

2/9/09  
COOK  
INLET GAS  
EXPLORA-  
TION &  
DEV.



## Division of Oil and Gas Senate Resources Committee

Kevin R. Banks  
Director  
February 2009

1

## Cook Inlet 2008

- Administered 410 oil and gas leases (Jan. 1, 2009)
- Held Areawide Lease Sale
  - 23 bids on 18 tracts; result 9 active leases
- Managed 25 oil and gas units with 36 Participating Areas \* (exploration and production)

\*end of calendar year 2008

2

## Cook Inlet Approvals issued in 2008

- Exploration
  - 3 for seismic programs in Cook Inlet.
- Development
  - 15 for Cook Inlet.

3

## Cook Inlet Oil & Gas Activity 2008

- Beluga River Unit – ConocoPhillips (Gas)
  - Drilled two wells, BRU 211-26, BRU 243-34.
- Deep Creek Unit (Happy Valley) – Chevron (Gas)
  - Completed Happy Valley B-13. Beluga and Tyonek objectives.
- Granite Point– Chevron (Oil and Gas)
  - Drilled two wells, GPS 18742 32RD2, GPS 18742 24RD.
- Kasilof Unit – Marathon (Gas)
  - Two miles offshore; Extended reach drilling (17,000 ft).
  - Kasilof S #1 well turned on for winter production only, Tyonek Formation.
- Kenai Unit – Marathon (Gas)
  - Drilled 5 wells, KBU 42-07RD, KBU 41-18X, KBU 14-8, KDU 9, KU 22-6X.
- Nicolai Creek Unit – Aurora Gas (Gas)
  - Two wells are permitted, Nicolai Creek #10 and Nicolai Creek #11.

4

## Cook Inlet Oil & Gas Activity 2008

- Nikolaevsk Unit – Chevron (Gas)
  - Continued evaluation for delineation and development.
  - 1<sup>st</sup> POD work commitment – drill or cause a well to be drilled by March 31, 2009 in Red Prospect.
- Ninilchik Unit – Marathon (Gas)
  - Drilled 2 wells, Paxton #2, GO #7. Tyonek Formation.
  - Currently drilling SD #6.
  - Chevron is 40% working interest owner in unit.
- North Alexander – Escopeta (Gas)
  - Permitted one exploration well, Alexander #1.
- North Cook Inlet– ConocoPhillips (Gas)
  - Drilled 3 gas wells, NCI A-14, NCI A-15, NCI A-16
- North Fork Unit – Armstrong (Gas)
  - Drilled one well, North Fork 34-26; tested gas in the Tyonek.
  - Met with Enstar to discuss possible pipeline and gas markets

5

## Cook Inlet Oil & Gas Activity 2008

- Trading Bay Unit/ McArthur River Field– Chevron (Oil & Gas)
  - Drilled and completed two wells TBU M-17, TBU K-12RD2.
  - TBU M-17 targeted gas in the Tyonek, and TBU K-12RD2 targeted oil and gas in Hemlock.
- West McArthur River Unit– Pac Energy (Oil & Gas)
  - Continued evaluation of reprocessed 3D seismic data to support additional gas wells.
  - Pilot water-flood project to determine potential for additional recovery from the Hemlock reservoir (oil) under consideration.
- Additional Activity – (Oil & Gas)
  - Fowler Oil and Gas permitted a coal bed methane well at corner of Trunk Road & Bogard Road in Wasilla on fee acreage.
  - Corsair Unit Plan of Exploration in default effective December 1, 2008.
  - Kitchen Unit Plan of Exploration requires drilling by December 31, 2008.
- Activity in Units managed by Federal Government or CIRI
  - Beaver Creek Unit (Marathon): 1 well drilled for gas, Beaver Creek Unit 19.
  - Lone Creek Unit (Aurora): currently drilling for gas, Lone Creek 4.
  - Moquawkie Unit (Aurora): 1 well permitted for gas, Moquawkie 4.
  - Swanson River Unit (Chevron): currently drilling for gas, SRU 211-33.
  - Wolf Lake Unit (Marathon): 1 well permitted for gas, Wolf Lake 3.

6

## Projects for 2009

- Gas Storage Expansion Plans
- Exploration and Development
- Lease Sales
- Coordination with Federal Government

7

## Exploration & Development Activities

- ConocoPhillips completing two additional wells from the Tyonek platform in Cook Inlet.

8

## Lease Sales

- Just issued Final Best Interest Finding for Cook Inlet
- Areawide Sale tentatively scheduled for May 2009

9

## Coordination with Federal Government

- Encouraging exploration and development of federal lands.
- Continue partnering with Minerals Management Service and Bureau of Land Management in managing and oversight of jointly-owned lands (Beluga River and Cosmopolitan Units).

10

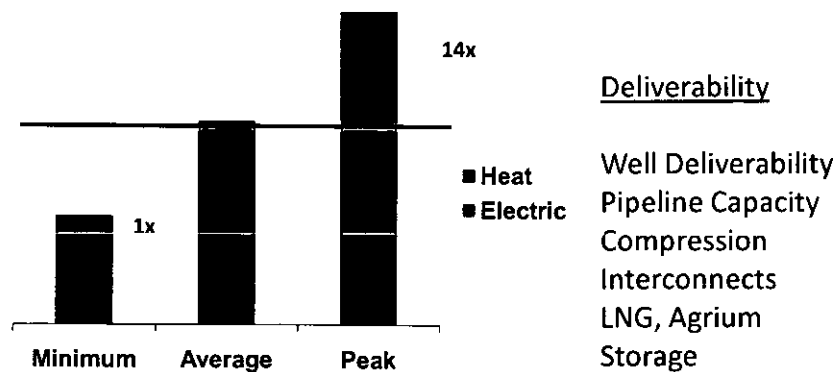
## Gas Storage Expansion Plans

- Continue to develop CI storage capacity
- Engaging producers and utilities on storage
- Actively working one potential storage lease
- Potential for storage in winter 09/10

