

2/28/07

**PRESENTA-
TION: AK
MINING
INDUSTRY &
ANGDA**

ALASKA STATE LEGISLATURE

Sen. Charlie Huggins, Chair
Sen. Bert Stedman, Vice Chair
Sen. Lyda Green
Sen. Gary Stevens
Sen. Lesil McGuire
Sen. Bill Wielechowski
Sen. Thomas Wagoner



State Capitol, Room 119
Juneau AK 99801-1182
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Senate Resources Committee

Joint House Senate Resources Committee Meeting

Wednesday, February 28, 2007

12:00 p.m.-1:30 p.m.

Senate Finance Room 512

AGENDA

Presentation: ALASKA MINING INDUSTRY BRIEFING

By Council of Alaska Producers

Review of Major Mine Projects – Steve Borell, Exec. Dir., Ak Miners Assoc.

Taxation of the Mining Industry – Karl Hanneman, Pres. Council of Ak Producers

**Donlin Creek Workforce Development - George Gardner, President (retired)
Chiulista Camp Services, Inc.**

**Bill Bieber ,Operations Manager,
DonlinCreek Project/Barrick Gold Corp.**



ALASKA MINERS ASSOCIATION, INC.

RE: Mining Industry Taxation

February 2007

Tax, Rent and Royalty History

1. The Mining License Tax was first enacted by the Territorial Legislature in 1913.
2. 1981 - tl. State AG questioned state policy under Section 6(i) of the State Constitution.
3. 1981/82 - Legislature worked on modifications.
4. 1983 to 1987 - litigation over the 6(i) issue.
5. 1987 - Alaska Supreme Court ruled rents or royalties are required.
6. 1989 - Legislature enacted **both** rents **and** royalties.

Taxes presently paid in Alaska by the mining industry

1. Since statehood, the mining industry has been targeted to pay a "special" tax called the Mining License Tax (MLT). This is a 7% net profits tax that applies to all mining operations regardless of land ownership. **This MLT is over and above the corporate tax applied to other industries.**
2. On State land, an additional 3% Net Profits Production Royalty is paid.
3. Claim rentals are paid on state and federal lands.
4. Alaska Corporate Income Tax at 9%.
5. Payments to local governments - for property taxes, sales taxes, direct payments, payments in lieu of tax, etc.

Observations

1. There are **only five large mines** (Usibelli, Greens Creek, Red Dog, Ft Knox, and Pogo) and **one intermediate mine** (Nixon Fork) operating in Alaska. Kensington and Rock Creek are in construction but at both of these projects the Corps of Engineers is being sued over wetlands permits the agency has issued.
2. **In order to significantly increase tax revenue from the mining industry, Alaska needs more large mines.**
3. The mining industry worldwide, including Alaska, is experiencing a period of growth and increased investment. This has been due primarily to **improved metal prices**, which can be

volatile. Improved prices have resulted in increased exploration activity, development of some projects, and new investments are being made in the state.

4. **Metal prices are cyclic** and will swing the other way at some point in time. Metals are a commodity and prices are **established by world markets** and tax increases go directly to the bottom line and reduce the viability of projects. **There is no possibility to pass on any tax to the customer.**
5. Alaska has a **progressive tax structure** for mining. When the miner is successful the State is also successful and shares in that success.
6. Under current tax policy, when metal prices decrease, mines will continue to operate longer before being idled and thereby **provide added stability to local communities by maintaining the jobs.**
7. Mines are **very capital intensive**. New operations can take 5 to 15 years from exploration to first production, and possibly longer, with large amounts of money spent on exploration, environmental studies, mine design, etc. (Kensington - >\$150 million over 16 yr period and still no production; AJ - >\$100 million and then closed and reclaimed with no production.)
8. **Historically, the worldwide mining industry has averaged about a 5% return on investment, significantly below other major industries in Alaska.** Due to these low rates of return, **a net profits tax is the only type of tax that can be paid on a sustainable basis.**
9. The mining industry supports paying its fair share and is now paying higher taxes through the mining license tax.
10. Mining represents **the greatest source of private employment and local revenue in many parts of rural Alaska** and this directly **off-sets State contributions** and provides the basis for these areas to become self supporting.
11. Mining companies have invested in Alaska because of its stable tax and regulatory climate. They have made their decisions based on this situation. In order to continue attracting investment to Alaska, the industry needs this tax stability.
12. Mineral development has the **greatest opportunity for future economic activity in many parts of rural Alaska.** **In much of rural Alaska mineral development may be the only opportunity for creating new, quality, local jobs.**



Issues of Concern to the Alaska Mining Industry for 2007

It is the position of the Alaska Miners Association that:

February 2007

FISCAL ISSUES

1. **State Fiscal Policy** - The Governor and Legislature adopt a long range fiscal plan and a biannual budget cycle. And provide effective funding for the minerals and permitting functions in the Department of Natural Resources, the Department of Community & Economic Development, and the Department of Environmental Conservation.
2. **Annual Airborne Geophysical Mapping Program** - The Legislature and the Governor accelerate the extremely effective program of State investment in airborne geophysical mapping along with water quality mapping.
3. **Baseline Water Data** - The Legislature accelerate funding for collection of baseline water information, focusing on areas where resource development is anticipated.
4. **Mineral Education** - The Legislature continue to support **mining engineering** and **geological engineering** at UAF, and **geology** programs throughout UA at levels that will ensure continued accreditation, as well as the Delta Mine Training Center (DMTC) and the Mining and Petroleum Training Service (MAPTS).
5. **AMEREF (Alaska Mineral & Energy Resources Education Fund)** - The Legislature continue funding of the State's share of this program in the public schools.
7. **Land Transfers** - Prior to any state land transfers to boroughs, **land disposals/sales**, or leases not required for resource development, require a detailed mineral evaluation, to include airborne geophysical surveys, be completed to help ensure that mineralized lands or key access routes are not transferred.
8. **Outdated Federal Withdrawals** - The State pursue removal of old federal land withdrawals (where purpose for withdrawal has expired) which are blocking land transfers to the State, *such as PLO 5150, the outer pipeline corridor*. Encourage BLM to remove such PLOs and open the lands through its land planning process.
9. **Evaluation of State Land Selections** - The Administration continue to pursue land transfers with special emphasis on high value resource lands and lands required for access rights-of-way.
10. **New Federal Withdrawals** - The Governor and Legislature oppose all new federal land withdrawals, roadless initiatives, marine restricted areas, Antiquities Act designations, BLM wilderness studies, etc. and fight vigorously against additional buffers or other restrictions to multiple use of federal lands . Alaska. The Alaska National Interest Lands Conservation Act (ANILCA) provides that "no more" federal land will be withdrawn for parks, preserves, monuments, wilderness designations, wild & scenic river designations, etc.

LAND MANAGEMENT ISSUES

6. **State Lands** - The Governor and the Legislature support **no net loss of multiple use lands** and require that additions to any state parks, refuges, critical habitat areas, marine restricted areas, or any other restricted-use areas, or transfer of state land to federal ownership, be made **only if** an equal acreage of other lands already having the same designation is released and the new area being designated is **first evaluated for mineral potential**.
11. **International Heritage & Biosphere Designations** - The Governor vigorously oppose establishment of international parks, biosphere reserves, and world heritage sites, such as the so-called Beringia (over the Seward Peninsula & Bering Sea), NPRA, or ANWR. International designations would - 1) surrender partial sovereignty to the United Nations, and 2) forever eliminate access across the affected lands and waters.
12. **Federal Mining Law Issues** - The Governor continue to oppose changes to federal law and regulations that would be adverse to Alaska miners.

ACCESS ISSUES

13. **Roads** - The State continue investing in the *roads to resources* program and construct new roads.

14. **Railroads** - The State continue work to define rail layout from the northwest Arctic to a deep water port on Norton Sound and from Eielson AFB to Delta Junction and on to Canada.

15. **Ports** - The State continue development of new/expanded ports at Red Dog, Nome, Cordova, Iniskin Bay, and elsewhere.

16. **RS-2477 Rights-of-Way** - The Administration continue to systematically and aggressively pursue the rights of the State of Alaska regarding RS-2477 rights-of-way, both administratively and in the courts, and that the Legislature provide funding to ensure this is done. Without RS-2477s much of Alaska public lands will never have overland access.

17. **Navigability** - The Administration continue to aggressively pursue recognition of State ownership of all navigable waters granted under the Statehood Act, including the North Fork and Mosquito Fork of the Fortymile River.

OTHER ISSUES

18. **Integrity of Permit Systems** - The Legislature and Administration ensure the integrity of the permit system.

19. **Non-Profit Foundation Money** - Legislation be enacted to require disclosure whenever funds from out-of-state 501(c)(3) foundations are given to Alaska non-profits, to include name of the source, amounts and purpose for which the moneys are given.

20. **Water Quality** - The State continue to revise water quality standards to ensure: 1) availability of **mixing zones**, 2) they are scientifically and technically supportable, 3) they are developed using Alaska-specific criteria, and 4) they are sufficient to protect water quality and support State implementation.

21. **Air Quality** - The State clarify and simplify the air quality regulations. The State utilize third party contractors where possible while maintaining a core staff of State employees to manage the effort.

22. **Jones Act** - Because Jones Act vessels for bulk mineral shipments are not available, the Governor and Legislature should petition Congress to amend the Jones Act to allow use of non-Jones Act vessels for shipment of "*non-petroleum bulk natural resources from Alaska*".

23. **National Environmental Policy Act** - The Administration and Legislature should petition Congress to establish sideboards on the NEPA process and return it to the original intent of the law. NEPA is the single greatest impediment to project permitting.

24. **Wetlands** - The Administration and Legislature should petition the Bush Administration to develop regulations that strictly follow the U.S. Supreme Court decision in SWANCC.

25. **Endangered Species Act/Essential Fish Habitat** - The Administration and Legislature should petition the Bush Administration to develop new ESA and EFH regulations that strictly follow the original intent of these laws.

For further information on the above issues or for information regarding exploration and mining in Alaska please contact:

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STATE OF ALASKA

**ALASKA NATURAL GAS
DEVELOPMENT AUTHORITY**

SARAH PALIN, GOVERNOR

411 WEST 4th AVENUE, FIRST FLOOR
ANCHORAGE, ALASKA 99501

TELEPHONE: (907) 257-1347

February 26, 2007

**WORK PLAN & FUNDING REQUIREMENTS TO ADVANCE THE
Alaska Gas Market System (AGMS) PROJECT**

The AGMS work plan objective is to provide within one year a project description sufficient for producers, pipe-liners, LNG manufacturers & shippers, and customers to make a decision on:

1. a formal application to the State of Alaska under the AGIA RFP,
2. an "open season", and
3. financial commitments to proceed with design and permit applications.

JOINT-WORK PROCESS

ANGDA proposes that the project definition phase of the AGMS be conducted as "joint-work" with any interested parties capable of contributing expertise as participants. ANGDA would provide the funding and working with others select contractors to define the technical parameters needed in the design. All participants would be expected to "contribute" experts to share in the contractor guidance and task reviews.

There are several major technical and business work areas in the project definition phase of the AGMS. While this work needs to be coordinated and integrated, there may be a separate group of experts and contractors for each effort. Ideally, a full-time study leader would be available from the participants experts to be the daily point of contact with contractors for the more dynamic tasks.

A steering committee open to management / project representatives of the participants would meet at regular intervals to review progress and discuss further work requirements.

ANGDA has office space and computer connection resources immediately available for a central work location of a few participants.

PLAN DEVELOPMENT COSTS

A one to two year funding of approximately \$5 million would be required. This presumes a substantial in-kind commitment of technical staff by the participants; including the salary and expenses of their company's project personnel. In addition to funding contractor work, ANGDA would be providing in-kind the administrative costs of contractor management and result publication.

Identification of specific work tasks will be the first major effort of the joint-work participants. To illustrate the range and complexity of Phase I tasks, a draft task-matrix was constructed by Shaw Alaska in concert with a variety of former and current ANGDA contractors (see Shaw Alaska transmittal letter).

The attached Shaw Alaska compilation describes a matrix of 80 tasks within 10 major Project Evaluation Areas. The budget level cost estimate for this work exceeds \$10 million. The joint-work participants will prioritize the efforts to stay within the appropriated funding. Some tasks will be largely accomplished through information contributions and in-kind expert efforts of the participants.

CONFIDENTIALITY

While the use of some proprietary technologies may require confidentiality protection, the joint-work goal is to make as much of the results available publicly as possible. Participants will have the advantage of being part of the detail analysis, but summary presentations at the steering committee level would be public.

POTENTIAL PARTICIPANTS

- Oil & gas companies currently producing or exploring in Alaska including the major Prudhoe Bay lease holders.
- Pipeline companies
- LNG manufacturing, shipping, and/or marketing companies
- Experienced energy project investors
- Alaska utilities
- State of Alaska
- US Federal Government



Shaw Alaska, Inc.

