the larger Pipeline would actually be built.

And this gets us to the other key point regarding this goal: The issue is not as simple as getting a Pipeline built "sooner versus later." It is possible to build a Gas Pipeline in stages, with each stage being a step up-in capacity. Enbridge Inc., a large Canadian pipeline company, has proposed building a Pipeline with an initial capacity of 2.6 billion cubic feet (Bcf) a day which could, as market conditions would allow, be increased in stages to an eventual capacity of 4.5 Bcf a day or more.¹ The Alaska Natural Gas Development Authority advocates a similar approach.²

Why are they proposing this phased-in approach? Because it's entirely possible that a smaller capacity pipeline could get started sooner than a large one.[†] Getting started is a crucial step, probably the crucial step, in getting a Gas Pipeline. Once construction is under way, the chances of seeing the Pipeline finished are far greater than they are when you're still waiting for it to get started. It has been wisely observed, "The best is the enemy of the good."³ In other words, getting started sooner with a "good" Gas Pipeline for Alaska — one that can be readily adopted as necessary in the future to meet the gas-transportation needs then — may be better than waiting and waiting until conditions are right for the "best" Gas Pipeline to be built.

Is starting with a 2.6 Bcf-a-day Pipeline that's expandable to 4.5 (à la Enbridge and ANGDA) a "good enough" start towards having a real Gas Pipeline? Should Alaskans push to get this "expandable Pipeline" option moving forward as fast as possible, instead of waiting for circumstances to get right for a "perfect" 4.5 Bcf-a-day Pipeline? We can't say for sure at this time,[‡] but these are questions that each one of us will eventually need to find our own answers to. It's important for us to start thinking about this now, and about what information we will need in order to decide which choice is best.

* *Waiting for the larger Pipeline would be better, in our opinion, because greater pipeline capacity means there is more gas potentially available for in-state uses and may allow greater flexibility in trying to fill those needs. A "minimalist" Gas Pipeline, in contrast, could have little "extra" to spare for new in-state users.*

† *Here are some reasons why a smaller, but expandable Pipeline might get started sooner. A "full size" 4.5 Bcf-a-day Pipeline would use steel pipe of a diameter and strength at the cutting edge of today's technology, which means not only that this technology is not yet completely proven, but also that there are few if any steel mills that would be capable of making this pipe in large quantities right away. And, at 1100 pounds of steel per foot of length, such a Pipeline would need an enormous amount of steel no matter which route it took. Even if there were no issues about fabricating the pipe, simply providing so much steel in a fairly short timeframe would itself be a strain on global steel supply. In contrast, a 2.6 Bcf-a-day Pipeline would use steel pipe that is well within the existing technology and well within the pipe-making capabilities of most major steel mills. And it would use a lot less steel and impose far less strain on the global supply.*

‡ *One reason it's so hard to answer at this time is that it is not clear exactly what an expansion from 2.6 to 4.5 Bcf a day might entail. If it means laying an entirely new 1.9 Bcf-a-day Pipeline right next to the first 2.6-Bcf-a-day line, is it better to essentially lay two Pipelines separately side by side — with two separate mobilizations and two separate construction and installation periods — instead of laying one larger Pipeline? One can make "back of the envelope" estimates about this, but the real, detailed analysis that is necessary in order to properly answer this question remains to be done.*

Goal: “Alaska Hire” and “Alaska Contracting”*

For Alaskans these goals come just behind Motherhood and Apple Pie, and clearly both are crucially important. It is important to remember, however, that the State is not the only force that can advance these goals. Private industry, on its own, can act to further them. So can organized labor. The State must do as much as it can in these areas, but there are important constitutional limits on what it can do.

Constitutional limits on state action. Back in the 1970s when TAPS — the Trans Alaska [Oil] Pipeline System — was being built, the State had an Alaska Hire law on the books. TAPS had to cross state lands and since the Prudhoe Bay field was on state lands, and the 1970s Alaska Hire law required that the lease contract for a right-of-way across state lands had to include a commitment by the oil companies and Alyeska Pipeline Service Company to give a hiring preference to Alaskan workers. The right-of-way contract further required these companies to include in their own contracts with prime contractors provisions requiring not only the prime contractors to give same hiring preference to Alaskans, but also requiring the prime contractors to include similar provisions in their own contracts with subcontractors. So the subcontractors also had to “hire Alaskan” and in turn had to require their own sub-subcontractors to “hire Alaskan” and pass the Alaska Hire requirement on to the sub-sub-subcontractors. And so on.

All in all, this 1970s Alaska Hire law was quite well designed to ensure that Alaskans would get work building the oil pipeline. Unfortunately Alaska Hire, despite its contractual basis, was struck down in 1978 by a unanimous U.S. Supreme Court for violating the constitutional rights under the Privileges and Immunities Clause[†] of people outside Alaska who wanted to come here to work on the pipeline too. *Hicklin v. Orbeck*, 437 U.S. 518 (1978).^{*} The Court in *Hicklin* applied a two-prong test to judge the constitutionality of Alaska Hire:

* *Alaska Hire* is hiring qualified Alaskans to work on the in-state portion of the Gas Pipeline during its construction and operation. *Alaska Contracting* is contracting with Alaskan businesses to supply goods or services for building or operating the in-state portion of the Gas Pipeline.

† *The Clause states, “The Citizens of each State shall be entitled to all Privileges and Immunities of Citizens in the several States.” U.S. Constitution, Art. IV, § 2. In the words of the U.S. Supreme Court, the purpose of the Clause is “to place the citizens of each State upon the same footing with citizens of other States, so far as the advantages resulting from citizenship in those States are concerned. It relieves them from the disabilities of alienage in other States; it inhibits discriminating legislation against them by other States; it gives them the right of free ingress into other States, and egress from them; it insures to them in other States the same freedom possessed by the citizens of those States in the acquisition and enjoyment of property and in the pursuit of happiness; and it secures to them in other States the equal protection of their laws. It has been justly said that no provision in the Constitution has tended so strongly to constitute the citizens of the United States one people as this.” Paul v. Virginia, 8 Wall. (75 U.S.) 168, 180 (1869), quoted in Hicklin v. Orbeck, 437 U.S. 518, 524 (1978).*

* *The full text of the U.S. Supreme Court’s unanimous opinion in Hicklin is available online at <http://caselaw.lp.findlaw.com/> (under “Citation Search” enter “437” (without quotation marks) in the box to the left of “U.S.” and “518” (again without quotation marks) in the box to the right, and then click “get it”) (last visited 7 November 2005).*

1. There must be a “substantial reason for the discrimination beyond the mere fact that they are citizens of other States.” Such a reason “would not exist... ‘unless there is something to indicate that noncitizens constitute a particular source of the evil at which the [discriminatory] statute is aimed.’ ”⁴
2. “[E]ven where the presence or activity of nonresidents causes or exacerbates the problem the State seeks to remedy, there must be a ‘reasonable relationship between the danger represented by non-citizens, as a class, and the . . . discrimination practiced upon them.’ ”⁵

In terms of the “evil” that Alaska Hire was aimed at solving, the Court quoted AS 38.40.020 (1977 ed.) in the Alaska Hire law as authority for concluding that this evil was “Alaska’s uniquely high unemployment.” The Court found, however, that “no showing was made on this record that nonresidents were ‘a peculiar source of th[is] evil’ [that] Alaska Hire was enacted to remedy.”[†]⁶

In terms of the second prong of the test, the Court assumed for the sake of argument that an influx of nonresidents to work on TAPS posed a risk that unemployed Eskimos, Indians and others living in outlying areas might lose the opportunity to work on TAPS before they could complete their training for that work was an appropriate “evil” that the State could try to reduce or prevent through Alaska Hire.[‡] Even so, the Court said, Alaska Hire went far beyond the “reasonable relationship” between curing this “evil” and the discrimination that Alaska Hire caused: “Even if a statute granting an employment preference to unemployed residents or to residents enrolled in job-training programs might be permissible, Alaska Hire’s across-the-board grant of a job preference to all Alaskan residents[*] clearly is not”⁷ (emphasis added).

