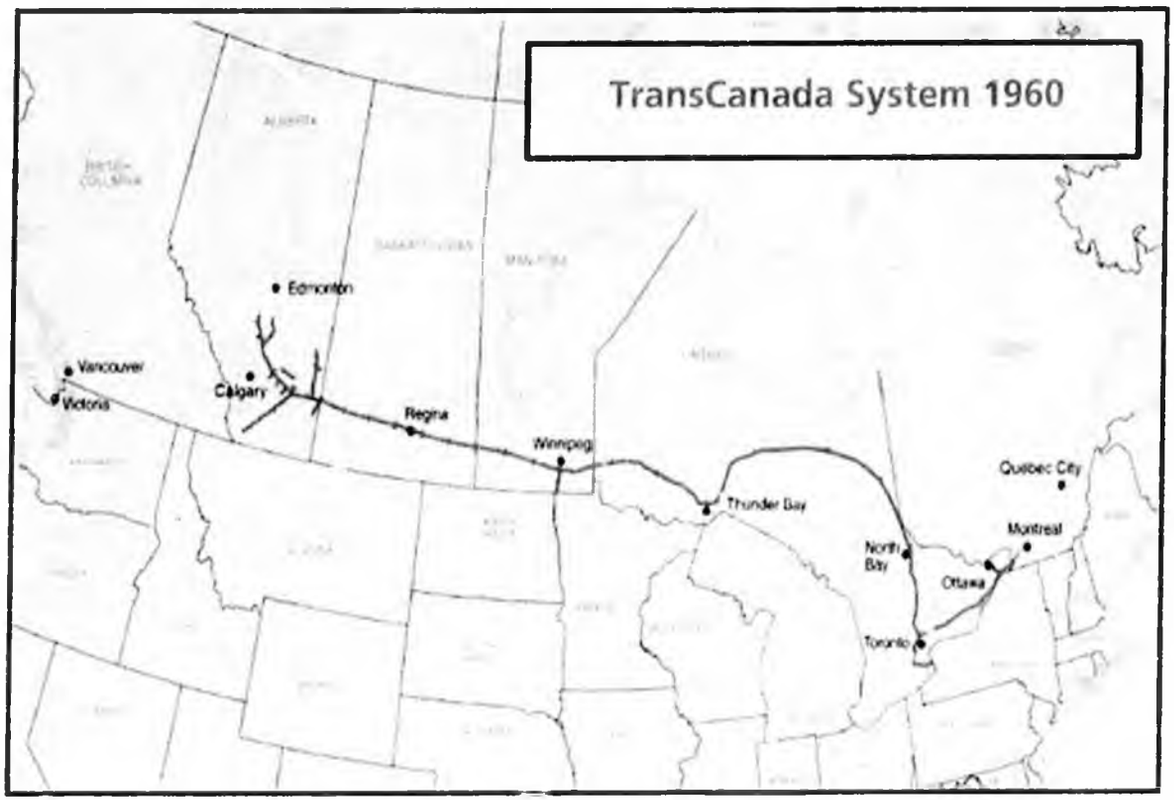
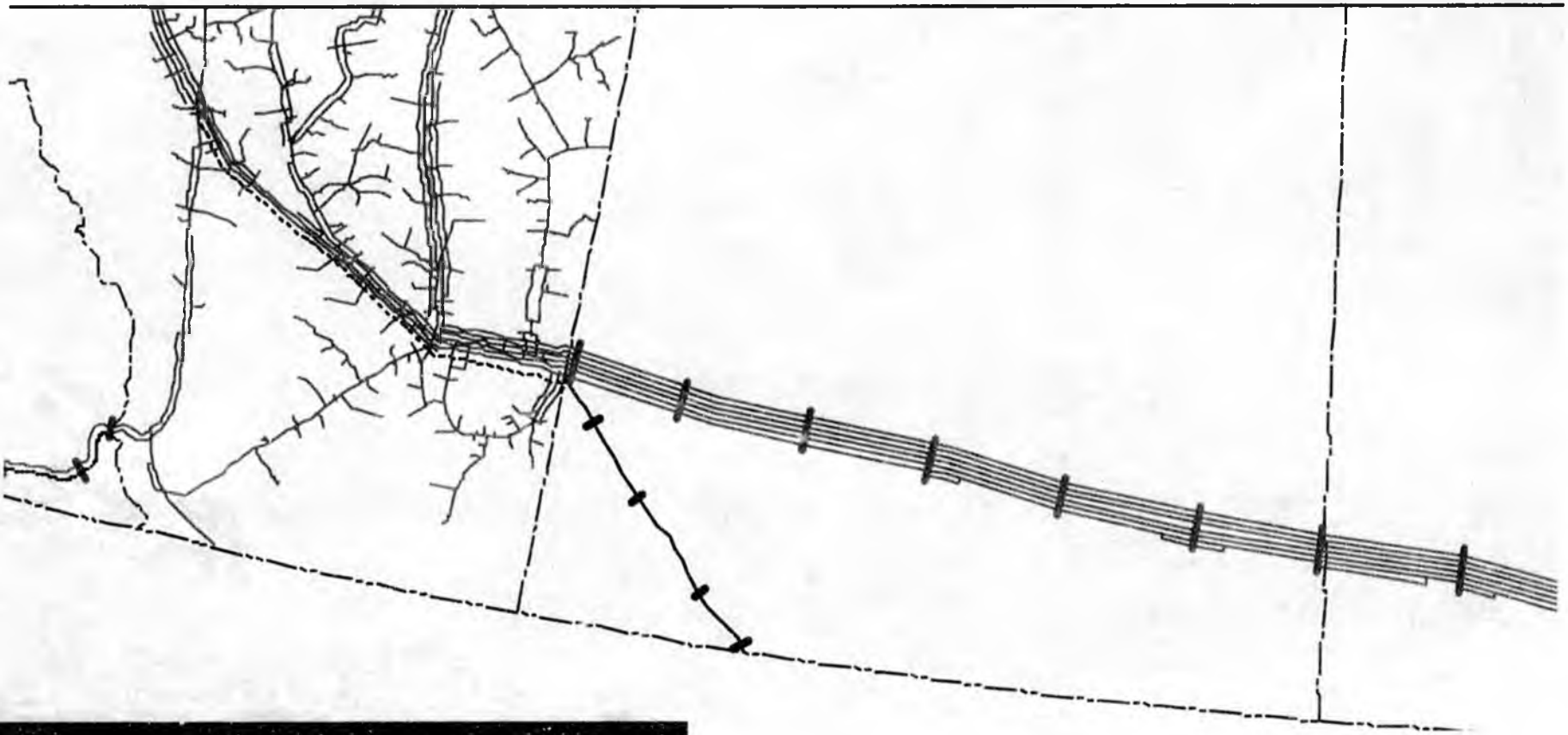
Proven Basin Developer – Mainline Example 1960



TransCanada

Proven Basin Developer – Mainline Example 2008



Regulatory Structure

- **Independent pipeline model**
- **Rolled-in tolls**
- **3 customers in 1958, 300+ today**

AGIA "Must Haves"

AGIA "Must Haves"	TransCanada's Application	Completeness
1. Filed by deadline	Filed on November 30, 2007	✓
2. Project details & schedule	Alaska Highway route 5 bcf/d GTP and 48" 2500/2600 psi pipe 2017 November in-service*	✓
3. Open season date certain Apply for FERC pre-filing Apply for FERC CPCN	Completed by Sept. 2009* June 2010* - not contingent on Open Season December 2011* - as above	✓
4. RCA filing	N/A	**N/A**
5. Open season frequency	Once every 2 years	✓
6. Expansions - Commitment to expand in engineering increments	Yes, 4.5 bcf/d initial design capacity Expandable to 5.9 bcf/d with compression only	✓
7. Rolled-in tolls	Up to 115% of initial rates in Alaska Full rolled-in rates in Canada	✓
8. Gas treatment plant	TransCanada will build if 3rd parties do not	✓
9. State reimbursement	Up to $500 million	✓

* Subject to AGIA license by April 2008

TransCanada

AGIA "Must Haves"

AGIA "Must Haves"	TransCanada's Application	Completeness
10. Project debt ratio minimum	Construction - 70% Operation – 75% (to reduce tolls)	✓
11. Capital cost overrun measures	TransCanada's return reduction (penalty) Potential $18 B loan guarantee (stable tolls)	✓
12. In-state deliveries	Min. 5 delivery points	✓
13. In-state delivery rates	Distance sensitive rates	✓
14. Local headquarters in Alaska	Yes	✓
15. Local hire, local businesses, etc.	Opportunities for local hire and businesses	✓
16. Waive right to appeal	Waived	✓
17. Project labor agreement	Commit to negotiate PLA	✓
18. Treatment of State reimbursement	Excluded from rate base	✓
19. Details of Applicant	Provided	✓
20. Readiness, financial resources and technical ability of Applicant	Proven record and demonstrated capability	✓

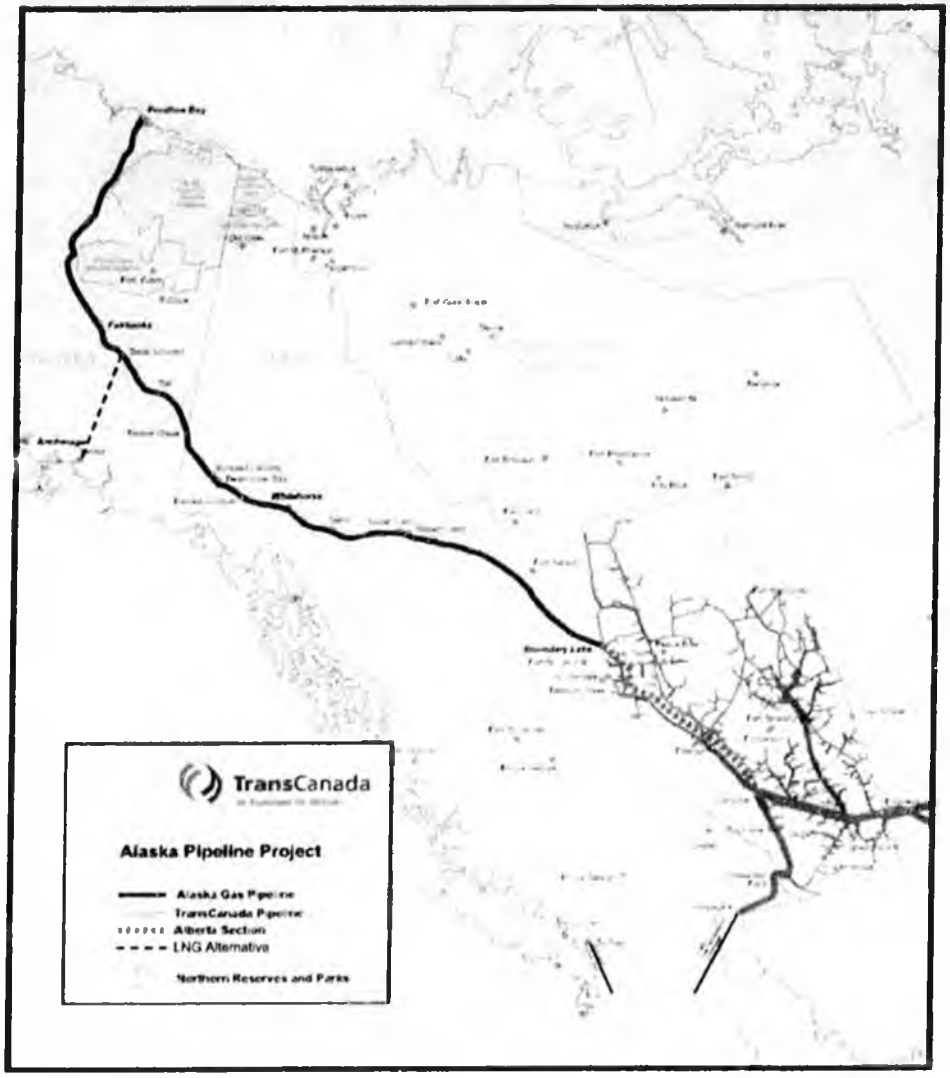
TransCanada

TransCanada's Competitive Response to AGIA

- TransCanada bid to win – competitive enhancements
  - Initial system design with inexpensive expandability
  - Gas treatment plant ownership, if no 3rd party willing to build
  - Equity opportunity for shippers committing gas in initial open season
  - 75% debt vs. 70% minimum limit in AGIA
    - Toll reduction of $0.09/mmbtu
  - TransCanada's return reduction in event of capital cost overruns
  - Fort Nelson Option upside
    - Toll reduction of $0.13 -$0.18/mmbtu
  - LNG alternative if insufficient gas commitments through Canada , or via Y-line

TransCanada

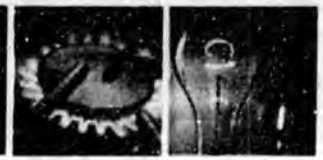
Alaska Pipeline Project



- **Alberta Hub is the most liquid market in North America**
- **TransCanada's Alberta System is the Alberta Hub**
- **Access to all North American markets coast-to-coast on TransCanada's existing pipelines**
  - **By 2018, spare takeaway capacity sufficient for full Alaska volumes**
- **One-third of Alaska pipeline in-service as Prebuild moving 3 BCFD**
- **LNG alternative if insufficient gas commitments through Canada or via Y-line**

TransCanada

Project Description



- Gas treatment plant at Prudhoe Bay
  - 5 Bcf/d initial capacity
  - TransCanada will develop/own only if necessary
- Natural gas pipeline from Prudhoe Bay to Alberta Hub
  - 4.5 Bcf/d initial capacity
    - Expansion to 5.9 Bcf/d with compression only
  - More than 1700 miles
  - 48-inch diameter; 2500/2600 psig
- Alberta Hub to Lower 48
  - TransCanada's existing pipeline system in Alberta is the "Alberta Hub"
    - TransCanada's Alberta pipeline is both a physical and commercial system
    - Largest natural gas trading hub in North America
  - By 2018, downstream pipelines projected to have spare capacity for full Alaska volumes

TransCanada

Project Economics [1]

- Capital costs
  - $26 billion (2007 $US excluding AFUDC)
    - Includes approximately $0.6 billion for Open Season and regulatory certification
- Tolls
  - $US 2.76/MMbtu in 2018 to the Alberta Hub
    - Levelized negotiated toll for 4.5 Bcf/d in nominal dollars, including fuel
  - Expansion Tolls
    - Rolled-in tolls in Canada
    - Rolled-in tolls in Alaska up to 115% of initial tolls, including fuel

[1] Based on information provided by the State and current TransCanada estimates

TransCanada

Financial Parameters

- Debt/Equity Ratio
  - 70/30 during construction
  - 75/25 upon completion of initial project
  - 60/40 for all expansions
- Return on Equity
  - U.S. 10-year Treasury Note plus 965 basis points
  - TransCanada's ROE will be adjusted downward in first 5 years by up to 200 basis points in the event of CAPEX overruns
- Fuel
  - 7.9% including GTP from Prudhoe Bay to Alberta Hub
  - $US 0.35/MMbtu in 2018 @ 4.5 Bcf/d

TransCanada

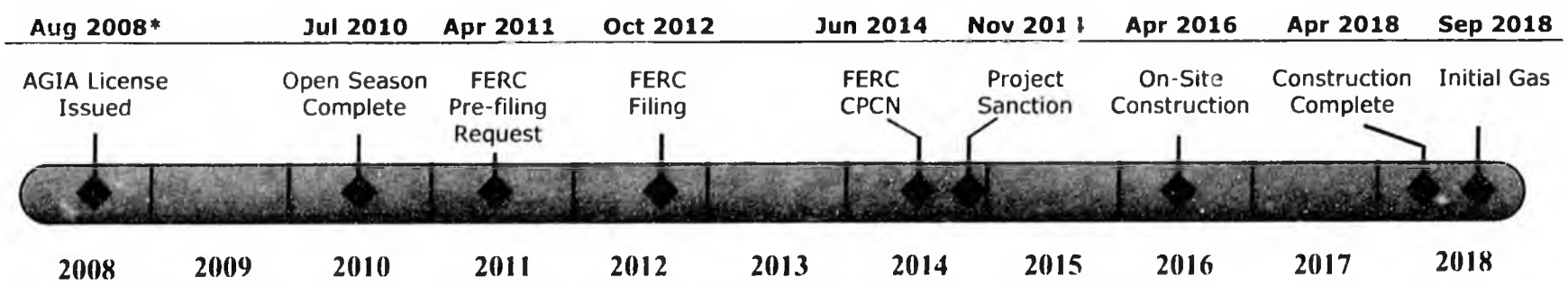
Schedule [1]

- Open Season
  - Concluded 24 months after AGIA License issuance – July 2010
- FERC Application
  - FERC pre-filing by April 2011
  - FERC Certificate application by October 2012
- FERC Approval
  - CPCN by Q2 2014
- In-service
  - September 2018

[1] Subject to AGIA License being issued by August 2008

TransCanada

Project Schedule



* AGIA license assumed to be issued in August 2008

TransCanada

Partnership Opportunity

- TransCanada will offer equity opportunity to Shippers in the initial Open Season that subscribe for a threshold volume
  - Should improve likelihood of success and alignment of interests between project sponsors and Shippers

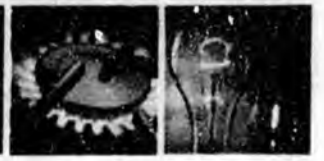
TransCanada

Upstream Fiscal Terms

- TransCanada's AGIA obligations are not conditional on a review of Alaska's upstream fiscal terms.
- TransCanada acknowledges that this issue is between the State and natural gas producers.
  - TransCanada requests that the State review upstream fiscal terms for natural gas prior to the initial open season.