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February 26, 2007

Harold Heinze
CEO
Alaska Natural Gas Development Authority
411 West 4th Avenue, First Floor
Anchorage, Alaska 99501

Re: Phase I Alaska Gas Market System Task Matrix

Dear Mr. Heinze:

Please find attached a working level draft of a **Phase I Alaska Gas Market System Task Matrix**. This Matrix was prepared by Shaw Alaska, Inc. under ANGDA Contract No. 06-0408. This work was performed in concert with various ANGDA contractors and consultants as part of your proposed "joint-work process". A listing of these contributors is enclosed as Attachment A.

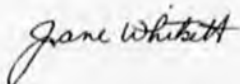
We have collectively identified 10 major Project Evaluation Areas with 80 key technical, program management, economic, regulatory, institutional and legal tasks to be undertaken over the next 1 to 2 years. A table summarizing these Project Evaluation Areas and Tasks and associated budget cost estimates is enclosed as Attachment B. The **Phase I Alaska Gas Market System Task Matrix** is enclosed as Attachment C.

It is expected that the successful conduct of these Project Evaluation Areas and Tasks will advance AGMS to the next level and allow the project to proceed to an 'open season'. It is expected that follow-on work will continue to be accomplished through the "joint-work process".

We look forward to supporting AGMS going forward.

Sincerely,

Shaw Alaska, Inc.



Jane Whitsett, Office Director

Attachment A

Listing of Contributors

Contributor	Affiliation
Kaye Laughlin	ENSR
Bill Popp	Kenai Peninsula Borough
Steve Pratt	ANGDA
Brad Barta	Shaw Stone & Webster, Inc.
Carolyn Dunmire	Dunmire Consulting
OD Odsather	ANGDA
Alan Christopherson	PND
Dempsey Thieman	PND
Joe Griffith	ANGDA
Tony Izzo	ANGDA
Pat Athey	Shaw Alaska, Inc.
Patrick Burden	Northern Economics, Inc.
Jane Whitsett	Shaw Alaska, Inc.
Joe Petrillo	Shaw Alaska, inc.
Cal Kerr	Northern Economics, Inc.
Keith Darby	Shaw Stone & Webster, Inc.
Sue Garven	Shaw Stone & Webster, Inc.

Attachment B

Project Evaluation Areas	Number of Tasks	Cost (\$MM)
Project Scope and Description - Pipelines	9	\$1,410
Project Scope and Description - LNG	10	\$1,135
Project Scope and Description - Gas Conditioning Plant	5	\$850
Project Scope and Description - NGLs	5	\$385
Market Analysis and Needs Assessment	12	\$1,300
Project Management Plan	6	\$900
Preliminary Economic Analysis (Cost and Tariffs)	5	\$475
Reserves and Financing	10	\$1,100
Regulatory, Permitting, Legal and Stakeholder Requirements	12	\$1,585
Key Issues, Risks, Uncertainties and Opportunities	6	\$1,300
Totals	80	\$10,440

Attachment C Phase I AGMS Task Matrix

Project Evaluation Areas

	Tasks	Task Description	Budget Level Cost Estimate
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Project Scope and Description - Pipelines

\$1,410

	Review previous ANGDA Pipeline Studies	Review all ANGDA studies related to pipelines.	\$10,000
	Develop AGMS Pipeline Project Definition Document	Develop Pipeline Project definition document to include high-level design criteria, routing, compressor station locations, sensitive environmental areas, available infrastructure, manpower requirements, contracting strategy, equipment requirements, etc. This document will be revisited after the Open Season to correspond with more detailed gas demand estimates and schedule. This document will also support the regulatory and permitting process.	\$250,000
	Routing reconnaissance and TAPS co-location siting study.	Evaluate potential route options, facility locations, and "choke" points for proposed AGMS pipeline route. Conduct a routing reconnaissance and TAPS co-location siting study. Review the TAPS route alignment and establish those areas where a deviation will be required for a 24-inch diameter pipeline. In addition consider those areas where additional deviations will be required if the pipe diameter is increased to 30 inches, 36 inches, 42 inches and 48 inches. There are areas where the gas line may require deviating from the TAPS System. Also smaller diameter lines could make the routing less critical than the oil line. Heavier equipment required for large diameter pipelines may pose more constraints.	\$500,000
	Review TransCanada and YPC ROWS	Review and evaluate TC Highway and YPC ROWs as alternatives to co-locating AGMS NS pipeline in TAPS ROW. Review TPC ROW from Delta Junction to Valdez.	\$100,000
	Update existing 'Spur Line' ROW	Review existing ANGDA work. Complete matrix of plans/actions required to perfect existing conditional rights-of-way.	\$150,000
	Evaluate Hydraulic and Thermal Pipeline Design & Compressor Station Locations	Evaluate hydraulic and thermal pipeline design alternatives and develop an expendable hydraulic model. Identify approximate size and locations of compressor stations. Develop an energy chart showing pressures and energy requirement by elevation for the length of the pipeline(s).	\$250,000
	Mackenzie Pipeline Application & Design Information	Review to determine applicability to AGMS.	\$50,000
	YPC and Port Authority Applications and Pipeline Design Information	Review to determine applicability to AGMS.	\$50,000
	Evaluate existing infrastructure to support AGMS Pipeline Project construction	Evaluate existing access roads, bridges and public infrastructure that may be used for project implementation. Review the RISE Alaska work for ADOT&PF. Determine critical new project infrastructure requirements.	\$50,000

Project Scope and Description - LNG

\$1,135

	Review previous ANGDA LNG Studies	Review all ANGDA studies related to LNG.	\$10,000
	Develop LNG Project Definition Document	Develop LNG Project definition document to include high-level design criteria, size, site location(s), infrastructure availability, marine and shipping information, permitting and regulatory information (from subsequent tasks) as well as site-specific project execution information (from subsequent tasks). The document will be a resource to solicit third-party interest in the project. It will also be used to support the regulatory and permitting process.	\$250,000
	YPC/Bechtel LNG Project Design	Review and update the YPC/Bechtel LNG design.	\$150,000
	Evaluate YPC / APA LNG Site Alternatives	Determine suitability of the YPC site to accommodate the proposed AGMS LNG facility. Evaluate alternative site locations. Evaluate all site locations with respect to the new FERC seismic criteria.	\$100,000
	LNG Site: FERC Seismic Criteria	Determine the effect of new FERC seismic criteria on the suitability of the Anderson Bay site selected as the LNG Plant site for the YPC project. A preliminary geotechnical engineering review of the site data is necessary.	\$100,000
	Update LNG Plant Cost Estimate	Review available studies of LNG Baseload Plant. Assess impact of FERC seismic criteria and ANGDA desired train size on site location, plant configuration and plant costs. Evaluate effect of increasing train size to 5.0 MM mtpa.	\$150,000
	LNG Plant Modularization Assessment	Determine feasibility and benefits of modularizing the LNG Plant to mitigate manpower availability constraints. Establish an order of magnitude estimate for economic comparisons.	\$100,000
	Floating LNG Plant Assessment	Determine feasibility and benefits of a floating LNG plant to mitigate seismic criteria and manpower availability constraints. Determine ability to utilize ExxonMobil Modular LNG tank design.	\$100,000

Attachment C Phase I AGMS Task Matrix

	Marine Traffic Study	Undertake a marine traffic study to evaluate the viability of safely handling existing and projected oil traffic with the projected LNG carrier traffic. Assume both 125,000 and 250,000 cubic meter capacity LNG carriers and 24-hour turnaround.	\$125,000
	LNG Loading facility requirements	Evaluate operating requirements for QMAX LNG carriers on berth at the proposed LNG site.	\$50,000
Project Scope and Description - Gas Conditioning Plant			\$850
	Develop GCP Project Definition Document	Develop GCP Project definition document to include high-level design criteria, size, site location (s), infrastructure availability, permitting and regulatory information (from subsequent tasks) as well as site-specific project execution information (from subsequent tasks). This will also be used to support the regulatory and permitting process.	\$150,000
	North Slope Gas Off-Take	Establish Allowable North Slope Gas Off-Take. Obtain definitive timeline, analysis from AOGCC estimating the impact of AGMS gas off-take has on hydrocarbon recovery in the PBU. Consider alternatives for CO2 and water reinjection rather than dumping NGL's back down hole.	200,000
	Define GCP Design Basis	Based on initial market assessment, define delivered gas quality requirements. Also review the work that has been undertaken to date and summarize study results.	\$50,000
	Prepare Conceptual Design for the Pipeline Gas Treatment Facility at PBU	Develop a conceptual design for conditioning gas to remove water to very low levels (3¢/a per MMscfd), and CO2, N2, Mercury and H2S if existing in the gas stream. Establish an optimum size for the conditioning train based on modularization. Develop gas export specification that should be attractive to a LNG Base load plant owner/user. Establish an order of magnitude cost estimate for a 1.25 BCFPD and 2.25 BCFPD plant.	\$200,000
	Gas Treatment Plant (GTP) Site Evaluation	Prepare a preliminary GTP site evaluation including location, site plan, logistics, supply & transportation of gas, quality of raw material, schedule for facility construction.	\$250,000
Project Scope and Description - NGLs			\$385
	Summarize previous ANGDA NGL Market Studies	Summarize all ANGDA studies related to NGL.	\$10,000
	Develop NGL Project Definition Document	Develop NGL Project definition document to include high-level design criteria, size, extraction takeoff location(s), infrastructure availability, permitting and regulatory information (from subsequent tasks) as well as site-specific project execution information (from subsequent tasks). This will also be used to support the regulatory and permitting process. This document should identify potential partners, that have resources, technical capabilities, financial capacity, and political strength.	\$100,000
	Determine NGL Quantities and Qualities	Conceptual analysis to confirm quantities and qualities of NGL's. Much of the information will come from the hydraulic pipeline studies (pigging frequency, NGL quantities for varying gas compositions and pressures), and GCP conceptual design.	\$100,000
	Evaluate NGL Markets and Develop Optimal Extraction Locations	Review existing market studies and conduct further analysis to quantify short term and long term markets. Combine Market demand analysis for NGL (location based e.g. Yukon, Fairbanks, Anchorage) with above study to determine NGL extraction locations along pipeline route.	\$150,000
	NGL Project Conceptual Design	Develop a conceptual design for NGL alternative locations.	\$25,000
Market Analysis and Needs Assessment			\$1,300
	Review previous ANGDA Market and Needs Studies	Review all ANGDA studies and Business Plan related to AGMS market assessments.	\$50,000
	Standard Design for Utility Takeoff	Standard design and specification for utility hook ups to the gas transmission line.	\$50,000
	Gas Reserves Estimate	Develop a third party estimate of known reserves and range of uncertainty.	\$50,000
	Rank AGMS Task Within Integrated Energy Plan for Alaska	Evaluate and Rank AGMS within current long term energy plan and strategy for Alaska.	\$100,000
	Review Gas Supply and Demand Forecasts in the Cook Inlet Region	Evaluate Cook Inlet region utility, industrial and residential. Identify and optimize peak requirements and service options. Compile utility, industrial and residential gas consumption forecasts. Synthesize Cook Inlet Energy Market Information, Outlook for Consumers, AGMS Impact/Review ANGDA Bus. Plan and documents to date. Demonstrate how AGMS can resolve issues raised by the Gap Chart and deliverability issues. Reconcile impact of AGMS on Cook Inlet gas market, exploration/production incentives and options.	\$150,000

