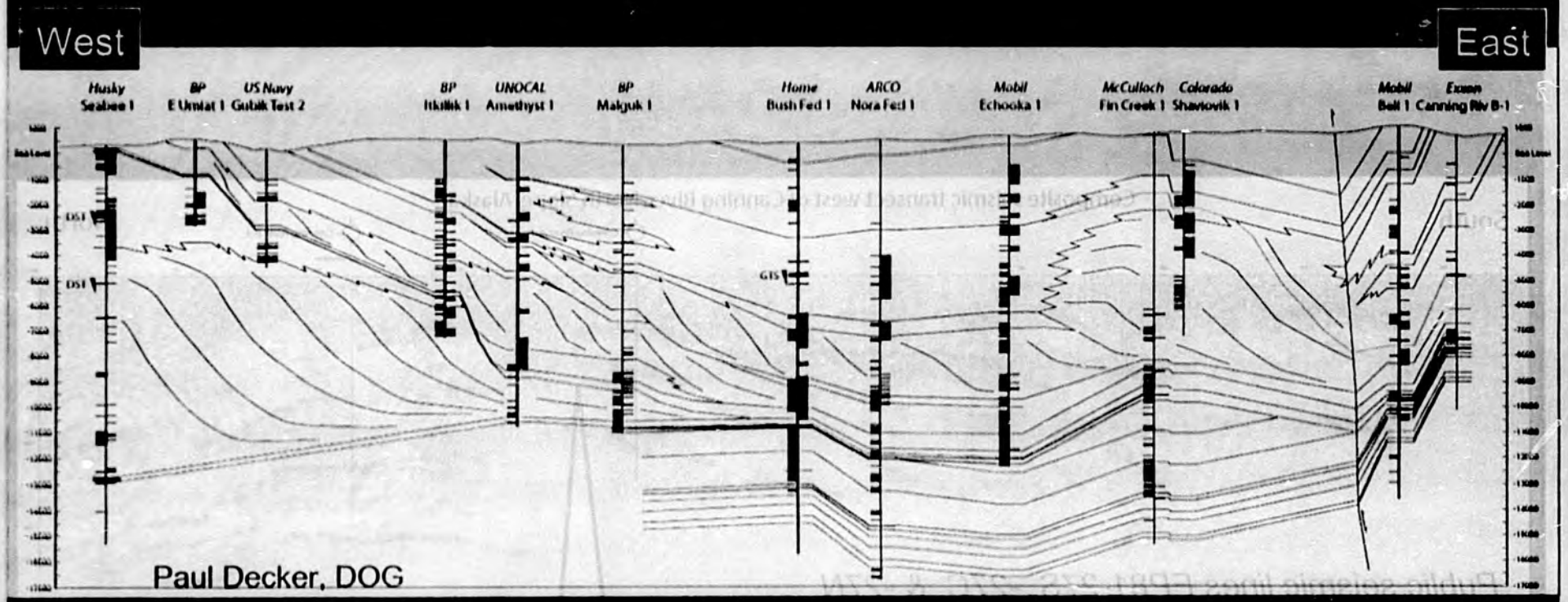
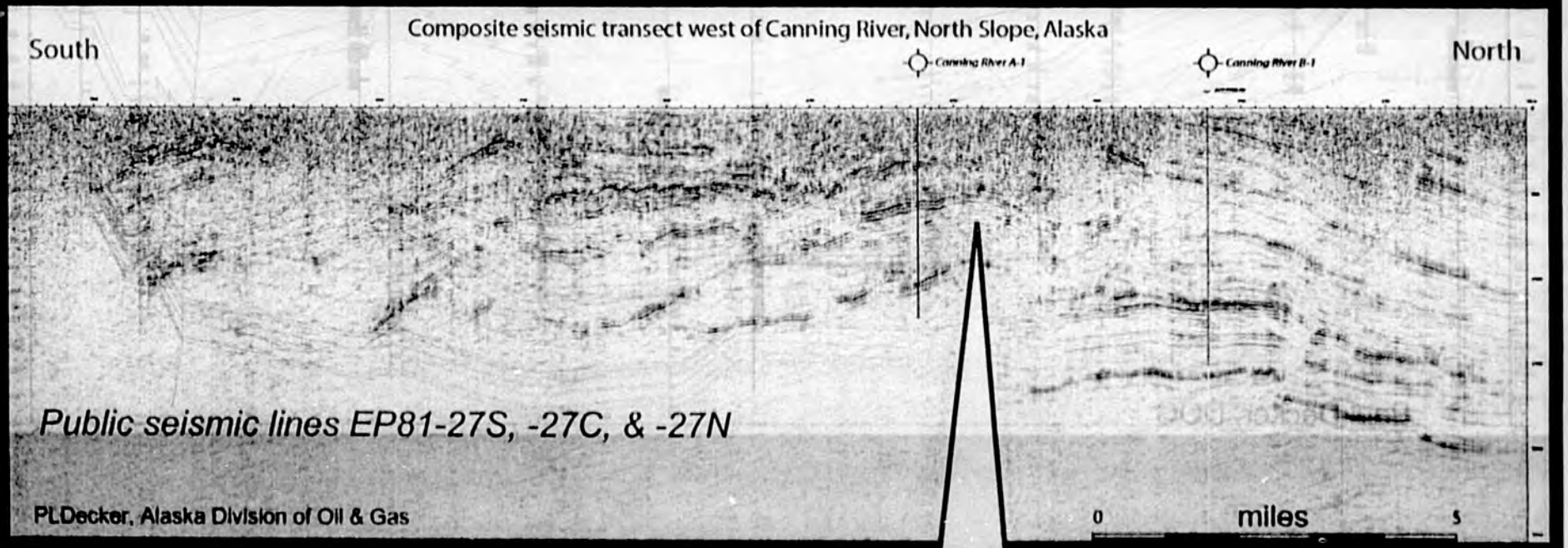
AK LEGISLATURE SPECIAL COMMITTEE FILES SCOMM 155 3289

