

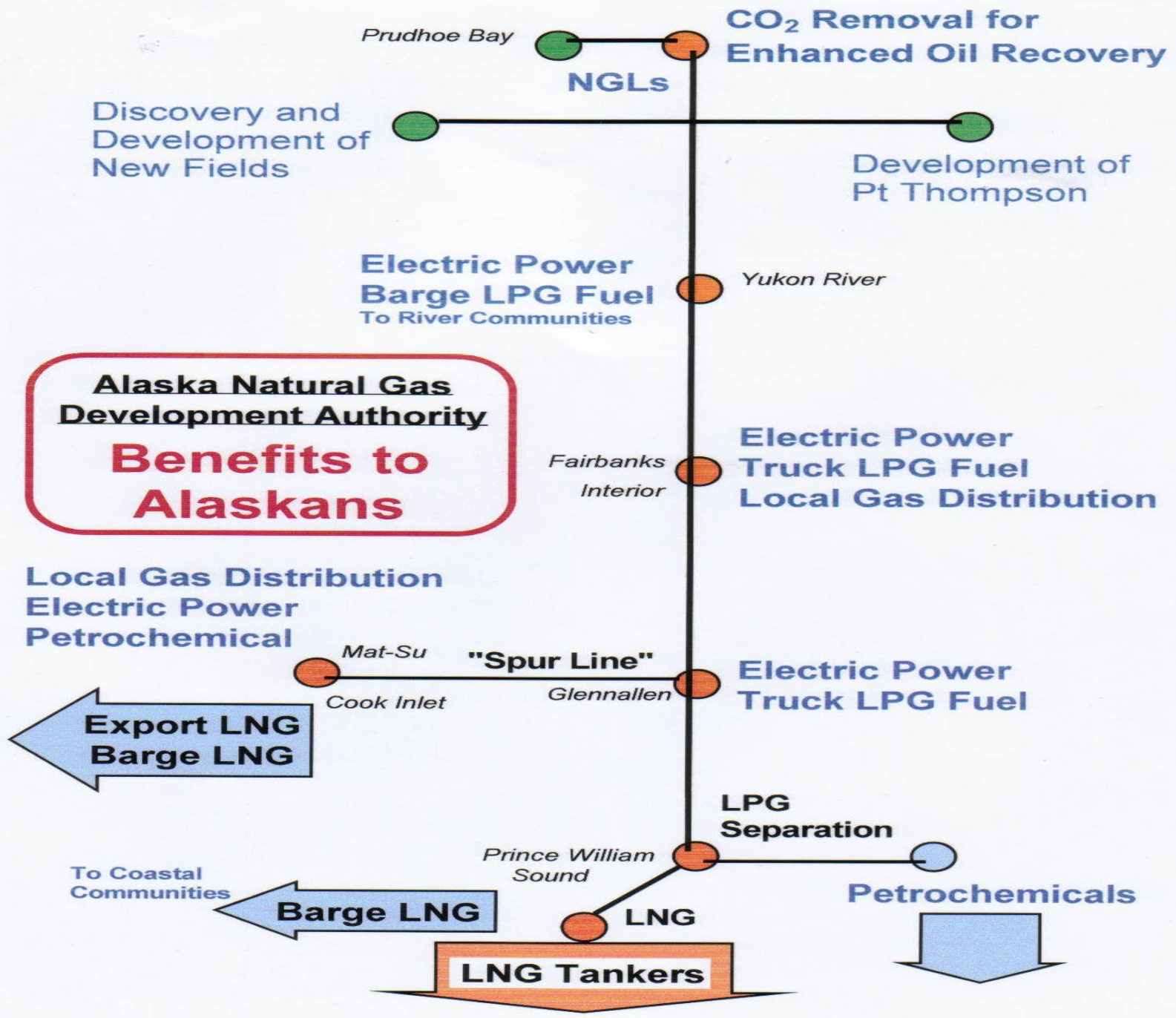
Use of North Slope **Natural Gas in Alaska**