TransCanada

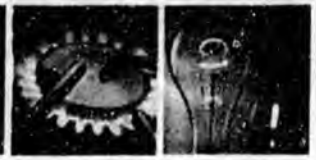
Other Project Components



- Within Alberta
  - Foothills will construct necessary additional facilities to integrate with TransCanada's existing pipeline system in Alberta and connect to the Prebuild under the NPA
- NGL Extraction
  - TransCanada can accommodate NGL extraction in Alaska or downstream
  - TransCanada's Alberta system is straddled by three NGL complexes owned by third parties
  - Excess capacity expected at those plants sufficient to process Alaskan gas if Shippers so choose

TransCanada

Other Project Components (cont'd)



- Fort Nelson Option
  - TransCanada is exploring options to move its Alberta system receipt point upstream of Boundary Lake to Fort Nelson, BC
  - If successful, this would provide toll savings for Alaska Shippers of $US 0.13-0.18/MMbtu
- LNG Alternative
  - TransCanada is willing to offer gas treatment and transportation services from Prudhoe Bay to an LNG terminal should insufficient gas be committed through Canada or via a Y-line

TransCanada

Regulatory Structure

- Alaska
  - TransCanada Alaska Company, LLC will proceed under Alaska Natural Gas Pipeline Act of 2004
- Canada
  - Foothills Pipe Lines Ltd. will proceed under the Northern Pipeline Act (NPA)
- Canada/U.S. Treaty
  - The pipeline will follow the route set out in the Treaty and the NPA

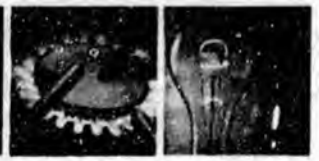
TransCanada

Alaska – TransCanada Alaska Company, LLC

- Was never a partner in ANNGTC and owes no obligation to ANNGTC or Withdrawn Partners
- New start in Alaska, TransCanada Alaska Company, LLC will develop entirely new assets for the project – no utilization of **any** ANNGTC assets (certificate, Right-of Way, 404 permits, engineering, geotechnical, etc.)
- Additional safeguard - TransCanada's AGIA application commits to never including any potential ANNGTC liability in AGIA project tolls.

TransCanada

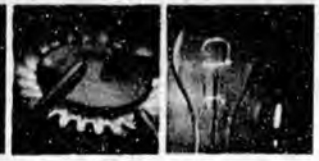
ANNGTC



- ANNGTC is a partnership certificated by the FERC some thirty years ago under ANGTA to construct the Alaskan section of a North Slope pipeline project
- Prior to the AGIA deadline for submitting applications, the ANNGTC partnership considered whether it could, or should, submit an application for the AGIA License
- ANNGTC concluded that the uncertainties created by its historical contingent liabilities precluded it from making a viable proposal
- Accordingly, ANNGTC did not make an AGIA application, and has played no role in the AGIA application filed by the TransCanada AGIA co-applicants
- No TransCanada entity is prohibited from pursuing a different project
  - No non-compete clause in ANNGTC partnership agreement
  - No implied duty to refrain from competing

TransCanada

ANNGTC (cont'd)



- Withdrawn Partners forfeited any right to be treated as a partner when they withdrew from ANNGTC
  - They have no right to anything unless ANNGTC builds the pipeline, which it cannot do
  - Entitled only to contractual right to payment
    - If and when ANNGTC builds the pipeline, and
    - If payment would not pose undue hardship on ANNGTC
- Partnership Agreement specifically provides that no other remedy is available.
- The two remaining ANNGTC partners intend to formally dissolve the ANNGTC partnership and dispose of all of its assets because it is no longer a viable enterprise.

TransCanada

ANNGTC - Summary

- TransCanada's AGIA Applicatior has nothing to do with ANNGTC, its long history or its contingent obiigations to Withdrawn Partners
- No claim has ever been made or even threatened by Withdrawn Partners
- Additional safeguard – TransCanada's AGIA Application commits to never including any potential ANNGTC liability in AGIA project tolls
- Any claims against third parties would also fail because third parties played no role in the TransCanada Partners' decision that the ANNGTC Partnership is no longer viable

TransCanada

Canada - Foothills Pipe Lines Ltd.

- Foothills Pipe Lines Ltd. was certificated under Canada's Northern Pipeline Act for the section of pipeline in Canada
- Foothills is an entirely separate entity from ANNGTC
- No Withdrawn Partner issues in Canada
- Foothills has no potential future contingent liability
- ANNGTC does not hold any authorizations under the Northern Pipeline Act or otherwise for any facilities in Canada
- Foothills Pipe Lines Ltd. does not hold any authorizations for facilities in the U.S. under ANGTA

TransCanada

Canada - Advantages of the NPA - Timing

- **Certificate of public convenience and necessity has been issued** by statute (section 21 of the NPA)
  - Public interest determination has been made
  - Process for meeting current environmental standards and approving design plans will include input by appropriate stakeholders and First Nations but **will not revisit the go/no go decision**
- **Single window, expeditious regime**
  - Cabinet is authorized to transfer the powers of any department or agency of the Gov't of Canada to the Minister responsible for the NP Agency
  - Minister is entitled to second employees from any dept or agency (including the NEB) to the NP Agency

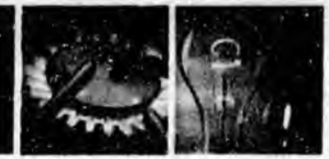
TransCanada

Canada - Advantages of the NPA – History of Implementation

- The NPA has a history of implementation that will provide the precedents required to move forward on the APP.
- The NPA was used as the regulatory vehicle for the following:
  - Construction of the Pre-Build (approximately 25% of the Canadian portion of the APP)
  - Construction of 5 Expansions of the Pre-Build
  - Other – acquisition of Duke's Interest in Foothills (as recently as 2003-2004)

TransCanada

Canada - Advantages of the NPA - Flexibility



- **NPA is not prescriptive as to volume or design**
  - Sec. 3 (Treaty): "The initial capacity of the Pipeline will be sufficient to meet, when required, the contractual requirements of United States shippers and of Canadian shippers."
  - Sec. 10 (Treaty) indicates that the line size may be 48-54 inches in diameter "or any other combination of pressure and diameter which would achieve safety, reliability and economic efficiency...the decision relating to pipeline specifications remains the responsibility of the appropriate regulatory authorities".
  - NPA is not prescriptive as to timing
  - No sunset date in legislation

TransCanada

Canada - Advantages of the NPA – Flexibility (cont'd)

- **NPA is uniquely designed to meet current standards by requiring:**
  - Approval by the Designated Officer of plans submitted by Foothills to implement the approved project
  - Foothills to comply with all undertakings it provided during the NEB hearing and to provide to DO, for approval:
    - Final detailed design and detailed construction procedures and specifications
    - A schedule for project control, including schedules for regulatory reviews and approvals
    - Results of further studies (environmental, social and economic matters) as may be ordered or directed by the DO
    - Business and opportunity plans, environmental plans and procedures, plans for meeting Terms & Conditions

TransCanada

Canada - Advantages of the NPA – Land Rights

- **Foothills holds a right-of-way (ROW) in the Yukon**
  - Provides access through Yukon along the route of the APP
  - Acknowledged in the Umbrella FinalAgreement by Yukon First Nations, Canada and Yukon
    - Final Agreements have been entered into by the Kluane, Champagne Aishihik and T'an Kwach'an First Nations, Kwanlin Dun, Carcross/Tagish and the Teslin Tinglit Council.
  - ROW has since been approved by Cabinet pursuant to Sec. 37 of the NPA and remains in full force and effect

TransCanada

Canada - Other Land – BC and Alberta

- In BC, Foothills holds Map Reserves under the *Land Act* and Mining Reserves under the *Mining (Placer) Act* for all lands required for pipeline purposes
- In Alberta, Foothills holds a Consultative Notation with respect to Provincial Crown Lands
- The effect of the above is to give notice of intended use of land to all others and provides Foothills with the opportunity to review and comment upon any conflicting proposed development
- The normal process for acquiring Crown land rights will occur as the project progresses; including a License of Occupation (*Land Act*) in BC and a Pipeline Agreement (*Public Lands Act*) in Alberta
- Negotiations with landowners for privately held lands

TransCanada

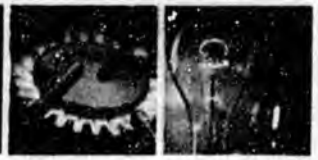
Fundamental Decisions

In passing the NPA, Parliament clearly:

- Decided that the APP is in the public interest
- Determined there is a need for the APP
- Recognized a general route for the APP
- Recognized that environmental and social impacts, while expected, would be acceptable with mitigation
- Created NP Agency to be the exclusive regulatory agency to determine environmental and socio-economic issues related to the completion of the APP, i.e. what was appropriate and what required mitigation

TransCanada

AGIA "Must-haves" Promote Basin Development



- Rolled-in tolls up to 115% of initial rates in Alaska
- Open Season every 2 years
- In-State deliveries
  - Distance-sensitive tolls
  - Minimum 5 delivery points
- Low equity ratio requirement for pipeline sponsors
- State fiscal incentives (if any) targeted to AGIA pipeline shippers

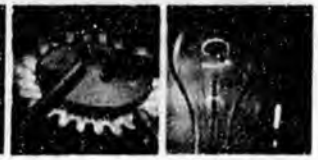
TransCanada

Long-run Basin Development – Pipeline Expansions

- Value to Producers / Governments?
- Does Alaska have enough gas?
- Drilling impacts?
- Impact of rolled-in tolls?

TransCanada

Value of Potential Expansions ($Billions)[1]



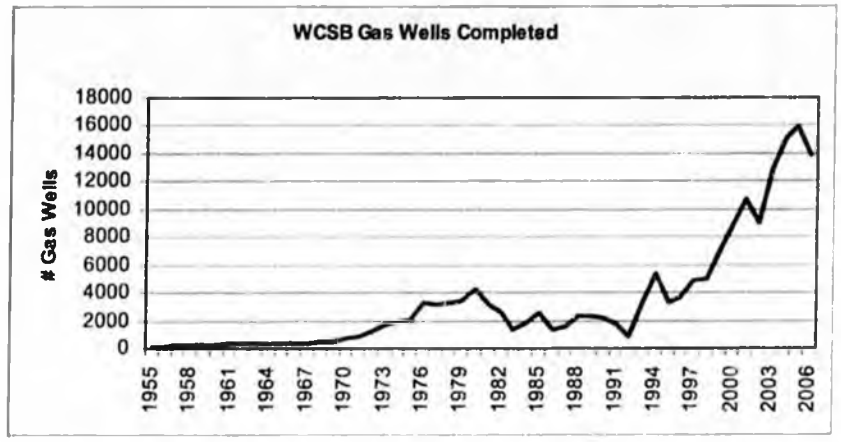
	Producer/Govts. Total Revenue *	Expansion Value
Base Project		
- 25 years @ 4.5 Bcfd	350	
Expansions		
Case I		
- Base volumes for 10 years (4.5 Bcf/d)		
- 30% expansion for 25 years (5.9 Bcf/d)	600	250
Case II		
- Base volumes for 10 years (4.5 Bcf/d)		
- 60% expansion for 25 years (7.2 Bcf/d)	700	350

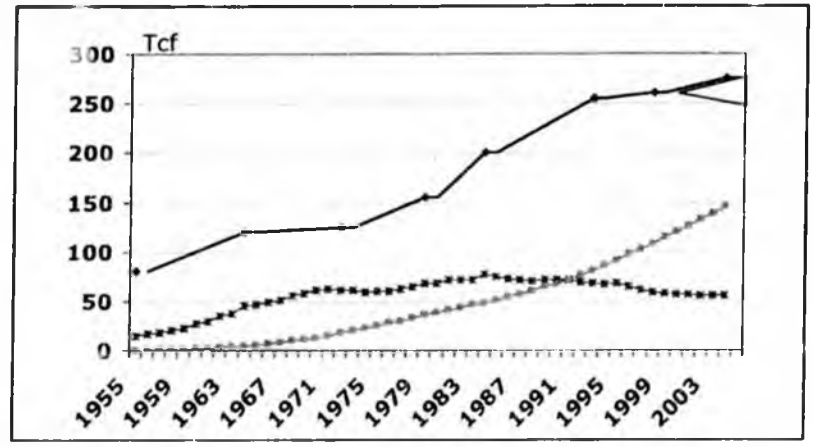
[1] Assumes annual average netback of $6.89/MMbtu

* Direct revenue only
  - no indirect impacts from additional E&P activity and spin-offs

TransCanada

Basin Development – Western Canada Example

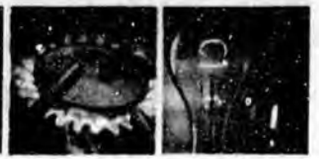


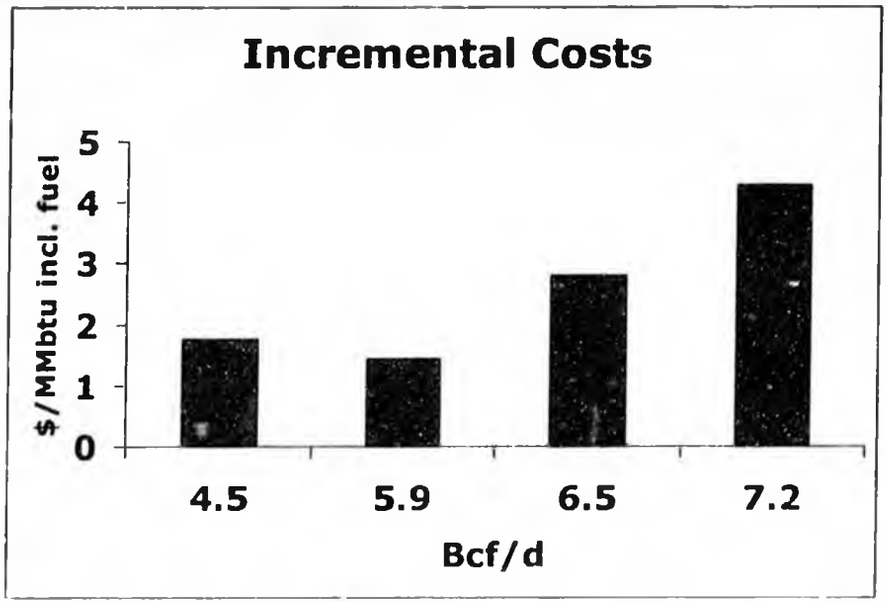


- Pipeline expansion can create "virtuous circle"
  - More exploration and drilling
  - If successful, leads to more pipeli e expansion
- Exploration and drilling drives service industry and employment over long term

TransCanada

Impact of Rolled-in Tolls?