Foothills Cross Section - Oil and Gas Shows



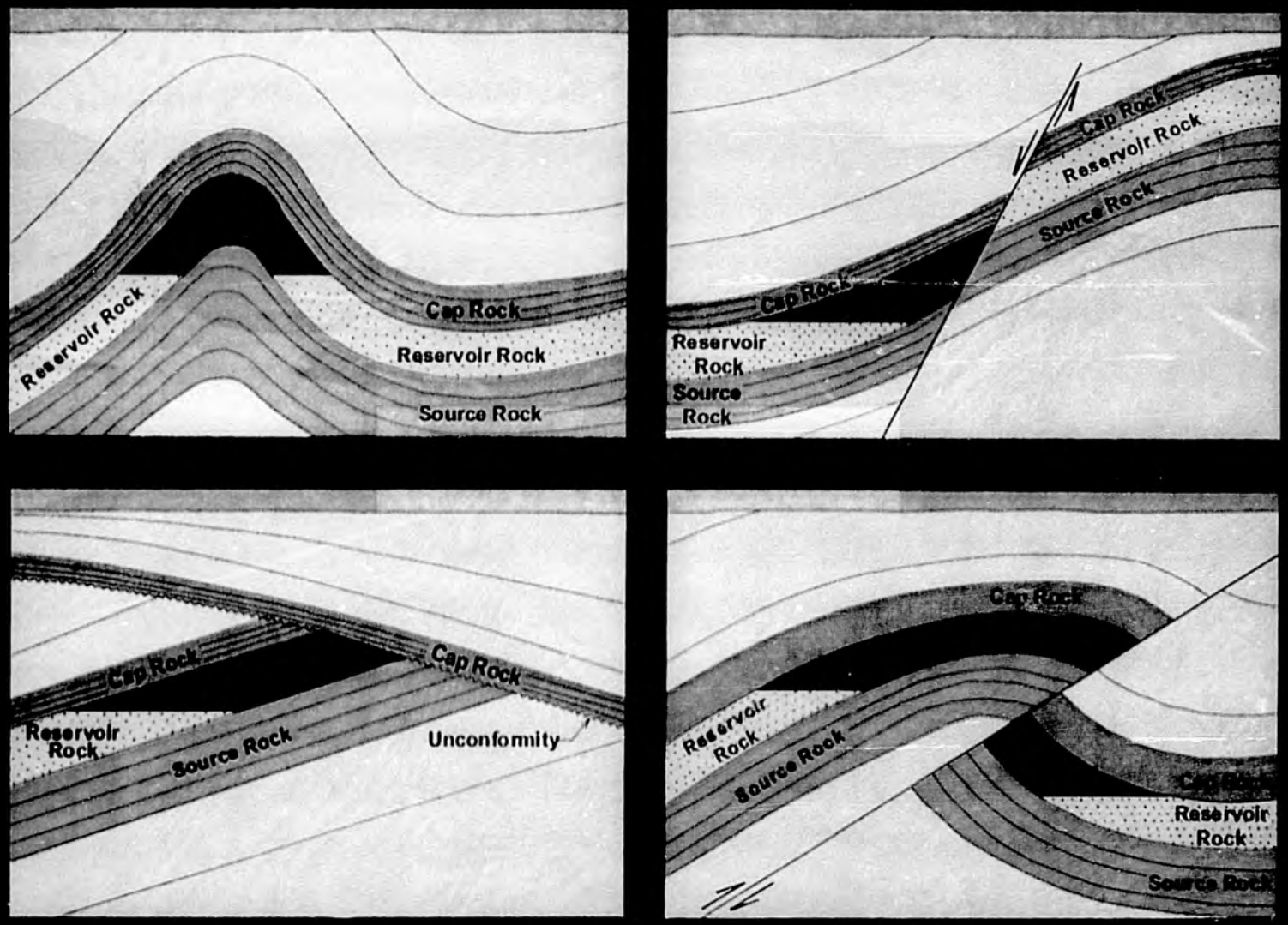
Foothills Structural Plays

Seismic Interpretation



Kavik structure

Conventional Exploration Play Types



Oil and Gas Trapping Mechanisms

USGS Role
dhouse@usgs.gov
USGS

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

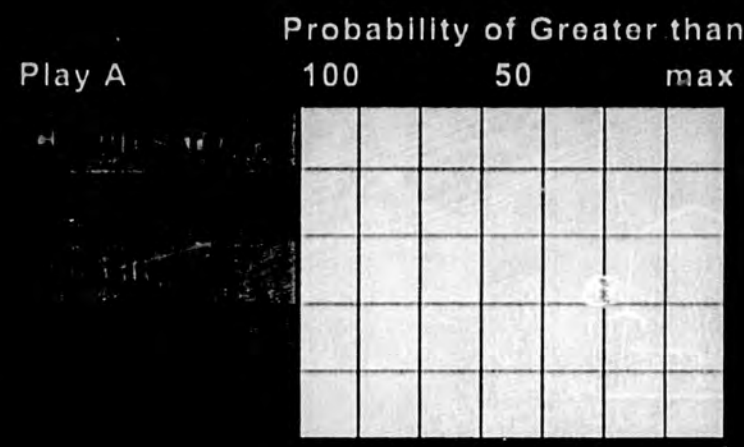
Data from AK-DOG Annual 2006 Rpt.