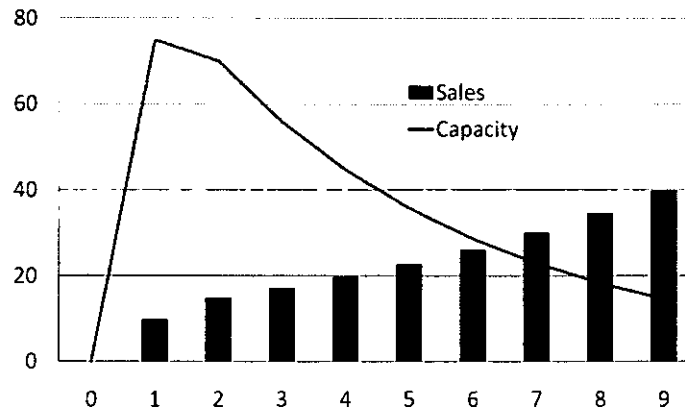
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## Why Store Natural Gas?

Cook Inlet Daily Gas Demand



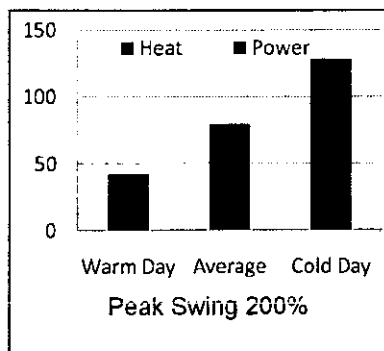
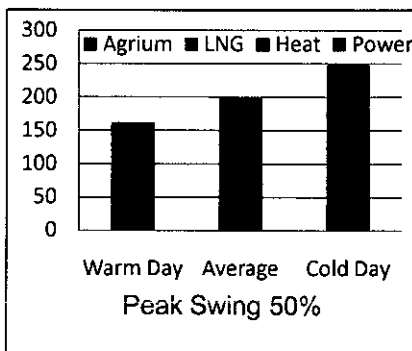
## Production Constrained by Market



Division of Oil and Gas, Alaska DNR.

13

## Seasonal Deliverability



## Kenai LNG Export Agreement

- COP – 2 wells in beluga
- MRO – 2 wells in Ninilchik, 3 wells in Kenai
- Catalog well and seismic data for sale
- RFP to buy gas for LNG plant
- Enstar contract reasonably approvable by RCA
  
- Fill unmet need of Chugach 5.2 BCF in 2010 through good faith negotiation approvable by RCA



# Alaska Gas Exploration Potential In The Cook Inlet

Alaska Division of Geological & Geophysical Surveys

Bob Swenson  
State Geologist  
Monday, February 9, 2009

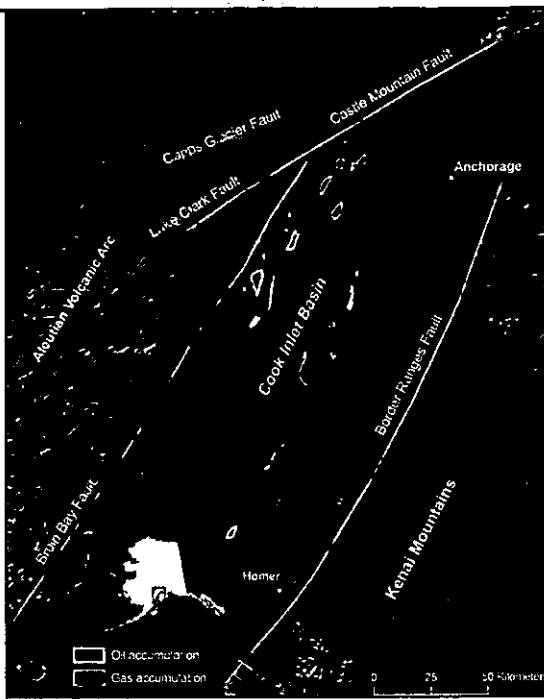
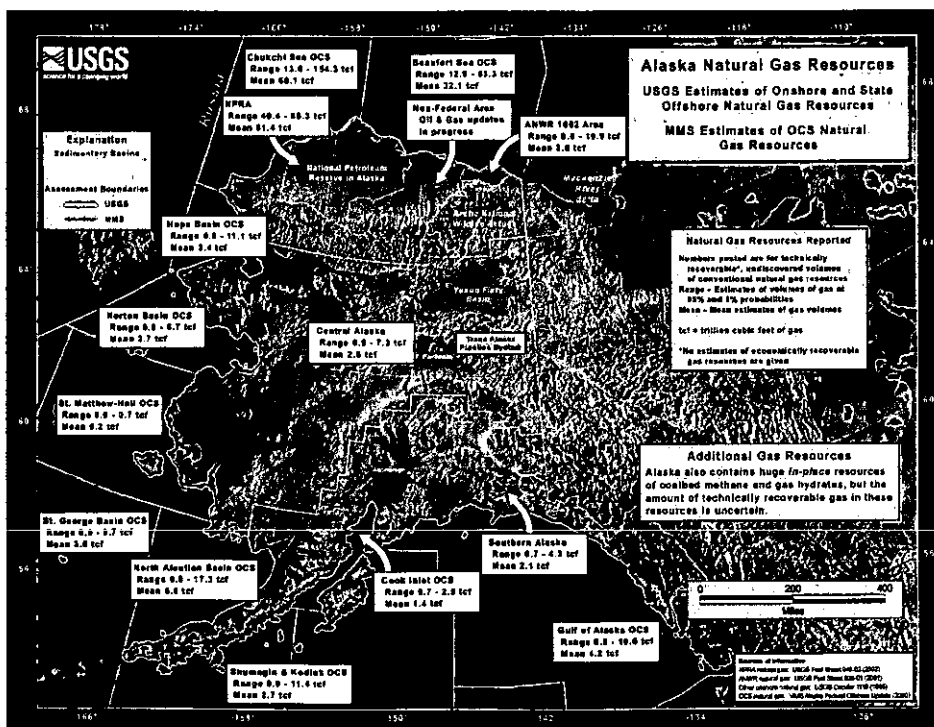