**Alaska Natural Gas Development Authority
(ANGDA) to the**

South Central Alaska

Energy Forum

September 21, 2006 in Anchorage



Alaska Natural Gas Development Authority
Benefits to Alaskans

Local Gas Distribution
 Electric Power
 Petrochemical

Export LNG
Barge LNG

To Coastal Communities

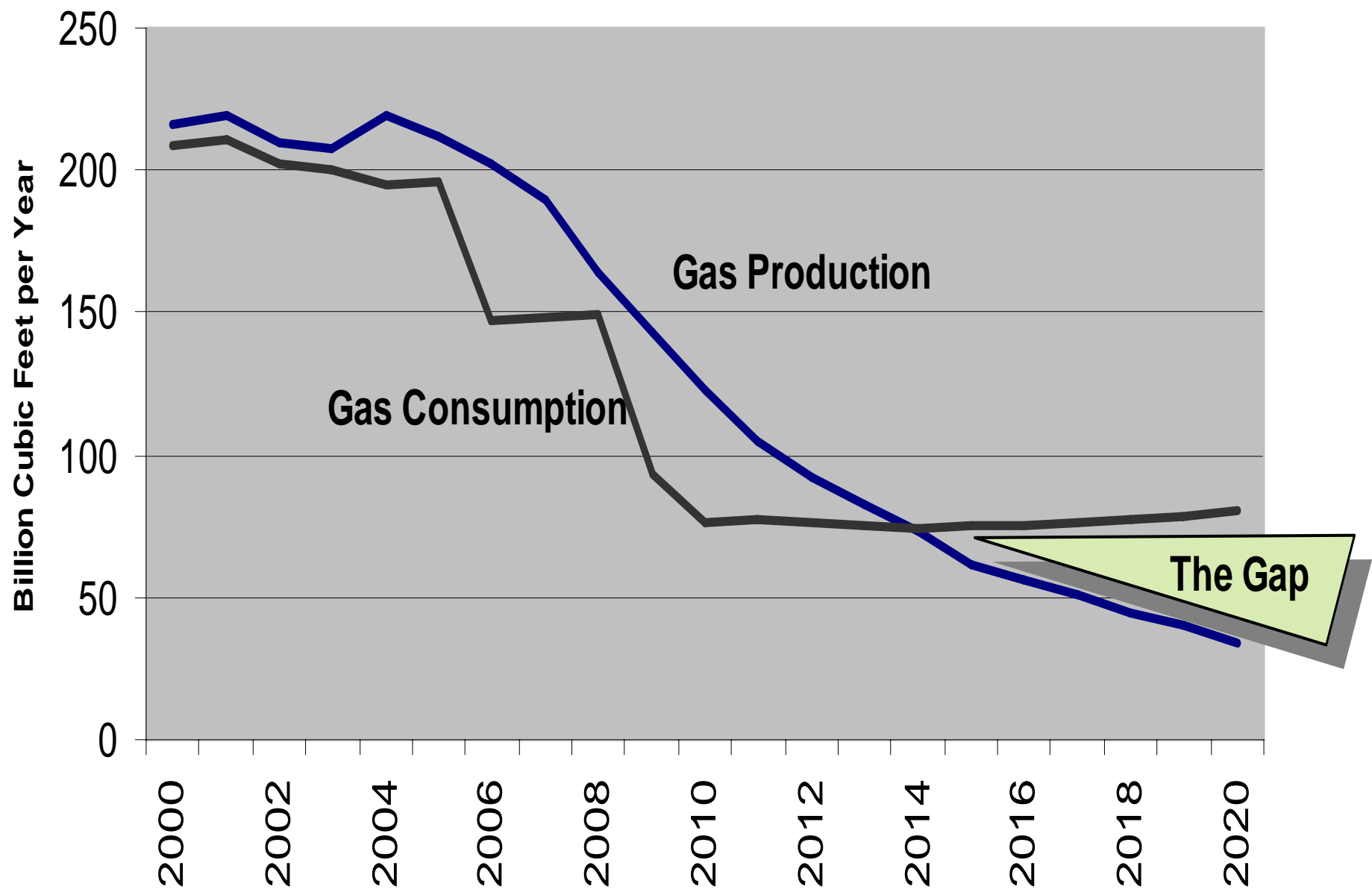
Barge LNG

LNG Tankers

Petrochemicals

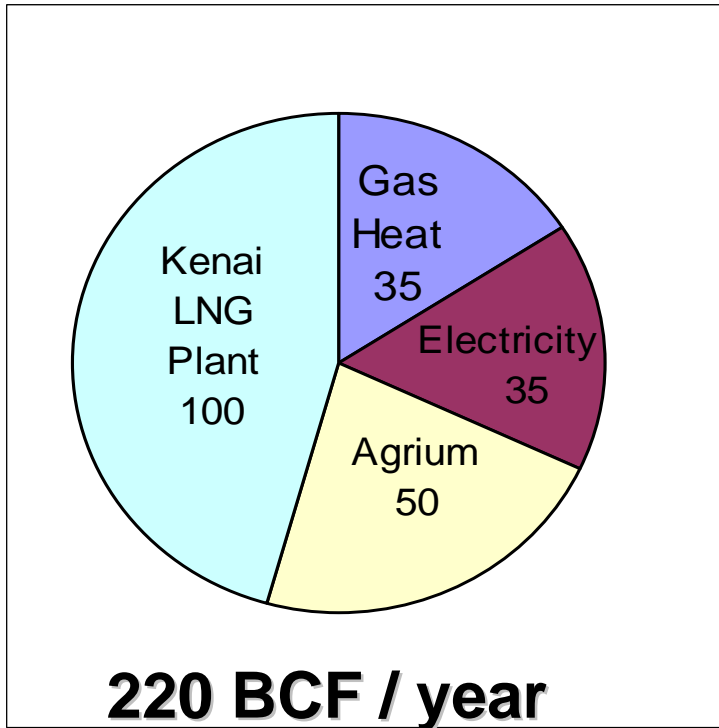


Cook Inlet Gas Supply & Demand

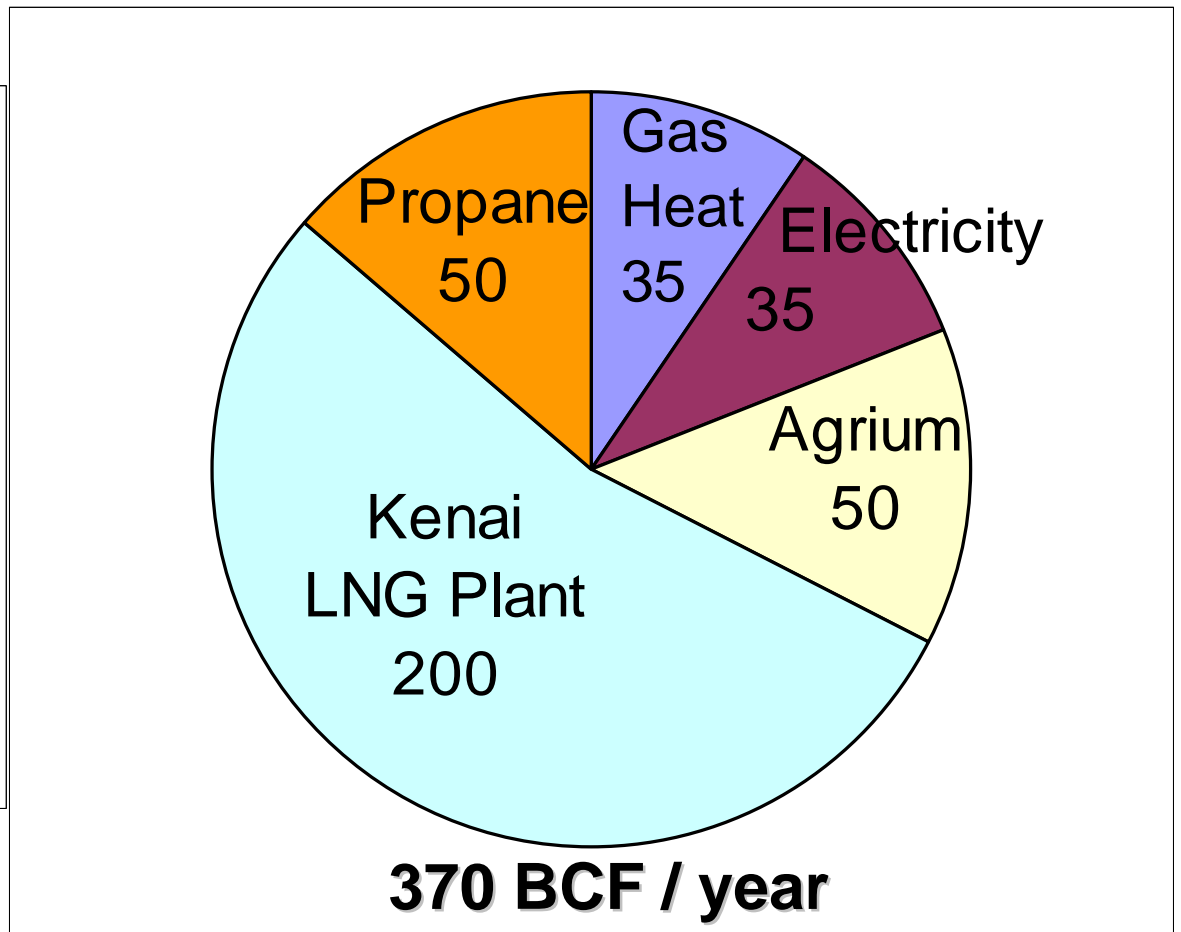


Cook Inlet Gas Uses

**Demand
In Year 2005**

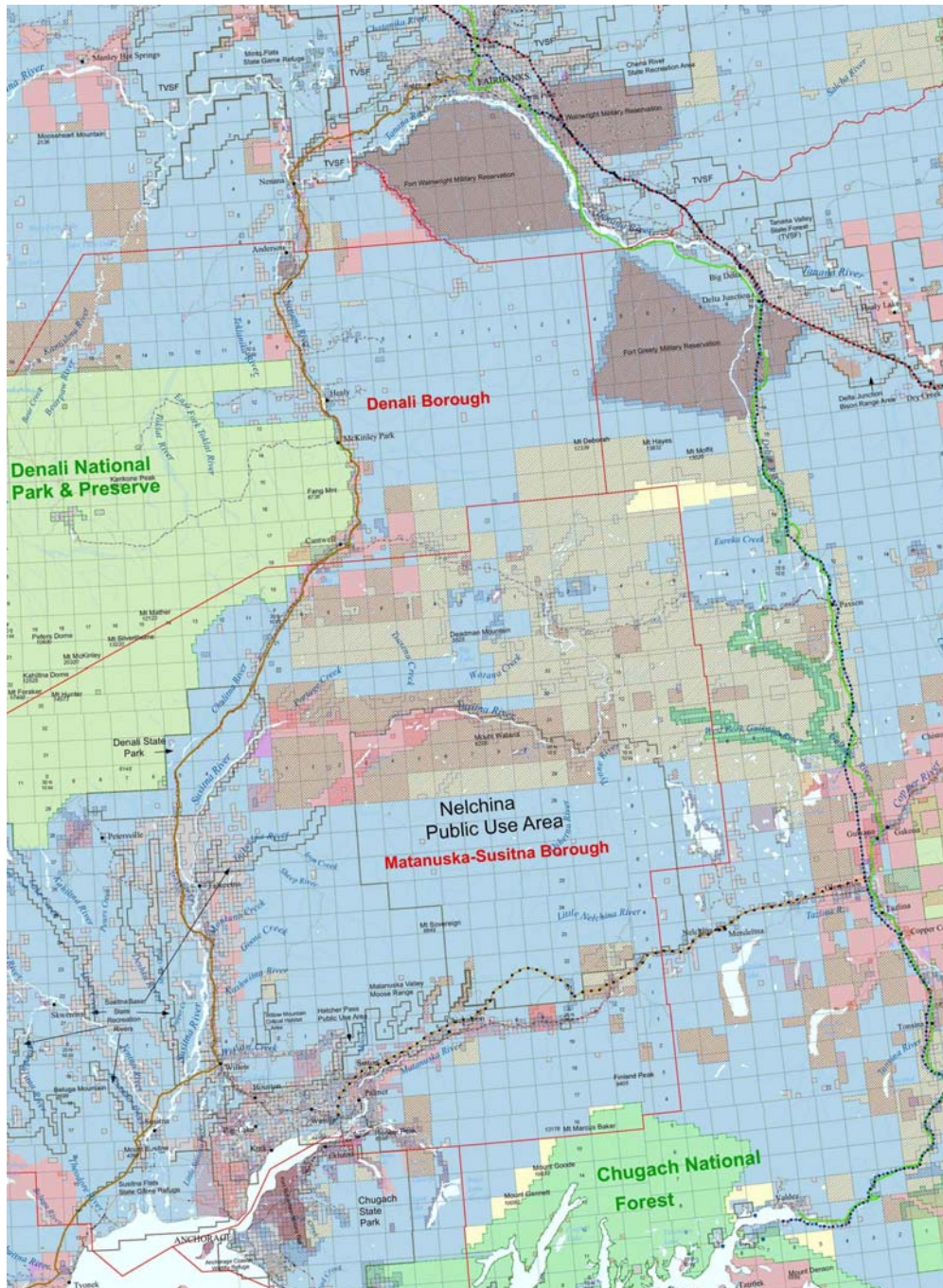


**Future Demand with
Cook Inlet Spur-Line**



“Spur” Line Project Parameters