† On this legal point the Court wrote:

What evidence the record does contain indicates that the major cause of Alaska’s high unemployment was not the influx of nonresidents seeking employment, but rather the fact that a substantial number of Alaska’s jobless residents – especially the unemployed Eskimo and Indian residents – were unable to secure employment either because of their lack of education and job training or because of their geographical remoteness from job opportunities; and that the employment of nonresidents threatened to deny jobs to Alaska residents only to the extent that jobs for which untrained residents were being prepared might be filled by nonresidents before the residents’ training was completed.

437 U.S. at 526-527 (footnote omitted).

‡ Before applying the first prong of the constitutional test, the Court expressed doubt whether curing such an “evil” is even a legitimate purpose for Alaska Hire to prevent or cure: “Even assuming that a State may validly attempt to alleviate its unemployment problem by requiring private employers within the State to discriminate against nonresidents – an assumption made at least dubious by Ward [v. Maryland, 12 Wall. (79 U.S.) 418 (1871)] – it is clear that [Alaska Hire violates the first prong of the constitutional test, as the Court then proceeded to explain.]” 437 U.S. at 526 (emphasis and bracketed material added; footnote omitted).

** Describing the overbreadth of the Alaska Hire preference, the Court wrote: “Alaska Hire simply grants all Alaskans, regardless of their employment status, education, or training, a flat employment preference for all jobs covered by the Act. A highly skilled and educated resident who has never been unemployed is entitled to precisely the same preferential treatment as the unskilled, habitually unemployed Arctic Eskimo enrolled in a job-training program.” 437 U.S. at 527.*

It should be noted that the State made the “Owner State” argument in *Hicklin* to justify Alaska Hire.[†] The U.S. Supreme Court acknowledged that “a State’s ownership of the property with which the statute is concerned is a factor – although often the crucial factor – to be considered in evaluating whether [a] statute’s discrimination against noncitizens violates the [Privileges and Immunities] Clause.”⁸ However, the very success of Alaska Hire in permeating the work for TAPS was the reason why it was unconstitutional:

Alaska Hire extends to employers who have no connection whatsoever with the State’s oil and gas, perform no work on state land, have no contractual relationship with the State, and receive no payment from the State. The Act goes so far as to reach suppliers who provide goods or services to subcontractors who, in turn, perform work for contractors despite the fact that none of these employers may themselves have direct dealings with the State’s oil and gas or ever set foot on state land. Moreover, the Act’s coverage is not limited to activities connected with the extraction of Alaska’s oil and gas. It encompasses, as emphasized by the dissent below [i.e., in the Alaska Supreme Court], “employment opportunities at refineries and in distribution systems utilizing oil and gas obtained under Alaska leases.” 565 P.2d., at 171. ...In sum, the [Alaska Hire] Act is an attempt to force virtually all businesses that benefit in some way from the economic ripple effect of Alaska’s decision to develop its oil and gas resources to bias their employment practices in favor of the State’s residents.[⁹]

Facing a system that extended so far beyond the land and resources that the State owned, the Court concluded, “We believe that Alaska’s ownership of the oil and gas that is the subject matter of Alaska Hire simply constitutes insufficient justification for the pervasive discrimination against nonresidents that the [Alaska Hire] Act mandates.”¹⁰

What is left of Alaska Hire and Alaska Contracting after *Hicklin* that would be constitutional? Basically three options:

1. A mandatory Alaska Hire or Alaska Contracting system like the one in *Hicklin* that cascades down from contractor to subcontractor through successive tiers of contracts but only if —
 - a clear social “evil” can be identified that would be created or made worse by letting nonresidents work on the Gas Pipeline (the first prong of the *Hicklin* constitutional test), AND

[†] The Court summarized this argument as follows: “Alaska contends that because the oil and gas that are the subject of Alaska Hire are owned by the State, this ownership, of itself, is sufficient justification for the Act’s discrimination against nonresidents, and takes the Act totally without the scope of the Privileges and Immunities Clause.” 437 U.S. at 528 (footnote omitted). In the footnote omitted from the quotation, the Court noted specifically the State’s huge land endowment under the Alaska Statehood Act. *Id.*, n. 11.

- the discrimination against nonresidents under the Alaska Hire provisions actually avoids or reduces the “evil” and is reasonably tailored so it does not go beyond what is reasonably necessary to address the “evil” (the second prong of the *Hicklin* test).

A constitutional program of this kind might take the form, for instance, of finding an “evil” to be a chronic lack of training and employment opportunities for Native people which is denying them equal employment and economic status as a group,^{*} and the preference to cure this “evil” would be to give priority to training and hiring Alaska Natives over other Alaskans and nonresidents.

2. A system of Alaska Hire and Alaska Contracting that is voluntary on the part of contractors at each step in the cascade of contracts from contractor to subcontractor.

By being voluntary on the part of the private-party contractors and the successive subcontractors down the line, such a program would not involve action by the State itself other than entering into the top-tier contracts that urge (but don’t actually require) Alaska Hire or Alaska Contracting. The Privileges and Immunities Clause only applies to actions by states, not private parties, and so such a program should avoid the *Hicklin* constitutional issues altogether.[†]

The obvious drawback to a purely voluntary program is, of course, the difficulty in trying to enforce it if people don’t live up to their promises.

3. An “Owner State” program relying on state ownership of the land or resources in question, where the Alaska Hire or Alaska Contracting is reasonably limited in scope to what it is that the State owns. Such a focused program would not need to be purely voluntary.

Since the discovered gas reserves on the North Slope are almost all on state land, state ownership might well justify Alaska Hire and Alaska Contracting in the development and installation of gas facilities for those fields on the Slope. State ownership might also allow Alaskan preferences for jobs and contracts in the portions of the Gas Pipeline that cross state land. If the State acquires a significant ownership interest or share in the Gas Pipeline, that ownership might allow the scope of Alaska Hire and Alaska Contracting to extend into the construction and operation of the Gas Pipeline even where it is not crossing state land.