Attachment C Phase I AGMS Task Matrix

	Review Propane distribution use along coastline, highways and rivers	Build on existing studies to assess LPG market in Alaska, especially delivery to remote villages. Evaluate costs, volumes, and deliverability for LPG. Compile recent studies on potential LPG market, update and fill-in data gaps as needed. Evaluate potential partners and distributors necessary to ensure the success of this operation.	\$100,000
	LNG export Markets	Evaluate LNG export markets in Pacific Rim.	\$150,000
	Evaluate the potential for establishing a petrochemicals industry in Alaska	Evaluate the potential to develop a petrochemicals industry in Alaska at various site locations. Identify optimal locations based on pipeline takeoff points, critical infrastructure requirements, and potential markets in the Pacific Rim.	\$50,000
	Determine the technical and economic feasibility of gas storage options in the Cook Inlet Region including the Beluga Gas Field	Coordinate efforts with ConocoPhillips, ML&P, Chevron, Enstar, Chugach Electric and Marathon.	\$400,000
	Coordinate market assessment and needs issues with RCA, AOGCC et al	An important part of the business plan. Leads to issues and resolutions with potentially RCA, AOGCC, etc. Expand the study made and narrow into the coal centers that will enhance service to the communities and bring value added to our citizens plus money to the STATE.	\$50,000
	Effect of Blue Sky project on demand for natural gas in Cook Inlet	Assuming the Blue Sky project is built as recently described, evaluate effect on gas demand in southcentral Alaska. At present, the Blue Sky project would provide all of the gas needed by Agrium and supply a portion of electricity used in southcentral Alaska.	\$50,000
	Identify propane business plan for rural Alaska energy needs	Identify the business plan and economic effects on the rural propane usage and address short, medium, long-term volumes and impacts at various throughput volumes.	\$100,000
Project Management Plan			\$900
	Evaluate improvements to key infrastructure requirements to support AGMS	Identify and estimate order of magnitude costs for infrastructure improvements to support and facilitate the development of AGMS.	\$150,000
	Develop a Project Execution Plan	Develop a PEP to expeditiously implement the AGMS and move the AGMS Phase 1 project to an Open Season and RCA application. The PEP will include a project management and controls system to control Phase 1 scope, schedule and budget.	\$150,000
	Prepare a Level 1 Project Schedule Identifying Major Milestones	A Level 1 Project Schedule will be developed.	\$100,000
	Prepare an Order-of-Magnitude Cost Estimate for the AGMS	An order of magnitude cost estimate will be prepared for the pipelines, LNG plant, GCP and NGL facilities.	\$250,000
	Develop a list of long-lead time equipment and materials	Develop a list of long lead time items for the AGMS project.	\$100,000
	Identify critical manpower, construction equipment, logistics and technical support requirements	Develop estimates of required man-power, equipment, materials, etc. for the project. This tool would be used to make adjustments as needed to fit available resources, develop estimates of required man-power, equipment, materials, etc. for the project.	\$150,000
Preliminary Economic Analysis (Cost and Tariffs)			\$475
	Evaluate Tariff Structure	Develop tariff for pricing gas and NGL for in-state use. Conduct economic analysis based on a cost-of-service type model to quantify the probable cost of gas for Alaskans. Assumptions on demand, capital costs, etc. will be based on above work efforts. Operating cost estimates for the pipeline and GCP will need to be developed.	\$150,000
	Prepare an Economic Analysis of Cost and Benefits of AGMS	Expand the economic model used in the tariff study above to also include the LNG plant and other aspects of the AGMS project. The benefits model previously developed for ANGDA incorporates a LNG plant and can be modified to incorporate new information. Conduct sensitivity analysis related to key risk areas. Economic analysis to address: a) regional gas demand analysis (based on updating previous studies and above work efforts) b) tariff structure for in-Alaska gas usage (cost-of-service assessment) c) market assessment and market forecast for LNG d) summarize the potential financing options e) perform economic model development for third-party LNG plant.	\$150,000
	Estimate economic impact of AGMS on employment, state revenues, and other measures	Update ANGDA benefits model to reflect AGMS parameters. Determine the economic benefits of a stable, secure supply of gas for 25 years at a fixed price. The results of this analysis will provide information that can be used by ANGDA to seek additional support for the project.	\$50,000
	Provide economic development opportunities for communities	Evaluate AGMS contribution to economic development in communities affected by the project. Look at skills necessary for jobs generated by the project, and the skills available in the community's workforce and define needed training. Coordinate efforts with the Tri-Borough Commission.	\$75,000

Attachment C Phase I AGMS Task Matrix

Update ANGDA business plan	After feasibility of the AGMS components has been satisfied and partners identified, update the existing business plan to reflect this new arrangement.	\$50,000
Financing Options (Reserves and Financing)		\$1,100
Develop general business strategy and option for ownership and financing of the AGMS project	Solicit ideas and input from members of the financing and development community as well as local AGMS Phase I participants.	\$100,000
Development of other Alaska basins	Evaluate options for bringing gas discovered in other basins to market.	\$100,000
Establish a formal on North Slope Gas contract	Work with gas producers to determine their preferred gas sales contract.	\$250,000
Evaluation of financing risks	As a precursor to obtaining financing, the project team must assess risks to the financiers. Focus on construction schedule and cost, regulatory uncertainty, on-shore and off-shore gas market conditions.	\$200,000
Summarize debt and equity options for potential third parties	Include results of economic analysis. Identify risk areas and mitigants.	\$125,000
Solicit interest of project participants in providing equity support	Assess access to equity from operators, material suppliers, constructors. Based on costs of specific elements (LNG plant, gas conditioning facilities, pipelines) of the project, consider factoring investment opportunities into the contracting structure.	\$50,000
Evaluate ownership structure	Explore access to municipal funds, bonds, capital markets, IPO, with due consideration to the loan guarantees program available under the 2004 Federal enabling legislation. Private and public companies have access to different financing mechanisms. Key to the financing strategy is the creation of the right combination of entities.	\$150,000
Evaluation of tax-exempt and tax bond financing, large private placement, large public offering	Explore access to municipal funds, bonds, capital markets, IPO. Assess market's acceptance of financing an infrastructure project of this magnitude in Alaska, the impact that Alaska's "nationalistic spirit" may have on financing.	\$50,000
Determine Applicability of Federal Loan Guarantees	Review the requirements of the 2004 Federal enabling legislation relative to loan guarantees for Alaska gasline projects.	\$25,000
Evaluate RCA financing mechanisms	Several non-traditional financing mechanisms have been proposed for the spur line but it is unknown if RCA will permit such mechanisms. Perform an analysis that compares these non-traditional mechanisms with more traditional financing. Coordinate efforts with key stakeholders.	\$50,000
Regulatory, Permitting, Legal and Stakeholder Requirements		\$1,585
Alaska Regulatory Process: Strategy	Develop a Strategy Plan and Program as a road map to advance the Project with the Regulatory Commission of Alaska (RCA). Develop and deliver a cohesive vision and a transparent and even-handed decision framework to help utilities, local governments and key stakeholders frame options and evaluate risk. The goal of this effort is to provide decision-makers with consistent information about the AGMS and to promote open dialogue of critical program milestones and decision opportunities.	\$150,000
Alaska Regulatory Process: Education and Outreach.	Implement specific measures of the regulatory strategy for the Project including: 1. Training and education for utility boards and local governments. Leverage groups such as Alaska Power Association to conduct training on Open Season process, mock bidding session. 2. Develop and implement a decision framework suitable for evaluating risk and opportunities associated with AGMS and other energy alternatives. 3. Incorporate other key issues related to energy policy in Alaska such as climate change and energy independence into the AGMS decision process. 4. Create and administer a public version of the project schedule and organization chart.	\$200,000
Federal Regulatory Strategy	Develop a Strategy Plan and Program as a road map to advance the Project with the Federal Energy Regulatory Commission (FERC) process governing export of LNG.	\$150,000
Project Permitting Strategy	Develop a Strategy Plan and Program as a road map for the permitting process for the entire project. Numerous environmental and land use authorizations are needed to construct and operate the Project. A strategy to guide the permitting process is necessary to advance the Project in preparation of submitting permit applications to federal and state regulatory agencies. The Strategy will build upon previous work by ANGDA to identify permitting requirements.	\$250,000
Gas Treatment Plant Permitting	Develop and implement specific actions to move forward with pre-permitting activities for the Gas Treatment Plant component of AGMS. Review of the authorizations completed or in progress for the ANGTS GTP.	\$10,000
Critical Data Gaps in Project Permitting	Identify the critical gaps in the body of data that is necessary for preparing and supporting the environmental and land use permits for the Project including the state and federal ROW grants.	\$200,000
Pre-Permitting Work Group	Initiate the permitting process for the AGMS Project by assembling the AGMS Permitting Work Group. The Work Group will consist of staff from resource agencies, AGMS representatives, and other stakeholders. The Work Group will meet regularly to consider environmental, land use, subsistence and socioeconomic protection issues related to permitting the Project. The Work Group will provide valuable early feedback from resource agencies and other stakeholders that will help to advance the Project.	\$100,000

Attachment C Phase I AGMS Task Matrix

Public Education and Outreach Program	Develop and initiate a public education and outreach program for AGMS and utility/coop member decision process. Coordinate information flow in both directions. Create and implement a branding and education campaign for AGMS. Have a transparent and consistent message for the project. 2. Conduct public forums/discussions with Alaska Native communities to include their concerns about the Project, with special attention on subsistence activities and resources.	\$250,000
AGMS NEPA Compliance / EIS Strategy	Develop a road map to achieve NEPA compliance for the Project, including the potential for a third-party EIS or supplemental EIS to cover all components. Consider the opportunity for utilizing the TAGS/YPC NEPA authorizations for the pipeline component.	\$100,000
AGMS Acquisition of TAGS/YPC Permits and Authorizations	Determine if the existing permits and authorizations held by YPC are usable for the AGMS project concept. Identify the process and conditions under which these could be acquired by AGMS.	\$50,000
AGMS Use of TAPS Right-of-Way	Determine the opportunities for utilizing portions of the TAPS ROW for the AGMS pipeline, compressor stations, or other facilities. Review the Project technical data and conduct discussions with regulatory agencies (JPO) and TAPS Operators (Alyeska Pipeline Service Company). Identify options for sharing costs with TAPS.	\$50,000
ROW Grant and Permit Conditions Matrix	Compile and correlate the requirements of the conditional ROW Grants and permits issued for the ANGDA Spur Line and the TAGS/YPC project to date. Initiate development of the plans and programs to satisfy the ROW conditions and other permit stipulations.	\$75,000

Key Issues, Risks, Uncertainties and Opportunities **\$1,300**

Evaluate a Fast Track Permitting Strategy	With the current support to bring North Slope gas to market, consider developing an early permitting and licensing program in concert with key Alaska agencies. Conduct high-level coordination with federal and state agencies to consider options to reduce permitting timelines, building upon the existing Joint Pipeline Office structure.	\$150,000
Implement a Comprehensive Public Outreach and Stakeholder Relations Program	Design a public outreach and stakeholder relations program to ensure that AGMS is understood by all stakeholders. Provide a forum for comments and input to the Phase 1 project as it moves forward.	\$250,000
Quantify Risks and Rewards	Identify and quantify major risks, uncertainties, mitigating measures, opportunities, and rewards for the AGMS.	\$100,000
New Technology and Innovations	Evaluate technology developments that could materially impact the cost and schedule of the AGMS project.	\$100,000
Identify and Option Critical Logistical Sites	Review utilization and suitability of selected sites for work camps, site preparation, long-lead orders for pipe, supplies, prepositioning of material, management plan and assignment of responsibilities. Take options on existing critical sites and prepare applications for new sites.	\$500,000
Open Season' Preparation	Develop and provide educational/informational workshops for utility participation in open season. Provide workshops on Offtake Points, Cost Drivers, FERC Open Season Rules, FERC/RCA approval timeframes, Potential for State Royalty gas, Open Season Bid Components, Gas Supply Chain, Financial Commitment Requirements. Conduct Practice Open Season.	\$200,000

GRAND TOTAL FOR ALL WORK GROUPS \$ 10,440

Alaska Gas Market System (AGMS)

A Conceptual Gas Line Project Proposal (North Slope Gas To Market)

Released on January 29, 2007



**Alaska
Natural Gas Development Authority**

"Connecting Alaskans To Their Natural Gas"

STATE OF ALASKA

SARAH PALIN, GOVERNOR

411 WEST 4th AVENUE, FIRST FLOOR
ANCHORAGE, ALASKA
99501

**ALASKA NATURAL GAS
DEVELOPMENT AUTHORITY**

TELEPHONE: (907) 257-1347

January 29, 2007

To: Board of Directors
Alaska Natural Gas Development Authority (ANGDA)

RE: Alaska Gas Market System (AGMS) Project Proposal

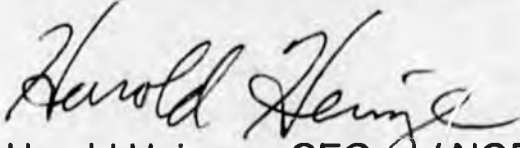
Dear ANGDA Board Members:

On December 5, 2006, Governor Palin challenged ANGDA to develop an Alaskan based project to connect North Slope gas to market. The attached proposal for your consideration is based on multiple studies conducted over several years.

The AGMS project proposal is intended to be advanced simultaneous with other efforts. This conceptual proposal is a starting point for the initial effort of project development and the project will be improved as the joint-design process advances. ANGDA intends to work with any and all interested experienced parties in a co-operative non-exclusive study effort leading to a project definition and open season within one to two years.

The AGMS project proposal overcomes several key public and legislative concerns highlighted during the public review process of the Stranded Gas Act gas line contract. AGMS is a very "doable" project that can be built with an Alaskan workforce and can provide a timely solution to Alaska's energy crisis.

ANGDA is an essential participant to make the AGMS project proposal happen, but the work effort will consume the entire staff, contractor, and funding resources of ANGDA. I ask for your concurrence and support.


Harold Heinze, CEO, ANGDA

The Alaska Gas Market System (AGMS)

A Project Proposal For Alaska's North Slope Gas

Preamble

There is a growing concern at Alaska Natural Gas Development Authority (ANGDA) that inadequate attention has been given to the political, regulatory, and legal difficulties of building the Alaska Gas-line through Canada. This concern has been fueled by the inability of the supporters of the Mackenzie gas pipeline to move that project forward. We are concerned that the proposed large Alaska Gas-line project will ultimately be indefinitely delayed because of problems (Canadian) beyond Alaska's control.