- **High-pressure (2,500 psi) buried gasline (24-inch diam) from the “main-line” to Cook Inlet can supply twice today’s 0.5 BSCFPD of use**
- **Building the spur line as a gas transmission utility with low-interest-rate debt-financing can reduce the cost of service (RCA regulated)**
- **Connection point and final routing dependent on other’s decisions as larger North Slope gas projects are defined**
- **Spur line project could be a pre-build**



Delta –to- Glennallen –to- Palmer

TAPS (Richardson Hwy)
and Glenn Hwy

Fairbanks –to- McKinley Park –to- Palmer

Parks Hwy, Railroad, &
Electric Intertie

Either “spur” is:
**300 miles &
\$1 billion**

Estimated Price of North Slope Gas in Cook Inlet (\$/Mcf)

Assumptions	Prices	Source of Assumption				
Chicago Market Price	\$5.50	State of Alaska Base Case in 2005 \$s				
Mainline Tariff for North Slope to Chicago	\$2.40	Assumes 4,300 MMcf/d Thru Canada				
Estimated North Slope Wellhead Netback	\$3.10	Additional Gas Conditioning Charge of \$0.25/Mcf Would Apply To All Gas				
		Throughputs				
Spur Off-take in Alaska (MMcf/d)	100	200	300	500	800	
Mainline Tariff for North Slope to Fairbanks	\$0.54	\$0.52	\$0.51	\$0.48	\$0.45	
Spurline Tariff for Fairbanks to South Central	\$2.64	\$1.35	\$0.92	\$0.72	\$0.73	
Cook Inlet Market Price	\$6.28	\$4.97	\$4.53	\$4.30	\$4.28	

Source: ANGDA, DOE, 2006.