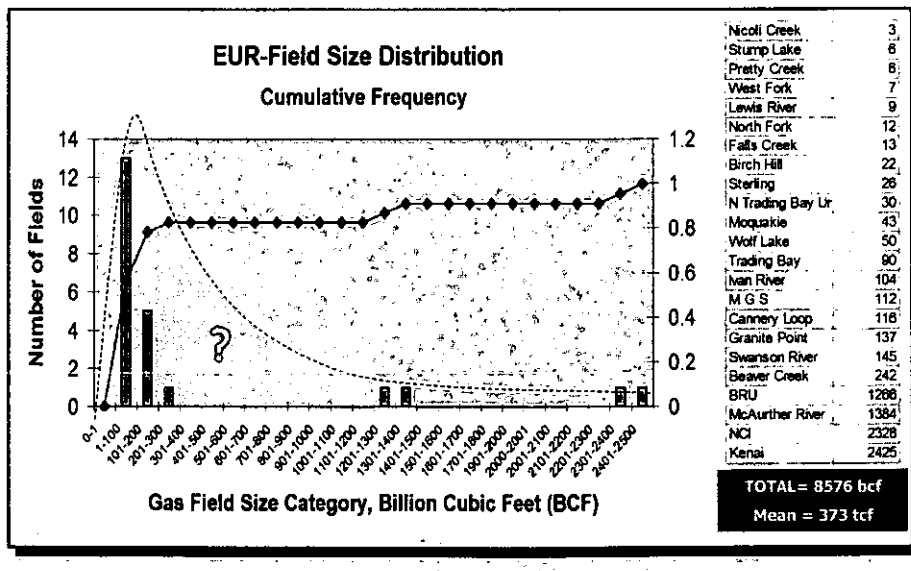
Figure 1



## Cook Inlet Gas Exploration Statistics

- 85% of gas discovered early in exploration cycle while drilling for oil
- Only structural traps had been explored for or developed – stratigraphic trap potential essentially untapped
- Nearly one in ten fields >2 tcf
- 4 largest fields have 86% of reserves
- Field-size distribution lacks discoveries in 300-1300 bcf range → yet to be discovered?

## Gas Field Size Distribution – Cook Inlet



## Take Home Points

- ▶ Minimal focused exploration for natural gas in the Cook Inlet until recent years
- ▶ Oil and Gas exploration is inherently risky, with a low chance of economic success with long lead time
- ▶ Difficult data acquisition with thick coals and low velocity surface
- ▶ The best chance of success is achieved when numerous geologic concepts are tested, which requires access to entire sedimentary basin, numerous exploration wells
- ▶ Market certainty, modern high resolution geologic data, and non-volatile pricing are key to meeting economic risk thresholds
- ▶ In the Cook Inlet, most of the "easy" (inexpensive) gas has been found and delineated

## Is there more gas to be found?

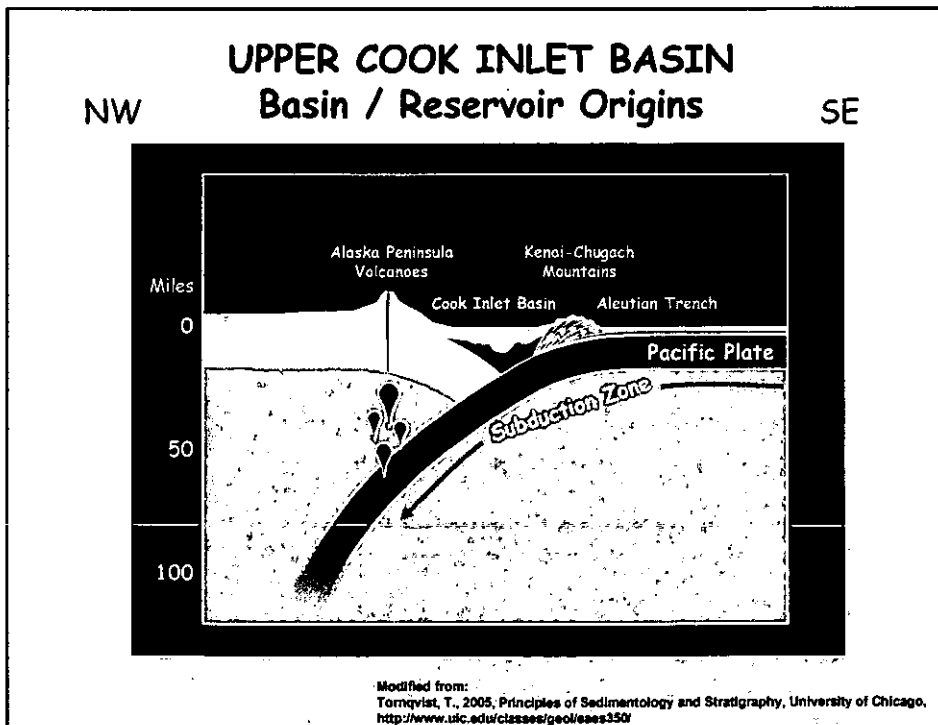
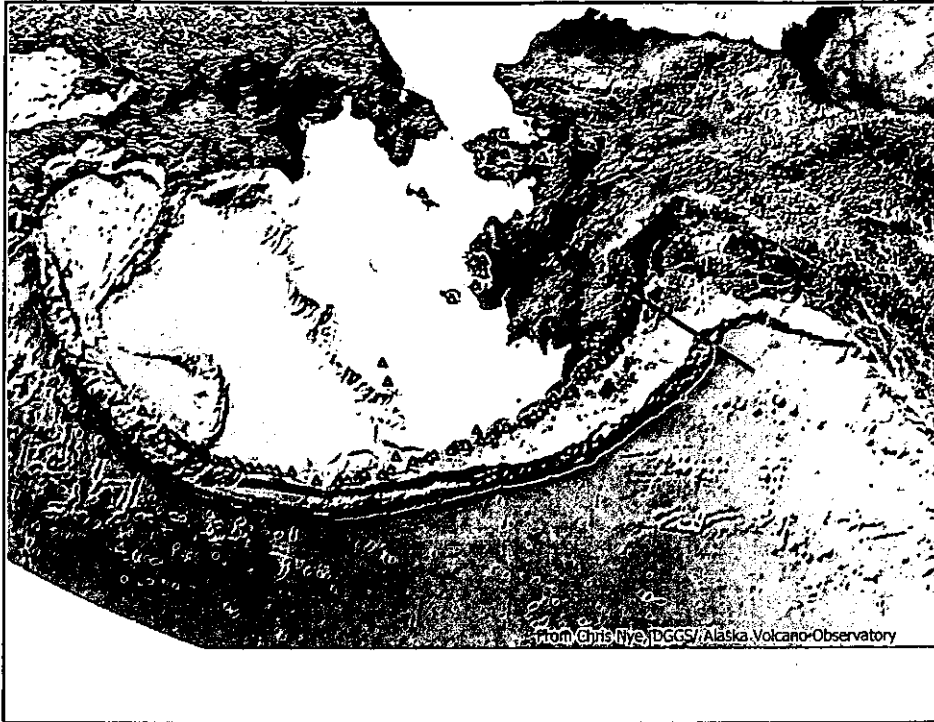
- ▶ Yes