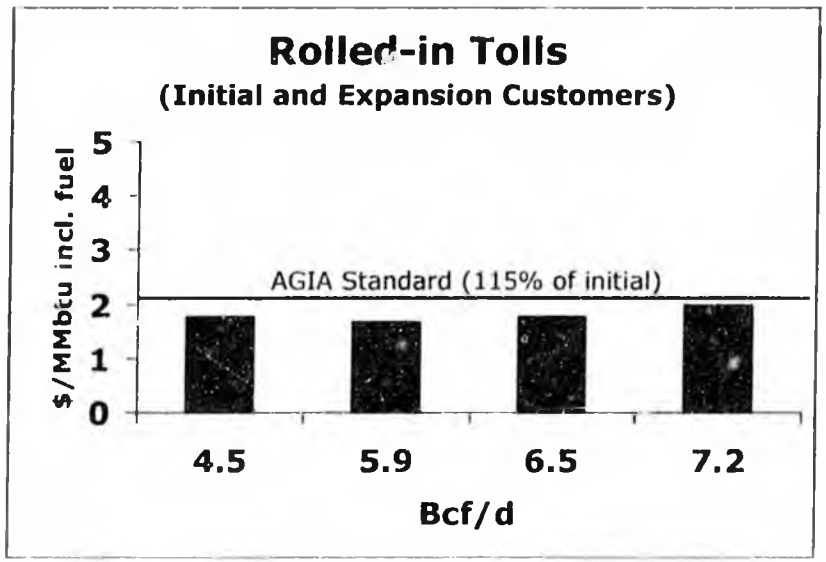


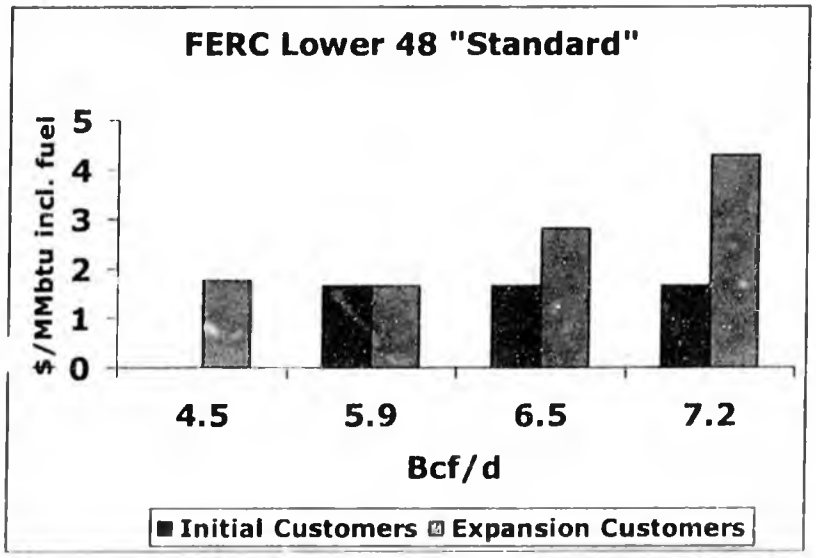
Alaska & Yukon-B.C. sections only

Assumed Volumes: 4.5 Bcf/d years 1 & 2
5.9 Bcf/d years 3 & 4,
6.5 Bcf/d years 5 & 6,
7.2 Bcf/d years 7 & beyond

TransCanada

Impact of Rolled-in Tolls?

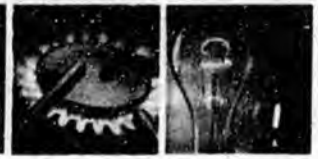




- Rolled-in tolls increase chance of expansions above 5.9 Bcf/d
  - 35% lower tolls for expansion customers to 6.5 Bcf/d
  - 50% lower to 7.2 Bcf/d

TransCanada

Climate Change Challenge - Overview

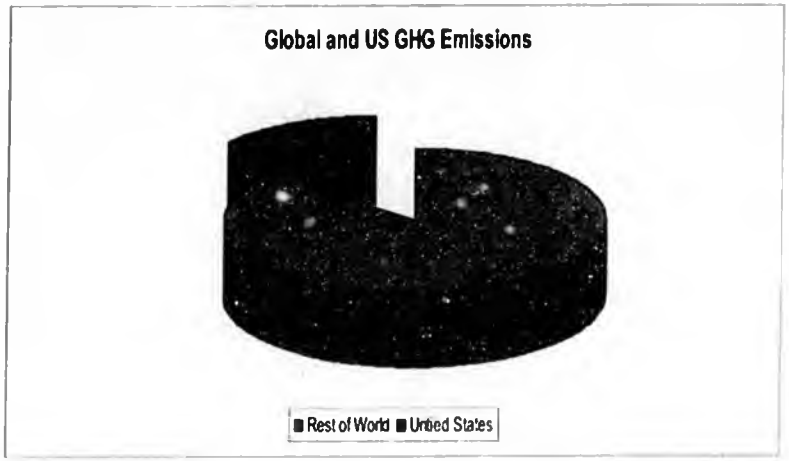


- Global concerns continue to grow.
- Intergovernmental Panel on Climate Change (IPCC) strengthens argument to limit manmade greenhouse gases (GHGs).
- Most common manmade GHG is carbon dioxide (CO2).
- Bulk of CO2 emissions generated by combustion of fossil fuels.
- Meeting the growing demand for energy while lowering GHGs is challenging as fossil fuels are abundant and inexpensive compared to low carbon alternatives.

TransCanada

Alaska's Greenhouse Gas Emissions

The United States emits approximately 14% of global manmade GHG emissions.



Alaska emits less than 1% of US domestic GHG emissions: 52 million of 7076 million tonnes CO2e.

TransCanada

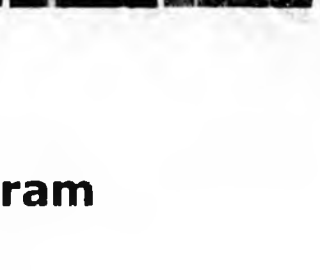
Alaska and Climate Change

Alaska faces a unique challenge:

- Alaska and other regions at high northern latitudes will experience greater warming trends resulting from climate change.("Warming is expected to be greatest over land and at most high northern latitudes…." Section 3.2.2, Page 46, Climate Change 2007:Synthesis Report, IPCC)
- Supplying natural gas to markets will increase Alaska's emissions levels, however it will also help address the challenge of climate change by potentially displacing higher carbon fuels.
- Natural gas is cleanest burning fossil fuel, emitting approximately 50% less CO2 than coal at the burner tip and roughly 25 % less CO2 than oil when combusted.

TransCanada

TransCanada's Climate Change Activities



Emissions Reduction Programs

- **Leak Detection and Repair Program**
- **Blowdown Management**
- **High Efficiency Engines**

Technology Development

- **Supersonic Ejector Patent**
- **Incineration**
- **Field test RB211-6761**

Sharing Knowledge

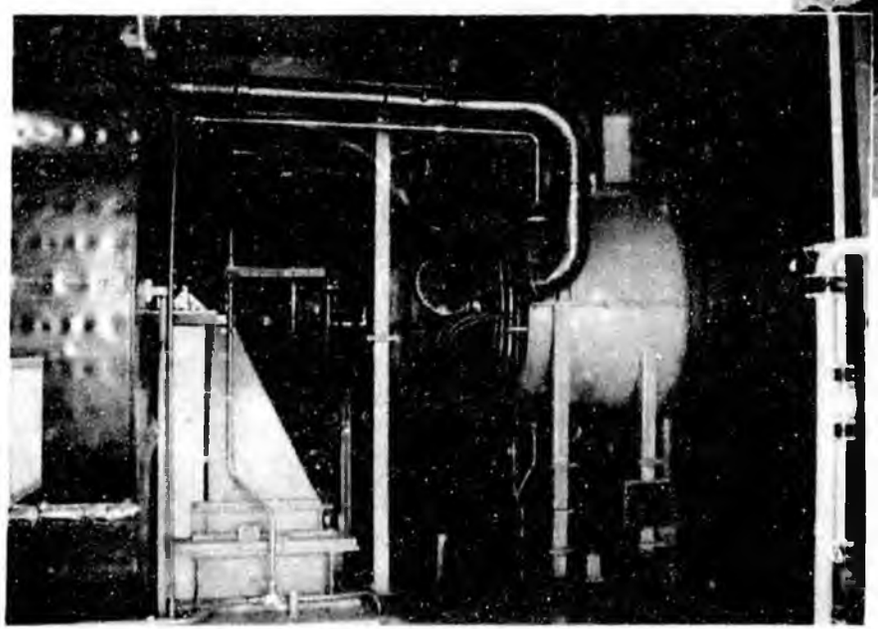
- **Methane to Markets (Washington, China, Russia)**
- **USEPA Natural Gas Star – since 1990s**

TransCanada

Technology Excellence

TransCanada is currently operating the world's first Rolls-Royce RB211-6761.

Unit demonstrates high efficiency (40%), low NOx and CO2 emissions.



Features include: remote stand-alone operation, modular design (ease of maintenance, reduced downtime).

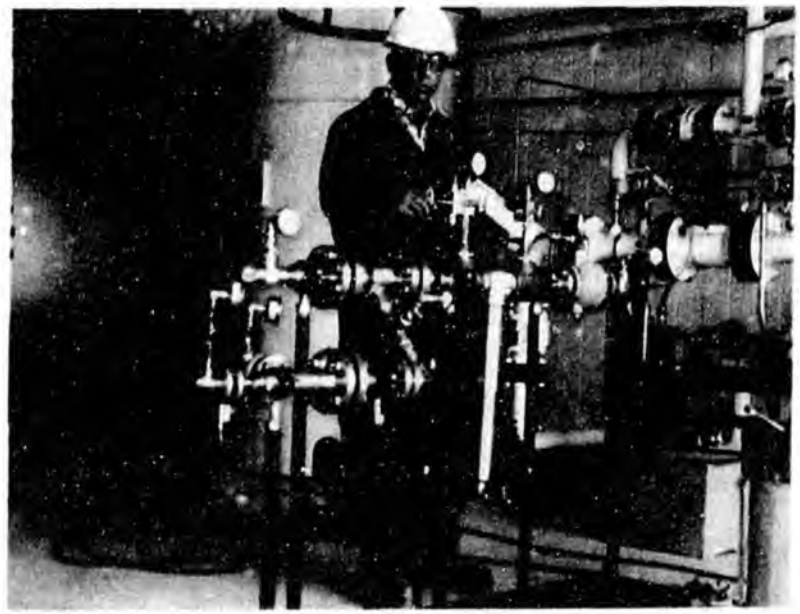
TransCanada

TransCanada Invents New Gas Technology

Supersonic Ejector reinjects very low pressure methane into high pressure gas stream.

Benefits include:

- GHG reduction of 1,700 tCO2e (per unit per year),
- Savings of $28,000 (per unit per year),
- Zero operating cost.



Canadian, US and PTC (world) patent applications

TransCanada

GHG Emissions from Long Haul Natural Gas Pipelines

TransCanada's Alberta System **2.5 million tonnes CO2e**
(typically 900 PSI, 11 bcfd, 300 miles average distance of haul)

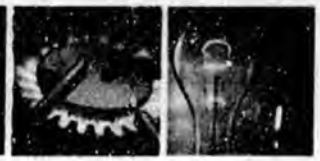
TransCanada's Mainline **3.8 million tonnes CO2e**
(typically 900 PSI, 7 bcfd, 1400 miles average distance of haul)

Proposed GTP **4.1 million tonnes CO2e**

Proposed pipeline / facilities **2.0 million tonnes CO2e**
(2500 PSIG, 4.5 bcfd, 1715 miles)

TransCanada

Climate Change - Alaska Pipeline Project



- TransCanada will responsibly manage GHG emissions associated with the pipeline.

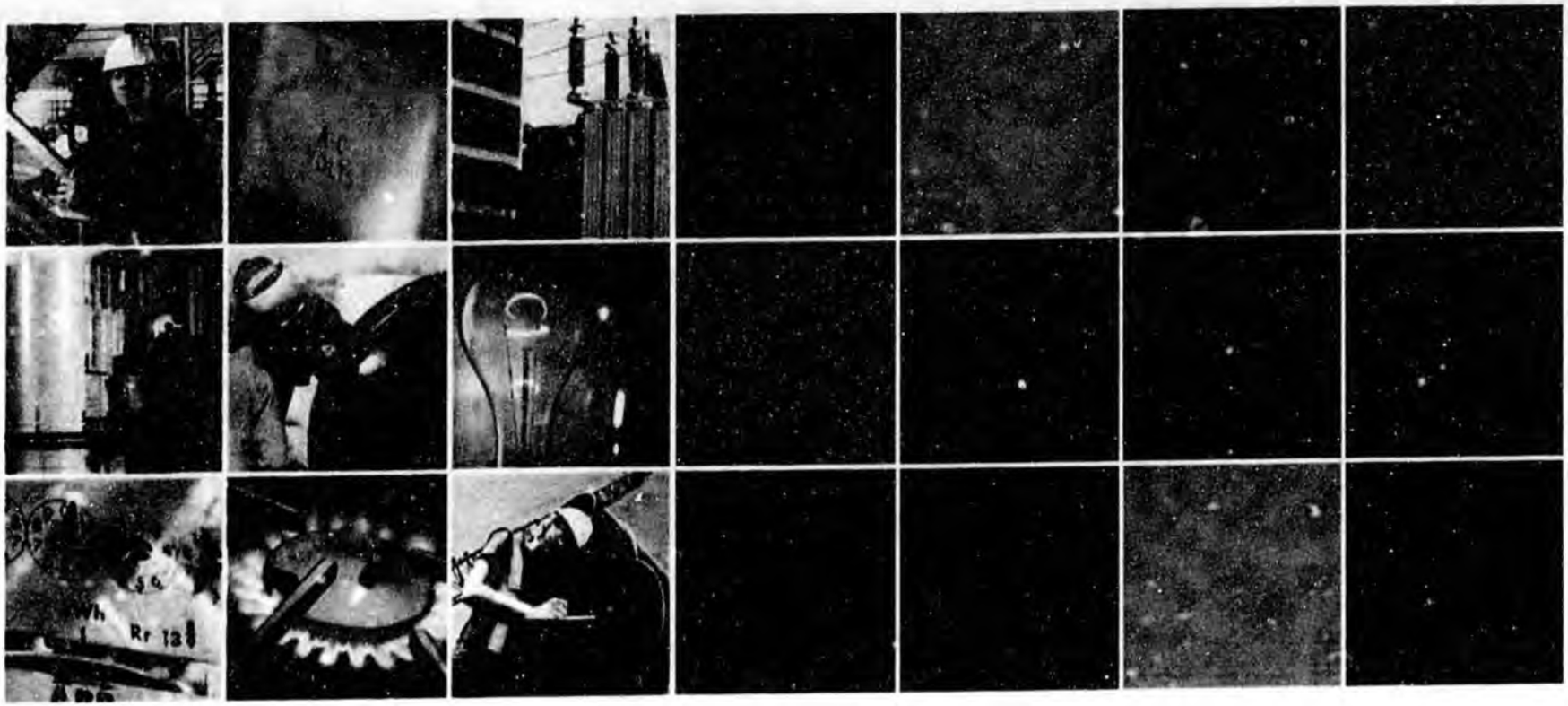
- TransCanada's efforts to control emissions from this project will include the use of Best Management Practices in pipeline design and operation including:
  - Installation of the highest efficiency engines that are suitable for this application
  - Use of high strength steel, which will lower fuel usage by allowing higher pressure operation
  - Implementation of industry leading methane management programs

TransCanada

Summary

- Last year, the Administration and Legislature established AGIA as Alaska's transparent and competitive process to advance a gas pipeline project
  - AGIA was structured to encourage:
    - Construction of base project
    - Long-run basin development
    - Open access terms for:
      - Initial and future shippers
      - In-State, Lower 48, and LNG markets
- TransCanada has the credentials and capacity to build, own, operate and expand the project
- TransCanada's objectives are aligned with AGIA
  - Early in-service
  - Long-run basin development
  - Open access – equitable treatment for all customers