Propane Distribution in Alaska

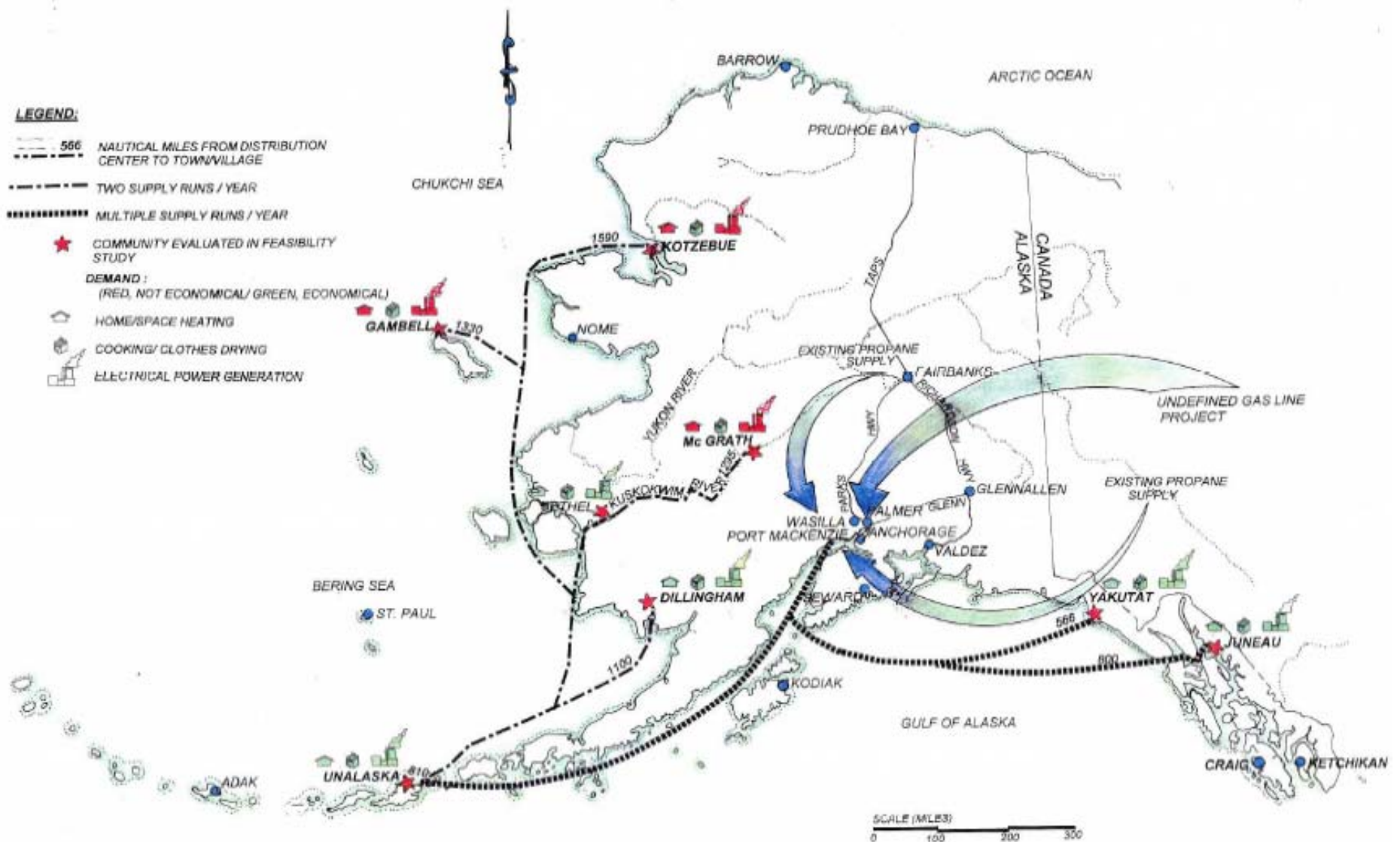




Figure 1. Tank Solutions, Inc. of Houston, Texas, is among manufacturers of 20- to 40-foot long ISO tanks (intermodal containers) for lease and purchase. ISO containers could be produced in Alaska if sufficient demand develops.

The “Open Season” Process

- **Sealed bid auction of volumetric shipping capacity in gas pipeline**
- **Tariff to delivery points known**
- **Shipper makes a firm multi-year commitment in a “ship or pay” contract**
- **Creditworthiness of shippers is essential since committed capacity is design basis**
- **Results of process are public & regulators hear complaints before certification of the project**