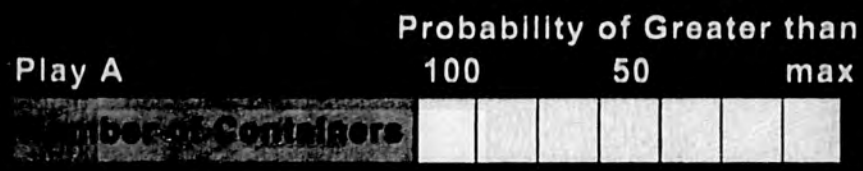
Other Known Accumulations Possible Gas Reserves (BCF)	
Onshore	
Gubik	600
Kavik	115
Square Lake	58
Meade	20
Umiat	5
East Umiat	4
East Kurupa	?
Kemik	?
Wolf Creek	?

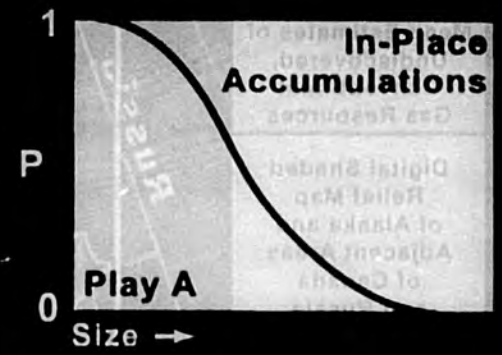
Data from Thomas et al., 1996 (DOE)
Craig & Sherwood, 2004 (MMS)
Bird pers. comm., 2003 (USGS)

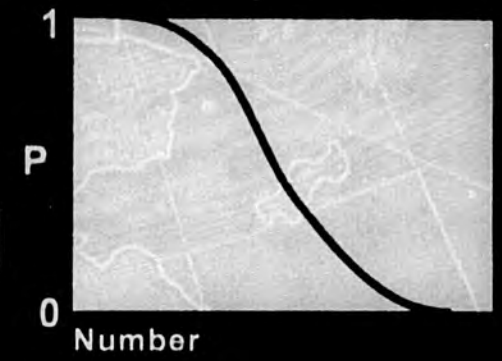
Alpine Play in NPRA – More Gas than Oil?