Additionally a large diameter gas-line down the Alaska Highway necessitates the participation of Exxon, BP and Conoco Phillips as shippers. As we have seen over the past four years, striking a deal that has their unanimous support is problematic in itself, and may not be in the best interest of the State. None of these companies has shown any inclination to back down from the contract negotiated by the Murkowski administration which met substantial criticism from the public, and did not have the requisite legislative support.

We believe Alaska's Governor, the Alaska Legislature, and the People of the State of Alaska need to consider a project primarily dedicated to providing natural gas to Alaskan markets.

Project Summary of Alaska Gas Market System (AGMS)

This project concept provides a 1.25 BCFPD (billions of cubic feet of gas per day) linkage of the Prudhoe Bay Field on Alaska's North Slope to in-state natural gas markets in Cook Inlet, Fairbanks, Valdez and the Yukon River. The buried high-pressure gas pipeline follows the

general alignment of the existing TAPS oil pipeline to Valdez. An additional connector gas pipeline links Glennallen to the existing natural gas facilities and the Beluga gas field in the northern Cook Inlet area. Gas and propane are provided for along the route with connections specified at the Yukon River, Fairbanks, North Pole, Delta Junction, and Glennallen. A new 2-train LNG plant and loading dock is constructed at the Port of Valdez.

The Alaska Gas Market System (AGMS) initially delivers gas to Fairbanks and Cook Inlet to replace the depleting gas reserves used for heating and electric power generation (0.25 BCFPD). The first increment of full gas pipeline operations adds a pipeline to serve a single-LNG train in Valdez for gas export and NGL separation at several locations (total of 0.75 BCFPD). In the final configuration, compressors are added to increase throughput to serve a second-LNG train and new petrochemical plants (1.25 BCFPD capacity).

COST & TARIFF

The AGMS conceptual project would cost \$5 B (billion US dollars) to deliver gas to both tidewater locations (\$4 B for pipelines and \$1 B for North Slope gas conditioning). The estimated annual revenue requirement would indicate a tariff in the range of \$1- to \$2-per-mmbtu (millions of btu) from the North Slope to Valdez and Cook Inlet. The LNG plant and loading facilities in Valdez for 7 mmtpa (millions of tons of LNG per year) would cost \$3 B, with a \$1.00- to \$1.50-per-mmbtu tariff implied to meet annual revenue requirement. Downstream cost-of-service charges for marine LNG transport and re-gasification are estimated at a \$1.00- to \$1.50-per-mmbtu using available ships and terminals.

RESERVES & FINANCING

Financing of the pipeline systems would be based on firm shipping commitments made during an "open season" process early in the

system line sizing determinations. Gas sales contracts committing 10 TCF (trillion cubic feet of gas) of Prudhoe Bay gas would also be required. This project concept assumes that at least one working interest owner (7 TCF is held by each of the 3 major lease holders) and the State of Alaska's 3 TCF are available. This 40% of the total Prudhoe Bay gas reserve will support a 1.25 BCF/D offtake for over 20 years.

Additionally there is another 6- to 10-TCF of known, but undeveloped gas, that alternatively could provide a basis for the AGMS project. Gas explorers are anxious to drill along the pipeline corridor in the northern foothills of the Brooks Range and the discovery of an additional 2 TCF could be handled by expansion of the AGMS.

PROJECT TIMELINE

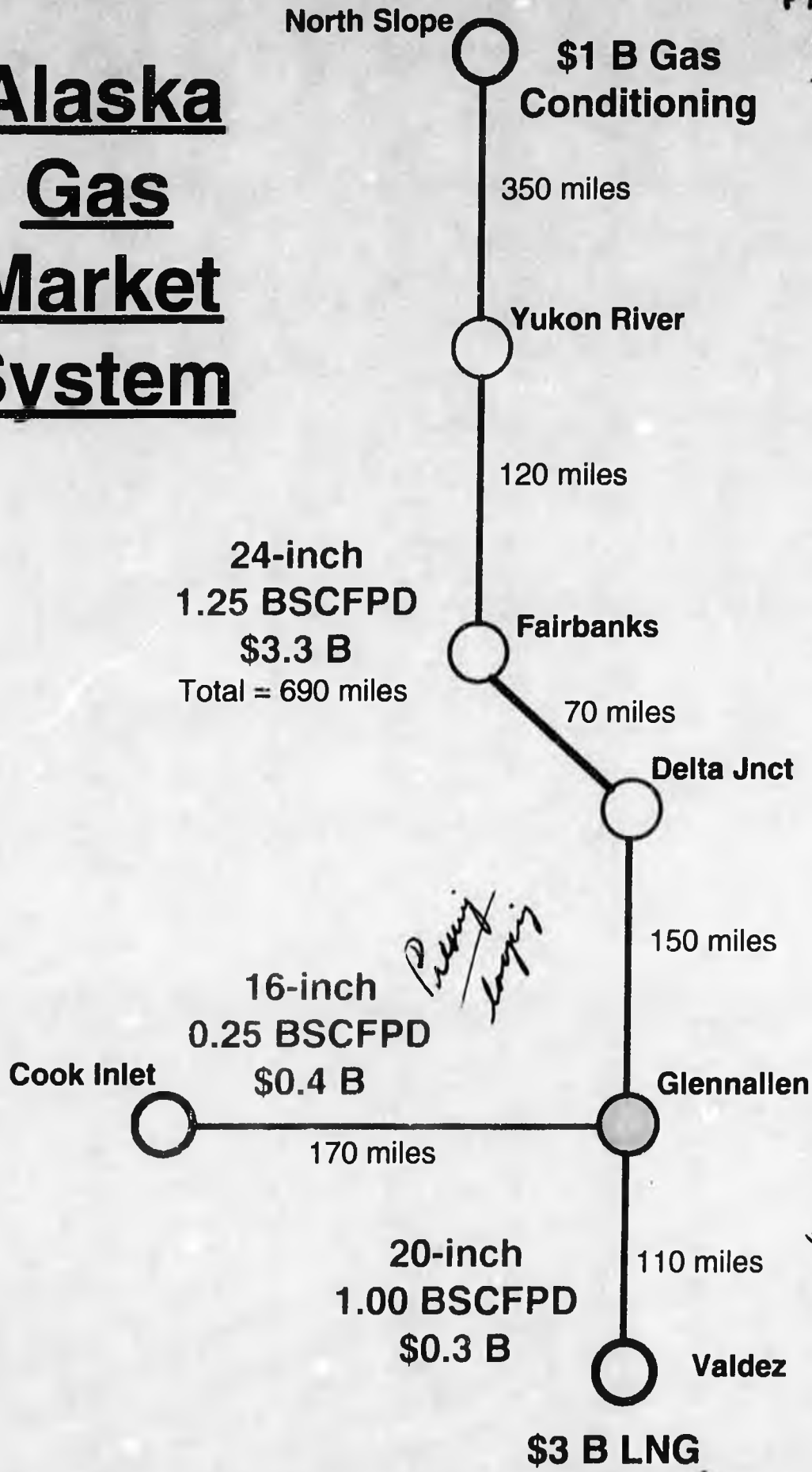
The six plus year span of the project conceptual schedule includes a year of project description and an additional year for conditional regulatory approvals and financing. Procurement, logistics setup, and right-of-way are the major tasks in the projects third year, followed by a three year construction period. Project phasing and early startup would allow gas to flow all the way to Cook Inlet prior to the availability of the Valdez LNG plant or North Slope conditioning facility.

MARKETS

The AGMS project will deliver North Slope gas to 4 major markets:

1. natural gas to local utilities for heating and electric power generation
2. propane at several points for distribution along the coastline, highways, and rivers
3. A Valdez LNG manufacturing plant for LNG tanker shipment to US and other Pacific Rim markets
4. Industrial and petrochemical plants in the Cook Inlet area

Alaska Gas Market System

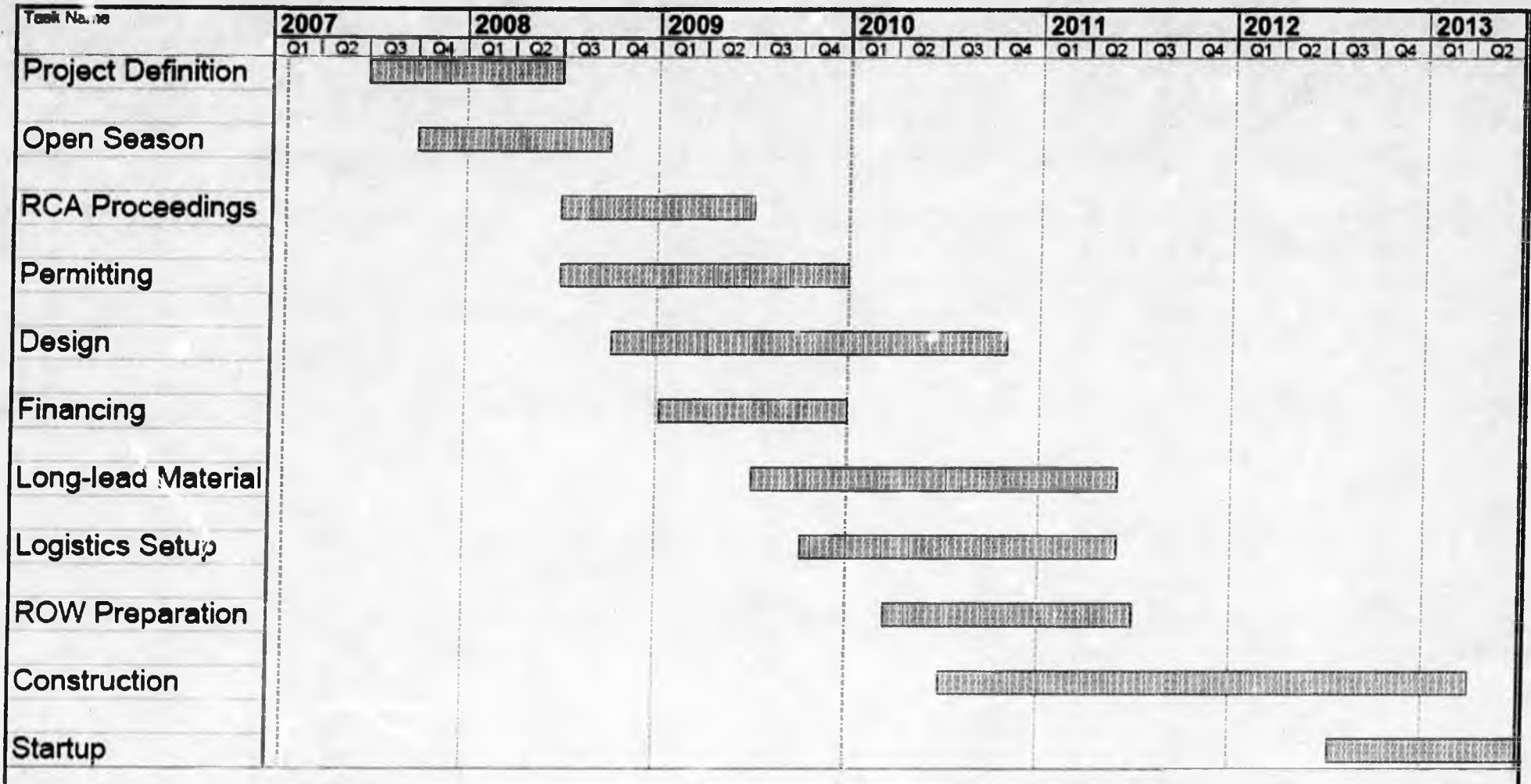


Alaska Gas Market System

<u>Pipeline Segment</u>	<u>Miles</u>	<u>Diam</u>	<u>BCFPD</u>	<u>k\$/Inch-mile</u>	<u>Cost</u>
North Slope to Glennallen	690	24	1.25	200	\$3,312
Glennallen to Cook Inlet	170	16	0.25	150	\$408
Glennallen to Valdez	110	20	1.00	150	\$330
<u>Total Cost (\$ B)</u>					\$4,050
Cook Inlet Share of Cost					\$1,070
Valdez Share of Cost					\$2,980
<u>10% / Yr Revenue Required</u>					
Tariff to Cook Inlet					\$1.17
Tariff to Valdez					\$0.32
<u>\$2.50 to Chicago Equivalent</u>					
Tariff to Cook Inlet					\$2.04
Tariff to Valdez					\$1.42
<i>Prepared by Harold Heinze of ANGDA on 01/24/07</i>					

Alaska Gas Market System Project Proposal

Project Tasks and Conceptual Timeline



Prepared by Joe Griffith and Harold Heinze for ANGDA on 01/24/07

The Alaska Gas Market System (AGMS)

WORK PLAN TO ADVANCE THE AGMS PROJECT

The work plan objective is to provide within one to two years a project description sufficient for producers, pipe-liners, LNG manufacturers & shippers, and customers to make a decision on submitting a formal application.

JOINT-STUDY PROCESS

ANGDA proposes that the project definition phase of the AGMS be conducted as "joint studies" with any interested parties capable of contributing expertise as participants. ANGDA would provide the funding and working with others select contractors to define the technical parameters needed in the design. All participants would be expected to "contribute" experts to share in the contractor guidance and study reviews.