## Where will it be found?

- ▶ In existing fields
- ▶ In new exploration play types

## What are the hurdles?

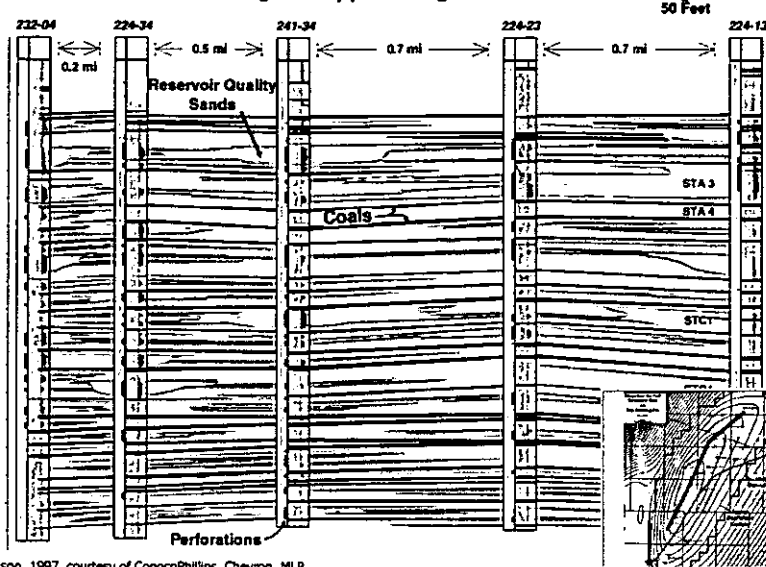
- ▶ Land access over all basin
- ▶ Expensive data gathering and drilling costs
- ▶ Complicated limited market