TransCanada



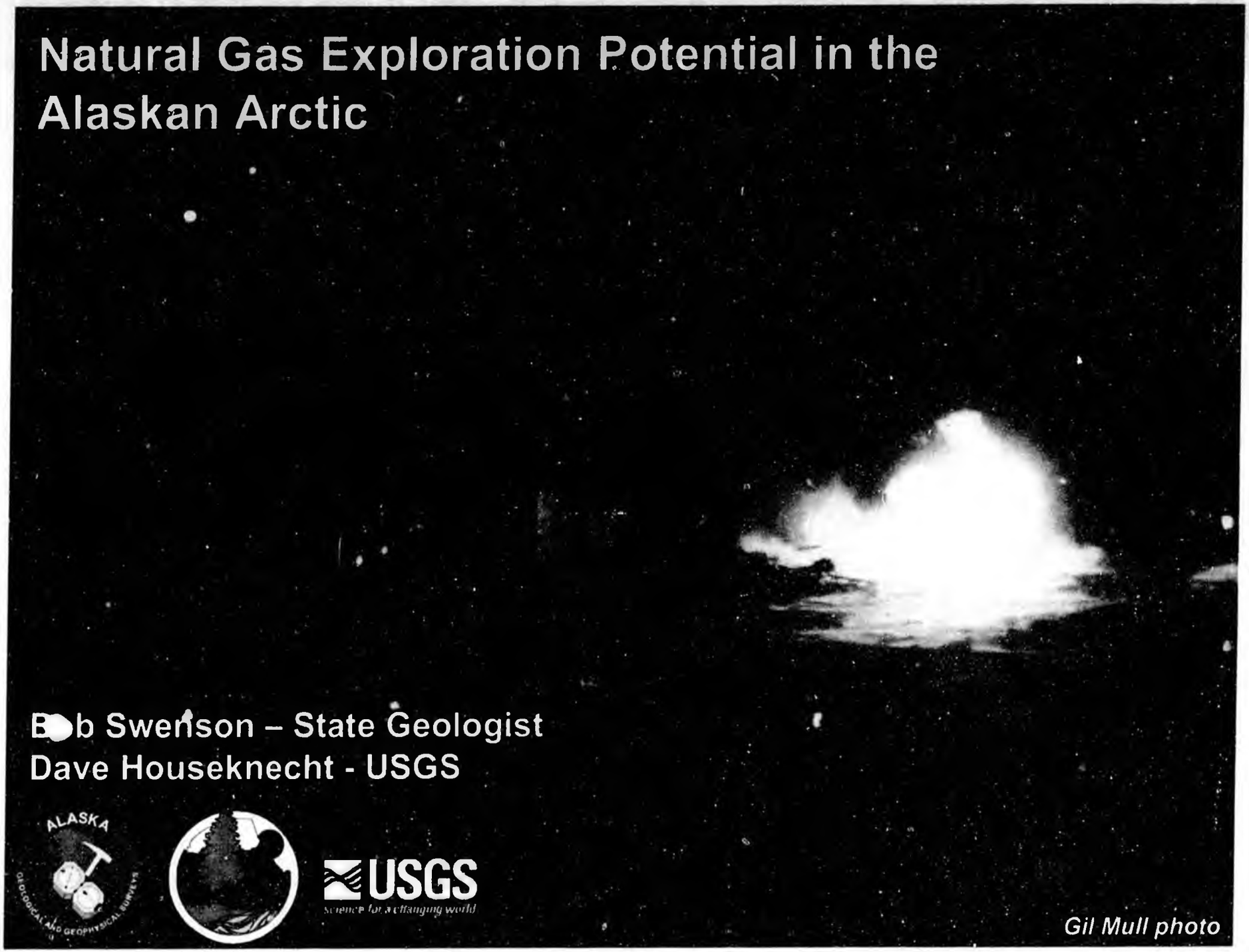
Thank You

TransCanada

In business to deliver

HB 3001
SB 3001
6/7/08
SPECIAL SESSION DOCUMENTS

Natural Gas Exploration Potential in the Alaskan Arctic

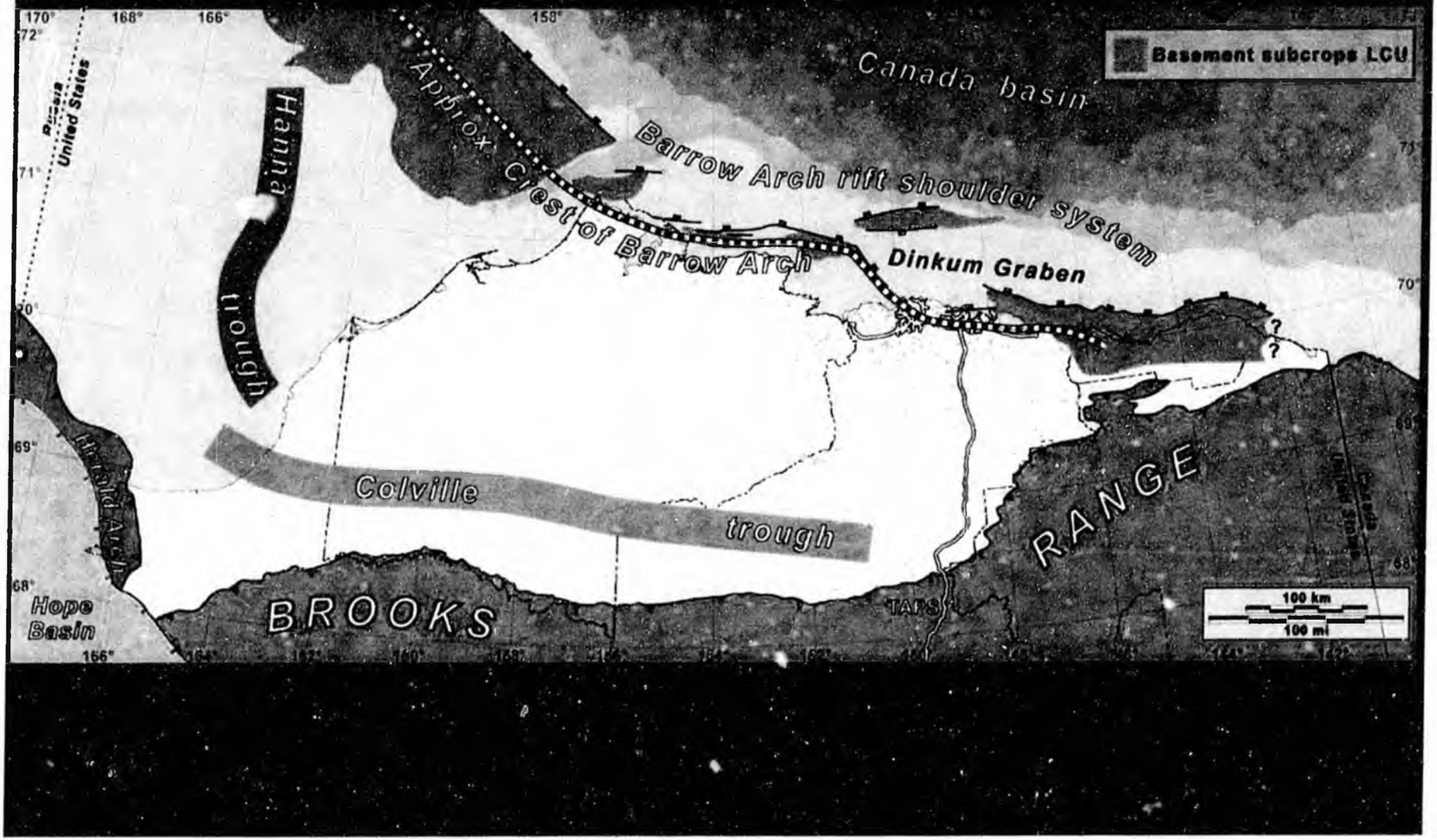


Bob Swenson – State Geologist
Dave Houseknecht - USGS

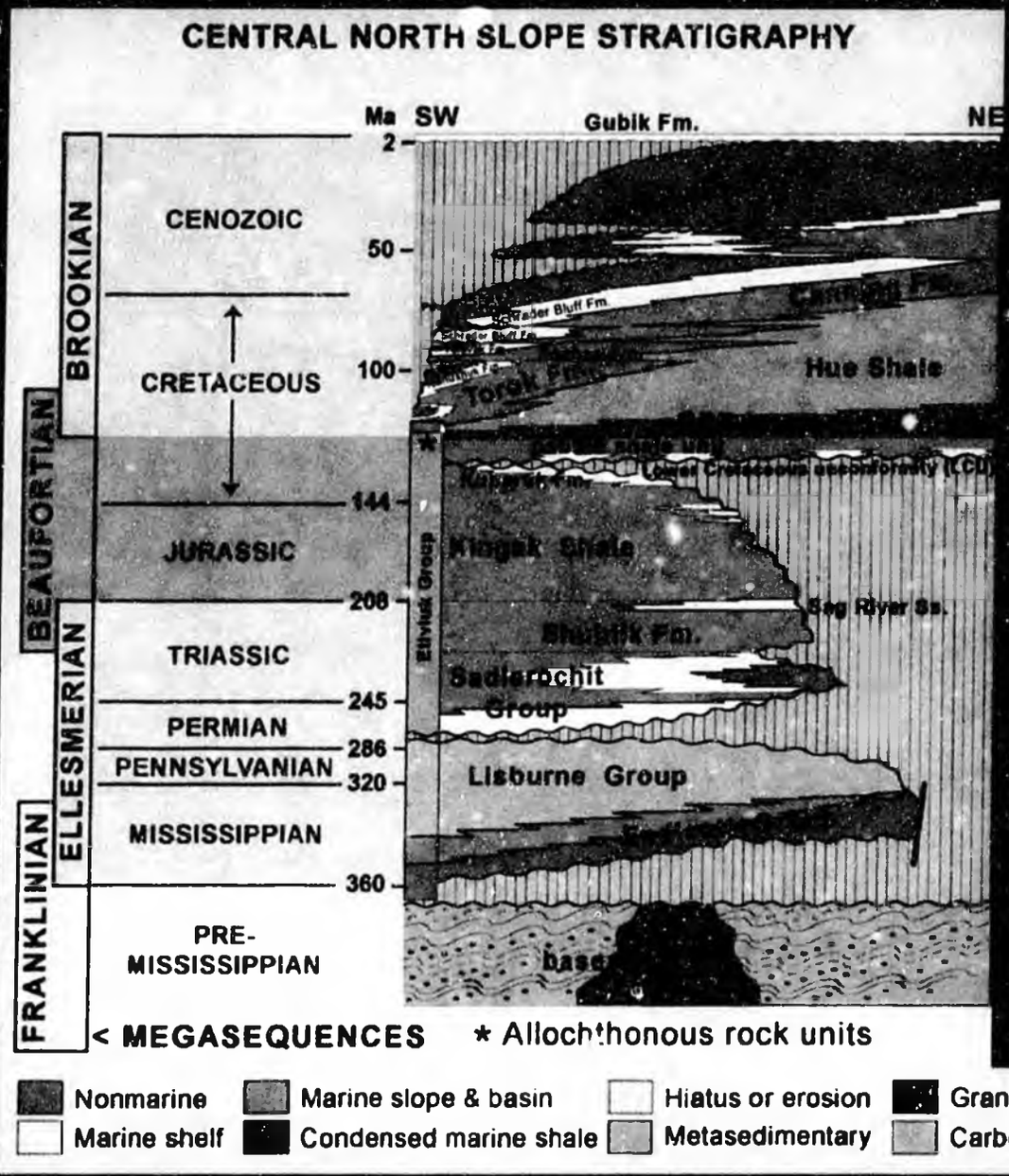
USGS
science for a changing world

Gil Mull photo

Arctic Alaska - Key Geologic Features



Stratigraphy – Known & Potential Source Rocks

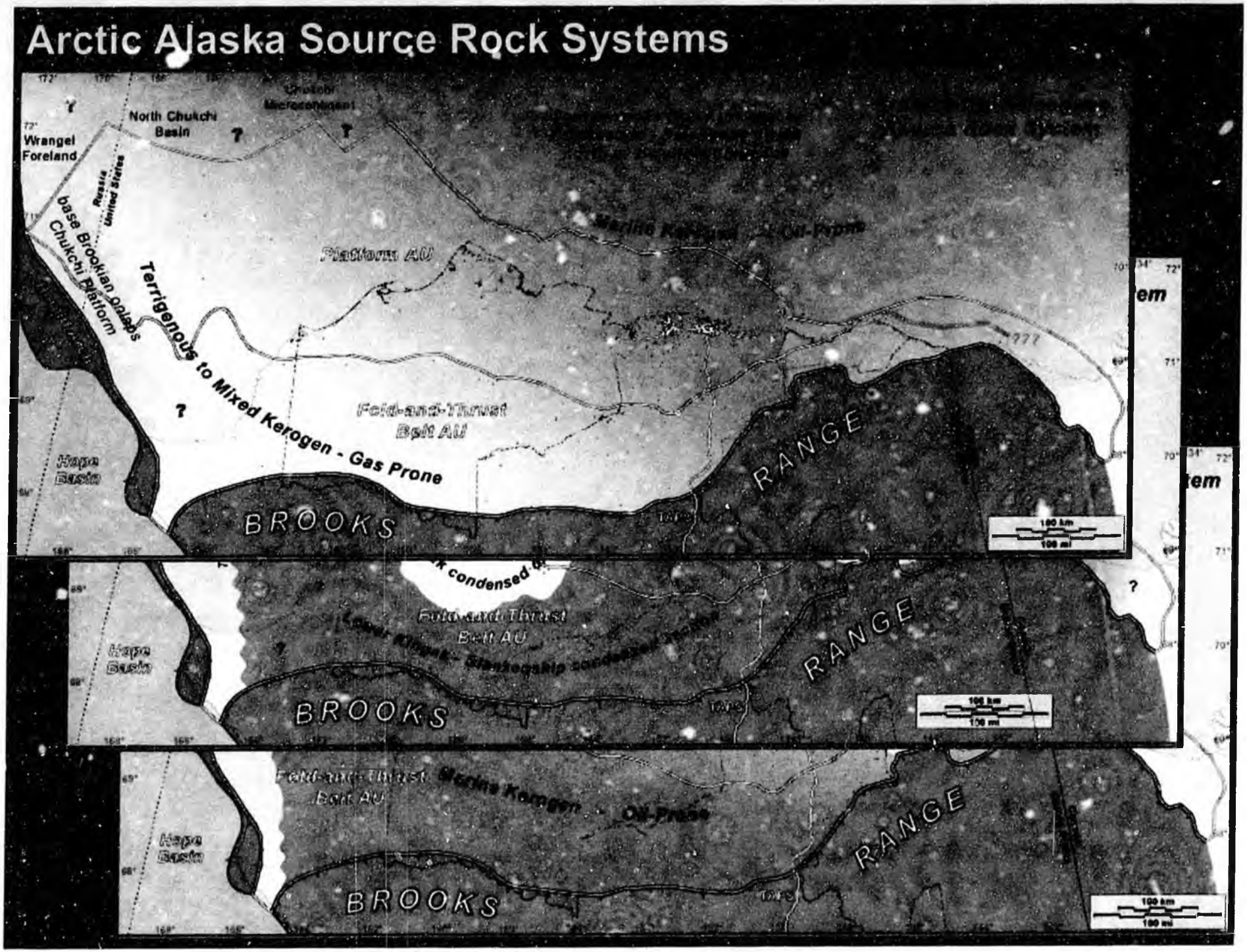


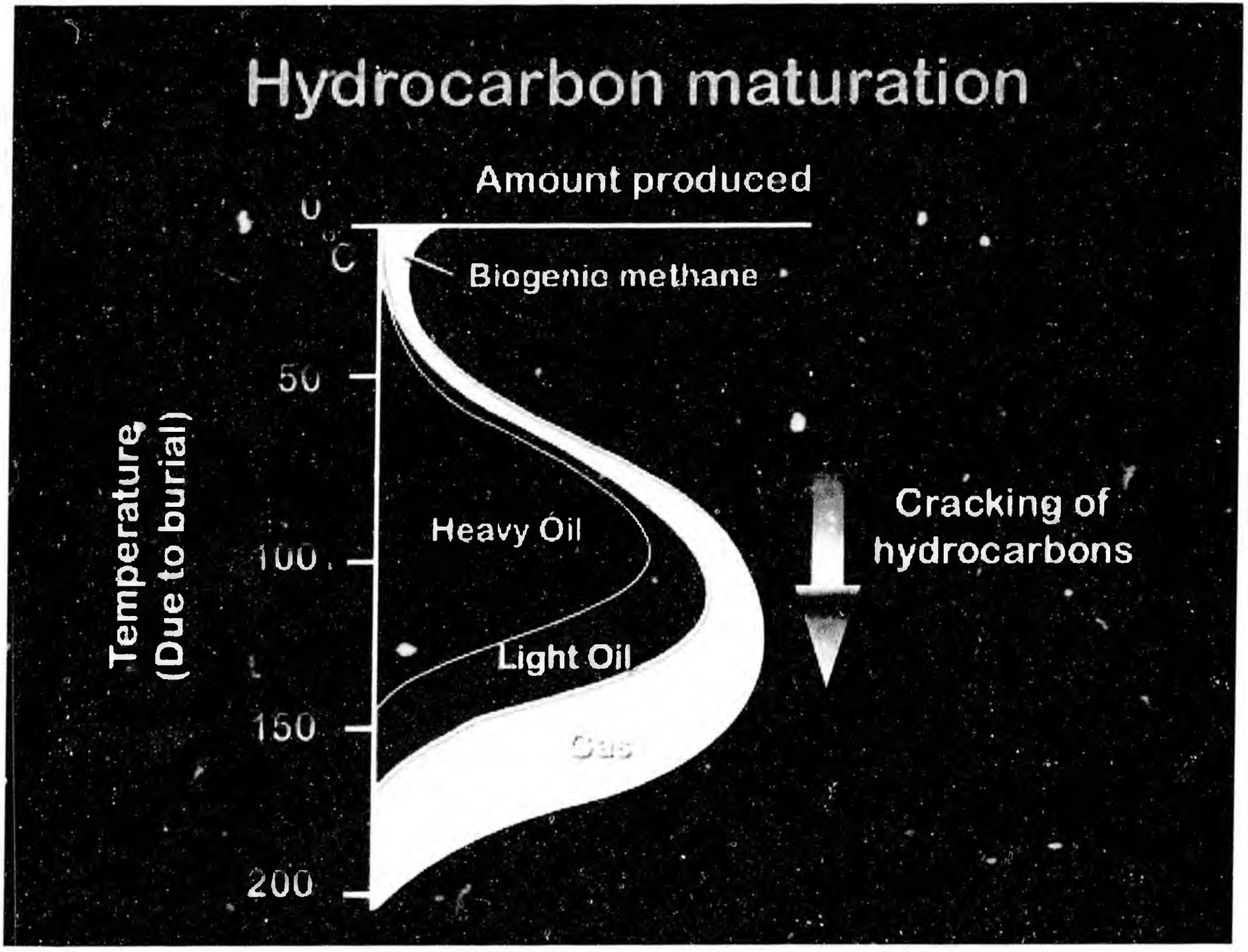
< *Paleogene Canning*

< *Seabee*
< *GRZ (HRZ)*

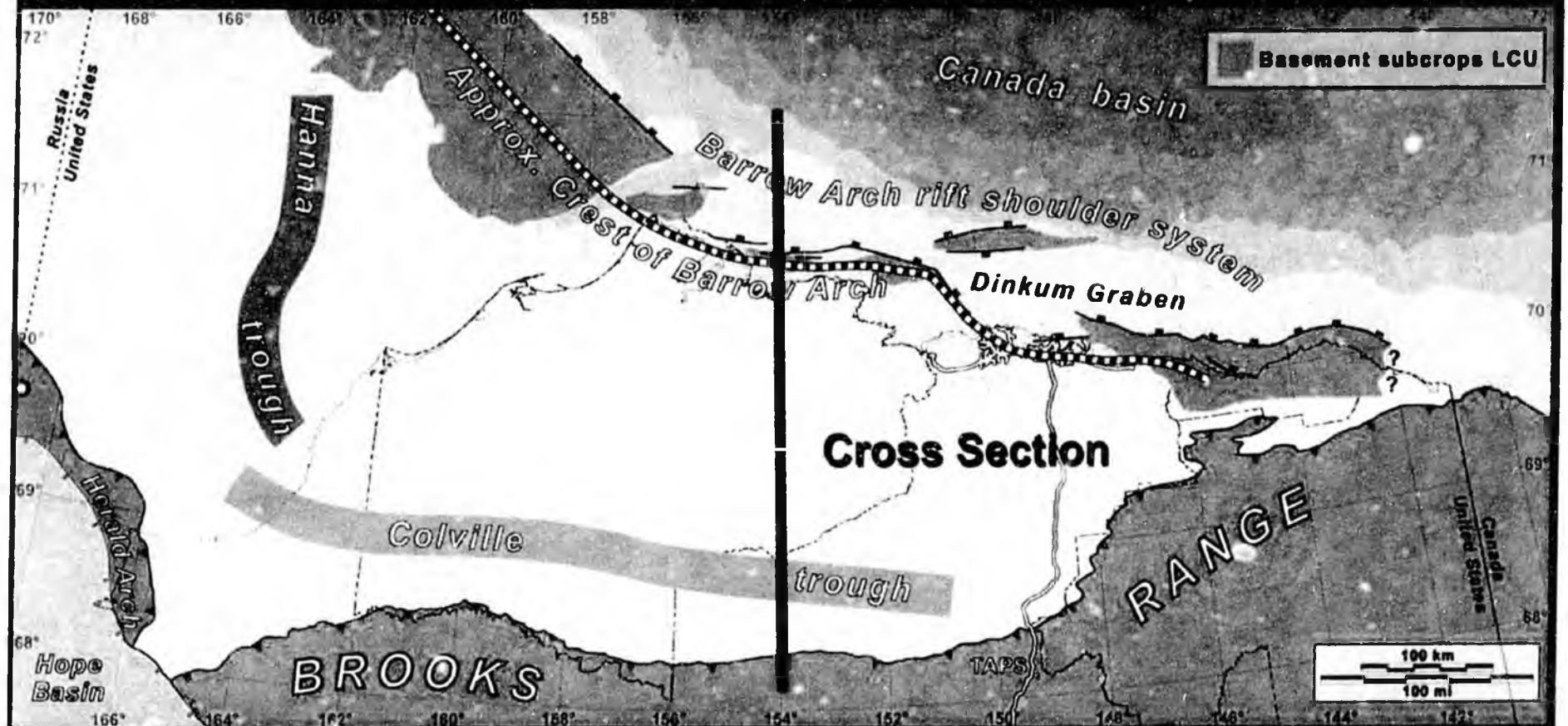