There are two major technical study areas in the project definition phase of the AGMS: pipelines and LNG plant. While this work needs to be coordinated and integrated there may be a separate group of experts and contractors for each effort. Ideally, a full-time study leader would be available from the participants experts to be the daily point of contact with contractors.

A steering committee open to management / project representatives of the participants would meet at regular intervals to review study progress and discuss further work requirements.

ANGDA has office space and computer connection resources immediately available for a central work location of a few participants.

CONFIDENTIALITY

While the use of some proprietary technologies may require confidentiality protection, the joint-study goal is to make as much of the study results available publicly as possible. Participants will have the advantage of being

part of the detail analysis, but summary presentations at the steering committee level would be public.

POTENTIAL PARTICIPANTS

- Oil & gas companies currently producing or exploring in Alaska including the major Prudhoe Bay lease holders.
- Pipeline companies
- LNG manufacturing, shipping, and/or marketing companies
- Experienced energy project investors
- Alaska utilities
- State of Alaska
- US Federal Government

PLAN DEVELOPMENT COSTS

A one to two year funding of approximately \$5 million would be required. This presumes a substantial in-kind commitment of technical staff by the participants; including the salary and expenses of their company's project personnel. In addition to funding contractor work, ANGDA would be providing in-kind the administrative costs of contractor management and study result publication.

Identification of specific study efforts will be the first major effort of the joint-study participants, but may include by way of example:

- Project execution plan
- Construction of the North Slope gas conditioning plant as a pipeline facility (as opposed to a PBU production facility)
- Review of Mackenzie gas pipeline cost information publicly filed
- Co-use of the entire TAPS right-of-way

Evaluation of Alternative Project Proposals by the State of Alaska

Getting North Slope Gas to Market Using the AGMS

The Alaska Gas Market System (AGMS) project proposal addresses several key concerns voiced about alternative project proposals to getting North Slope gas to market.

Delays in Construction of Canadian Pipeline Segments

The multi-year delays being experienced in the review of the Mackenzie gas pipeline in northern Canada challenges the producer sponsor group's presumption of a comparable approval timeline with the Canadian National Energy Board (NEB) process equivalent to Federal Energy Regulatory Commission (FERC). While the environmental, native, and independent explorer concerns may be resolved by the NEB; the constitutional requirements for "consultation" being litigated are far from final rulings and legislative changes.

The AGMS project proposal does not include a Canadian route segment, it represents an alternative that will allow development of North Slope gas even if internal Canadian issues prevent timely action. When a much larger future Canadian gas pipeline is constructed, the AGMS project can carry all the natural gas liquids (NGL's are ethane, propane, butane) separately to premium component markets as part of its continuing operation supplying natural gas to SouthCentral Alaska. It may be strategic to advance AGMS until it is certain that no major Canadian delays can occur.

Gas Pipeline Design Basis Exceeds Reserve Base

A very large 4.5 BCFPD project proposal assumes a 50 TCF gas reserve is available to support a financially viable gas line project life.

The known developed reserves of the North Slope are estimated at only half that (24 TCF in Prudhoe Bay). Financers normally require that the decade's long commitments in gas sales and transportation contracts be made at some discount of even the high-probability US Security Exchange Commission (SEC) booked reserves. While the North Slope has potential for more gas discoveries; the size, timing, and development cost of gas discoveries should be recognized as speculative.

The AGMS project is based on a reserve basis of 10 TCF committed to the project (approximately 40% of Prudhoe Bay gas). At a minimum the commitment of one member of the producer group and the State of Alaska royalty gas would be required. If one or more gas owners at Prudhoe Bay supports AGMS as an appropriate project to market their gas as required under the State of Alaska lease, they can proceed at their own risk and expense. Reservoir management issues within the Prudhoe Bay Unit are subject to rulings by the Alaska Oil & Gas Conservation Committee (AOGCC) and confidential studies of a permissible gas off-take rate are currently under way.

The Next Step For All The Project Proposals Is An "Open Season"

None of the project proposals are ripe for final approval by the core sponsors. Throughputs for design and market support for financing will only be known when all potential shippers and consumers have sufficient information to make the multi-billion dollar commitments during an "open season" process. All of the proposals require further design, analysis, field data gathering and regulatory review as parallel tasks in developing the information to advance the project to the next level.

The AGMS project proposal benefits from the ANGDA studies to date and may be advanced significantly by study work already performed by potential joint study participants and future public filings. An expenditure of \$5 million in a variety of contractor studies will result in a defined project.

The vast majority of that work is directly usable if the AGMS project is restricted to an in-state spur pipeline with a tie-in from a larger alternative project.

Gas Line Project Is Strengthened By Involvement Of Independent Parties

The AGMS project proposal of ANGDA is a starting point to be built on by ALL interested parties that can contribute expertise during a "joint study" process leading to the public information put forward at a level-field open-season. It is reasonable expectation that every aspect of the project proposal (size, ownership, market, schedule, cost, etc) will be tested against individual company and group criteria and changes made. The AGMS has been purposely defined as a minimal stand-alone project that is very doable and supported by strong market forces. ANGDA's role is to support the joint study (through contractors) and assure a maximum amount of public transparency at a summary level of all the analysis.

And Finally

North Slope gas has waited over 35 years to get to market. Several times, projects have made good progress only to fall back and fail. New basin explorers are poised to look for more gas in Alaska if we can just get a first link to move gas. While the AGMS project concept may not be the biggest of North Slope gas transmission alternatives, it is economic and feasible, and meets Alaska's needs in every way.

The AGMS is a doable project concept that must be allowed to mature.

Alaska Gas Market System --- Cost & Tariff Estimates

Pipeline Segment	Miles	250 mmscfd to Cook Inlet						500 mmscfd to Cook Inlet						Stressed		Best	
		Diam		BCFPD		Diam		BCFPD		Diam		BCFPD		Diam		BCFPD	
North Slope to Glennallen	690	24	1.25	24	0.75	24	0.25	24	1.25	24	1.00	24	0.50	16	0.10	30	2.00
Glennallen to Cook Inlet	170	16	0.25	16	0.25	16	0.25	20	0.50	20	0.50	16	0.50	16	0.10	20	0.75
Glennallen to Valdez	110	20	1.00	20	0.50	0		20	0.75	20	0.50	0		0		24	1.25
Total Cost (\$ B)		\$4.1		\$4.1		\$3.7		\$4.2		\$4.2		\$3.7		\$2.6		\$5.0	
Cook Inlet Share of Cost		\$1.1		\$1.5		\$3.7		\$1.8		\$2.2		\$3.7		\$2.6		\$2.1	
Valdez Share of Cost		\$3.0		\$2.5		\$0.0		\$2.3		\$2.0		\$0.0		\$0.0		\$3.0	
10% / Yr Revenue Required																	
Tariff to Cook Inlet		\$1.17		\$1.66		\$4.08		\$1.01		\$1.19		\$2.04		\$7.17		\$0.75	
Tariff to Valdez		\$0.82		\$1.39		na		\$0.85		\$1.09		na		na		\$0.65	
\$2.50 to Chicago Equivalent																	
Tariff to Cook Inlet		\$2.04		\$2.88		\$7.09		\$1.75		\$2.06		\$3.54		\$12.46		\$1.31	
Tariff to Valdez		\$1.42		\$2.42		na		\$1.47		\$1.89		na		na		\$1.14	

Prepared by Harold Heinze, CEO of ANGDA on 01/23/07

STATE OF ALASKA

ALASKA NATURAL GAS DEVELOPMENT AUTHORITY

SARAH PALIN, GOVERNOR

411 WEST 4th AVENUE, FIRST FLOOR
ANCHORAGE, ALASKA 99501

TELEPHONE: (907) 257-1347

December 27, 2006

To: Governor Sarah Palin
Lt. Governor Sean Parnell
Commissioner Pat Galvin
Commissioner Marty Rutherford

From: Harold Heinze

Subject: Follow Up To December 5, 2006. Meeting on North Slope Gas

Please find attached several narrative pages, tables, and a diagram summarizing ANGDA's understanding of project alternatives to deliver North Slope gas to Alaska markets.

While this is a high-altitude overview of project feasibility, we find it encouraging that an in-State gas pipeline is economic and can result in lower costs to Cook Inlet area gas users (especially when a Valdez LNG project happens).

ANGDA has worked on several aspects of these recommended projects and we are ready to take the lead in the focused definition efforts that are needed to advance this conceptual phase.



Copies To: ANGDA Board Members
Mike Tibbies - Chief of Staff
John Bitney - Legislative Liason
ANGDA Contractors

Summary of ANGDA Analysis

Alaska Gasline System

This project summary is a follow up to ANGDA's briefing of Governor Palin's on December 5, 2006. The alternatives for an in-State gasline system based upon Alaska gas markets were defined and the costs to deliver North Slope gas to Cook Inlet area gas consumers were estimated using comparative assumptions.

The attached tables demonstrate the following conclusions:

- The lowest cost of delivering gas to Cook Inlet is a project with a large diameter gasline to Delta Junction and a spur pipeline system connection into the Cook Inlet area.
- A gas pipeline system segment from Glennallen to Valdez delivering gas to even a small LNG project significantly lowers the gas delivery cost to Cook Inlet.
- A gasline from the North Slope, designed for the Alaska gas market only, is economically feasible if there are major industrial gas users in Cook Inlet and/or an LNG project in Valdez.
- The utilization of lower-interest-rate utility debt-structures (pledge of consumers approved by RCA) can significantly reduce the delivered cost to Cook Inlet gas consumers (up to 40% reduction).

ANGDA recommends, that in the best interest of Alaska gas consumers, the State focus its in-State project definition efforts and leadership on:

- A 16- to 24-inch spur gas pipeline system connecting Delta Junction to Cook Inlet and Valdez.

- A 16- to 24-inch gas pipeline connecting Prudhoe Bay Field to Delta Junction via Fairbanks.
- Potential gas service connections in Fairbanks, at the Yukon River bridge, and other Alaska sites along the route (including a propane distribution / utilization demonstration project for rural communities)
- Utilization of a 16- to 24-inch direct pipeline linking the North Slope to Cook Inlet and Valdez to carry the entire NGL content of larger gas volumes associated with a future very large diameter gas pipeline system through Alberta to the Mid-West.
- Receiving and inter-connection facilities and pipelines to interface with existing gas infrastructure in Cook Inlet.
- A 20- to 24-inch gas pipeline connecting Point Thomson Field to Cook Inlet and Valdez
- Conceptual design of LNG manufacturing facilities and storage to be located in Valdez (joint study with all potential LNG plant and LNG tanker builders, operators, and owners).

Further ANGDA observations on the conduct of the project definition efforts:

- In addition to the project design, engineering, construction planning, cost estimates, and logistics it is essential that work on permitting, financing, and customer development for the project proceed in parallel efforts.
- The State should encourage private-sector companies to contribute to these early project definition steps with the intention that companies may come forward that have the interest, experience, capability, and financial commitment necessary for the companies to assume the project management role and provide a maximum benefit to Alaskans.
- In any of these efforts the work should be publicly available and be communicated at appropriate intervals.

Methodology

- A simplified spread sheet model was created of a multi-node in-State gas pipeline system (see system diagram and mileages).
- Gas pipeline diameters were selected based on approximated maximum flow capacity: (implied reserves needed to support 20 years at flow capacity also shown)

12-inch	0.125 BCFPD	1 TCF
16-inch	0.250 BCFPD	2 TCF
20-inch	0.750 BCFPD	6 TCF
24-inch	1.250 BCFPD	9 TCF
36-inch	3.000 BCFPD	22 TCF

- Pipeline costs, including compressor stations, were estimated using a conservative assumption of \$150,000 per inch-diameter mile.
- A Cook Inlet share of the total pipeline system cost was estimated by proportioning the cost of each segment based on the ratio of Cook Inlet flow rate to the total flow rate in that segment.
- Calculations were performed at a variety of flow rate assumptions based on general usage numbers:

0.125 BCFPD	residential & commercial heating with gas
0.250 BCFPD	heating plus electric power generation
0.500 BCFPD	current CI consumption with industrial users
0.500 BCFPD	single train LNG plant in Valdez (3 mmtpa)
0.750 BCFPD	max gas off-take rate from Pt Thomson
3.000 BCFPD	max gas off-take rate from Prudhoe Bay

- A utility tariff structure was approximated by setting an annual revenue requirement of ten-percent of the proportioned Cook Inlet capital cost (see report by First Southwest Company on ANGDA website)
- Also, a tariff structure equivalent to the Sponsor Group's announced \$2.50 tariff to Chicago was estimated by scaling the Cook Inlet flow rate and proportioned cost using ratios compared to the 4 BCFPD flow rate in a very large diameter pipeline system costing \$21 billion.