Assessment Methodology – Geologic Basis

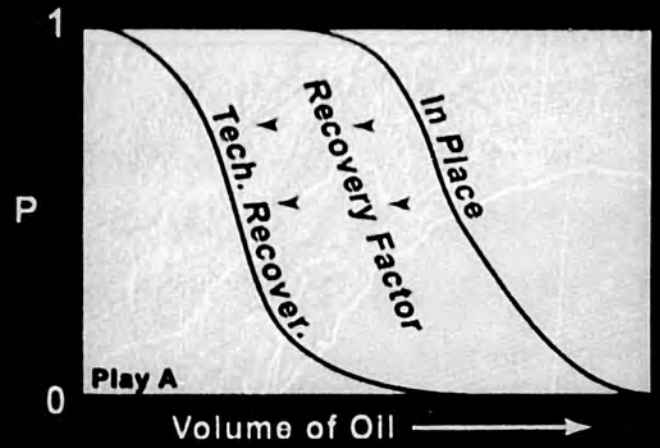




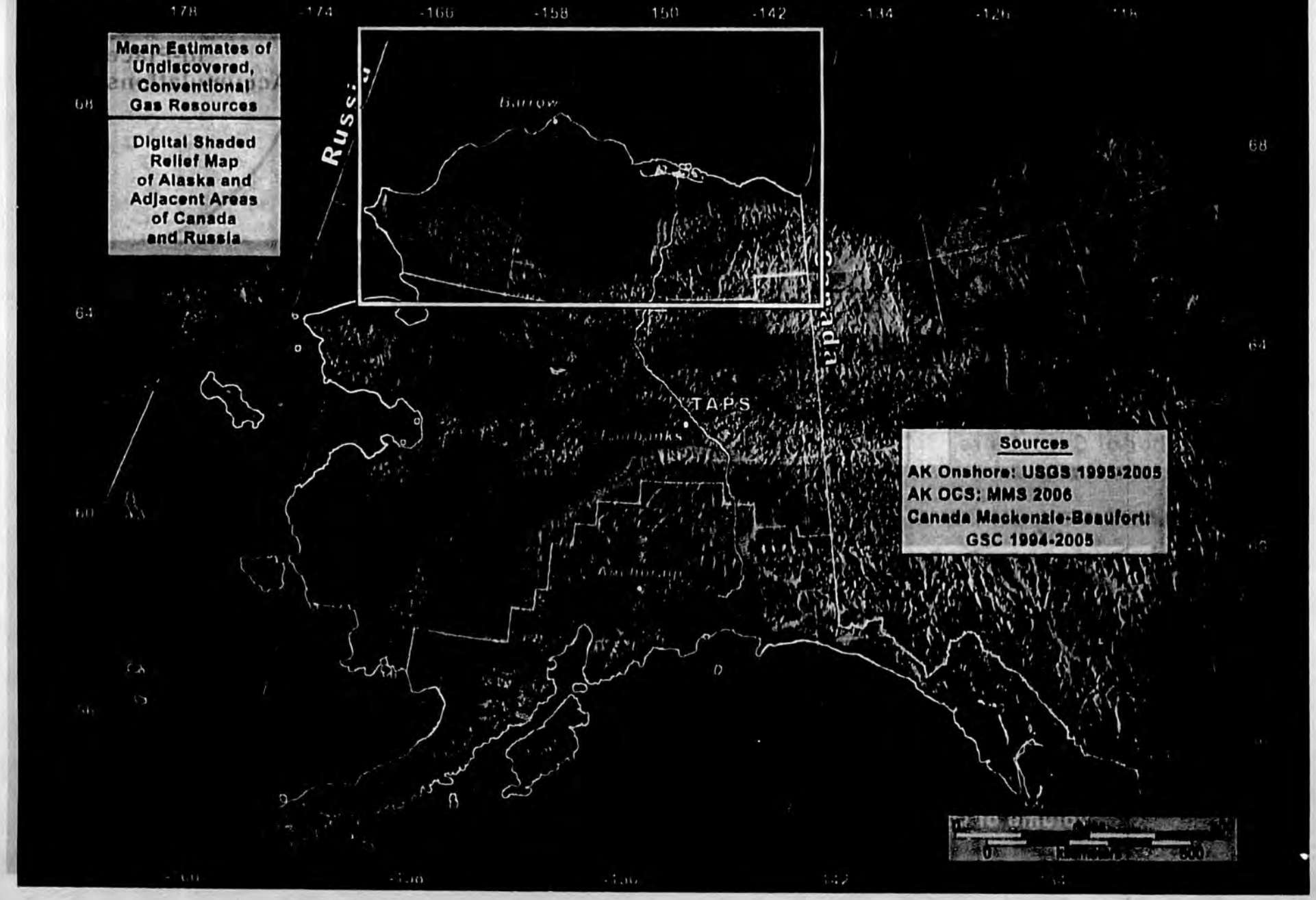




Oil vs. Gas



Undiscovered Conventional Gas Potential



Potential for Undiscovered Petroleum in Arctic Alaska

Mean Estimates of Undiscovered, *Conventional* Natural Gas in Arctic Alaska (trillion cubic feet)

	Non-Associated Gas	Associated Gas	Total Gas
Onshore & State Offshore Areas (USGS estimates)			
NPRA	**61.35**	**11.68**	**73.03**
Central North Slope	**33.32**	**4.20**	**37.52**
ANWR, 1002 Area	**3.84**	**4.76**	**8.60**
Subtotal	***98.51***	***20.64***	***119.15***