** Making up for past social injustice for a specific group of people is a stronger justification for Alaska Hire than lowering unemployment of Alaskans generally. Regarding the latter goal, the Hicklin case said the “assumption] that a State may validly attempt to alleviate its unemployment problem by requiring private employers within the State to discriminate against nonresidents [is] an assumption made at least dubious by Ward [v. Maryland, 12 Wall. (79 U.S.) 418 (1871)].” Hicklin, 437 U.S. at 526. In contrast, with respect to remedying past social injustice, the Court the same year it decided Hicklin — in a plurality opinion by Justices Brennan, White, Marshall and Blackmun in Regents of Univ. of California v. Bakke, 438 U.S. 265, 324-379 (1978) — wrote: “a state government may adopt race-conscious programs if the purpose of such programs is to remove the disparate racial impact its actions might otherwise have and if there is reason to believe that the disparate impact is itself the product of past discrimination, whether its own or that of society at large.” Id. at 369 (emphasis added).*

† A voluntary Alaska Hire or Alaska Contracting program would not, of course, authorize private parties to engage in discrimination that, for other reasons, would be unlawful or unconstitutional.

In *Hicklin* the major problem with the prior “Owner State” rationale was that the Alaska Hire program extended to jobs far beyond those that took place on state lands or were directly involved in developing and producing oil and gas from state lands. The key for the Gas Pipeline would be to tailor the scope of Alaska Hire and Alaska Contracting to apply only to areas where the State has a sufficient ownership interest to justify an Alaskan preference.

Voluntary action by business and labor. So far our discussion about Alaska Hire and Alaska Contracting has focused on what the State may constitutionally do to advance these goals, or require others to do to advance them. It is important to recognize, however, that the State is not the only one that can make a difference. For instance, labor union locals can, through their hiring-hall practices, make a big difference on Alaska Hire. Alaskan businesses can team up to coordinate and consolidate their efforts and thereby gain economies of scale and bargaining power that, with even a modest local-preference factor in awarding the contracts, could allow them to compete successfully with Outside businesses. In other words, Alaska Hire and Alaska Contracting are not merely about what the State can do for Alaskan workers and Alaskan businesses. It’s also about what they can do to help themselves.

“Successful” Alaska Hire and Alaska Contracting. It is important to understand what “success” would look like in Alaska Hire and Alaska Contracting with the Gas Pipeline. “Success” for Alaska Hire does not mean that every job will go to an Alaskan, nor even a majority of the jobs. The number of workers the Gas Pipeline will need during construction will simply overwhelm the work force here in Alaska. So, instead of all Pipeline jobs being held by Alaskans, “success” in Alaska Hire will mean that qualified Alaskans who want a job on the Pipeline can get a job on the Pipeline. Much the same is true for “success” in Alaska Contracting.

Goal: Meeting Alaskans’ non-industrial natural gas needs

During 1999 – 2003 (the most recent years for which DNR has published data), Alaskans in Southcentral used an average of 0.0322 Tcf* of natural gas a year to heat their homes, offices and businesses and to cook on their gas stoves. During that same time electric utilities used an average of 0.0347 Tcf a year to generate electricity for the entire Railbelt from Homer to Fairbanks.¹¹ Alaskans’ total non-industrial use during those five years averaged 0.0669 Tcf a year.

The current non-industrial use is less than 20% of the 1 Bcf-a-day (0.365 Tcf a year) capacity for a “Bullet Line” to Cook Inlet that the Alaska Natural Gas Development

* A Tcf is 1,000,000,000,000 (1 trillion) cubic feet, or 1,000 billion cubic feet (1,000 Bcf).

Authority considers to be a threshold for the “Bullet” to be economic. In fact current non-industrial use is only 37% of the likely 0.5 Bcf-a-day capacity for a “Spur Line” to the Cook Inlet area.

At historic growth rates electrical generation and home and business use will increase to a total of 0.086 Tcf a year in 15 years, 0.095 Tcf a year in 20 years, 0.105 Tcf a year in 25 years, and 0.116 Tcf a year in 30 years.¹² Even the figure for 2035 is less than a third of the capacity for a “Bullet Line,” and it’s still not even two-thirds of the capacity for a “Spur Line.”

The point is, today and for a long time to come, local demand for natural gas in homes, businesses and electrical generation will be insufficient to justify either a “Bullet Line” or a “Spur Line” on purely economic terms. If either of these lines is to be built, either it will have to be subsidized or there will have to be significant additional demand for natural gas in the Cook Inlet area to justify it.

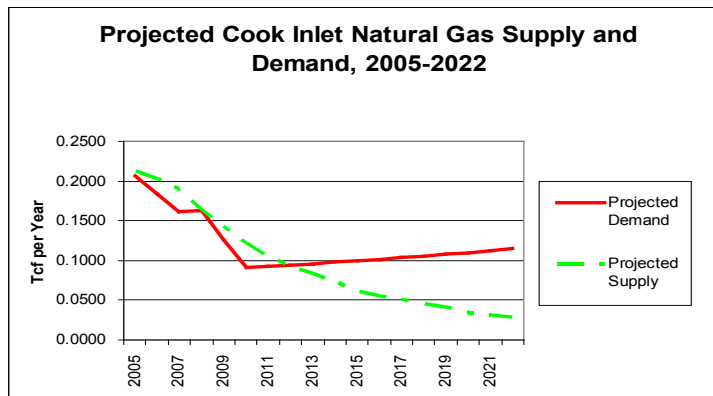
Goal: Preserving the existing natural gas-based manufacturing industry in Alaska

There currently are two natural gas-based manufacturing industries in Alaska: Agrium’s fertilizer plant at Nikiski in the northern Kenai Peninsula, which used an average of 0.0487 Tcf a year during 1999 – 2003; and the Marathon-ConocoPhillips LNG plant, also at Nikiski, which averaged 0.0757 Tcf a year during that period.¹³

Both of these industrial users are facing insufficient supplies of natural gas to support their operations in the near term. Agrium has natural gas contracts only to run its plant at half capacity through October 2006, and has insufficient supplies to run the plant at all after that. The current export license for the LNG plant expires in mid 2009.

Agrium announced on 16 November 2005 that it is examining coal gasification as a possible way to keep its fertilizer plant at Nikiski open despite the looming shortage of natural gas feedstock for it. The coal would be used both as feedstock to be gasified and as fuel for a new electric power plant. The new plant would generate 100 megawatts of electricity for coal gasification and perhaps as much as 250 megawatts more for sale to the Railbelt electrical grid or perhaps to the potential Pebble gold and copper mine on the west side of Cook Inlet if the mine is developed. If the coal plan pans out, the fertilizer plant would shut down in October 2006 as currently planned, but it would reopen as early as 2011 once the new power-generation and coal-gasification facilities are completed. During the fertilizer plant’s shutdown, its employees would have opportunities to seek work in the construction of the new facilities. The new plant would use four million tons of coal a year, which would likely come from either the Beluga coal fields on the west side of Cook Inlet or the Usibelli coal mine at Healy.¹⁴

Here is a graph from Volume 1, page 8, that shows how future natural gas demand compares with DNR's projected natural gas supply in the Cook Inlet area.