< *Lower Kingak*
< *Shublik*

< *Lisburne (Kuna)*
< *Kekiktuk*

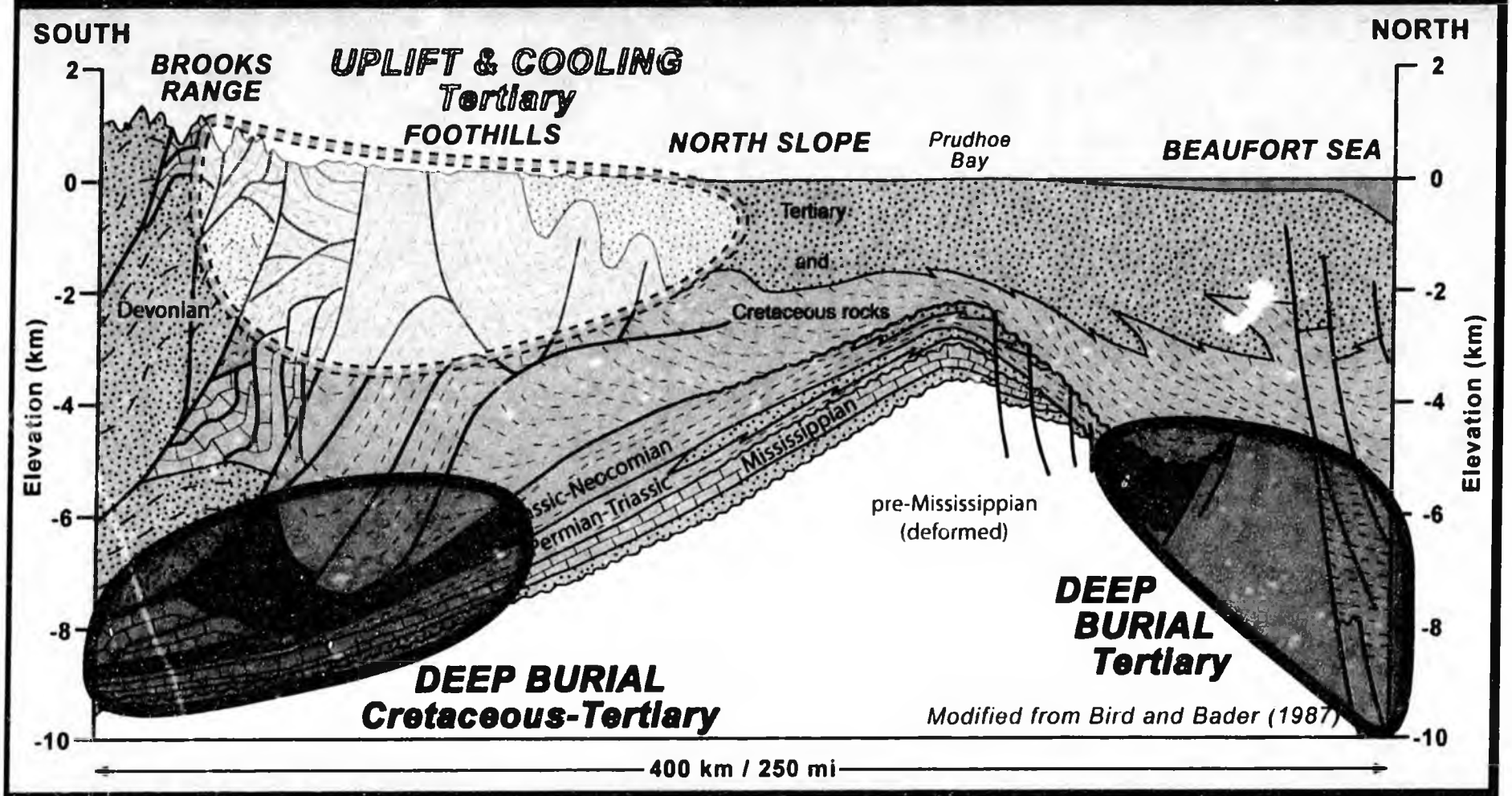

Arctic Alaska Source Rock Systems
North Chukchi Basin
Wrangel Foreland
Russia
United States
base Brookian Onlaps
Chukchi Platform
Terrigenous to Mixed Kerogen - Gas Prone
Platform AU
Fold-and-Thrust Belt AU
Hope Basin
BROOKS
RANGE
Marine Kerogen - Oil-Prone
Fold-and-Thrust Belt AU
Lower Cretaceous condensed section
Hope Basin
BROOKS
RANGE
Fold-and-Thrust Belt AU
Marine Kerogen - Oil-Prone
Hope Basin
BROOKS
RANGE


Hydrocarbon maturation
Amount produced
0 °C
Biogenic methane
50
Temperature (Due to burial)
Heavy Oil
100
Cracking of hydrocarbons
Light Oil
150
200