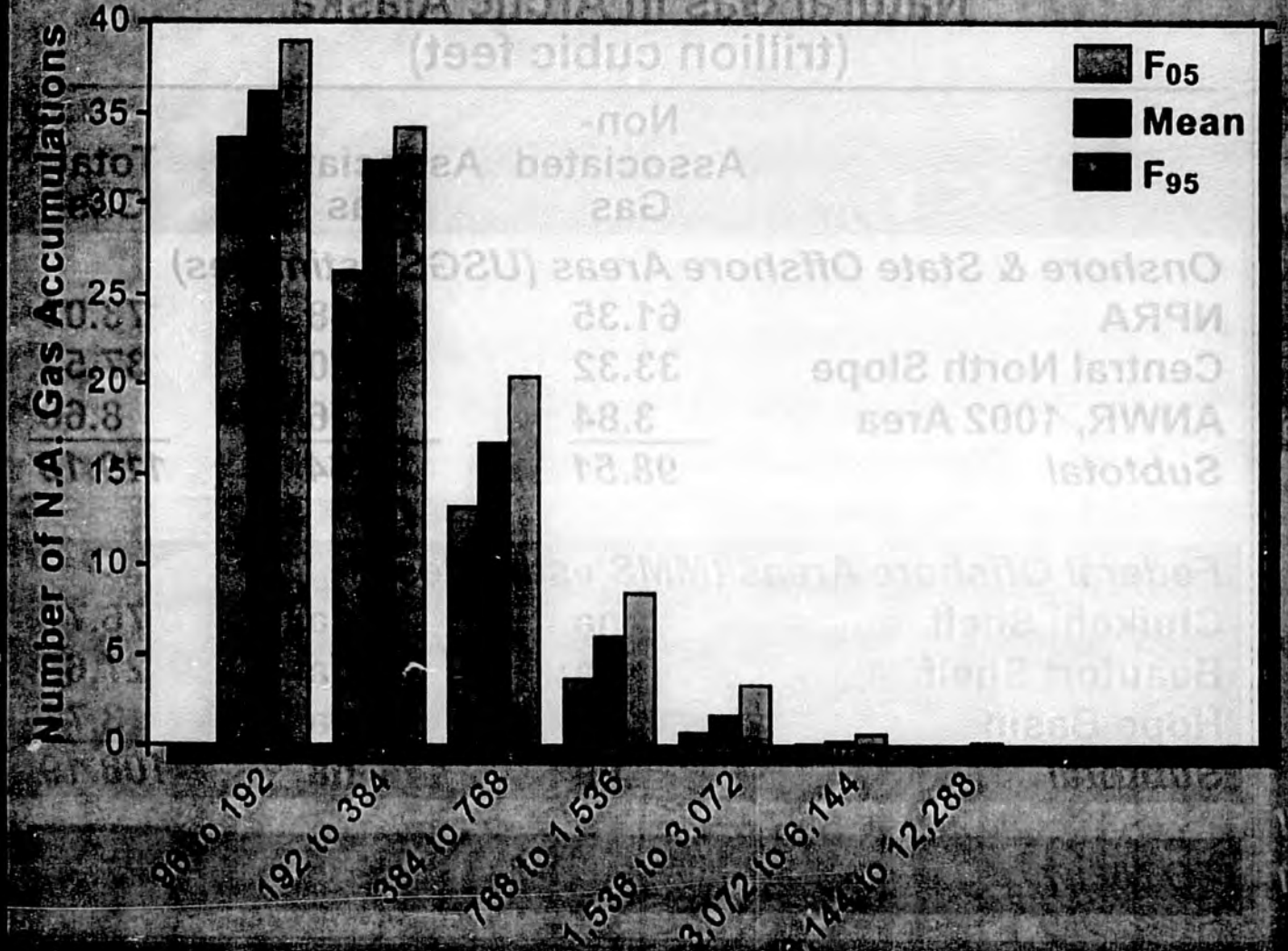
Offshore Areas (MMS estimates)

Chukchi Shelf	na	na	[illegible]
Beaufort Shelf	na	na	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]