# Sand Distribution in a Fluvial System

## Beluga River Gas Field Reservoir Correlation Along Structural Crest Sterling and Upper Beluga Formation



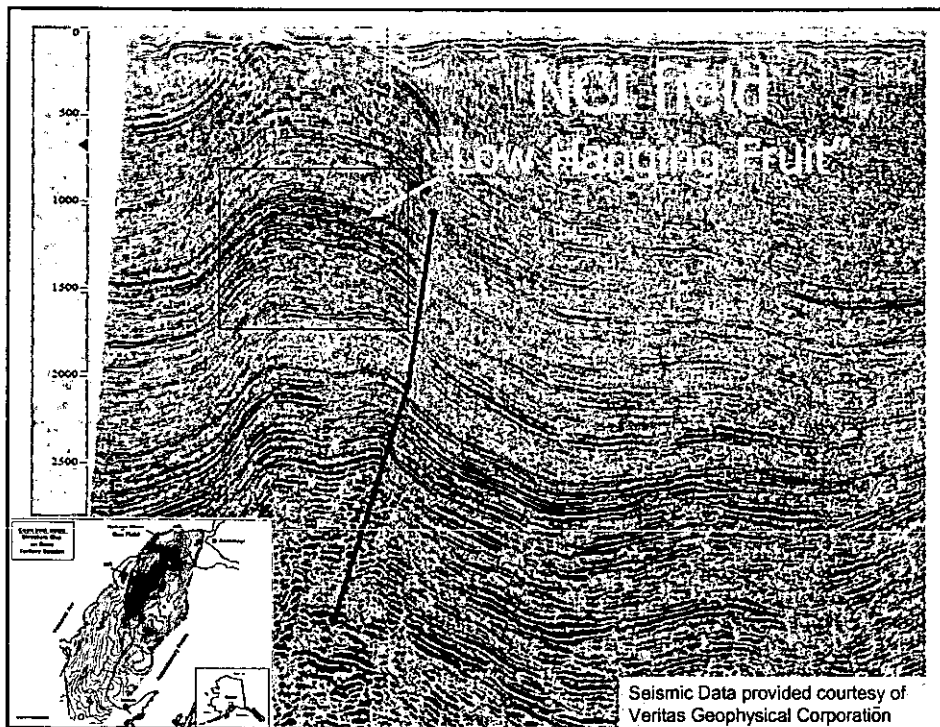
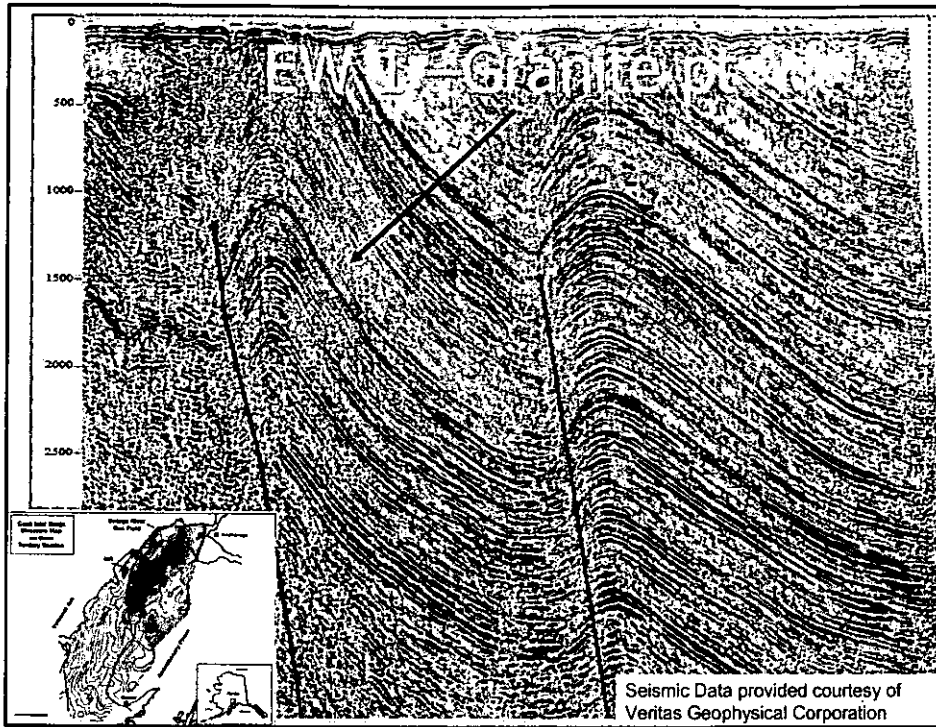
Up to 30,000 feet of Mesozoic marine and marginal-marine strata

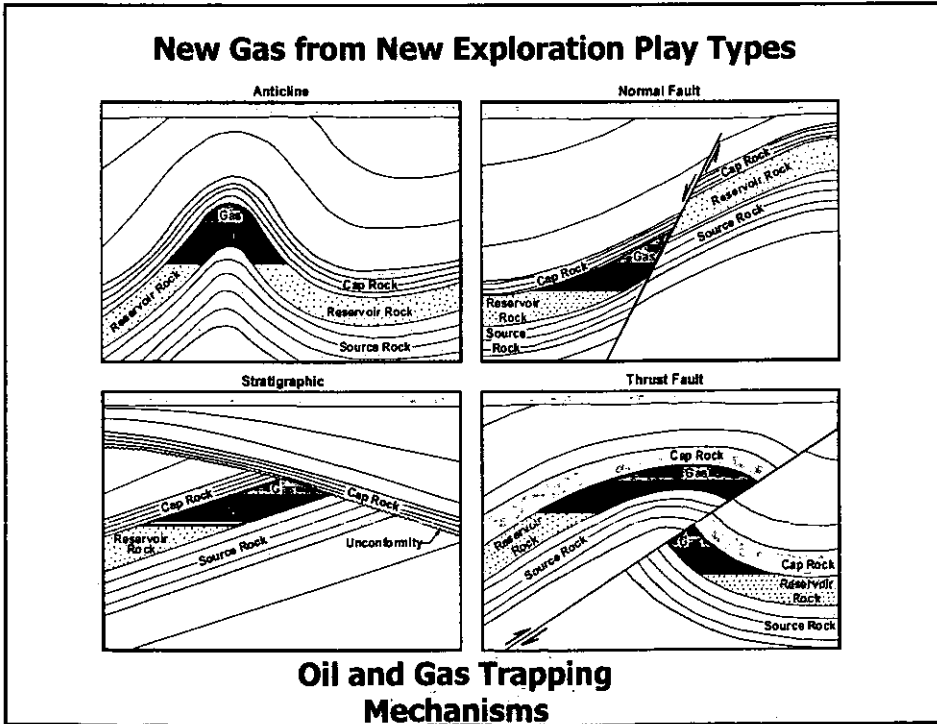
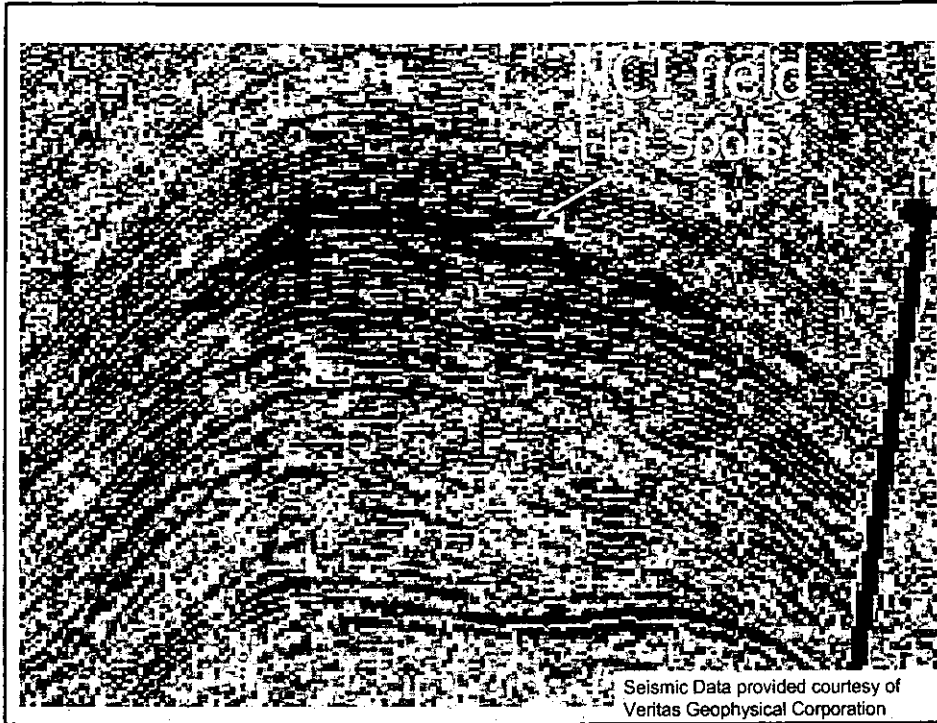
Up to 25,000 feet of Tertiary age nonmarine strata