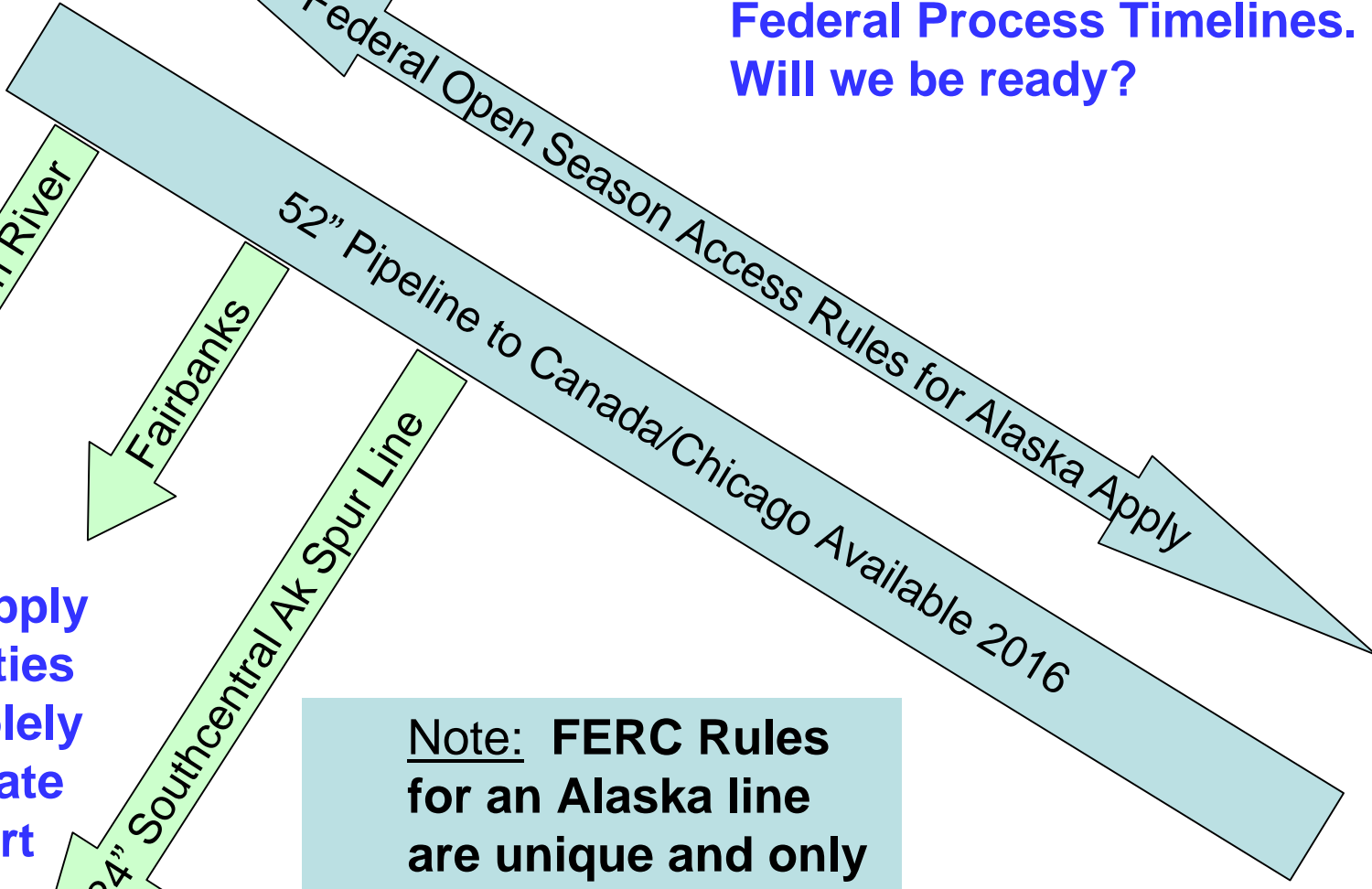
North Slope Gas Production

State Regulatory Process Needs to Operate Within Federal Process Timelines. Will we be ready?

Yukon River

Fairbanks

24" Southcentral Ak Spur Line



Federal Open Season Access Rules for Alaska Apply

State Access Rules Apply to Facilities Used Solely for In-State Transport

Note: FERC Rules for an Alaska line are unique and only apply to Alaska

Alberta; Chicago

Steps for a Utility to Get NS Gas

(Some steps may occur simultaneously)

- **Negotiate for gas supply before Federal open season (Purchase point may be North Slope or local area)**
- **Bid on Spur Line capacity during Intra-State open season**
- **Bid on In-Alaska capacity for “Main 52-inch Line” during Federal open season**
- **Negotiate a shipping contract on either inter-state and/or intra-state gas pipelines before or during the open season**
- **Obtain RCA approval for gas costs to be passed through to customers, including take or pay purchase contracts and ship or pay transportation contracts**

Potential Commitment at “Open Season” by Alaska Utilities

Ratio of Commitment Liability to:

<u>Alaska Utilities</u>	<u>Commitment (\$ million)</u>	<u>ASSETS</u>	<u>NET PLANT</u>	<u>DEBT</u>	<u>SALES</u>
Heating	2,927	2.9	5.1	6.6	4.8
Power	3,515	2.1	2.2	3.6	6.1
TOTAL	6,442	2.4	3.4	4.5	5.4

NOTE: Commitment calculated by assuming that 75% of gas need is supplied by new North Slope gas purchase and transportation contracts totaling \$5.50 /mmbtu over the 15 year period 2015 thru 2030

Making In-State Gas Offtake Work

- **Have “spur line” project ready to finance & build**
- **Open a docket with RCA to start review early**
- **Develop a “cohesiveness” amongst utilities**
- **Start conversations with FERC on in-Alaska gas off take issues faced by Alaska utilities**
- **Amend State law to simplify Alaska open season**
- **Provide Alaska utilities with a preference on gas availability & pricing –and- State backing of long-term financial commitments for NS gas**

Alaska Natural Gas
Development Authority

www.angda.state.ak.us

www.allalaskaing.com

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

For Further Information Contact:

Harold Heinze

411 W. 4th Ave, Anchorage 99501

(907) 257 – 1347

hheinze@jpo.doi.gov

Potential ANGDA Impacts

- **Gas for heating & electric power generation**
 - Along mainline & spur line
 - Coastal & river barges with compressed gas or LNG
- **Propane for individual homes**
 - Highway, river, & rail distribution
- **Alaska size project to fit in-State work force**
- **Financing & tax advantages keep delivery costs low for consumers and State resource revenues high**

The Wyoming Natural Gas Pipeline Authority

“simply put, all the natural gas production and the highest prices in the world won’t do us much good if we can’t get the gas to market.”