Resour
Mear

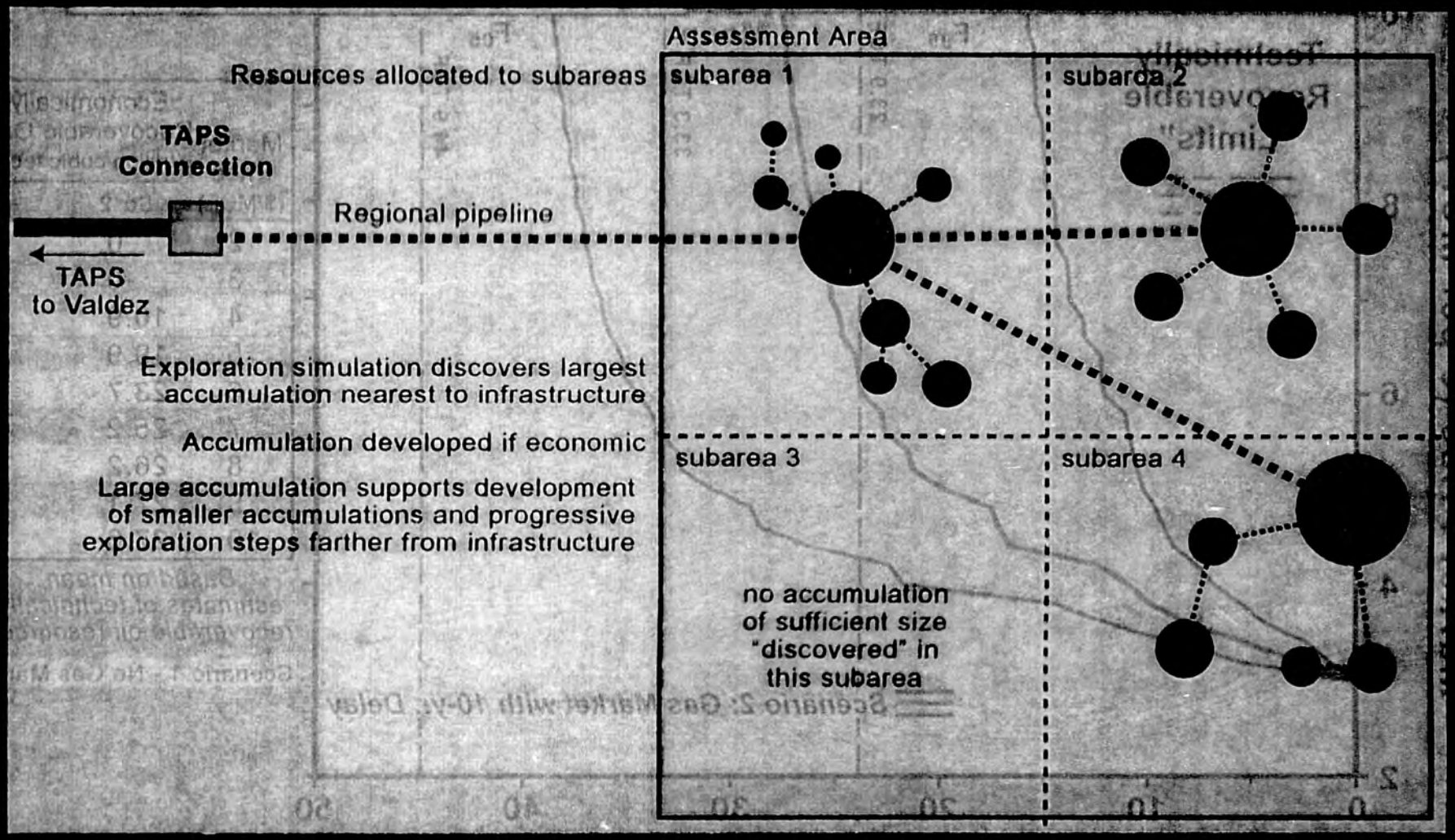
Sources: OCS estimates from MMS; onshore & state waters estimates from USGS