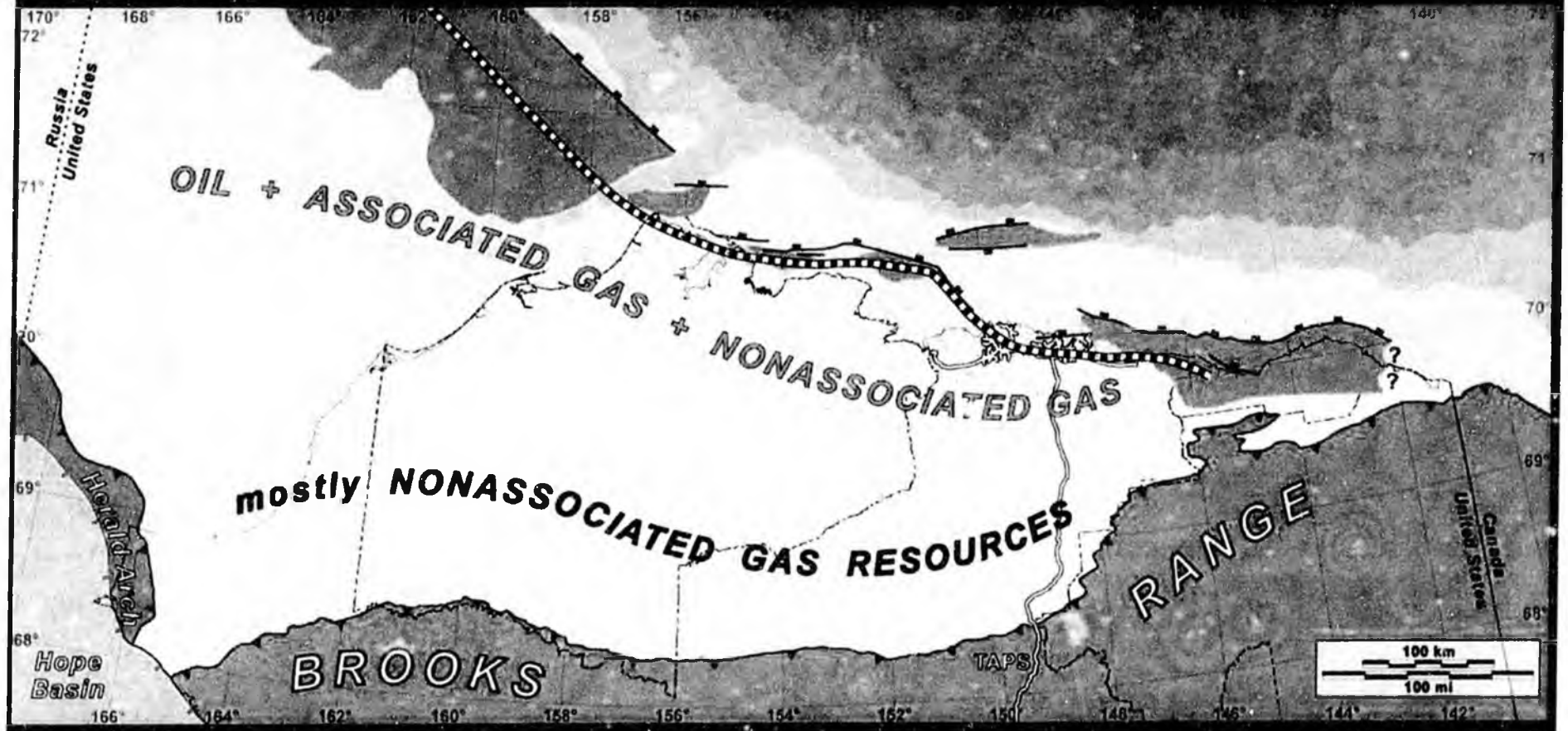
Arctic Alaska - Key Geologic Features

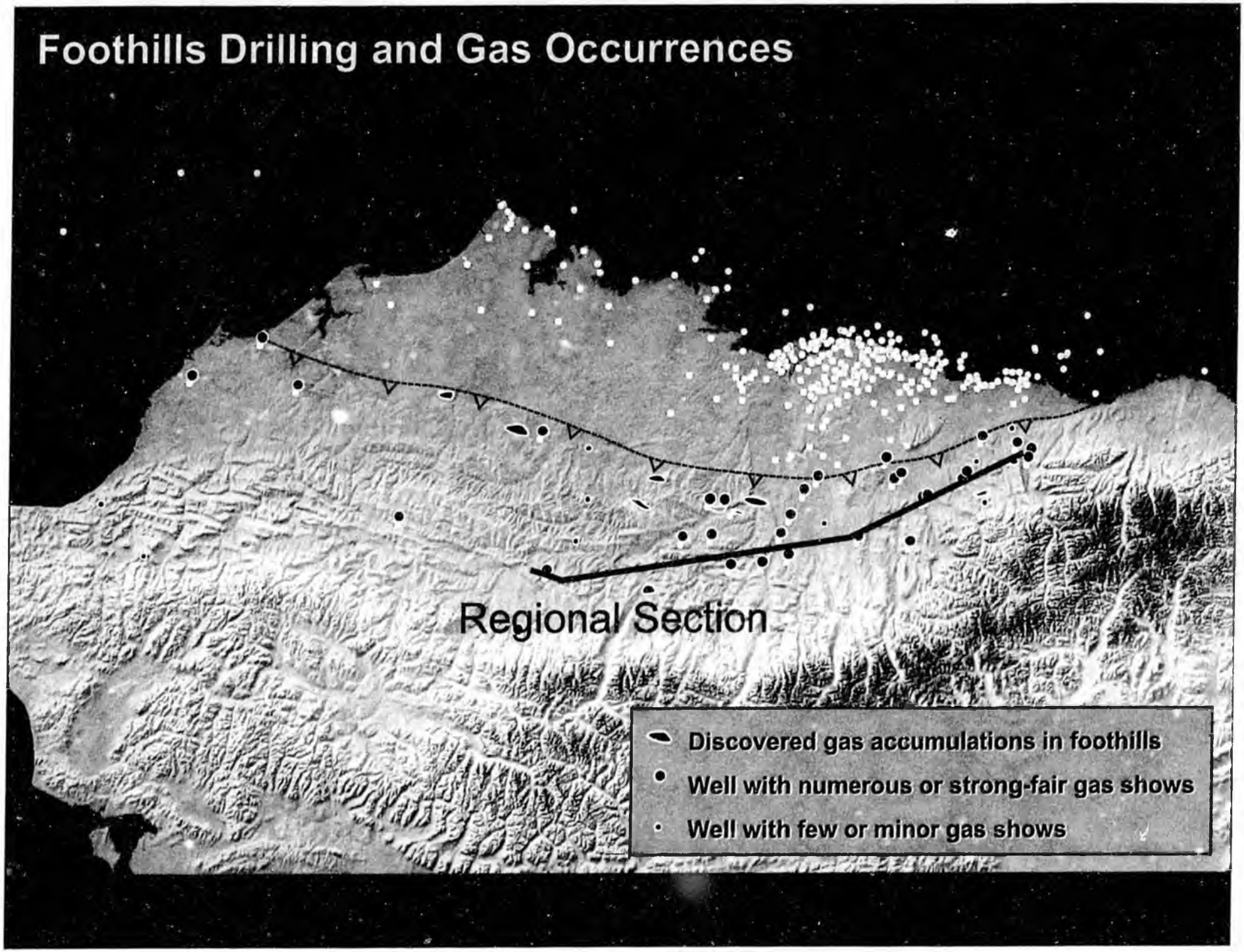


Overview of Regional Geology



Arctic Alaska Generalized Potential for Oil and Gas

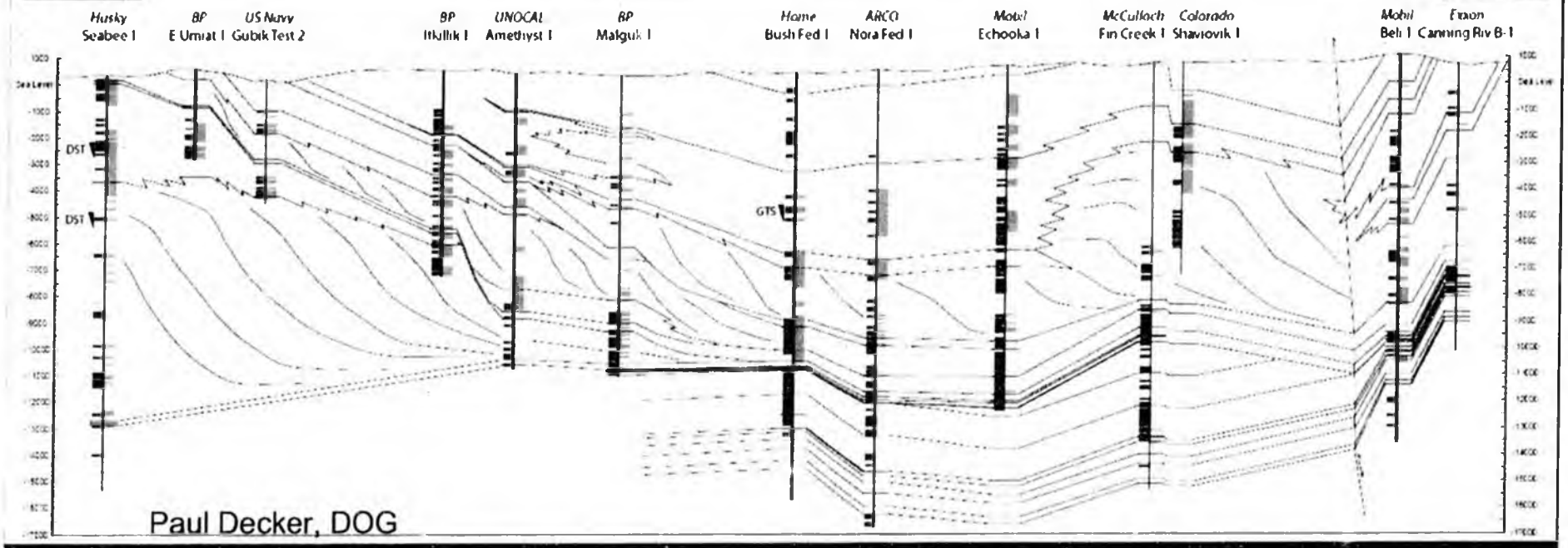



Foothills Drilling and Gas Occurrences
Regional Section
Discovered gas accumulations in foothills
Well with numerous or strong-fair gas shows
Well with few or minor gas shows

Foothills Cross Section - Oil and Gas Shows

West

East



Source Rock & Hydrocarbon Characterization

Synthesizing a decade of organic geochemical analyses and integrate with regional geologic data

Characterization of hydrocarbon occurrences

Reservoir Quality 1

Locations of Porosity and Permeability Outcrop Samples 1999-2002, Brooks Range Foothills and North Slope, Alaska

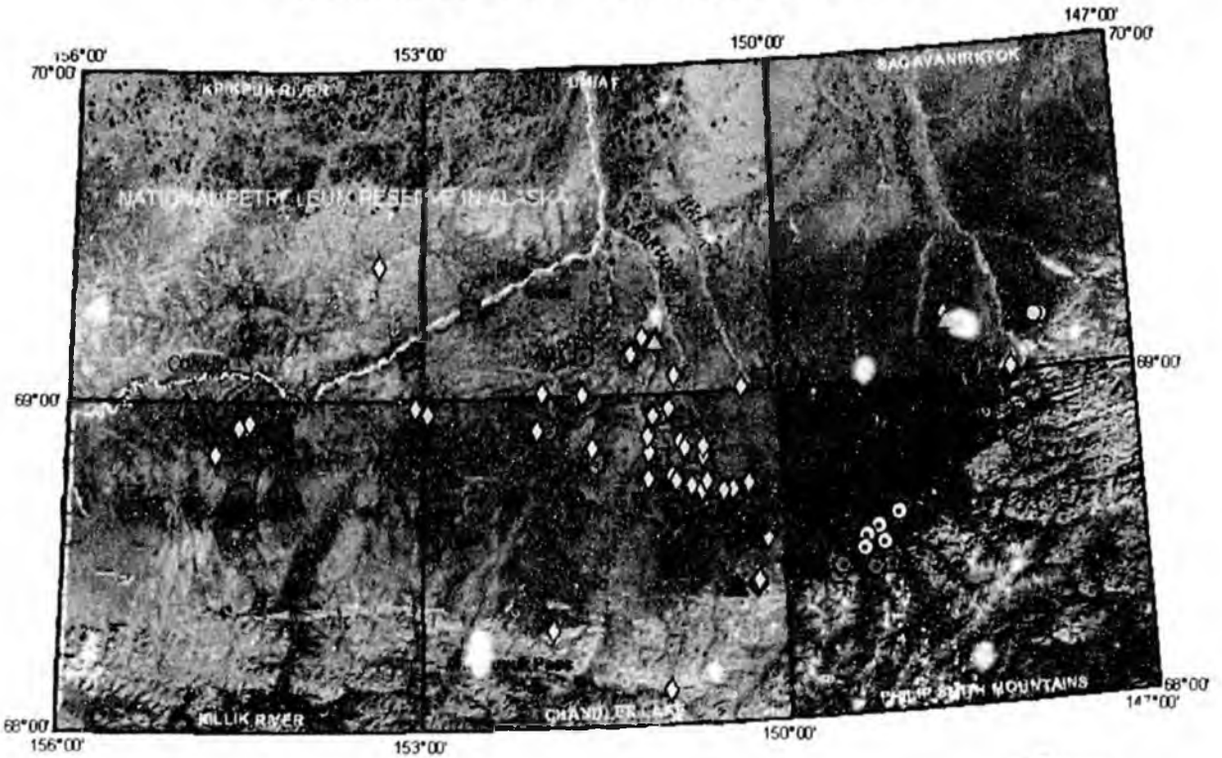
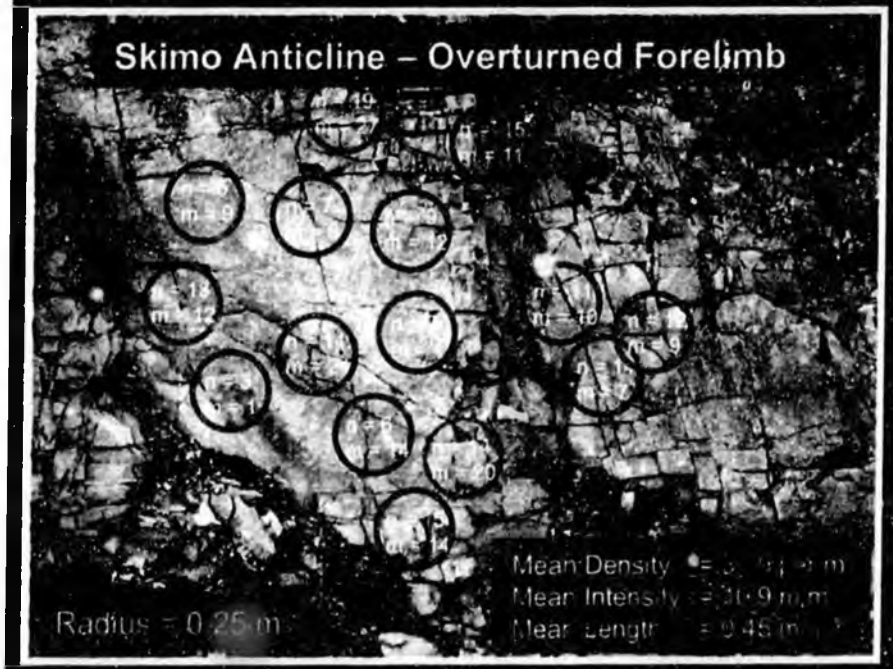
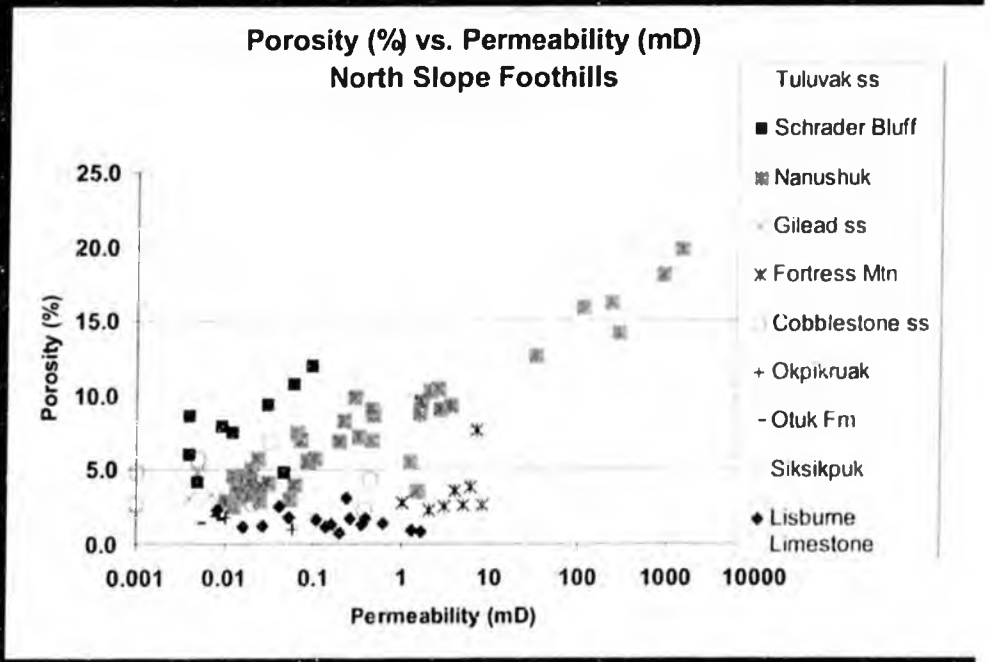


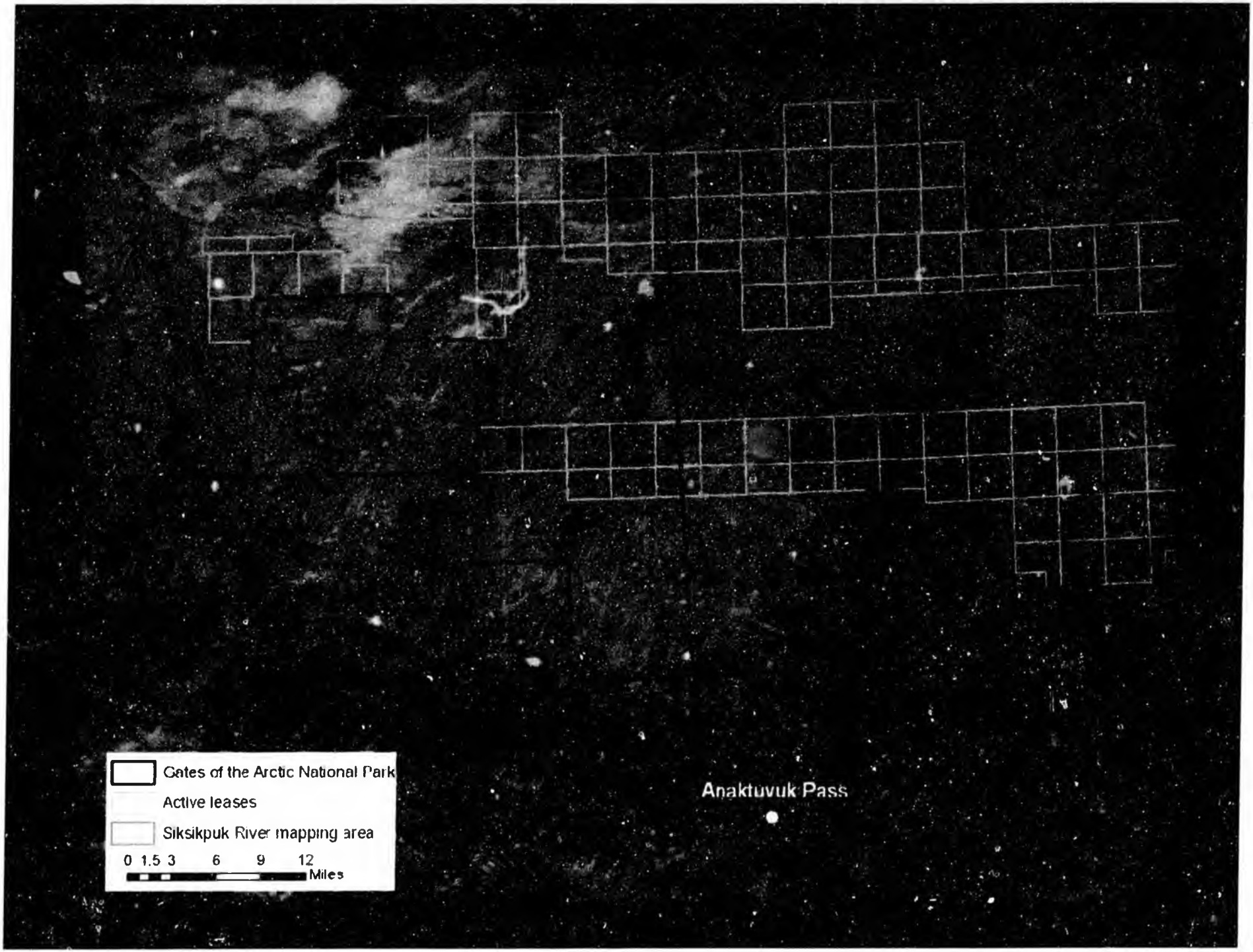
Figure 1. Satellite image showing locations and geologic formations of porosity and permeability samples from 1999-2002, Brooks Range Foothills and North Slope, Alaska