The fall in demand between 2005 and 2007 in this graph is due to the assumed permanent closure of Agrium's plant at the end of October 2006. The fall in demand between 2008 and 2010 is due to the assumed permanent closure of the LNG plant mid-way through 2009. As the graph shows, even with these assumptions, there is barely enough supply to meet the non-industrial demand out to 2012. Having enough gas to sustain Agrium beyond 2006 and the LNG plant beyond 2009 appears to be impossible unless new sources of natural gas are found or are made available for the Cook Inlet area.

It is too late to supply the Agrium plant because nothing from the North Slope can be completed by October 2006. Even supplying the LNG plant is an iffy proposition unless it would be by the "Bullet Line," which at least has a fair chance of being completed by 2009 if it had to be. Yet if the main Gas Pipeline is going to be built on the same route all the way to Fairbanks just a couple of years later, it would hardly make sense to build the "Bullet" just to save the LNG plant unless the LNG plant could afford to pay for it.

Despite its obvious merits if it could be achieved, using the Gas Pipeline to supply either of the existing natural gas-based industries appears to be an unrealistic and impractical goal. If they are to be supplied, something else will have to do it.

Goal: Making natural gas available to Alaskans in places where it is not available today

"Conventional" gas delivery methods. For many in the public, the goal of making natural gas available to rural Alaskans is associated with the concept of trying to replicate in those communities the conventional type of natural gas distribution system that has proven so successful Outside and in urban areas here. Such systems involve a local network or "gas grid" of small pipelines that run through the community, and each house or business puts in a small hook-up pipeline that links into the nearest part this "grid." If a community does not have the good fortune to be sitting on top of a

natural gas field, its gas distribution system must also include a gas transmission line to transport natural gas from a source somewhere else to a central point in the community. The local “grid” ties into the transmission line at this central point, and from there the gas moves through the “grid” into the hook-up lines into individual residences and commercial buildings.

Clearly, trying to make natural gas available in rural or Interior Alaska does not make economic sense if the Alaskans receiving the gas cannot afford to buy it when it gets to them. In the conventional approach for bringing natural gas to residential and commercial users in a community, two factors ultimately define and limit what people can afford to pay for natural gas, and thus they also determine the economic feasibility of making North Slope natural gas available to Interior and rural residents:

- a “critical mass” of population in the community(s) to be served , and
- a “critical density” of population within each community to be served.*

“Critical mass” is required in order to justify the cost of building and operating a pipeline to carry natural gas from an existing source[†] out to the community(s) to be served. For instance, if it costs \$10 million to build a pipeline to carry natural gas to a village and there are only 10 residents in that village, the “critical mass” is missing because there is no way the residents will be able afford to pay the costs of getting gas to them through that pipeline.

Similarly, “critical density” is important because, when potential gas-users start getting too far apart from one another, the cost of extending the local gas-delivery grid farther out to the next user or group of users “down the road” becomes too much for that user or group to afford to pay.[‡] For neighborhoods or districts that lack “critical density,” the people and businesses there effectively don’t count, in terms of the feasibility of getting natural gas to the community, because they won’t be hooked up to the community’s local grid even if gas gets there. As a result, a community with a small core and a large but scattered population living around it will effectively be much “smaller” than it actually is, in terms of whether it has “critical mass” for getting natural gas.

The Kenai Peninsula provides some important direct evidence about what it takes to have critical mass” and “critical density.”

* There are, of course, other factors as well that could affect what people can afford to pay, such as government subsidies to help them pay for the gas. In addition, high prices for the gas going into the pipeline taking it to a community can make it too expensive for the residents of that community, but that only affects how quickly the gas becomes unaffordable for them. The price of gas does not determine the upper limit on the economic feasibility of supplying gas to rural Alaskans, since that limit is reached where the cost, by itself, of getting the gas to them makes the gas unaffordable even if the price of the gas going into that system is zero.

† The source could be a gas field, the Gas Pipeline, or a place already linked to a supply of gas.

‡ Take a real-life example. In 2003 ENSTAR announced plans to lay a natural gas grid in Homer. It proposed a flat fee of \$20 for homes needing less than 100’ of line to hook-up into the nearest distribution line in the grid, and \$25 plus \$1 a foot for homes needing a hook-up line over 100’ long. “Pipe (line) dream closer to reality,” Peninsula Clarion (9 October 2003). For a house 200’ from the grid, the fee would be \$125; 500’ away, \$425; 1,000’ away, \$925 (ENSTAR said it would discuss an alternative fee structure for homes really far from a distribution line, so perhaps hooking-up would cost less in the latter two cases than these fees under the \$25-plus-\$1-a-foot formula). You can see how hooking up to the grid could become too expensive the farther apart the houses get.

In the northern Kenai, getting access to a supply of natural gas was not an issue. The Kenai Gas Field, the largest known gas field in the entire Cook Inlet area, lay literally beneath people's feet in certain parts of the City of Kenai. Because this ample supply of natural gas was already there, the growth and development of the local gas grid was driven almost entirely by the "critical density" factor. As a result, by the end of 2000 — after almost 40 years of development — the gas grid had grown to include the cities of Kenai and Soldotna and the populated corridor between them. As residential growth extended outward from these cores along the major highways running out of the two towns, some extension of the local grid was also made along the highways.

By 2000 the grid extended to within 10 miles of the community of Coho south of Soldotna on the Sterling Highway. But despite its population of 1,168¹⁵ Coho was not large enough to overcome the "low density" gap that separated it from the grid. Only after the new Nikiski-Kachemak gas transmission pipeline was built along the Sterling Highway to Nikiski in 2003, did it become economically feasible to make natural gas available to the residents of Coho, and this was not because the density gap was bridged, but because an offtake point in the Nikiski-Kachemak line was designed into that project specifically to allow gas to be taken off at Coho. This newly created source of gas in the Coho area is what allowed a new local gas grid to develop there independently of the existing grid serving the Soldotna-Kenai area.

Equally noteworthy as Coho's story is that of Homer (population 3,946 in 2000¹⁶), which for 40 years was too small to justify building a new transmission line to link it into the existing gas grid in the northern Kenai. This is because Homer was 78 highway miles away from Soldotna, and Homer's population simply was too small to cover the costs of building such a long natural gas pipeline to it. More tellingly, the construction of the Nikiski-Kachemak pipeline in 2003 extended the gas pipeline network on the Kenai to Nikiski, less than 30 miles from Homer. But there are no plans to build even a 30-mile pipeline linking Homer to the Nikiski terminus of the Nikiski-Kachemak pipeline.

In fact, the "gap" remaining between Homer and the existing natural gas pipeline network coming down from the northern Kenai may become even less than 30 miles. Just a month after the Kenai-Kachemak pipeline went into service,* ENSTAR filed an application with the Regulatory Commission of Alaska (RCA) to build a gas pipeline from Anchor Point to Homer and to lay a local gas grid in Homer. See "Pipe (line) dream closer to reality," *Peninsula Clarion* (9 October 2003). In conjunction with this, NorthStar Energy Group, Inc. would build a gas pipeline from its leases in the North Fork Unit west of Anchor Point to the latter city, where it would link up with ENSTAR's proposed new line running to Homer and thus supply gas from the North Fork Unit to that city. Although these latter developments have not yet been built, when and if they are, they will narrow the "gap" between Homer and the northern Kenai gas network to less than 15 miles — the distance between Ninilchik and Anchor Point. Yet no plan to bridge these last 15 miles has been unveiled to date.

