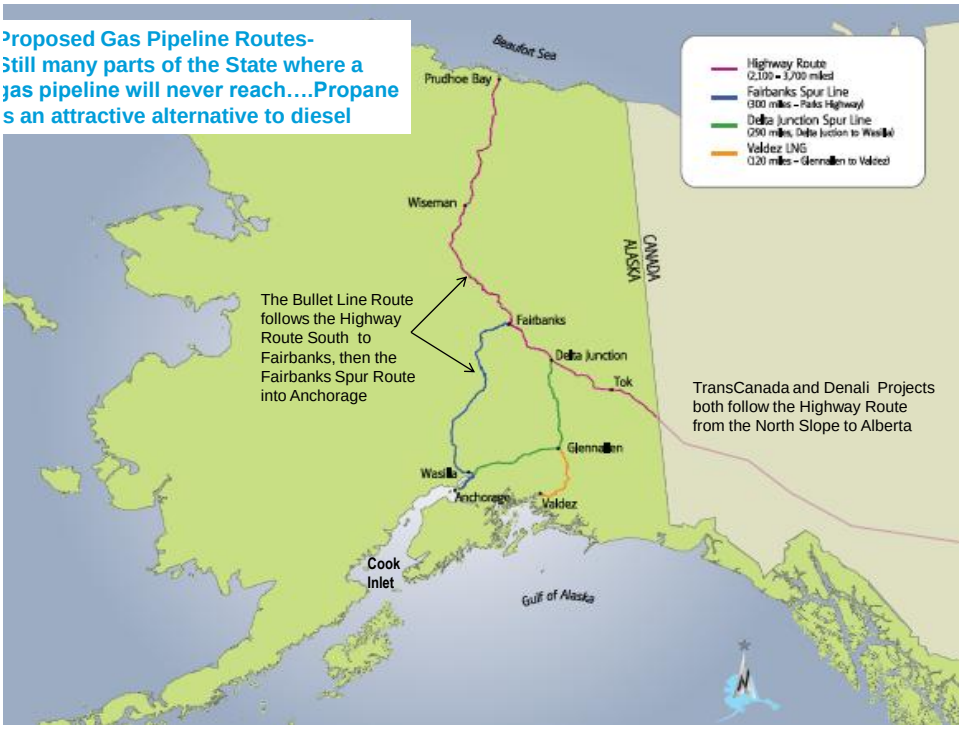
Alaska North Slope Propane Conference

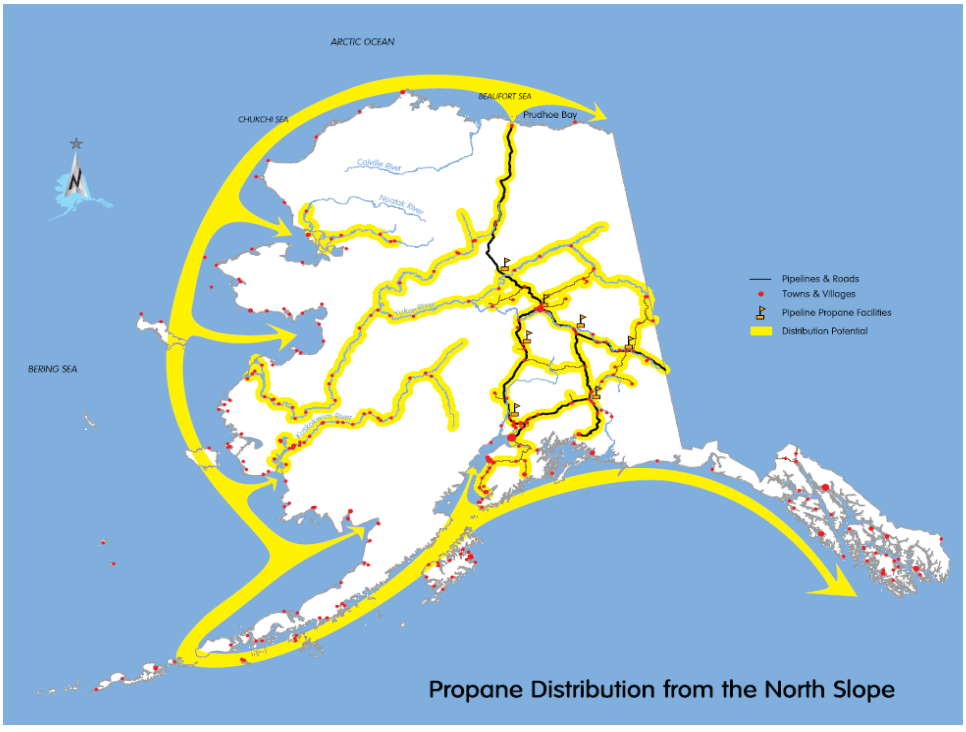
March 31, 2011 – April 1, 2011

Presentation by Mary Ann Pease, Consultant

Alaska Natural Gas Development Authority (ANGDA)