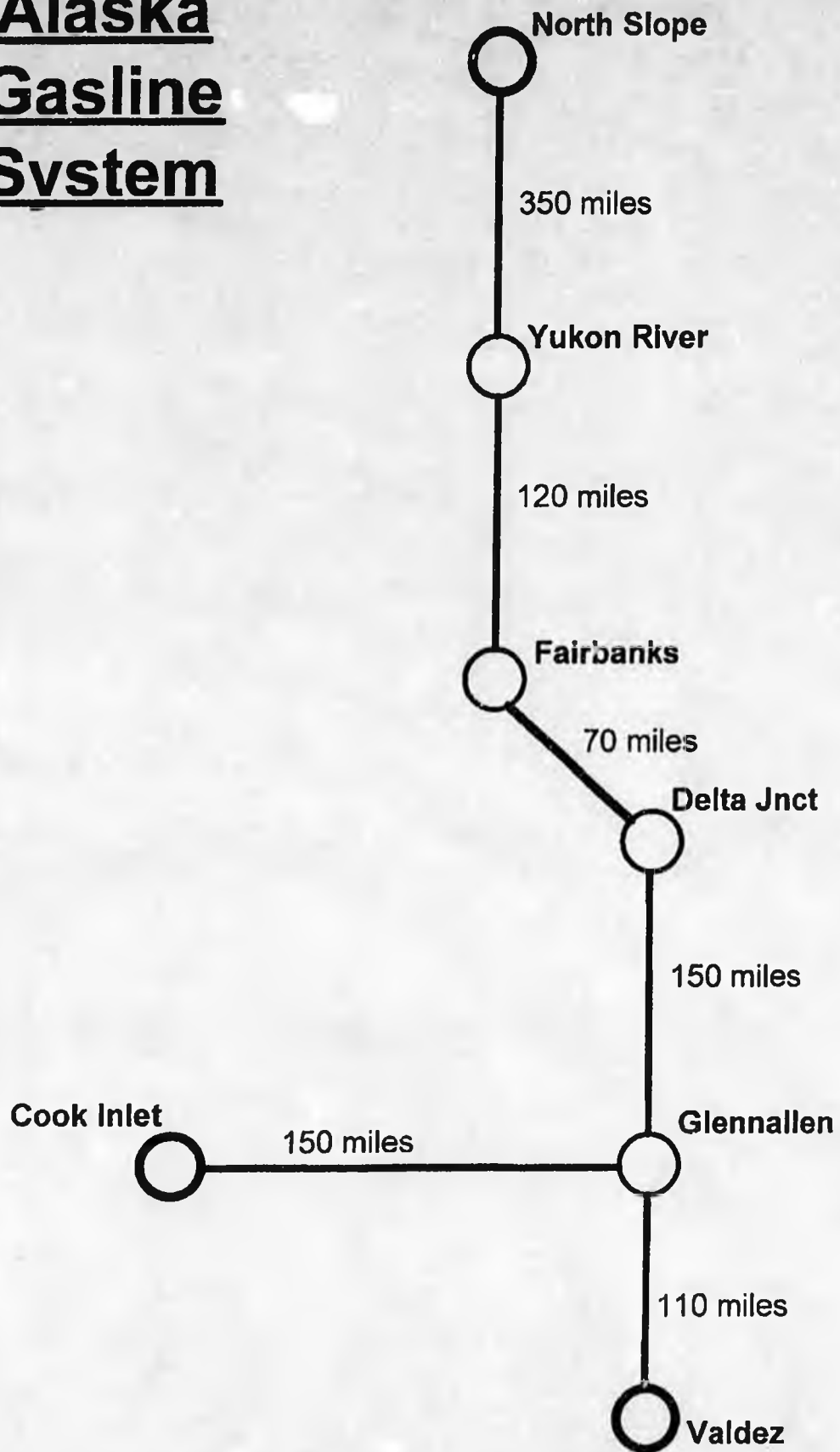
Alaska Gasline System

Comparison of Different Configurations

	<u>Cook Inlet Rate (MCFPD)</u>	<u>Valdez Rate (MCFPD)</u>	<u>Tariff To Cook Inlet</u>
<u>Spur Off Large Pipeline to Delta</u>			
	250	0	\$1.83
	250	500	\$1.43
	250	1000	\$1.35
<u>Line To Cook Inlet & Valdez Only</u>			
	250	0	\$3.84
	250	500	\$2.00
	250	1000	\$1.63
<u>Gasline To Cook Inlet Only</u>			
	125		\$5.76
	250		\$3.84
	500		\$2.40
<u>Assumed North Slope to Chicago Tariff</u>			\$2.50

Prepared by Harold Heinze of ANGDA on 12/26/06

Alaska Gasline System



Alaska Gasline System

Estimated Price of North Slope Gas In Cook Inlet

	<u>Spur Off Large Pipeline To Delta</u>	<u>Line to Cook Inlet & Valdez Only</u>	<u>Gasline to Cook Inlet Only</u>
Chicago Gas Price	\$5.50	\$5.50	\$5.50
Tariff to Chicago	\$2.50	\$2.50	\$2.50
Netback Gas Value on North Slope	\$3.00	\$3.00	\$3.00
Tariff In Large Gasline	\$0.46 ⁽¹⁾	\$2.00 ⁽³⁾	\$3.84 ⁽⁴⁾
Tariff In Spur Pipeline	\$1.37 ⁽²⁾		
Gas Value in Cook Inlet	\$4.83	\$5.00	\$6.84
<u>Assumption Footnotes</u>			
(1) 540 miles of 36" line carrying 3.00 BCFPD			
(2) 300 miles of 16" line carrying 0.25 BCFPD			
(3) 690 miles of 20" line carrying 0.75 BCFPD			
150 miles of 16" line carrying 0.25 BCFPD to Cook Inlet			
110 miles of 20" line carrying 0.50 BCFPD to Valdez			
(4) 840 miles of 16" line carrying 0.25 BCFPD			

Alaska Gasline System -- DIFFERENT CONFIGURATIONS -- Cost of Service Comparison

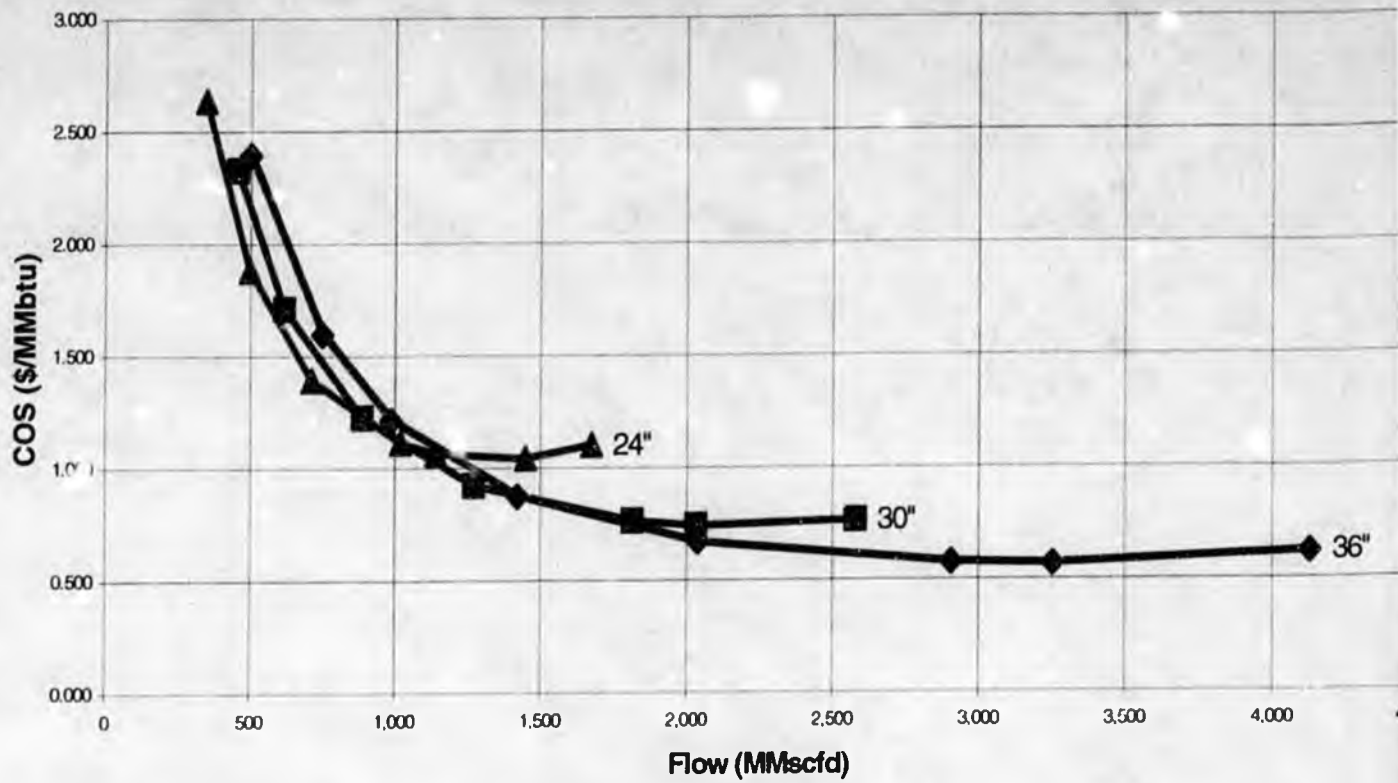
Pipeline Segment	Miles	Spur Off Large Pipeline to Delta						Line To Cook Inlet & Valdez Only						Gasline To Cook Inlet Only							
		Diam		BCFPD		Diam		BCFPD		Diam		BCFPD		Diam		BCFPD		Diam		BCFPD	
North Slope to Delta Jct	540	36	3.00	36	3.00	36	3.00	16	0.25	20	0.75	24	1.25	12	0.125	16	0.25	20	0.50		
Delta Jct to Glennallen	150	16	0.25	20	0.75	24	1.25	16	0.25	20	0.75	24	1.25	12	0.125	16	0.25	20	0.50		
Glennallen to Cook Inlet	150	16	0.25	16	0.25	16	0.25	16	0.25	16	0.25	16	0.25	12	0.125	16	0.25	20	0.50		
Glennallen to Valdez	110	0		20	0.50	24	1.00	0		20	0.50	24	1.00	0		0		0			
Cost at \$ 150 k/Inch-mile																					
Total System Cost		\$3,636		\$4,056		\$4,212		\$2,016		\$2,760		\$3,240		\$1,512		\$2,016		\$2,520			
Proportioned Cost to Cook Inlet		\$963		\$753		\$711		\$2,016		\$1,050		\$857		\$1,512		\$2,016		\$2,520			
Cook Inlet Rate in MCFPD		250		250		250		250		250		250		125		250		500			
Tariff to Cook Inlet At:																					
10% Yr Revenue Requirement		\$1.06		\$0.83		\$0.78		\$2.21		\$1.15		\$0.94		\$3.31		\$2.21		\$1.38			
\$2.50 to Chicago Equivalent		\$1.83		\$1.43		\$1.35		\$3.84		\$2.00		\$1.63		\$5.76		\$3.84		\$2.40			

Prepared by Heinze of ANGDA on 12/26/06

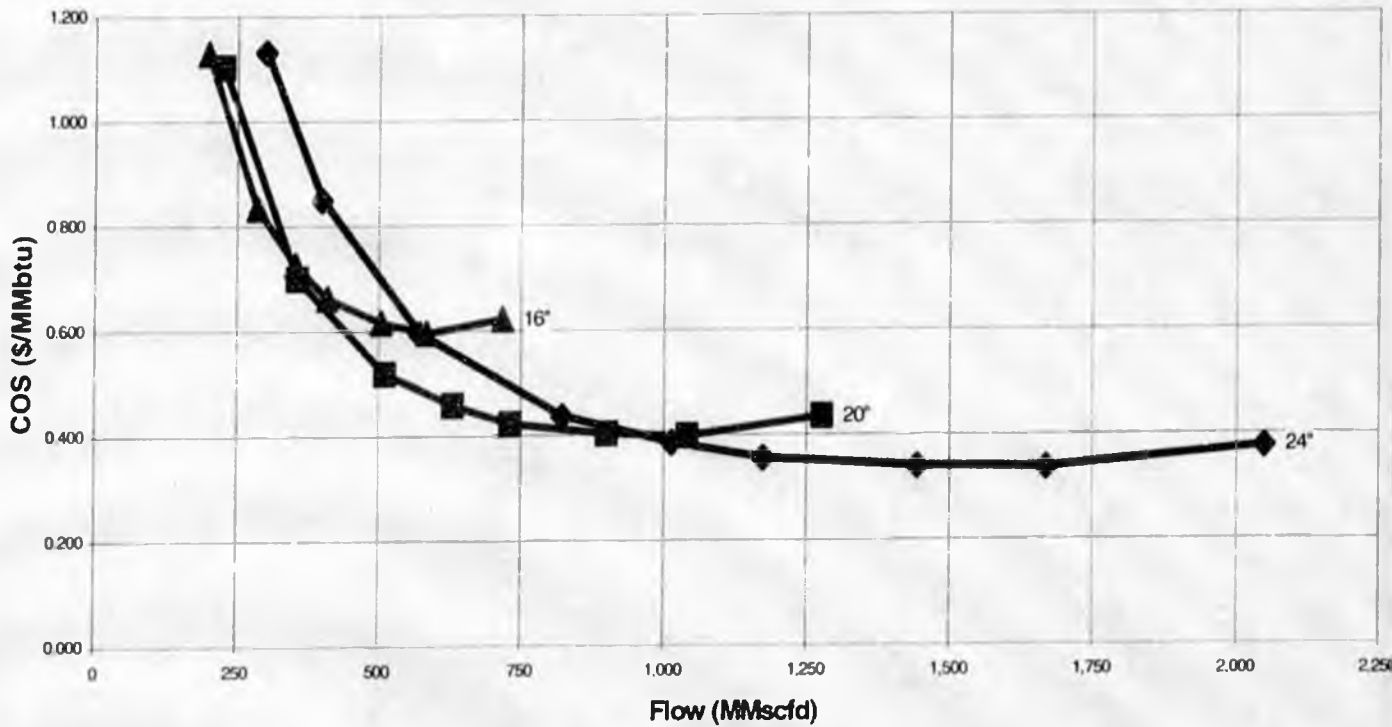
Nominal Pipeline Sizes & Capacity

NOMINAL CAPACITY (BSCFPD)	GASLINE DIAMETER (Inches)	PIPE AREA (36" = 1.)	IMPLIED RESERVES (TCF)
1		0.31	7
1.25		0.44	9
2		0.69	15
3		1.00	22
4		1.36	30
	30 - 30	1.39	
5	36 - 30	1.69	35
	48	1.78	
6	36 - 36	2.00	45
	52	2.09	
7	54	2.25	50
	40 - 40	2.47	