* The Kenai-Kachemak Pipeline was placed in service on 2 September 2003.

The lessons from these historical facts are significant and sobering with respect to the economic feasibility of making North Slope natural gas available to rural Alaskans. First, the Cohoe example shows that once a local gas grid runs into its natural “population density” limit, that grid will not expand further to hook up with a new market even when there are over 1,000 people in that potential market and it is less than 10 miles away. Second, the Homer example shows that even a 30-mile-long gas pipeline is not economically justifiable despite a market of nearly 4,000 people that it would reach.

This means it almost certainly will not be economically feasible to build a transmission pipeline to deliver natural gas to, say, Bethel from the nearest point of even an “All Alaska Route” Gas Pipeline because the city of Bethel has only 5,471 residents¹⁷ and is 400 miles from Anchorage and thus at least 500 miles from the closest point on the “All Alaska Route” to Valdez. Similarly Nome, with a population of 3,505¹⁸ and more than 300 miles distant from the nearest point of any Gas Pipeline route, would be economically infeasible to serve. Moreover, even if the State subsidized the cost of building a gas pipeline to one of these hub cities, it probably won’t be economically feasible to build any branch lines out to other communities in the region because of the “Homer effect” — those other communities will be far smaller than the 4,000 people Homer had, and they will often be the same 30 miles or more away that Homer was. For communities more like Cohoe in size, they will all be more than 10 miles away which was the insurmountable gap that Cohoe faced.

Even communities along the route of the Gas Pipeline may have a hard time being able to justify the cost of hooking up to it. This is because the Gas Pipeline will be operating at an extremely high pressure of more than 2,000 pounds per square inch, and valve system capable of handling such high pressure and stepping it down to, say, 100 p.s.i. for transmission through a local grid will be extremely massive and expensive — a quarter to half a million dollars or more. For pipeline communities like Glennallen (population 554 in the 2000 Census), Delta Junction (840), Copper Center (362) and Tok (1,393),¹⁹ it would cost at least \$718 – \$1,436 per household* just to pay the capital cost for such a valve, before factoring in any capital cost for the actual grid that would link this valve to the households throughout the community. It therefore seems quite possible that only the Fairbanks area would have enough population to justify the cost of an offtake valve to serve them.

Valdez (population 4,036),²⁰ because of its location at the terminus of the “All Alaska Route,” would not have to defray the costs of such an offtake valve because the gas pressure will be reduced for delivery into the LNG plant, and so Valdez could tap in for its local grid after the pressure has been lowered.

* These figures assume four persons per household and are based on the community with the largest population, Tok; i.e., 1,393 people at four per household represent 348¼ households, and $\$250,000 \div 348\frac{1}{4} = \718 per household; for a \$500,000 valve, the cost per household is twice as high, or \$1,436. This further assumes that all 1,393 people in Tok would in fact hook-up to the gas grid, which in turn assumes that there are no “critical density” issues that would prevent the grid from reaching everyone in Tok. For the other communities the cost range per household would be higher than this \$718 – \$1,436 range because their populations are smaller than Tok’s.

Nonconventional gas delivery methods. The discussion so far sounds very discouraging regarding the likelihood and economic feasibility of helping rural Alaskans with natural gas from the North Slope. But this is because we've only been looking at the conventional way of getting natural gas to residential and commercial users that works well Outside and in urbanized areas in Southcentral Alaska. But there are at least two other potential ways of getting natural gas, or the energy it represents, to rural Alaskans.

The first alternative is to deliver propane or butane to rural Alaskans instead of natural gas. The heating value of propane is 2½ times that of natural gas, while the heating value of butane is 2.7 times as great.²¹ Moreover, it is easy to liquefy propane and butane and keep them in liquid form, and the liquid form of propane takes only 1/270 as much volume as gaseous propane.²² This means that a single gallon of liquid propane represents as much heating value as 90.5 cubic feet of natural gas, while a gallon of liquid butane represents 97.4 cubic feet.²³ This high density of heating value in liquid propane and butane, together with the simplicity of transporting these liquids relative to transporting gaseous natural gas,* creates the possibility of delivering propane and/or butane to rural and coastal Alaska by barge at a price that is competitive with the cost of delivering fuel oil there.† Indeed, for nearly nine years now Alaska Intrastate Gas Company has been actively working to establish a propane-distribution business in Southeast Alaska — and Juneau, Ketchikan and Sitka in particular — in which railroad tank cars of liquid propane from Canada would be loaded onto barges, shipped to local communities and offloaded, and then the propane would be vaporized back into gaseous form and diluted with air so its heating value per cubic foot is comparable to that of natural gas, and finally the propane-air mixture would be delivered into a local grid for delivery to households and businesses for use the same as natural gas.‡²⁴

* Natural gas doesn't turn into liquid until it is super-refrigerated below the boiling point of methane, which is -259° F., which makes it extremely difficult, physically and economically, to use for delivering natural gas to in-state consumers. However, there are about 300 – 400 households in the Fairbanks area that currently are using natural gas that is shipped there as true LNG despite these difficulties. It seems likely that these households represent a very special case, and that more widespread use of LNG for in-state shipment and consumption will not occur.

† This is the conclusion in PND Incorporated, *Feasibility Study of Propane Distribution throughout Coastal Alaska (August 2005)*, commissioned by the Alaska Natural Gas Development Authority and available online in two parts at [www.angda.state.ak.us/Of%20Interest/FINAL%20of%20Propane%20-Distribution%20Report%20Report%20-%20pages%201%20to%20\\$2031.pdf](http://www.angda.state.ak.us/Of%20Interest/FINAL%20of%20Propane%20-Distribution%20Report%20Report%20-%20pages%201%20to%20$2031.pdf) and www.angda.state.ak.us/Of-%20Interest/FINAL%20of%20Propane%20Distribution%20Report%20%20pages%2032%20to%20-60.pdf (both last visited 11 December 2005; hyphens at line breaks are not part of either URL, but the hyphens in the expression "Report%20-%20pages" appearing in both URLs are part of them).

‡ In Alaska Intrastate's current plan, the railroad tank cars would be loaded with propane in Alberta or British Columbia and would then run along CN Rail's track to Prince Rupert, where they would be loaded onto barges. For Ketchikan and Sitka, the railroad tank cars themselves would serve as storage for the liquid propane, while in Juneau the propane would be taken from them and stored in a facility specially built for that purpose. The vaporized propane would be mixed with air to the desired heating value per cubic foot, and this "utility gas" would then be delivered to the local "city gate" where it would pass into the local natural gas distribution grid. Alaska Interstate would own the local grid and take delivery of the incoming "utility gas" at the city gate. An entity called *Prairielands Energy Marketing, Inc.* would off-load the railroad tank cars from the barges in Ketchikan and Sitka and would operate the special propane storage facility in Juneau. As they became empty, the railroad tank cars would be barged back to Prince Rupert and then hauled by rail to Alberta or BC to be refilled. See CH2MHILL, *Phase 1 of the Southeast Alaska and Gulf of Alaska Utility Gas Distribution Project (March 2002)*, "Executive Summary" pp. ES-2 and ES-3, which was commissioned by Alaska Interstate.