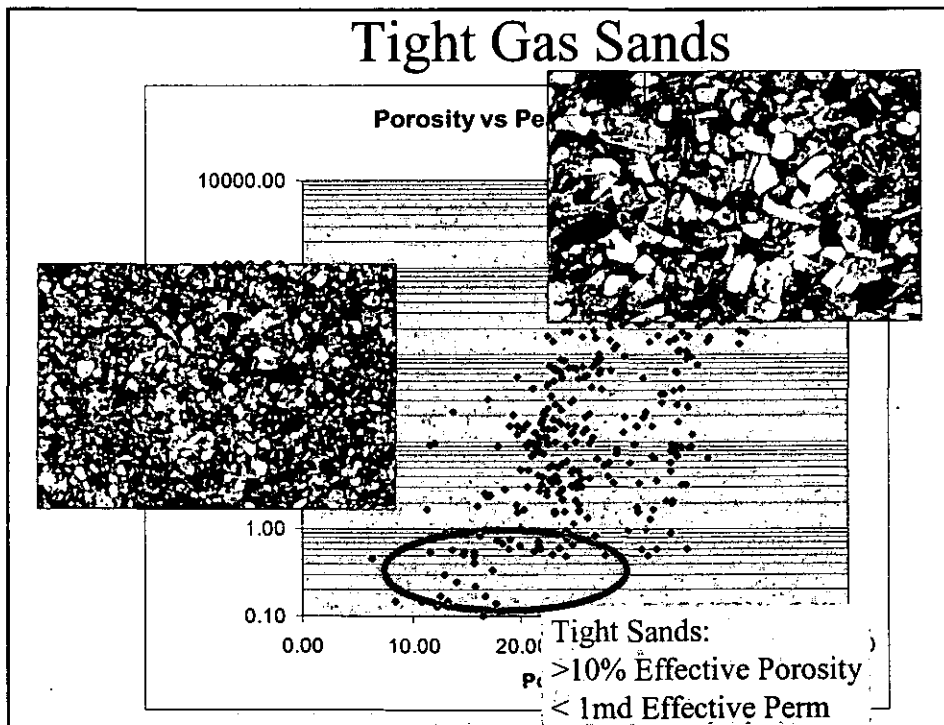
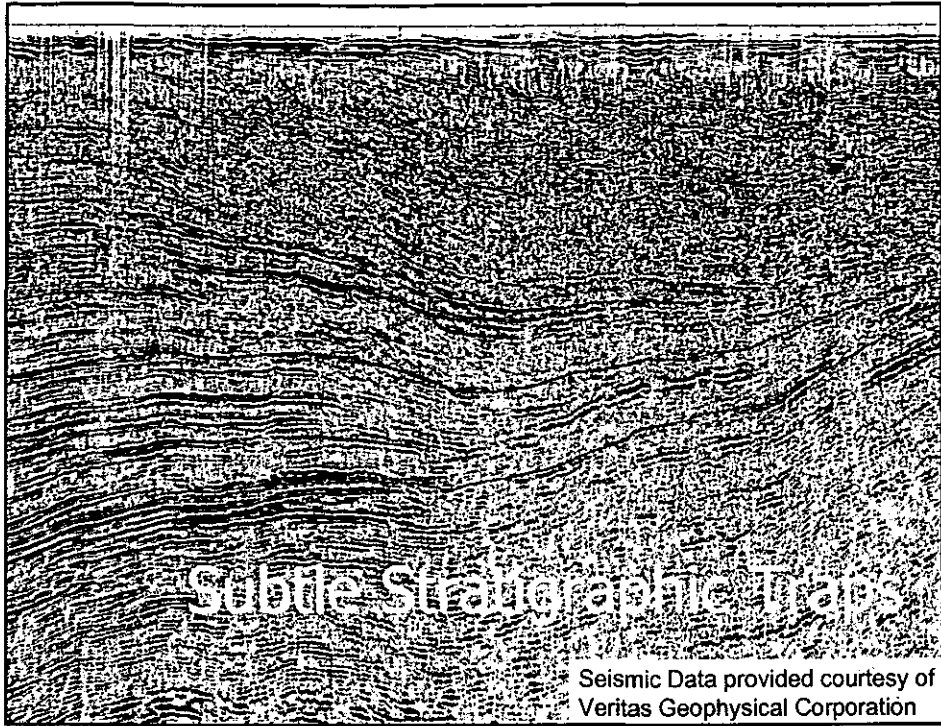
Basin fill modified by folding and faulting