"Connecting Alaskans To Their Natural Gas"





Propane's Benefits and Opportunities

- Alternative clean fuel for rural Alaska
- Price advantage of North Slope gas btu value
- Extends reach to Alaskans that transcends gas pipeline route.
- Opportunities
  - World class C_3 volumes currently produced and injected in PBU
  - Gas pipeline is designed to transport entire C_3 production stream
  - Current CGF configuration captures only one-third of C_3 processed

North Slope Propane Opportunity

- With no market for C_3, CGF operational target is maximum NGL (C_4+) in TAPS and enough C_3 for miscible injection
- A petrochemical market of 20 k bpd C_3 can be supplied by direct marine export due to reduced polar ice extent & thickness
- ANGDA is willing to facilitate logistical & market (both in-state & export) development consistent with the PBU developing a propane delivery point

LPG's & NGL's in North Slope Pipeline

North Slope Gas Pipeline Flow --- 4.5 BCFPD

Component		Mole Percent	Bbls/Day	Thousand Tonnes Per Year
C2	Ethane	7.23	206,000	4,250
C3	Propane	3.76	110,250	3,250
C4	Butane	0.76	26,250	900
C5+	Pentanes	0.03	1,250	45

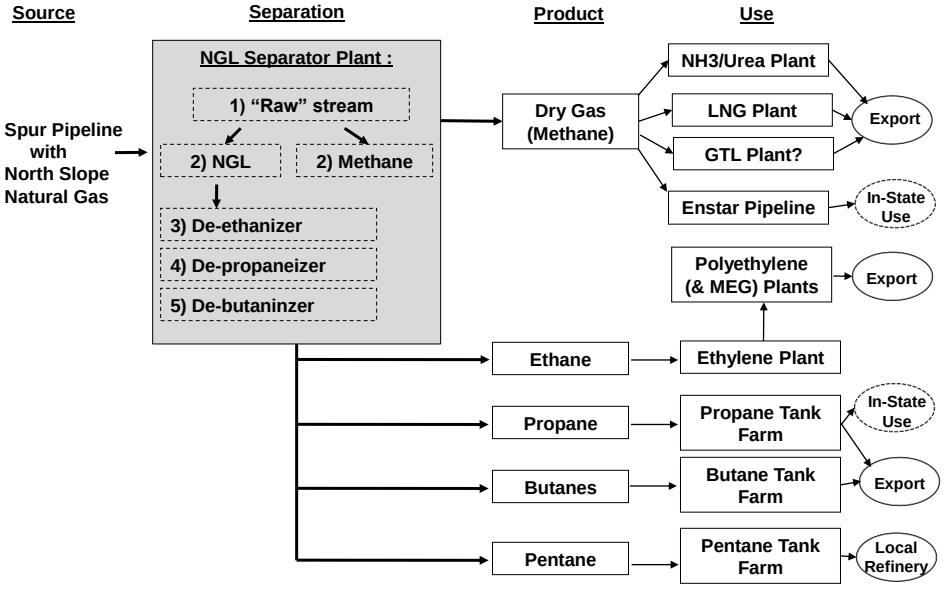
Feedstock Based Cracker Production Capacities

Carbon Number Product Name		C2 Ethane	C3 Propane	C4 Butane	C5+ Pentanes
Concentration Volume of Feedstock	Mole Pct Bbbls/Day	7.23 206,000	3.76 110,250	0.76 26,250	0.03 1,250
Total Available Feedstock	KTA	4,250	3,250	900	45
After Liquids Separation	KTA	1,934	1,479	410	21
Feed Used/MT of Ethylene	MT/MT	1.29	2.38	2.50	3.25
Ethylene Capacity	KTA	1,500	621	164	6
Propylene/MT of Ethylene	MT/MT	0.04	0.40	0.43	0.53
Propylene Capacity	KTA	54	248	71	3

There'll Be Enough Ethane for Three World Scale PE Plants (or Two PE + One Ethylene Glycol Plant), But Not Enough Other Feeds for a World Scale Propylene Derivative Plant, Even if They All are Used

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

Alaska Gas & NGL Potential Uses



Logistics to Asia & US West Coast

Cook Inlet has advantaged logistics to the US West Coast and Asia due to its location in the middle of the great circle route, with the potential for additional backhaul freight rate reductions to Asia.