The second nonconventional alternative is to deliver energy to rural Alaskans in the form of electricity generated by natural gas instead of the natural gas itself. It is much less costly to put in a power line or an electric intertie than it is to lay pipe in the ground to transport physical natural gas. The entire Railbelt from Homer to Fairbanks is already linked by interties to form a single large electrical system. If natural gas from the Gas Pipeline became available in, say, Fairbanks and were burned there to generate electricity, that electricity could flow anywhere in the existing power system. It might then be possible to extend this power system outward to additional communities for far less money than by trying to tie them in conventionally by pipelines as a rural natural gas system. In addition, with new electricity coming from such a Fairbanks plant, Chugach Electric and Anchorage's Municipal Light & Power utility could cut back their own consumption of natural gas for power generation and provide this Fairbanks-generated electricity to their customers instead. Burning less Cook Inlet gas for power generation would free up that gas so it could either be reserved for local use sometime in the future, or be used to support new or existing industry in Southcentral or to meet other natural gas needs.

Both of these alternative ways of sharing the benefits of North Slope natural gas with rural Alaskans appear promising, although it is too early to say with certainty how economic and feasible they may actually be. But the important thing is that these possibilities must be explored and evaluated now, so that we can be ready to reserve capacity in the Gas Pipeline during the "open season" and have the gas available to meet these rural opportunities. If we aren't ready when the "open season" opens, it is unlikely that the FERC or the sponsors of the Gas Pipeline will want to wait until we do our homework and figure out how much pipeline capacity we want to reserve for these purposes. Unless we're ready when the "open season" opens, it will be too late until the next "open season" occurs.*

Goal: Attracting new natural gas-based industry to Alaska

Attracting new industry to Alaska would be good even if the existing gas-based industry — the Agrium fertilizer plant and the Marathon-ConocoPhillips LNG plant on the Kenai Peninsula — stays open. If these plants close, attracting new industry could become crucial for meeting in-state residential and commercial needs since the existing and projected demand for residential, commercial and electrical-generation uses in the Cook Inlet area is too small to make even a "Spur Line" very attractive economically.

** It is likely there will be one or more "open seasons" after the initial one. If the Gas Pipeline is built with a 4.5 Bcf-a-day capacity, additional reserves will have to be discovered on the North Slope to keep it full even for the minimum of 35 years currently planned. As those reserves are discovered and become ready to be brought into production, there will be one or more "open seasons" to commit that gas and to set the terms and tariffs for the Pipeline to carry it. In addition, if the Gas Pipeline is ever expanded from its initial capacity, there would be another "open season" for each such expansion to ensure that it is right-sized for the additional gas to be carried, and to ensure that the additional gas will in fact be delivered to the Pipeline once the expansion is made.*

There is a potentially serious conflict, however, between attracting new gas-based industry and the goal of having a Gas Pipeline at all. Suppose, for example, that the Gas Pipeline starts off carrying 4.5 Bcf a day from the North Slope. If all that is removed from the Pipeline for in-state use is 0.183 Bcf a day²⁵ for current residential, commercial and power-generation demand, there is still over 4.3 Bcf a day to go down the Gas Pipeline and cover the costs of building and operating it. But if, in addition to current demand, we took, say, 1.5 Bcf a day for new industries, that would leave only 2.8 Bcf a day* to go down the rest of the Gas Pipeline and cover its costs.[†] Is a Gas Pipeline still economically feasible with throughput that low?[‡]

Goal: Maximizing the value of North Slope natural gas for Alaskans

Primarily this goal equates to maximizing state revenues from the North Slope natural gas. The bulk of state revenue from the gas will be in the form of production tax and royalties on it, and both will depend on the value of the gas delivered to the market Outside minus the costs of transporting that gas to those markets — the value that remains after deducting transportation costs is the “netback” value. The key to achieving this goal, then, is to transport the gas to market Outside as efficiently (i.e., as inexpensively) as possible.

Because natural gas used in Alaska has value for Alaskans beyond simply the potential state revenues from it, this goal of maximizing its value for Alaskans ceases to be purely a matter of maximizing state gas revenues when it comes to in-state use.

Suppose, for example, that gas from the Gas Pipeline (or regasified LNG in the case of the “All Alaska” route) sells for \$7.00 per million Btu** (MMBtu) when it is delivered to its eventual market destination Outside, and suppose further that it costs \$3.00 per MMBtu to get the gas there from the North Slope. This leaves a netback value on the Slope of \$4.00 per MMBtu (\$7.00 Outside minus the \$3.00 to get it there).

* 4.5 Bcf/d going into the Gas Pipeline, minus 0.183 Bcf/d for residential, commercial and power-generation uses and minus 1.5 Bcf/d for the new industry, leaves 2.817 Bcf.

† If one looks only at the Gas Pipeline, the reduction in throughput through the rest of the Pipeline is much less material for an “All Alaska” Pipeline. However, the Pipeline piece in an “All Alaska” project is only part of the picture in getting the gas to market. The rest of the picture is in the LNG tankers that someone is going to have to build, and the LNG regasification plant on the West Coast, and the costs of pipelining the regasified LNG to its ultimate destination from where it is landed on the West Coast.

‡ Suppose the Gas Pipeline is feasible with only 2.8 Bcf a day going through its full length. What happens if it is designed and built for that throughput and then it turns out that the anticipated in-state industry fails to materialize? We’d be stuck with a Gas Pipeline that is 1.5 Bcf-a-day smaller than it could have been. More fundamentally, in order to attract the new industry, who would step forward on behalf of that industry and commit irrevocably to reserve 1.5 Bcf a day of capacity during the FERC “open season” for the portion of the Pipeline between the North Slope and the off-take point where the gas would be taken out for the new industry? Is there even anyone who has the capability of stepping forward and making such a commitment on behalf of new industry?

** Btu stands for British thermal unit, which is a standard unit of measurement for the amount of heat that is released when a particular fuel is burned. Using the cost or price per Btu allows fuels with very different heating values to be compared as alternatives to one another (e.g., natural gas vs. coal vs. fuel oil). A cubic foot of natural gas gives off about 1,000 Btu of heat when it is burned, so the quantity of gas having a heating value of 1 million Btu is about 1,000 cubic feet (or 1 Mcf).

Now suppose it costs \$1.00 per MMBtu to ship the gas from the North Slope to the in-state destination where a new gas-based industry is located. This means natural gas could be sold to the in-state industry at a delivered price of \$5.00 (\$4.00 netback value on the Slope plus \$1.00 to transport it). In terms of the netback value of the gas, it is the same for the State whether the gas stays in Alaska or goes Outside, but the \$5.00 delivered price in Alaska is \$2.00 less than the prevailing market value Outside. This \$2.00 differential is the economic edge that would draw the new industry to Alaska in the first place.