Age (Ma)	Era	Period	Epoch	Stratigraphy	Source/Prod	Depositional Environment	Tectonism	
0	Cenozoic	Tertiary	Pliocene	Starling	S	Fluvial, lacustrine, coal swamp, alluvial fan	Onset of magmatism (ancestral to modern arc)	
10			Miocene	Beluga	S			Yakutat collision
20			Oligocene	Tyonek	S			
30			Eocene	Hemlock	S			Emergence of subduction complex
40			Paleocene	Unnamed	S			
60	Mesozoic	Cretaceous	80-90	Wentz	S	Brown Bay fault active		
80			80-90	Kaguyak	S		Emergence of subduction complex	
100			Late	Matanuska	S			WCT docks
120			Early	Herendeen/Nelchina	S		Growth of accretionary prism	
140			Late	Stanukovich	S			
160	Middle	Naknek	S	Evolution of shallow arc				
180	Early	Chitna	S		Evolution of shallow arc			
200	Triassic	Jurassic	180-200	Tuxedni		S	BRF initiated as subduction-related thrust?	
220			Late	Talkeetna	S			
240			Early	Kamishak	S			

Modified from Curry and others (1993) and Swenson (2002)

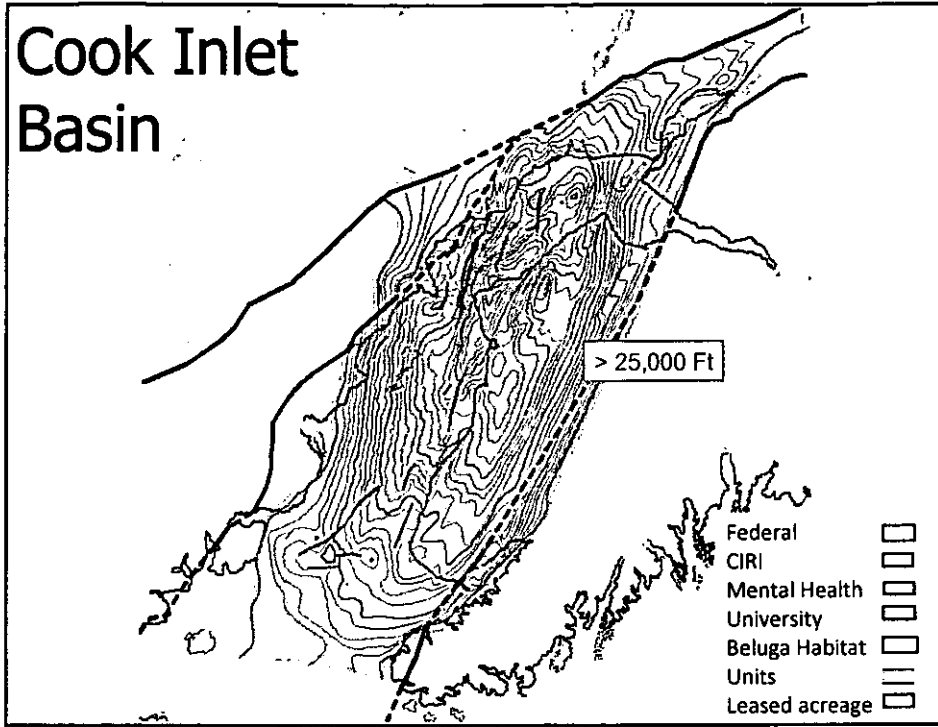




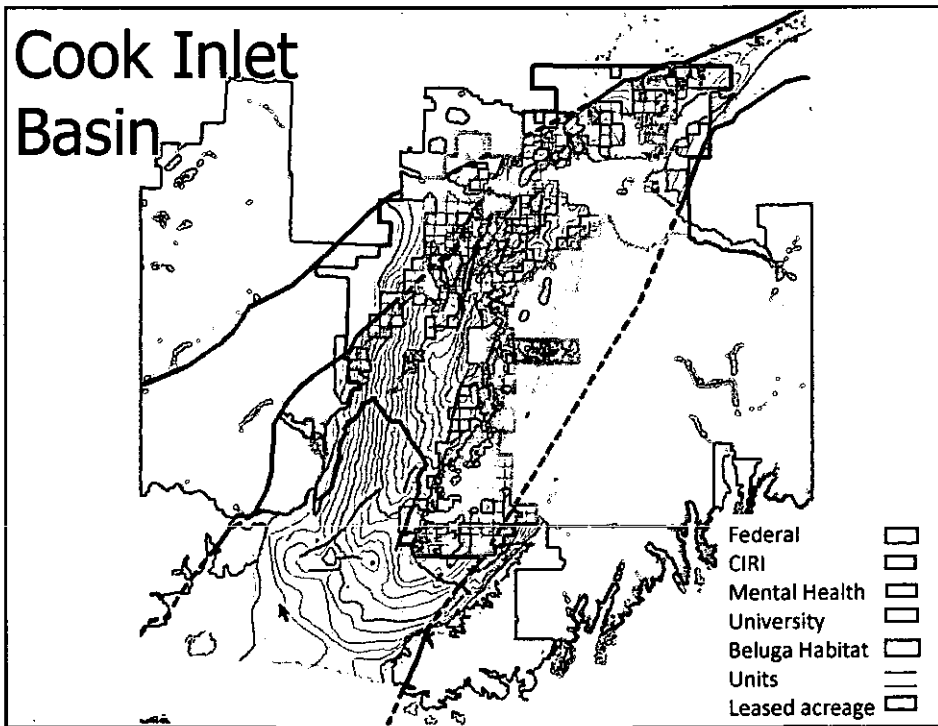




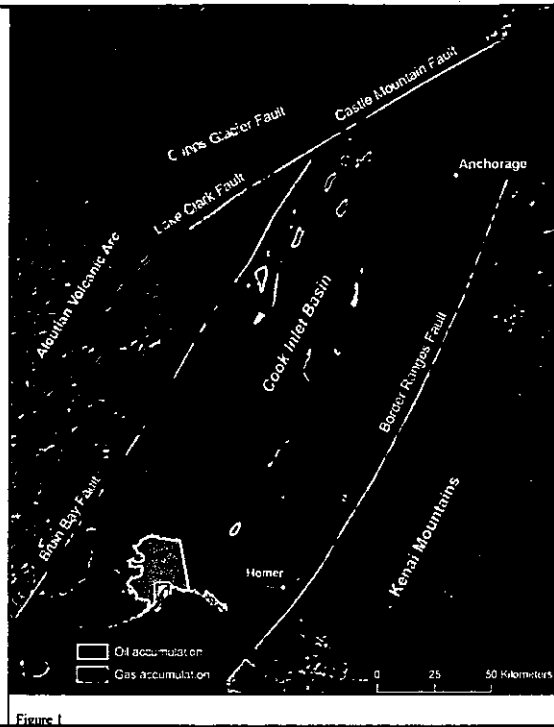
# Cook Inlet Basin



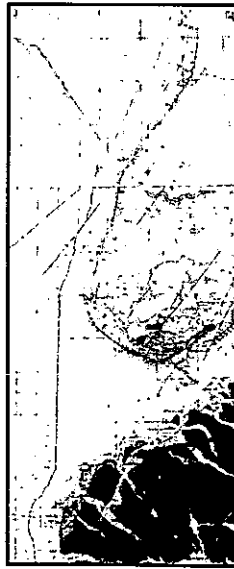
# Cook Inlet Basin

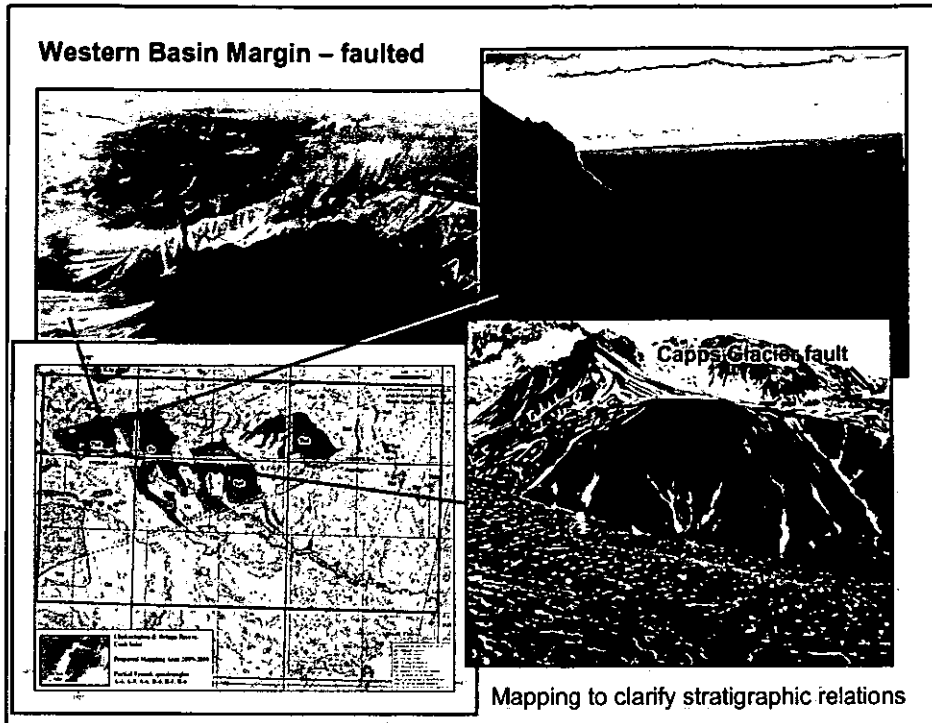