Chart is illustrative for comparing North Slope gas projects - ANGDA 3/04



Summary Figure 1: J-curves for 800-mile Pipelines of Varying Diameter



Summary Figure 2: J-curves for 300-mile Pipelines of Varying Diameters



Transport of North Slope Natural Gas to Tidewater

Leveraging Issues

Configuration Descriptions & Issues

New Project Concept

Submitted to

ALASKA NATURAL GAS DEVELOPMENT AUTHORITY

April 7, 2005

Submitted by

Baker
Michael Baker, Jr., Inc.

THIS WORK PERFORMED UNDER
CONTRACT FOR:



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Transport of North Slope Natural Gas to Tidewater

Leveraging Issues

Configuration Descriptions & Issues

New Project Concept

Summary & Conclusions

■ Introduction

Three configurations for a North Slope natural gas project were debated in the 1970s: 1) a pipe "over-the-top" of Alaska traversing down the Mackenzie River into Alberta, 2) the "Highway" pipeline generally following the Trans-Alaska Pipeline System to Delta Junction and then the Alcan Highway into Alberta, and 3) a pipeline to tidewater in south-central Alaska at which the gas would be liquefied for export.

Thirty years after the original debate, the three original project configuration options are again being discussed. The State of Alaska has essentially banned the over-the-top route by prohibiting state agencies from issuing the required permits. The US Congress passed in a bill in October 2004 granting incentives to the highway route and these incentives were extended to an LNG project in another bill passed late in 2004.

ANGDA

The Alaska Natural Gas Development Authority (ANGDA) was established as a new public corporation to bring stranded North Slope gas to market. ANGDA's primary goals are to achieve the lowest possible cost of service for the transportation of North Slope gas to tidewater for export and to maximize the benefits from a North Slope gas project to Alaskans.

ANGDA issued the "Interim Feasibility Report, All-Alaska LNG Project" in September of 2004 in which the viability of building a natural gas pipeline from Prudhoe Bay to tidewater and associated liquefaction facilities were assessed. ANGDA found: 1) no reasons to believe that an all-Alaska LNG project is not viable, and 2) that ANGDA is justified in pursuing further studies to define the project and bring it to the stage where a decision can be made whether to make further investments for preliminary engineering.

■ Conclusions and Results

The information contained in this report was developed only to a conceptual level as required to support narratives or illustrate a leveraging technical or design issue that ANGDA may wish to pursue in the future, *and should be used for no other purpose*. Selection of a configuration for the all-Alaska LNG Project and subsequent demonstration of economic viability will require a vast amount work.

The results of the various evaluations completed for this report support the following conclusions and recommendations regarding development of the all-Alaska LNG project:

All-Alaska LNG project leveraging technical and design issues

- ***Installation of a pipeline that is expandable*** by adding compressor stations is preferable to the installation of a smaller diameter pipeline with more compressor stations for the same throughput capacity;
- ***Increasing the content of non-methane hydrocarbons*** in the gas stream enhances project economics; ***significant amounts of non-methane hydrocarbons*** from the Prudhoe Bay Pool are concentrated into a single stream by the existing Central Gas Facility (CGF);
- ***A quicker ramp-up*** (i.e., the rate at which the project increases to the design throughput) enhances project economics and a protracted ramp-up of the project flow rate should be avoided;
- Limited information exists in the public record regarding the future operation of the Prudhoe Bay facilities after termination of the Prudhoe Bay Miscible Gas Project; ***ANGDA should obtain estimates of the remaining reserves of natural gas liquids at Prudhoe Bay as well as forecasts of various stream flow rates and compositions***; and
- ***A high pressure natural gas pipeline*** allows the transport of large amounts of non-methane hydrocarbons without encountering the formation of liquids and the resulting liquid slug flow that can damage the pipeline and attendant equipment.

Evaluations completed for this report support the following conclusion and recommendation regarding development of a project not previously considered:

- ***A small diameter pipeline from Prudhoe Bay to Cook Inlet transporting a highly enriched gas is a new project concept that*** may provide utility grade natural gas to communities along the Rail Belt at moderate prices and make propane available for transport to rural and coastal communities throughout Alaska; this, or a similar scenario, merits further evaluation.

Leveraging Issues – Natural Gas

Natural gas consists of a mixture of hydrocarbons that exist in the gas phase at the operating conditions of the processing facilities of an oil and gas production field. The composition of natural gas leaving an oil and gas field varies depending upon the characteristics of the oil and reservoir and how the hydrocarbons are processed.

Natural gas typically consists of methane with ethane, propane, butane and pentane as well as heavier components present in progressively decreasing amounts. The energy, or thermal content of the natural gas can vary significantly depending on the relative amounts of the non-methane components present in the mixture. Natural gas may also contain inert gases such as nitrogen and carbon dioxide that tend to lower the thermal content of the gas.

The composition of the natural gas within transmission pipelines is adjusted to meet a number of criteria including prevention of condensation of hydrocarbons within the pipeline. Liquid formation within a pipeline must be avoided since these liquids tend to collect in low areas of the pipe and when finally mobilized due to the gas flow result in liquid slugs. Pipelines are designed to avoid slug flow because the slugs can damage the pipeline as well as associated gas-handling facilities along the pipeline.

Essentially all sponsors of major gas pipeline projects from the North Slope have proposed use of pipelines operating at pressures that are much higher than typical gas pipelines operating in the Lower 48. The gas within these high-pressure pipelines is in a physical state known as "dense phase" (discussed in Section 3.3). A major advantage of a dense phase pipeline is that large quantities of non-methane hydrocarbons can be transported without producing a separate liquid phase thereby avoiding slug flow.

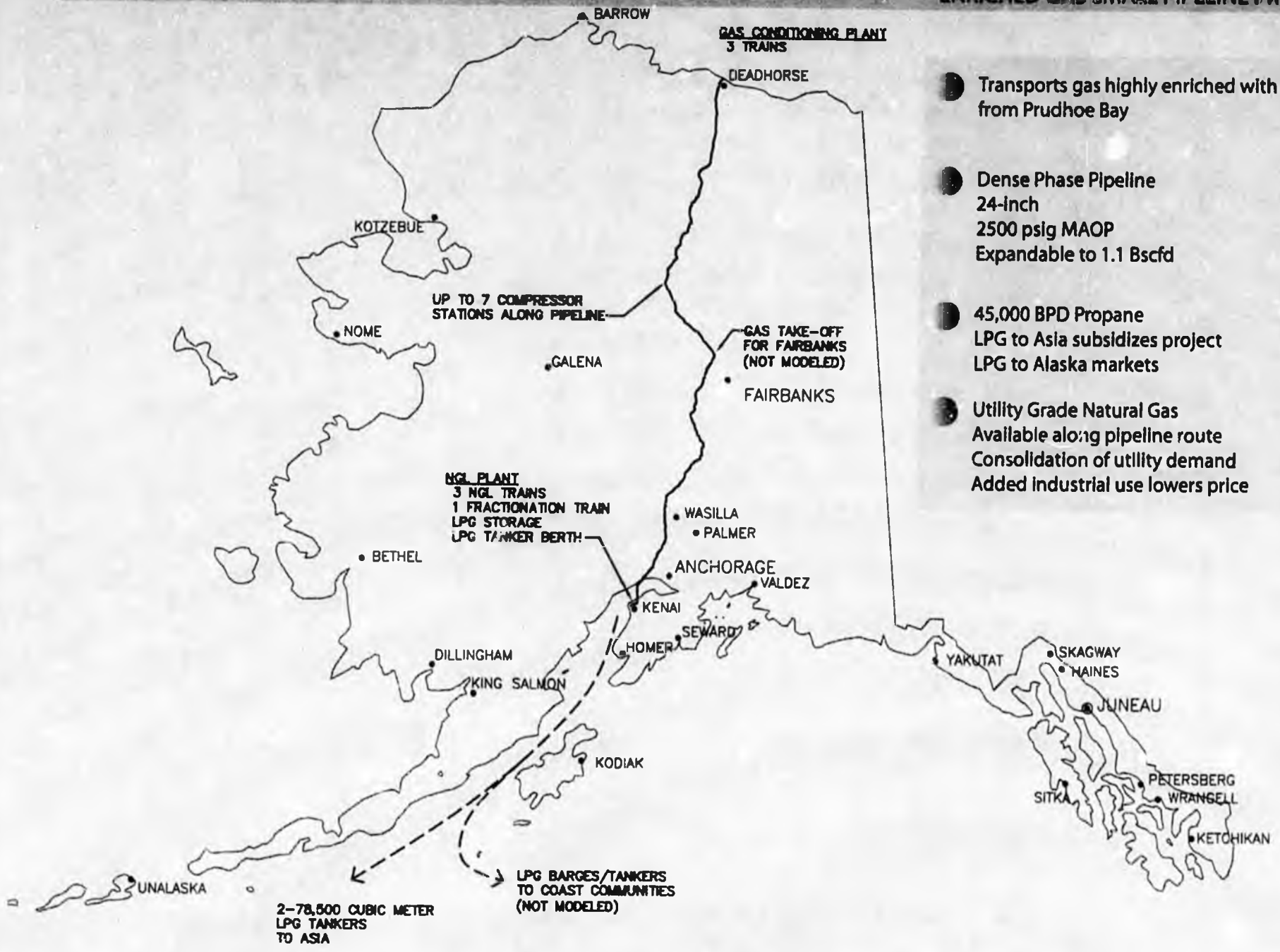
Crude oil, condensate, and natural gas liquids (NGL) are marketed from the North Slope via the Trans Alaska Pipeline System (TAPS). The amount of butane in the NGL is adjusted to meet criteria governing the liquid hydrocarbon mix tendered to TAPS. The remaining butane, propane, ethane, and methane produced with the oil are re-injected into the Prudhoe Bay reservoir or consumed as lease fuel.

The high-pressure pipelines currently being proposed for the various gas projects allow for the transport of butane, propane, and ethane with methane in a dense phase state thereby avoiding two-phase liquid and gas flow. All of the hydrocarbons from the North Slope can be sent to market utilizing the transport capabilities of both TAPS and a dense phase gas pipeline project.

Although vast amounts of methane exist on the North Slope, this hydrocarbon is perhaps the least economic to transport because it contains the least amount of usable energy per unit volume. The ability to transport non-methane hydrocarbons in a gas pipeline provides opportunities for project designers to affect the project economics by adjusting the composition of the gas.