If the goal were purely to maximize state revenues, the State would insist that the gas being sold to the new in-state industry has to be priced at the full market value prevailing Outside (i.e., \$7.00) instead of the \$5.00 in-state price. But this would destroy the non-monetary value for Alaskans of attracting new gas-based industry and jobs to the state.*

* There is a similar conflict between maximizing state revenues and meeting Alaskans' residential, commercial and power-generation needs for natural gas, which arises from the same factors. Maximizing state revenues would mean Alaskans should pay the \$7.00 price for gas instead of the \$5.00 price. There is no reason to take this \$2.00 out of Alaskans' pockets and give it to the State, since doing so creates no additional value for them from that gas.

CHAPTER 2. SETTING PRIORITIES AMONG THE GOALS

We believe Alaska Hire and Alaska Contracting are matters that permeate the other goals identified in Chapter 1. Whether the goal is getting a Gas Pipeline built or meeting Alaskans' energy needs, we cannot imagine the goal being achieved without Alaska Hire and Alaska Contracting playing a part in achieving it. Accordingly, we have not included these twin goals in the following ranking because they are already present, to some degree or another, in each of the others. With this understood, we recommend that the other goals identified in Chapter 1 be ranked as follows, starting with the highest priority and proceeding downward in order to the lowest.

1. Getting a Gas Pipeline built.

If this goal is not achieved, none of the other goals can be achieved either. Therefore no other goal can be as important as this one.

2. Maximizing the value of North Slope natural gas for Alaskans.

Alaska's remoteness from the Lower 48 markets has been the major obstacle to the development of North Slope gas because of the high cost of transporting that gas to market. But, as explained in Chapter 1, that same remoteness creates an opportunity to make North Slope natural gas available in Alaska at prices below those that will be prevailing in the Lower 48. This opportunity arises because it will cost less to transport the gas to an Alaskan destination than to the Lower 48.

Alaska, like the producers of the gas on the North Slope, can afford to be indifferent whether the gas goes to the Lower 48 or to Alaska if the netback value of the gas on the Slope is the same either way.* To the extent the netback from an Alaskan sale is less than the netback from the Lower 48, that sale would represent a subsidy from the State to the purchaser of the gas, which we do not endorse.† To the extent the netback from an Alaskan sale is greater than the Lower 48 netback, the State would be taking advantage of the in-state purchaser for Alaska's remoteness from the Lower 48, which would not be fair.

* An economist would probably say that the supply of gas from the North Slope is greater than the capacity of the Alaskan market to absorb it, and so the supply in excess of in-state demand is the incremental supply that determines the price at which equilibrium is reached in the market between supply and demand, and the netback price at the equilibrium represents the economic value of all of the gas, not just the gas going to the Lower 48.

† If there are to be any state subsidies of in-state gas users, they should not be done through a discounted price but through actual appropriations of the subsidies by the Legislature. This way the subsidy will be scrutinized each year by the people's elected representatives to make sure there isn't a more critical or more important public need for that money. If the subsidy is made through a price discount, the State could be stuck with that for the duration of the gas sales contract, regardless of any other needs that may arise, because "No State shall ... pass any Bill of Attainder, ex post facto Law, or Law impairing the Obligation of Contracts, or grant any Title of Nobility" under Article I, section 10, clause 1 of the United States Constitution (emphasis added).

3. Getting a Gas Pipeline built sooner rather than later.

While there is a potential trade-off between how quickly a Gas Pipeline could be built and how large that Pipeline's capacity would be, it is clear that "sooner" is better than "later" as a general proposition. It appears unlikely at this time that Alaskans will have to choose between having a smaller-capacity Pipeline sooner versus a larger-capacity Pipeline three or four years later. If such a choice does have to be made, we believe that the additional in-state development opportunities (and state revenues) to be gained from having a larger-capacity Pipeline would be worth waiting an extra 3 – 4 years if the choice is between a 2.5 Bcf-a-day Pipeline and a 4.5 Bcf-a-day one. But a similar delay would not be justified if the choice is between 4.5 Bcf a day and, say, 6 Bcf a day, because the current reserves available on the North Slope cannot sustain a 6 Bcf-a-day production rate.

In considering this "sooner versus later" issue, it is important to keep in mind that there does not necessarily have to be a stark choice between a "just ok" pipeline sooner and a "better" one later. If it can be designed and built in a way that readily allows expansion, an "ok" smaller-capacity Gas Pipeline could be built in order to get a Gas Pipeline in the first place (the #1 goal), and then it could be expanded later on as the need and justification arose.

4. Meeting Alaskans' non-industrial natural gas needs.

Although other measures can also be taken to meet current needs — particularly, exploring for new gas reserves in the Cook Inlet area, a pilot project for coal-bed methane development to identify what its actual impacts are in an Alaskan situation, and substituting wind-powered electrical generation for gas-fueled generation — North Slope natural gas seems likely to be a long-term source for residential, commercial and power-generation needs in the Cook Inlet area. It is therefore important that the Gas Pipeline be able to accommodate these needs in a reasonable manner.

5. Making natural gas available to Alaskans in places where it is not available today.

Except in and around Fairbanks (and in Valdez if an "All Alaska Route" pipeline is built), making North Slope natural gas available to people by conventional means (i.e., local "gas grids" and transmission pipelines between communities) promises to be extremely difficult to justify economically, without grants and subsidies to help those Alaskans pay for the natural gas they receive.* But it might well make economic sense to provide them with liquid propane and/or butane extracted from the natural gas and transported to them by barge. Their needs would be small compared to the volume of propane and butane that would be available in the natural gas coming down the Gas Pipeline. A second alternative might be to send rural Alaskans "virtual gas" in the form of electricity generated from natural gas, instead of the physical gas itself.

* The issues of social justice raised by such grants and subsidies lie beyond the scope of this paper.

To the extent that it is economically feasible to deliver North Slope natural gas to Alaskans, it is important to make sure that it is made available to them. In order to have this option at all, it will be necessary to analyze and quantify these needs now so that we are ready to reserve the necessary capacity in the Gas Pipeline when the “open season” opens. Otherwise, we will stand to lose this opportunity until there is another “open season” later on.

6. Attracting new gas-based manufacturing industry to Alaska.

This is an important goal, particularly in the long run, provided it can be done right. There is a kind of chicken-and-egg situation here because industry is likely to come if an assured supply of natural gas is available in Alaska at a competitive price, but at the same time it may be impractical, before the new industry is here, to reserve capacity in the Gas Pipeline during the FERC “open season” to ensure that gas can be delivered to it. Since the “open season” is going to come whether new industry is here or not, it is important that any reservations of firm (take-or-pay) capacity at that time be based upon realistic estimates of what industry will need, rather than Pollyanna-ish over-estimates of what it “might” need.

As with the possibilities for meeting Alaskans’ residential and commercial needs, the opportunities for attracting new industry need to be thoroughly reviewed and the need quantified as soon as possible. The “open season” provides an invaluable chance to make sure future industrial growth based on natural gas can occur. But if we aren’t prepared to use that chance when it opens up for us, we stand to lose it for a long time.