- Specific advantages include:
  - Favorable logistics costs versus Alberta production for Asian markets
  - Favorable logistics costs versus Asian production for US West Coast markets
  - Competitive logistics costs versus USGC for US West Coast markets

Channel to Market Issues– Export

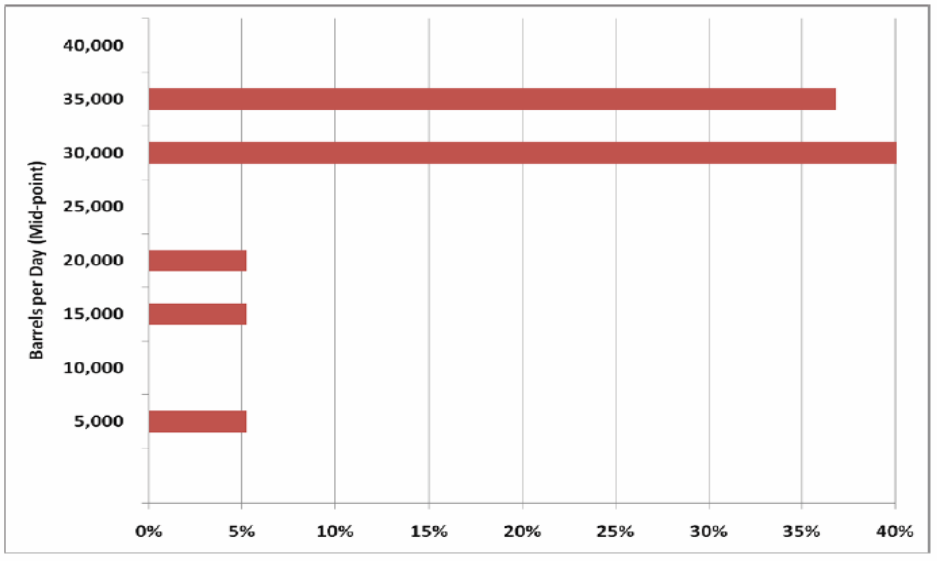
- An Asian company would be considered a domestic supplier in the US market if it has production capacity in Alaska, which could help in marketing to customers and in its dealings with the government.
- An Alaskan plant would not only have duty free access to the entire US market, but would also be able to participate in the North American Free Trade Agreement with Canada and Mexico, as well.
- The first mover on petrochemical investment in Alaska will understand the local situation better than latecomers will, and is better positioned for additional future petrochemical and downstream investments.
- Partnering with or buying a US company could facilitate market development activities for an Alaskan plant's owner (IPIC bought Nova, and SABIC bought GE Plastics).

ANGDA's Ask of PBU owners

- PBU Operator to perform technical evaluations of:
  - CGF Process shift to increase C_3
  - Design concept for new C_3 separation facilities
  - VROM Cost Estimate of modifications & new construction
- PBU to consider development of a non-unit logistical facility to receive individual owner C_3 sales

Potential Alaska In-State Demand For Propane
(Alaska Pipeline Project In-State Gas Study)

Figure 25. Chances of Propane Demand, Alberta Route, Years 10-15



Source: Northern Economics, Inc.

In-State and North Slope Opportunity

- Potential Fleet Services operation on the North Slope converted to less expensive N.S. propane rather than trucked ULSD
- Utilization of propane for new development staging facilities
- Transitional development from in-state and N.S. use to longer-term export
- Industrial applications, such as generation
- Rural community and village opportunity for home heating

Propane Barging / Tankering Direct From North Slope

- **Mining operations**
- **Cook Inlet Utilities**
- **The Gas Company in Hawaii**
- **Petrochemical Manufacturing Plants**
- **Lower 48 for peak seasonal demand**
- **Other worldwide applications and markets**