Reservoir quality studies

- Continued sampling for porosity and permeability
- Correlation of reservoir quality with depositional environment, petrology, and diagenesis
- Fracture analysis and reservoir characteristics

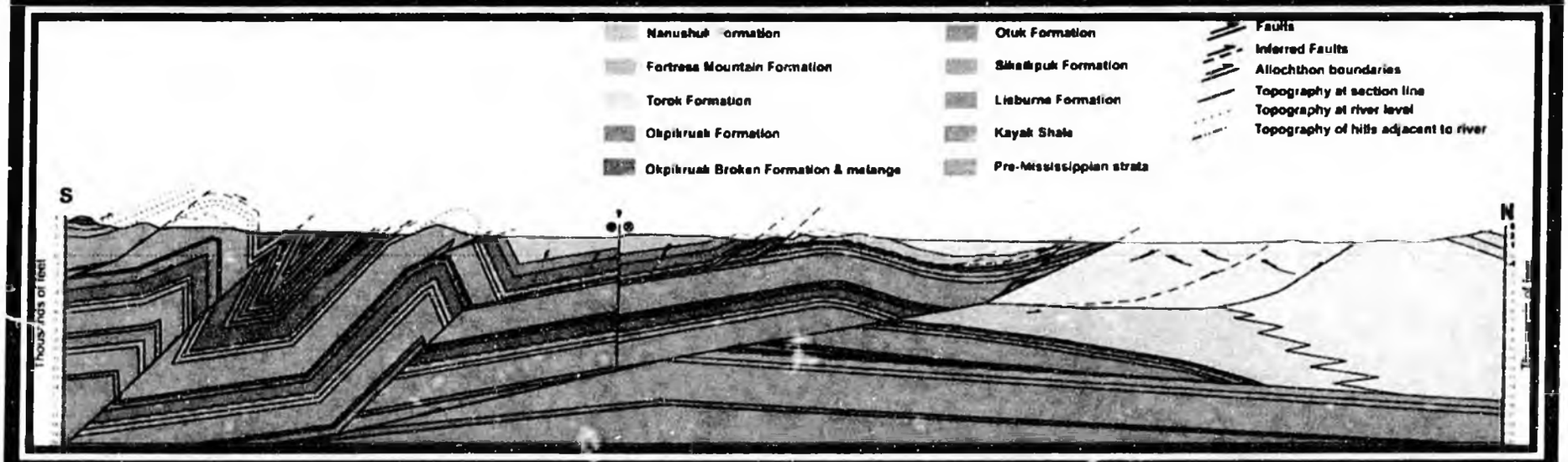




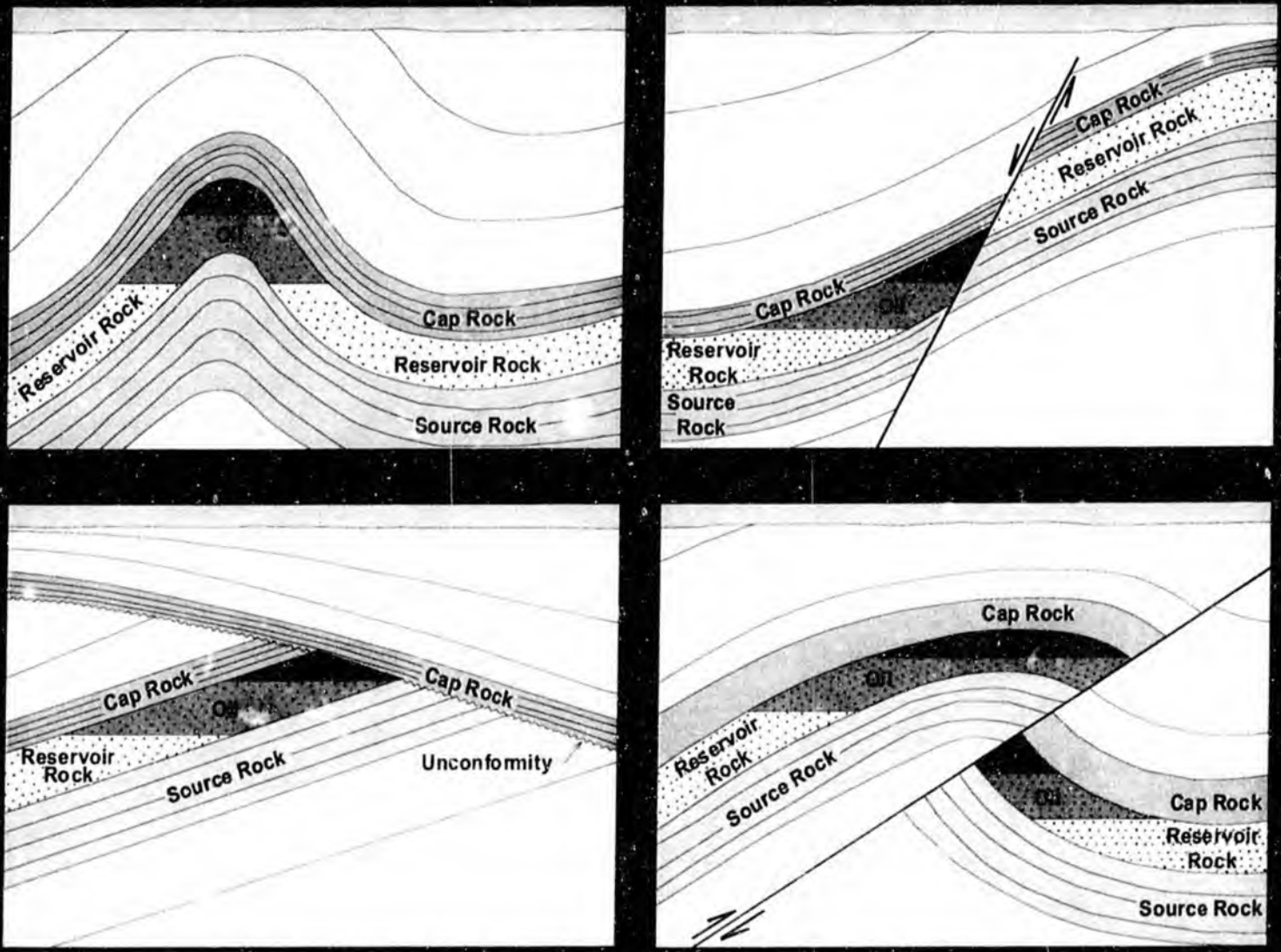

Gates of the Arctic National Park
Active leases
Siksikpuk River mapping area
0 1.5 3 6 9 12
Miles
Anaktuvuk Pass

Regional Burial and Exhumation History of the Southern Colville Basin

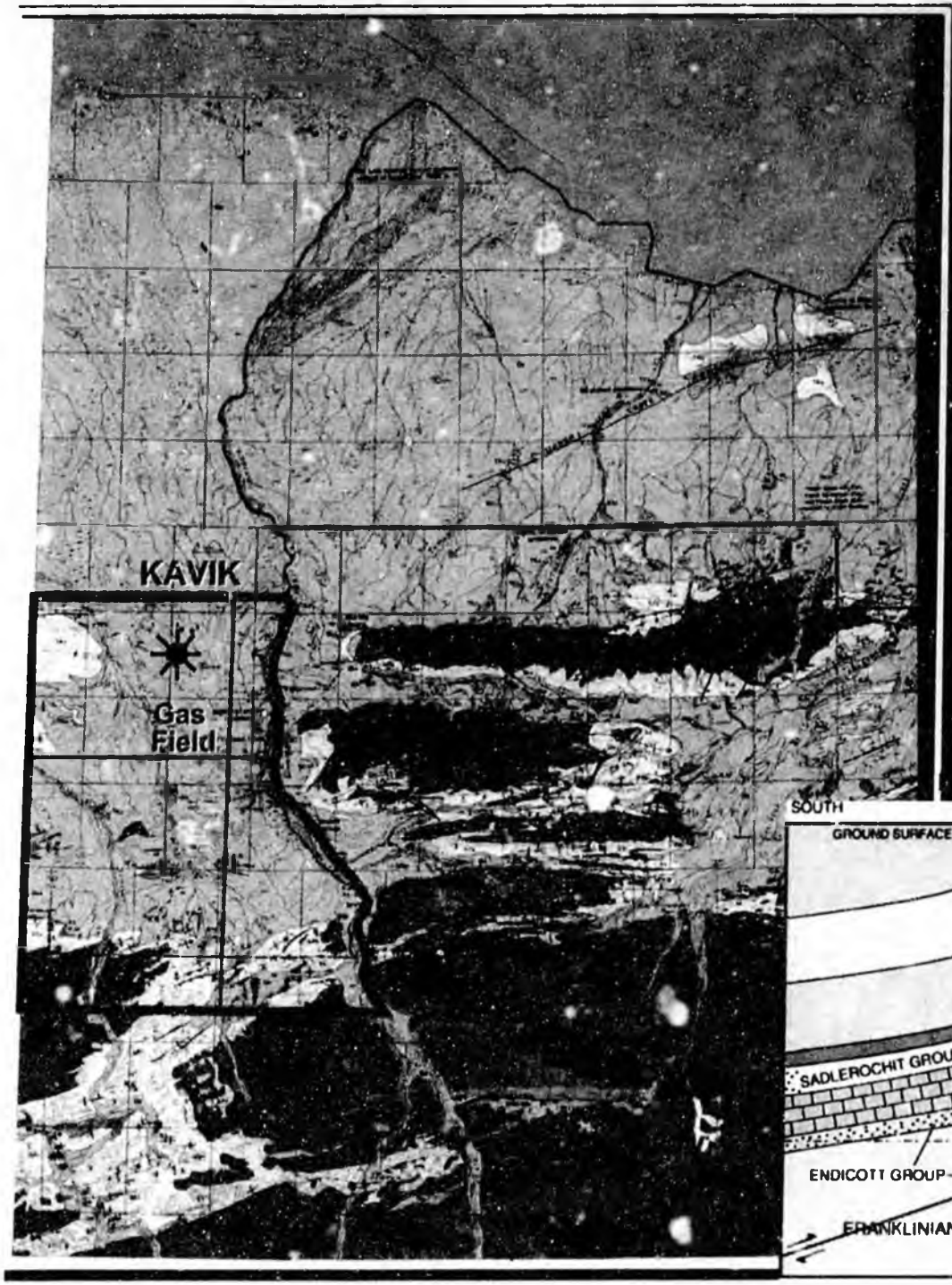
- Building balanced structural cross sections
- Fission track data confirm zone of low thermal maturity
- Evidence for mid-Cretaceous syntectonic sedimentation
- Constraining timing of key events affecting petroleum system