7. Preserving the existing natural gas-based industry in Alaska.

Although this goal would be very worthy in other circumstances, it cannot be a priority for the Gas Pipeline because there is nothing the Gas Pipeline can realistically do about it in time to make a difference.

ENDNOTES

- 1 SOURCE: *Application of Enbridge Inc. ("Enbridge") to the Alaska Department of Revenue Pursuant to AS 43.82.120 for Approvals under the Alaska Stranded Gas Development Act* (30 April 2004), pp. 7 – 10.
- 2 Discussion with Harold Heinze, ANGDA Executive Director (9 December 2005).
- 3 Voltaire, "Le mieux est l'ennemi du bien." See J. Kaplan ed., *Bartlett's Familiar Quotations* (New York: Little, Brown & Co., 16th ed. 1992), p. 306 #19.
- 4 435 U.S. at 525-526, quoting *Toomer v. Witsell*, 334 U.S. 385, 396 and 398 (1948) (citations omitted; square brackets in original)
- 5 *Id.* at 526, again quoting *Toomer* (citation omitted; ellipsis in original; bracketed material added).
- 6 *Id.* (bracketed material added).
- 7 *Id.* at 528.
- 8 *Id.* (emphasis in original).
- 9 *Id.* at 530 (footnotes omitted).
- 10 *Id.* at 531 (footnote omitted).
- 11 SOURCE: DNR Division of Oil & Gas, *2004 Alaska Oil & Gas Report* (December 2004), p. 4-27, Table IV.10 ("Cook Inlet Natural Gas Consumption by Major Group, 1990-2003").
- 12 See Volume 1, p. 45, endnotes 19 and 20 for the historic annual growth factors for home/business use and power-generation use, respectively, over the 1990 – 2003 period. The future consumption figures in the main text equal the average consumption over the last five years, times the annual growth factor raised to an exponent equal to the number of years out the projection is being made. For instance, home/business use grew by an annual factor of 1.031501485 from 1990 to 2003, so projected home/business use 25 years from now equals current use of 0.0322 Tcf/year times 1.031501485²⁵, or 0.06992 Tcf/year (rounded).
- 13 SOURCE: DNR Division of Oil & Gas, *2004 Alaska Oil & Gas Report* (December 2004), p. 4-27, Table IV.10 ("Cook Inlet Natural Gas Consumption by Major Group, 1990-2003").
- 14 SOURCE: "Agrium examining coal option to keep Nikiski plant running," *Anchorage Daily News* (17 November 2005), pp. B-1 and B-2.
- 15 Source: U.S. Bureau of the Census website <http://censtats.census.gov/data/AK/1600216420> (last visited 28 November 2005).

- 16 Source: U.S. Bureau of the Census website
<http://censtats.census.gov/data/AK/1600233140.pdf>
(last visited 28 November 2005).
- 17 Source: U.S. Bureau of the Census website
<http://censtats.census.gov/data/AK/1600206520.pdf>
(last visited 28 November 2005).
- 18 Source: U.S. Bureau of the Census website
<http://censtats.census.gov/data/AK/1600254920.pdf>
(last visited 28 November 2005).
- 19 Sources: U.S. Bureau of the Census websites
<http://censtats.census.gov/data/AK/1600228740.pdf> (Glennallen),
<http://censtats.census.gov/data/AK/1600218620.pdf> (Delta Junction),
<http://censtats.census.gov/data/AK/1600217300.pdf> (Copper Center),
<http://censtats.census.gov/data/AK/1600277800.pdf> (Tok), (each site last
visited 28 November 2005; hyphens at line breaks in any of the preceding URLs
are not part of that URL). These sites can be accessed by going to the Census
directory website <http://censtats.census.gov/cgi-bin/pct/pctProfile.pl>
(the hyphen in “cgi-bin” is part of this URL, but the hyphen at the line break isn’t)
and entering “Alaska” in the left box (if it isn’t already there) and the community’s
name in the right box.
- 20 Source: U.S. Bureau of the Census website
<http://censtats.census.gov/data/AK/1600282200.pdf>
(site last visited 28 November 2005).
- 21 The heating value of propane in its liquid form is 90,500 Btu per gallon, while liquid
butane is 97,400 Btu per gallon. Source: U.S. Environmental Protection Agency
online at [222.epa.gov/ttn/chieff/ap42/-ch01/final/c01s05.pdf](http://www.epa.gov/ttn/chieff/ap42/-ch01/final/c01s05.pdf) (last visited 11
December 2005; hyphen at line break is not part of the URL). For a given quantity of
propane, its volume in its gaseous phase at standard temperature and pressure is
270 times its volume in liquid form. Source: PND Incorporated, Feasibility Study of
Propane Distribution throughout Coastal Alaska (August 2005), p. 3 (“Propane
Facts”) (this PND report was commissioned by the Alaska Natural Gas Develop-
ment Authority). One U.S. gallon equals 231 cubic inches and one cubic foot equals
1,728 cubic inches (= 123), so one cubic foot equals 1728/231, or 7.48052 U.S.
gallons. Thus the heating value per cubic foot of gaseous propane equals —
 $(97,400 \text{ Btu/liquid gallon} \div 270 \text{ gaseous cubic feet/liquid gallon}) \times 7.48052 \text{ gallons/}$
 $\text{cubic foot} = 2,507 \text{ Btu per cubic foot.}$

For butane a similar calculation results in 2,698 Btu per cubic foot of gaseous butane. The heating value of natural gas varies according to the percentages of other gases in it besides methane, but typically natural gas has a heating value of about 1,000 Btu per cubic foot. Thus, relative to the heating value of a cubic foot of natural gas, a gallon of propane represents 2,507/1,000 or 2.5 times as much energy, while a gallon of butane represents 2,698/1,000 or 2.7 times as much.

- 22 Source: PND Incorporated, Feasibility Study of Propane Distribution throughout Coastal *Alaska* (August 2005), p. 3 (“Propane Facts”).
- 23 SOURCE: U.S. Environmental Protection Agency online at 222.epa.gov/ttn/chief/ap42/ch01/final/-c01s05.pdf (last visited 11 December 2005; hyphen at line break is not part of the URL). The volumes of natural gas in the main text assume the natural gas has a heating value of 1,000 Btu per cubic foot.
- 24 See Regulatory Commission of Alaska Docket No.U-97-046, Order [No. 6] Approving Application, Subject to Conditions, and Requiring Filings (31 December 1998), which granted a Certificate of Public Convenience and Necessity to Alaska Intrastate for this system; and related RCA proceedings. See also **CH2MHILL**, *Phase 1 of the Southeast Alaska and Gulf of Alaska Utility Gas Distribution Project* (March 2002), commissioned by Alaska Intrastate.
- 25 The figure given earlier (at p. 6) in this Volume for average in-state residential, commercial and power generation demand during 1999 – 2003 was 0.0669 Tcf per year: $(0.0669 \text{ Tcf/yr} \times 1,000 \text{ Bcf/Tcf}) \div 365 \text{ days/yr} = 0.183 \text{ Bcf/day}$.