All of the analyses contained within this report are based on the use of three gas streams with the Central Gas Facility at Prudhoe Bay. ***The recoverable quantities and availability of non-methane hydrocarbons from Prudhoe Bay is a key issue and is the focus of much of this report.***

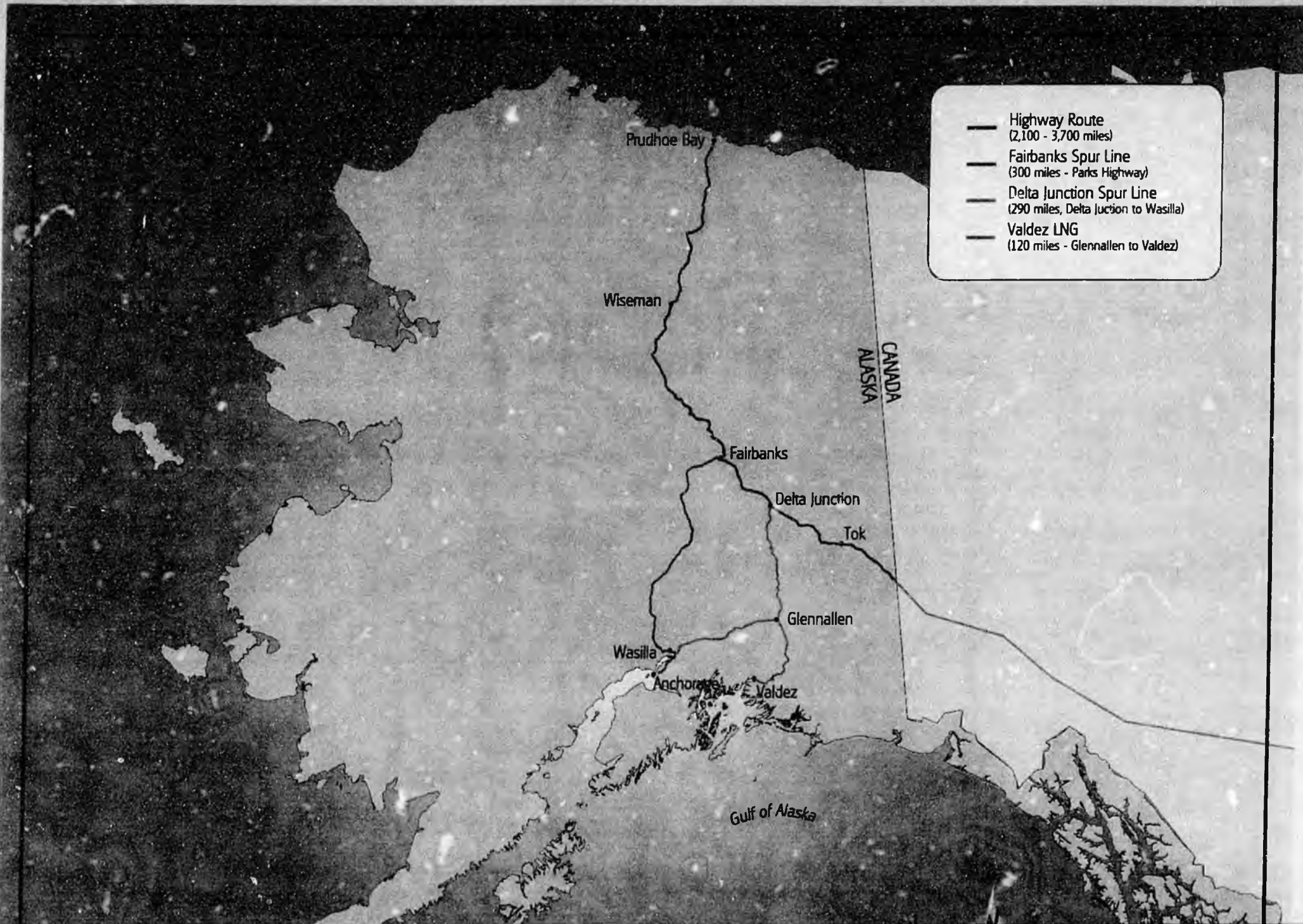
ENRICHED GAS SMALL PIPELINE PROJECT



- Transports gas highly enriched with NGL from Prudhoe Bay
- Dense Phase Pipeline
24-inch
2500 psig MAOP
Expandable to 1.1 Bscfd
- 45,000 BPD Propane
LPG to Asia subsidizes project
LPG to Alaska markets
- Utility Grade Natural Gas
Available along pipeline route
Consolidation of utility demand
Added industrial use lowers price

Summary Figure 3: Overview of the EGSP Project

April 2005



- Highway Route
(2,100 - 3,700 miles)
- Fairbanks Spur Line
(300 miles - Parks Highway)
- Delta Junction Spur Line
(290 miles, Delta Junction to Wasilla)
- Valdez LNG
(120 miles - Glennallen to Valdez)

Prudhoe Bay

Wiseman

Fairbanks

Delta Junction

Tok

Glennallen

Wasilla

Anchorage

Valdez

CANADA
ALASKA

Gulf of Alaska

Alaska Gas **Market System** **(AGMS)**



ANGDA — *"Connecting Alaskans To Their Natural Gas"*

Alaska Natural Gas **Development Authority**

www.angda.state.ak.us

www.jpo.doi.gov/ANGDA/ANGDA.htm

www.allalaskaing.com

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Elements of AGMS

- Gas pipeline is high pressure and buried
- Prudhoe Bay to Glennallen is 24-inch with 20-inch to Valdez & 16-inch to Cook Inlet
- LNG plant produces 7 mmtpa (1 BSCFPD) from 2 trains
- Gas conditioning on North Slope removes CO₂ (EOR use) & blends NGL's (ethane / propane)
- Cook Inlet terminus in Beluga Gas Field for storage (levels seasonal variations)
- Utility gas take-off points and propane wholesale facilities along route

Throughput & Cost & Tariff

- NS offtake is 1.25 BCFPD with 0.25 BCFPD to Cook Inlet & 1.0 BCFPD to Valdez LNG
- Pipelines are \$4 B, NS gas conditioning is \$1 B, and Valdez LNG plant is \$3 B (benchmark estimates)
- Expect tariff to Cook Inlet to be less than \$2 per mmbtu (Chicago is \$2.50)
- Tariff to Valdez less than \$1.50 per mmbtu and total cost to LNG destination less than \$4 per mmbtu

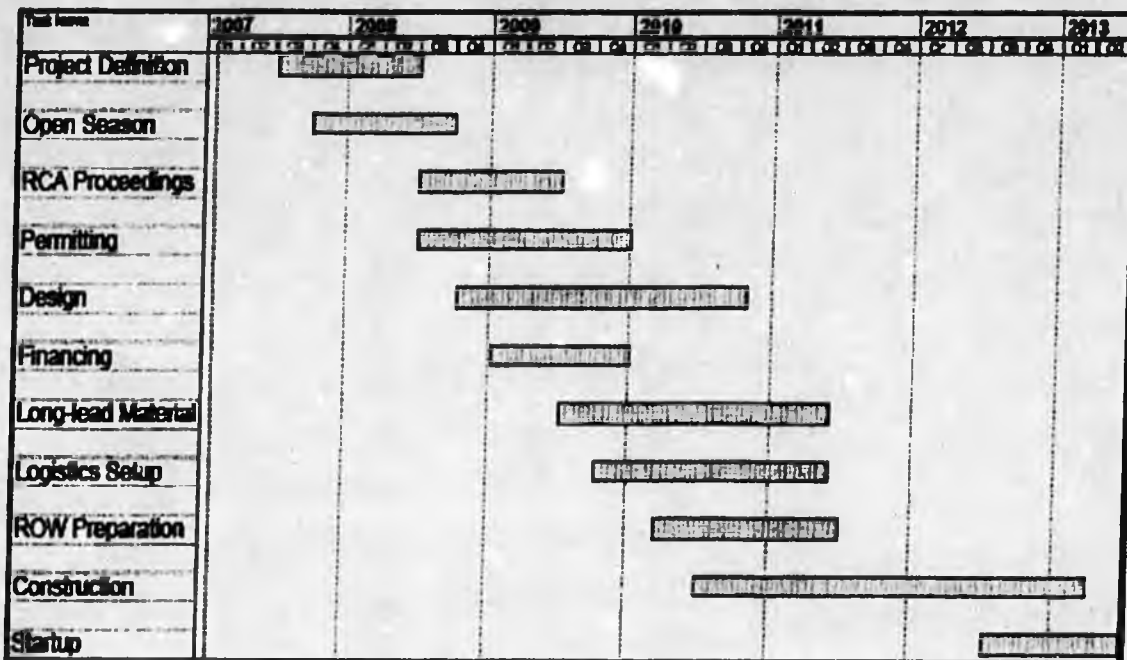
Markets

- **Cook Inlet and Interior utilities (gas & electric)**
- **Propane for use in coastal, river, and highway communities**
- **Valdez LNG for shipment to US & other Pacific Rim regas facilities**
- **Cook Inlet industrial and petrochemical plants**

Project Timeline

- **Six years to first gas delivery**
- **Three year construction period**
- **LNG facility will be constructed as a separate project**
- **Gas delivery can be started before gas conditioning & LNG facilities available**
- **North Slope gas conditioning may be a Prudhoe Bay Unit or pipeline facility**

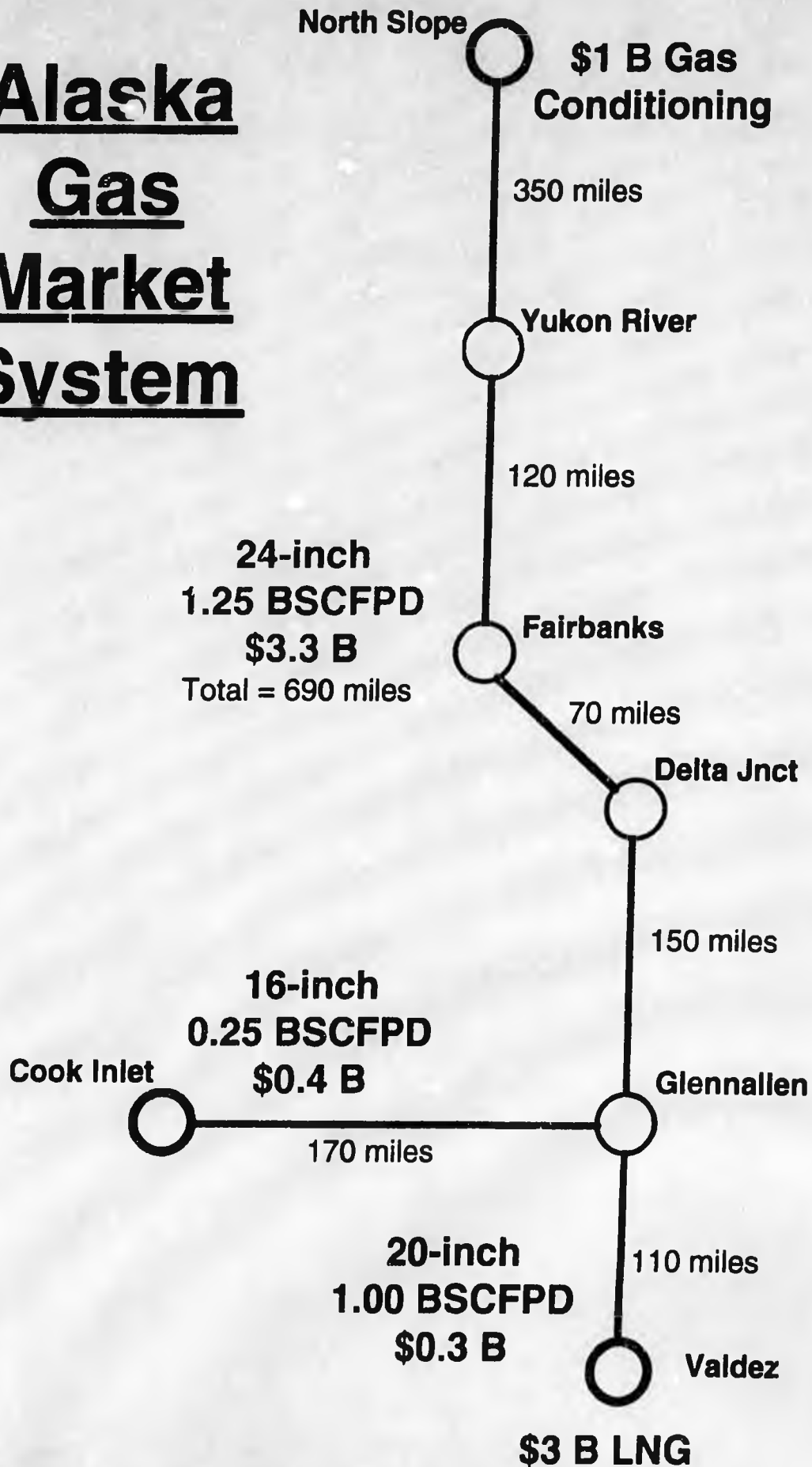
Tasks & Timeline



Joint-Work Process

- Covers the definition phase
- Voluntary and Non-exclusive
- Participant contribute in-kind expertise
- At least two major work effort teams (pipelines & LNG)
- Full time team leaders
- Steering committee open to all participants (summary info is public)

Alaska Gas Market System



Reserves & Financing

- **Financing basis would be 10 TCF of committed reserves**
 - State 3 TCF plus one-producer 7 TCF
 - State 3 TCF plus all Point Thomson at 8 TCF
 - State 3 TCF plus new discoveries of 3 TCF
- **LNG plant would be built and owned by LNG companies with existing tanker fleet and delivery sites**

Partners We Can Expect

- **Oil & gas companies (including “producers”)**
- **Pipeline companies**
- **LNG plant and ship owner / operators**
- **Experienced energy project investors**
- **Local Alaska utilities (gas & electric)**
- **State of Alaska**
- **US Federal Government**

No speculators or saboteurs