Governor Freudenthal, Wyoming

- **Originally ,created in 1979 as an instrumentality of the state with the authority to build, operate, and maintain gas pipeline & storage facilities**
- **Resurrected in 2003: Governor recognized the lack of pipeline infrastructure was costing the State of Wyoming over \$300 M/yr**
- **Line of Credit ended producer’s waiting for pipeline companies to expand pipeline capacity, while pipeliners were waiting for producers to drill more wells.**
- **The Wyoming Legislature has increased the WNGPA’s bonding authority to \$3 billion for the building of gas pipelines.**
- **WNGPA has made a shippers commitment to financially support the Rockies Mountain Express pipeline (2BSCFPD)**

ANGDA

Chief Executive Officer



Photo by Seanna O'Sullivan published ADN 3/17/05

HAROLD HEINZE, is the CEO of the State of Alaska's Natural Gas Development Authority (ANGDA). Considered an "engineer's engineer", Mr. Heinze left retirement in 2003 to lead ANGDA in the planning, engineering, and development of Alaska's gas pipeline.

With 35 years in Oil & Gas, the Past President of ARCO Alaska enjoys living in the north and values the "Alaska experience".

Graduating with high honors from Colorado School of Mines with a Petroleum Engineering degree and serving as an Officer in the U.S. Army was just the beginning for Heinze. He arrived on the shores of Prudhoe Bay six months after the 1968 announcement of its discovery and began working as a field reservoir engineer. Mr. Heinze went on to numerous ARCO management positions in the engineering, planning, and transportation of petroleum. He retired from ARCO in 1990, but retirement wasn't long-lasting since Alaska Governor Walter Hickel appointed Harold Heinze as Commissioner of Natural Resources that same year. As Commissioner, Heinze finalized the land selection of 100 million acres granted to Alaska at statehood.

Mr. Heinze is well respected for his community involvement, creativity, open management style, and sense of humor.

He is married to Cheryll Heinze, a successful artist, retail shop owner, and former Alaska Legislator.

NGL's Processing In-State

- **Main large-diameter high-pressure gas line will be carrying several hundred-thousands of barrels/day of ethane, propane & butane**
- **Historic NGL miscible injection is 100-150 k bpd**
- **Extracting the 1/8 to 1/5 State share and shipping in “spur line” to tidewater will allow petro-chemical manufacturing and LPG delivery to rural / coastal / river communities of Alaska**
- **State must maintain this as its unilateral option**

Summary CI Gas Demand in 2025

<u>SECTOR</u>	<u>GAS DEMAND</u>	<u>MAX PRICE</u>
Residential / Commercial	135 MMcf/d	\$8.50
Power Sector	135 MMcf/d	\$5.20
Petrochemical Plant	120 equiv – C ₂	\$4.60
LPG	115 equiv – C ₃	\$4.20
LNG	210 MMcf/d	\$3.20
GTL	480 MMcf/d	\$3.20
Ammonia / Urea	145 MMcf/d	\$2.80

Based on Table 1 of DOE Report in June 2006 "Alaska Natural Gas Needs and Market Assessment"

Cook Inlet Energy Alternatives

Supply Alternatives: Increase gas supply

Supply Alternative	Description
Increase Production	Enhance existing CI gas production Develop new production in Cook Inlet
Spur Line	Deliver North Slope gas to Cook Inlet with Spur Line from main gas line.
Bullet Line	Deliver North Slope gas to Cook Inlet with Bullet Line.
Enriched Gas Line	Deliver North Slope gas to Cook Inlet with methane carrier for liquids line.
CBM	Develop Coal Bed Methane in the Susitna Basin.
Import LNG	Import Liquefied Natural Gas to Kenai LNG facility.
Other Alaska Gas	Develop and deliver natural gas from Copper River, Nenana, or Bristol Bay.
Coal Gasification	Implement coal gasification such as Agrium's Blue Sky project.

Cook Inlet Energy Alternatives

Demand alternatives: reduce gas consumption with conservation or fuel substitution.

Demand Alternative	Description
Coal Power	Replace gas-fired electric generation with coal-fired power (Emma Creek)
Hydro Power	Replace gas-fired electric generation with small-scale hydropower.
Wind Power	Replace gas-fired electric generation With wind power (Fire Island Project)
Nuclear Power	Replace gas-fired electric generation with small-scale nuclear generation.
Tidal Power	Replace gas-fired electric generation with tidal power.
Gas Conservation	Implement end-use gas conservation programs (weatherization).
Electric Conservation	Implement end-use electric conservation programs (light bulbs)
Distributed Generation	Displace central gas-fired generation with on-site cogeneration or fuel cells.