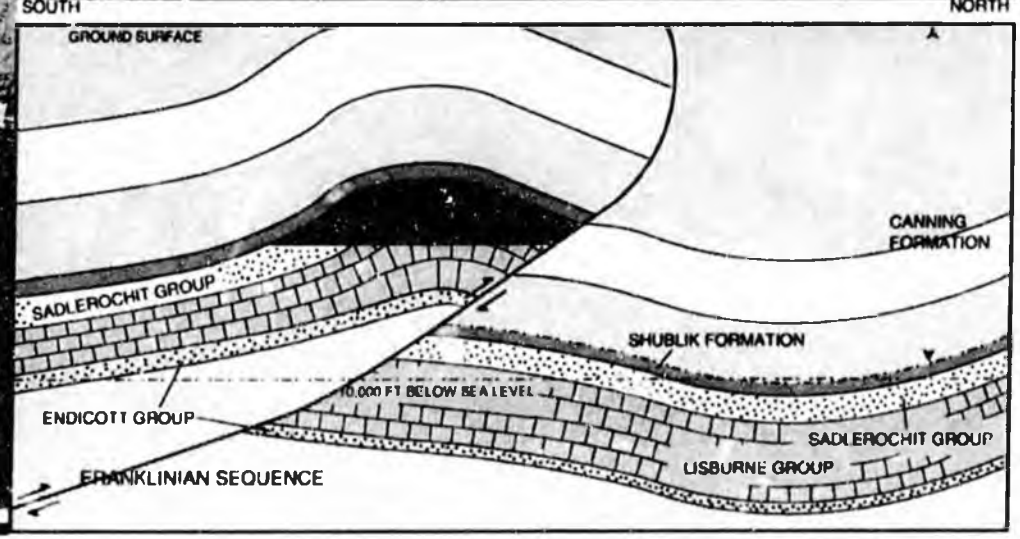
Conventional Exploration Play Types



Oil and Gas Trapping Mechanisms

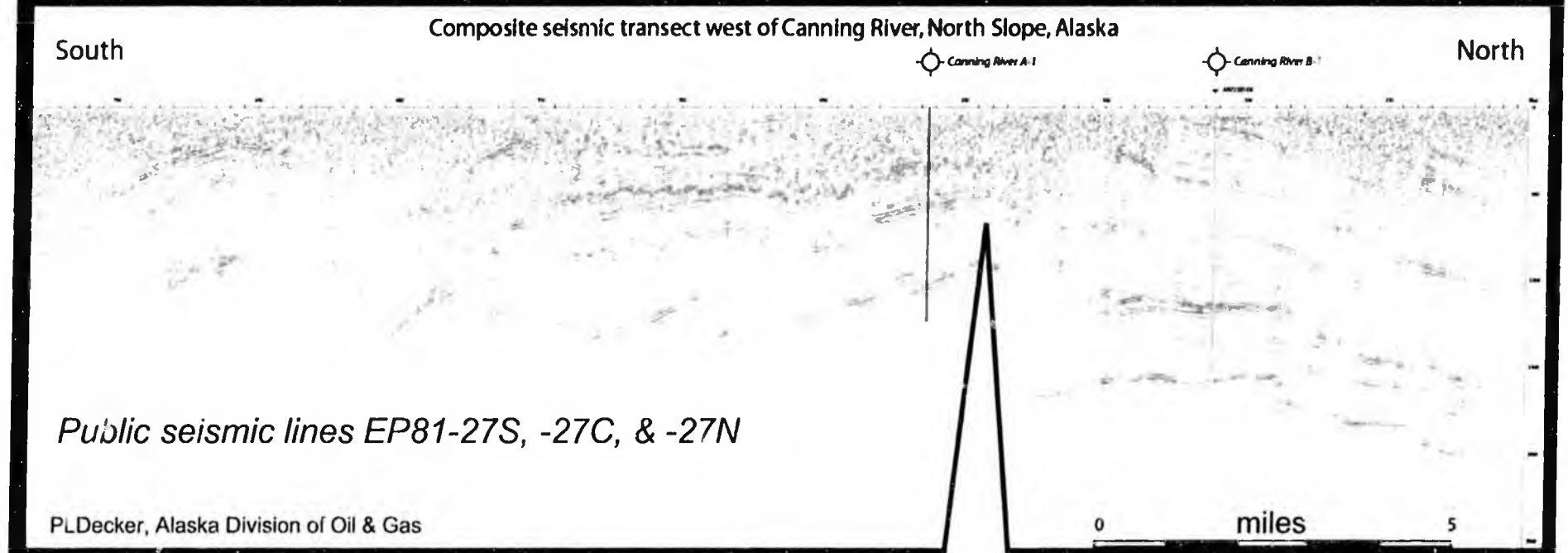


Kavik River Gas Field

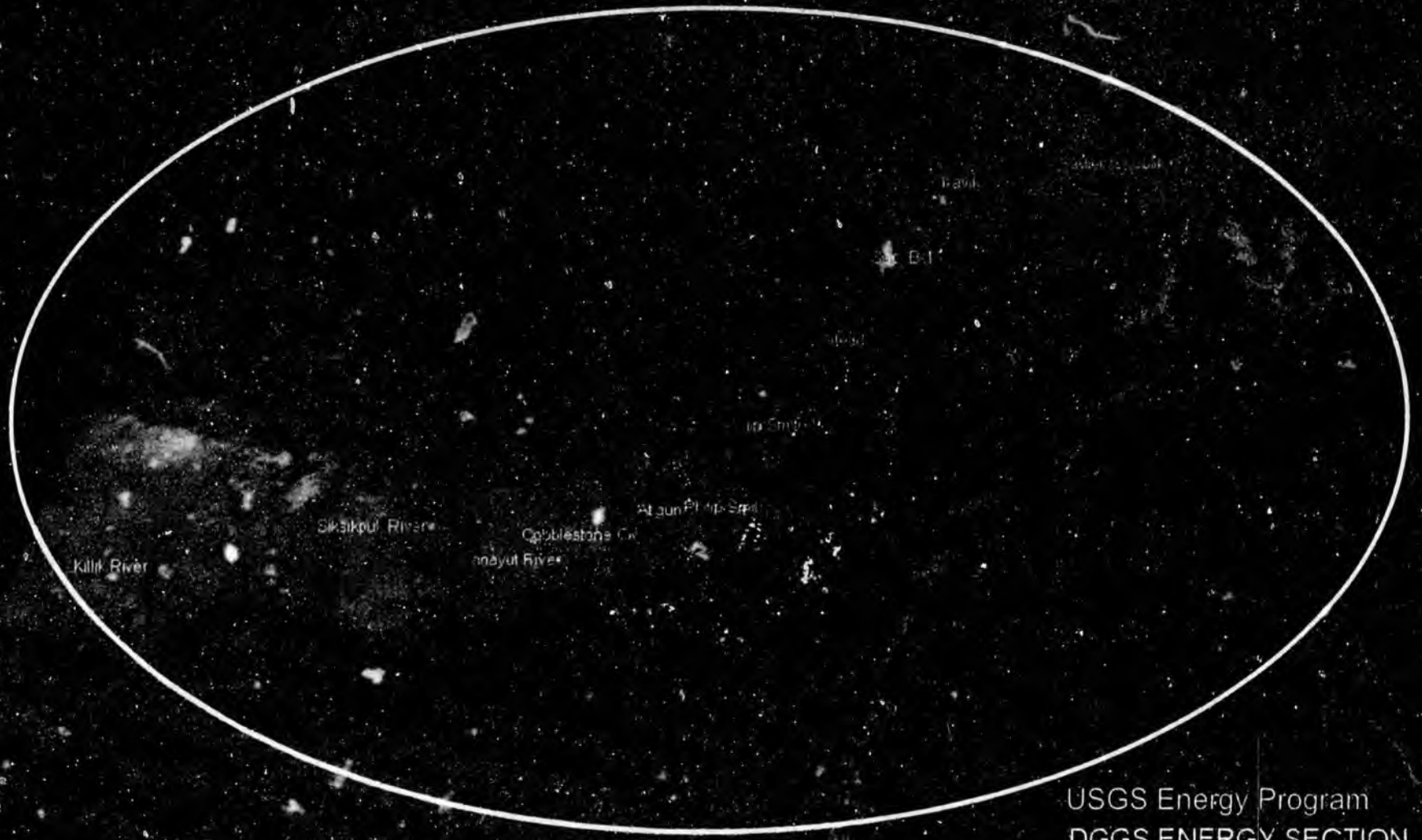


Foothills Structural Plays

Seismic Interpretation



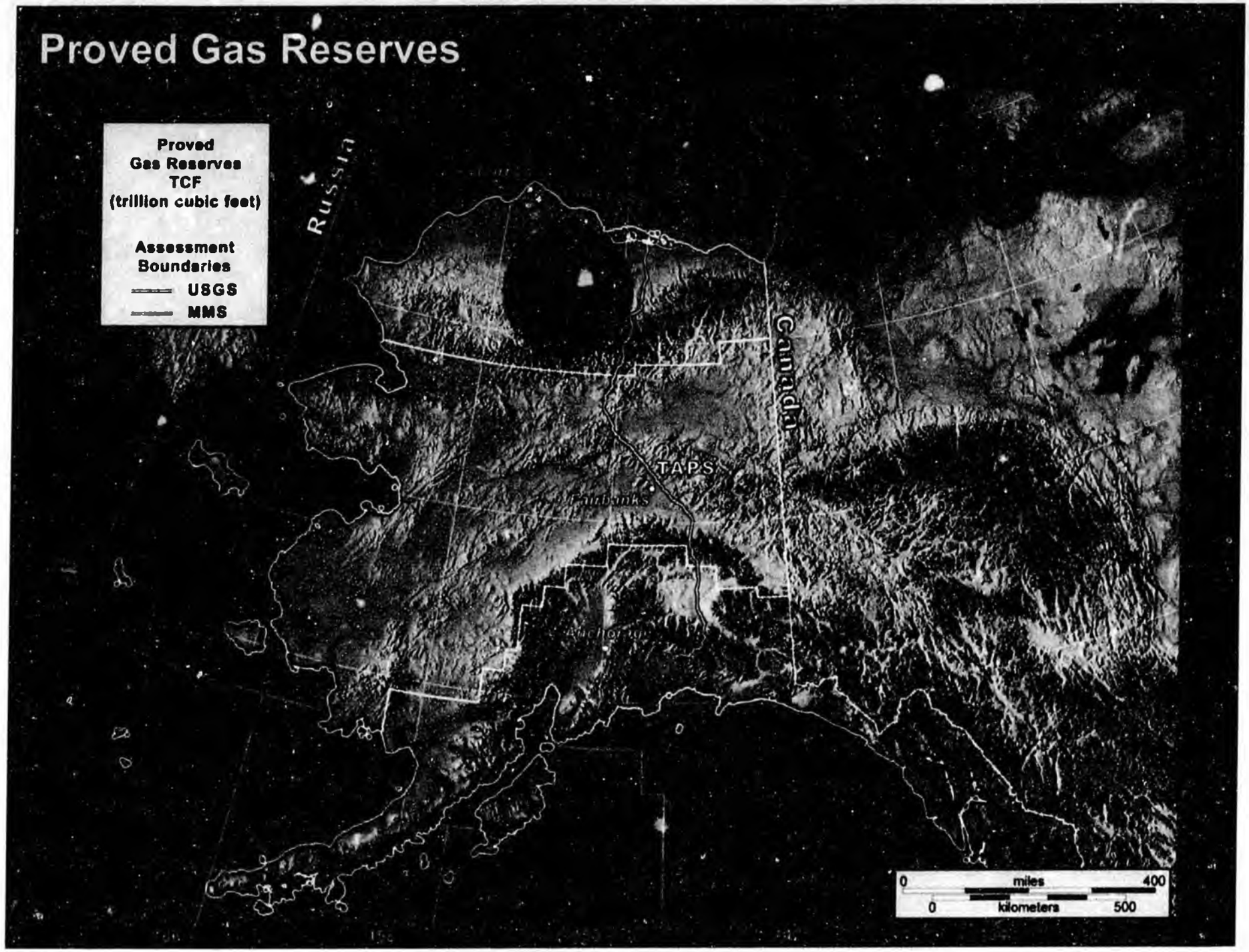
Brooks Range Geologic Mapping
Regional Geologic & Resource Analysis



USGS Energy Program
DGGS ENERGY SECTION
GEOLOGIC MAPPING
Eastern Brooks Range Foothills

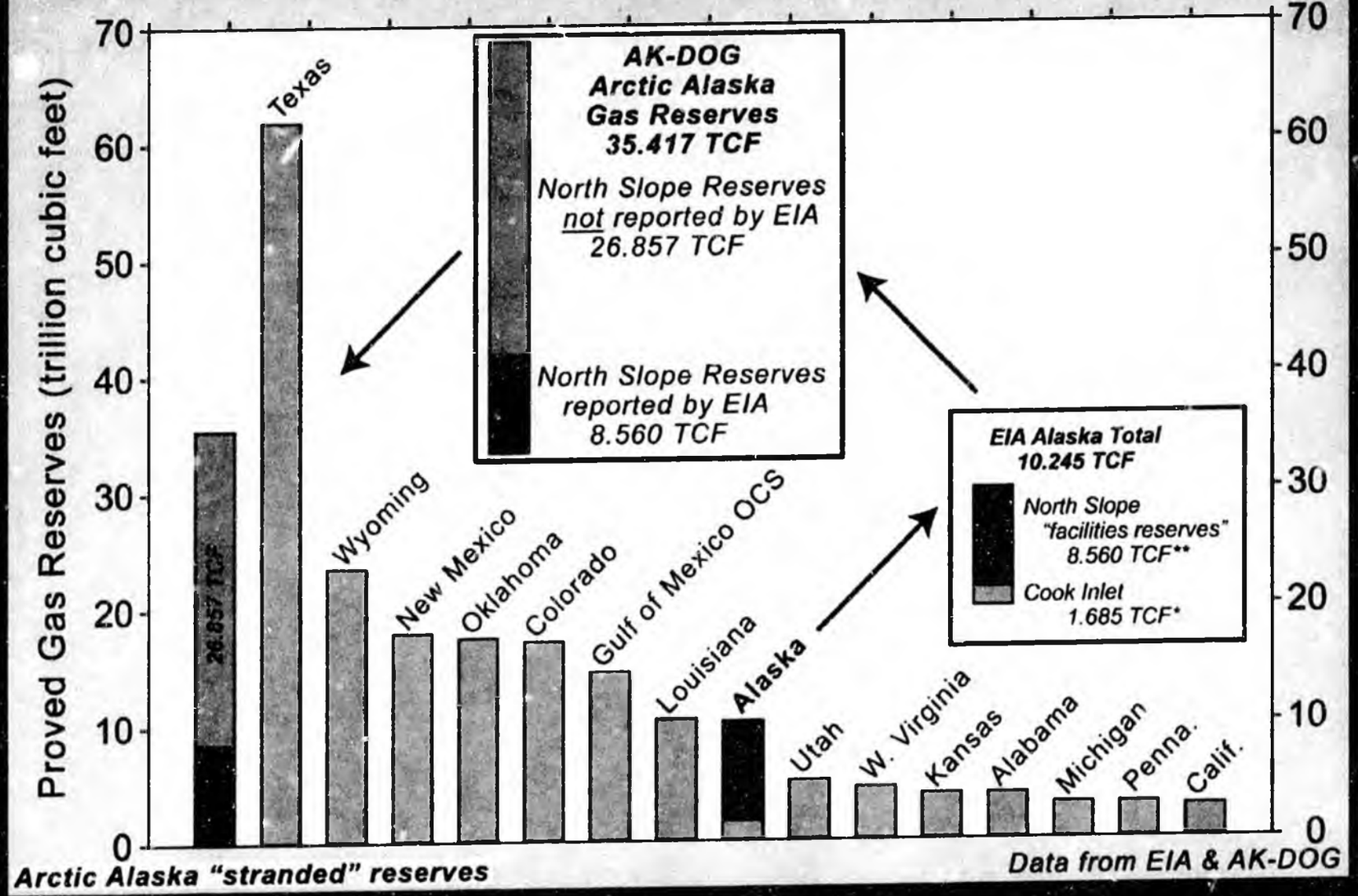
1.2 053 606

USGS Role


Proved Gas Reserves
Proved
Gas Reserves
TCF
(trillion cubic feet)
Assessment
Boundaries
USGS
MMS
Russia
Canada
TAPS
Fairbanks
Anchorage
0
miles
400
0
kilometers
500

2006 Proved Gas Reserves: Top 15 States – OCS Region

Public-Domain Data



*AK-DOG estimate; **difference between EIA state total and AK-DOG Cook Inlet estimate

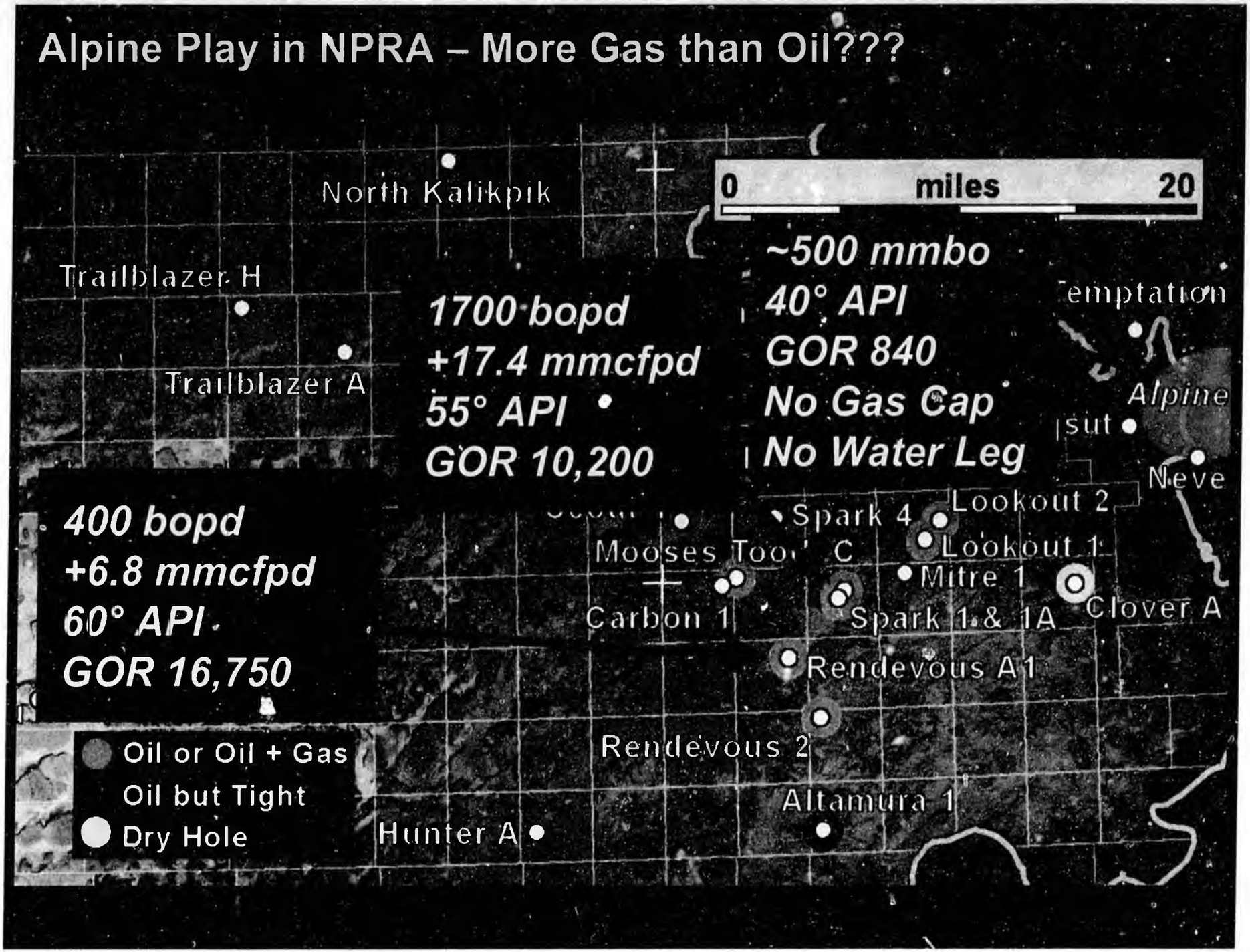
Known Gas Accumulations in Arctic Alaska

Known Reserves Unit & Gas Reserves (BCF)	
Prudhoe Bay	24,526
Pt. Thomson	8,000
Pt. McIntyre	1,526
Kuparuk River	1,150
Duck Island	843
North Star	450
Colville River	400
Barrow-Walakpa	34
Milne Point	14
TOTAL	35,417

Data from AK-DOG Annual 2006 Rpt.

Other Known Accumulations Possible Gas Reserves (BCF)	
Onshore	
Gubik	600
Kavik	115
Square Lake	58
Meade	20
Umiat	5
East Umiat	4
East Kurupa	?
Kemik	?
Wolf Creek	?
Offshore - OCS	
Burger	14,000
Sandpiper	?

Data from Thomas et al., 1996 (DOE)
Craig & Sherwood, 2004 (MMS)
Bird, pers. comm., 2008 (USGS)


Alpine Play in NPRA – More Gas than Oil???
North Kalikpik
0 miles 20
Trailblazer H
Trailblazer A
1700 bopd
+17.4 mmcfpd
55° API
GOR 10,200
~500 mmbo
40° API
GOR 840
No Gas Cap
No Water Leg
Temptation
Alpine
Nieve
400 bopd
+6.8 mmcfpd
60° API
GOR 16,750
Spark 4
Lookout 2
Lookout 1
Mooses Too
C
Mitre 1
Carbon 1
Spark 1 & 1A
Clover A
Rendevous A1
Rendevous 2
Altamura 1
Hunter A
Oil or Oil + Gas
Oil but Tight
Dry Hole