**What is the State Geological Survey Doing to Help Facilitate?**



**Eastern Basin Margin – mildly deformed**





## **Cook Inlet Basin Analysis Program Goals**

- ▶ Reconstruct depositional systems in Mesozoic and Tertiary strata – priority on gas-bearing sands in upper Cook Inlet
- ▶ Characterize sand body geometries
- ▶ Assess reservoir quality of sands and sealing capacity of mudstones
- ▶ Determine controls on tight gas sands and factors controlling gas producibility
- ▶ Evaluate Stratigraphic trap potential and methods for recognition using subsurface datasets
- ▶ Timely release of products in public domain to catalyze exploration investment
- Funding from SOA and industry sources
- ▶ **Work with USGS to provide realistic resource estimates**

## Summary

- ▶ Of the 8+ TCF of gas reserves found, nearly all were discovered while looking for oil on big structural plays
- ▶ Because of historic over-supply and limited market, there has been minimal focused exploration for natural gas in the Cook Inlet
- ▶ Oil and Gas exploration is inherently risky, with a low chance of economic success
- ▶ The best chance of success is achieved when numerous geologic concepts are tested
- ▶ Market capacity & certainty, modern high resolution geologic data, and non-volatile pricing are key to meeting economic risk thresholds
- ▶ In the Cook Inlet, most of the "easy" (inexpensive) gas has been found and delineated