ANGDA Work Items (Thru 2005)

- **Gas spur line field work**
- **AOGCC Hearings on Prudhoe Bay**
- **L B & A Hearings on SGA Information**
- **Challenges to FERC Open Season Rules & Alaska In-State Gas Uses**
- **Contracting preparations to meet Cook Inlet gas supply timeline**
- **Work with new Alaska gas consumers**

Historical Volume of NGL Re-injected as MI

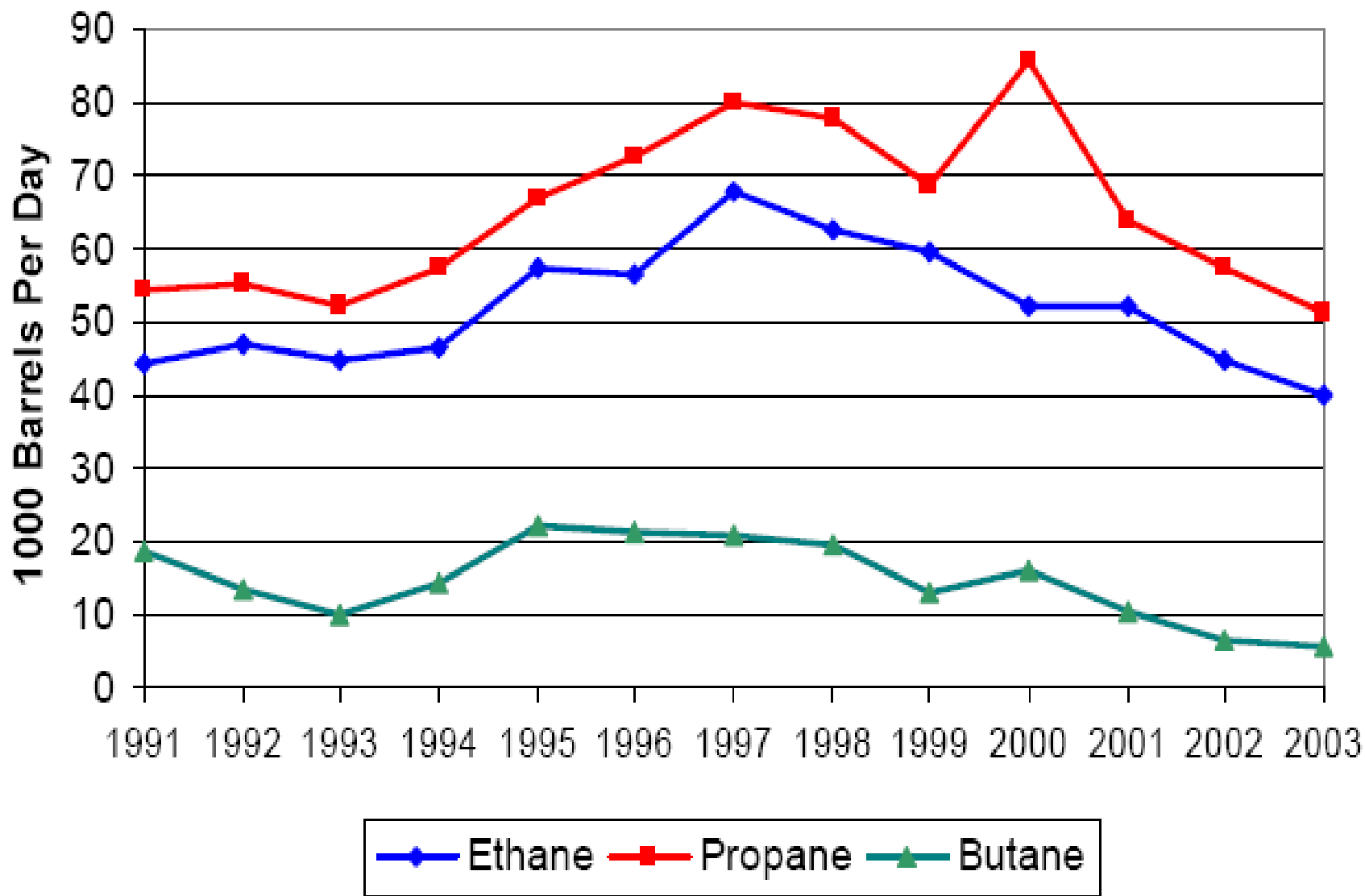


Figure 3.4 from ANGDA contractor report "Transport of North Slope Gas to Tidewater" by Baker (04/07/05)

NGL Volumes in North Slope Gas Pipelines

	<u>Mole Percent</u>		<u>Barrels / Bcf</u>		<u>Barrels / Day</u>		
	<u>Lean</u>	<u>Rich</u>	<u>Lean</u>	<u>Rich</u>	<u>2 Bcf/d</u>	<u>4.5 Bcf/d</u>	<u>4.5 Bcf/d</u>
C2	6.09	7.23	38,550	45,750	91,500	173,500	206,000
C3	2.06	3.76	13,425	24,500	49,000	60,500	110,250
C4	0.32	0.76	2,450	5,800	11,500	11,000	26,250
C5+	0.05	0.03	425	250	500	2,000	1,250
Specific Gravity	0.626	0.654					
BTU / SCF	1076	1121			(Rich)	(Lean)	(Rich)

Composition Based on ANGTS – Alaska ROW Application (June 1, 2004) – Page 9 of 34

NOMINAL CAPACITY (BSCFPD)	GASLINE DIAMETER (Inches)	PIPE AREA (36" = 1.)	IMPLIED RESERVES (TCF)
1	20	0.31	7
1.25	24	0.44	9
2	30	0.69	15
3	36	1.00	22
4	42	1.36	30
	30 - 30	1.39	
	36 - 30	1.69	
5	48	1.78	35
	36 - 36	2.00	
6	52	2.09	45
	54	2.25	
7	40 - 40	2.47	50