...ies of Gas Accumulation Sizes



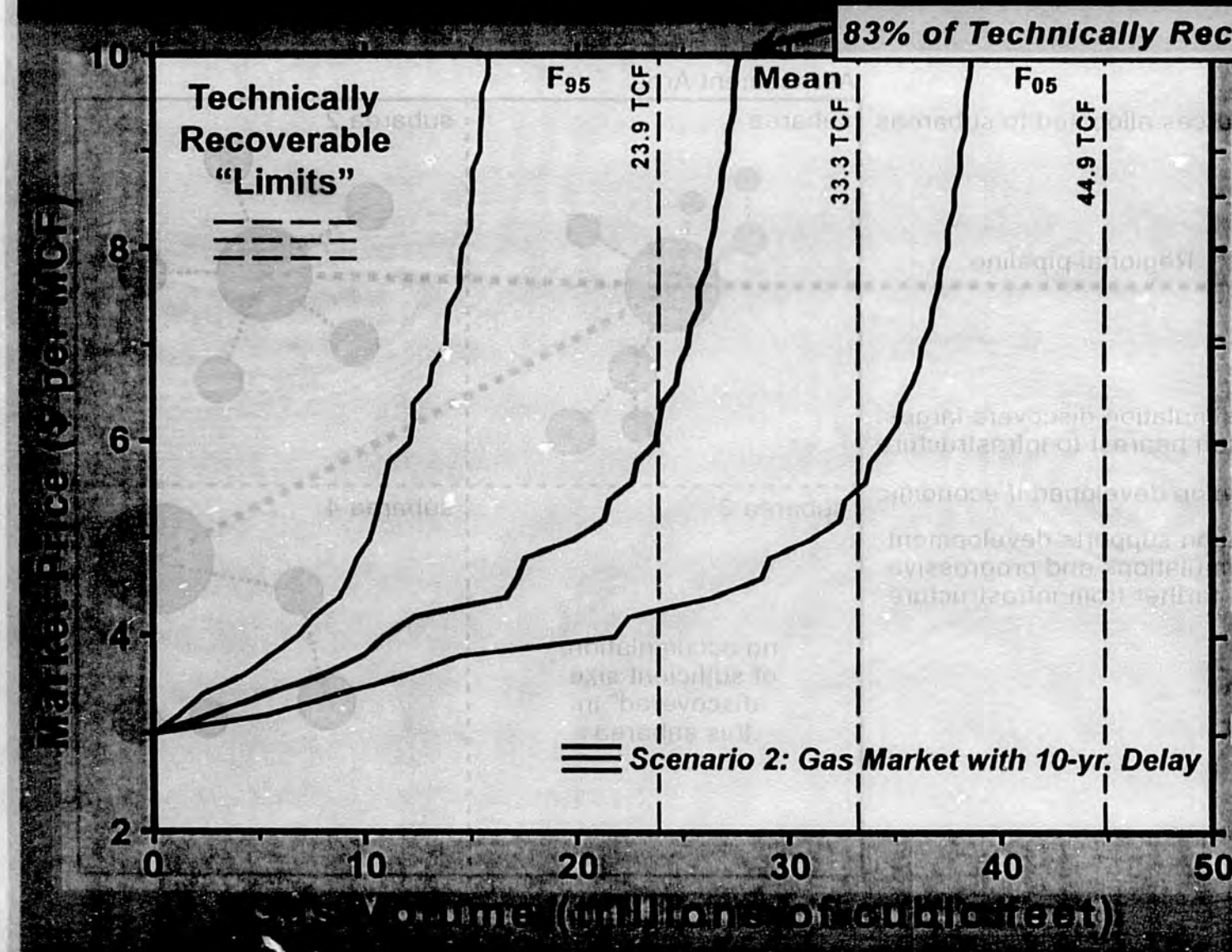
USGS

Economic Analysis Simulates Exploration and Development



Central North Slope Economically Recoverable Gas

Undiscovered, Non-Associated Natural Gas Resources



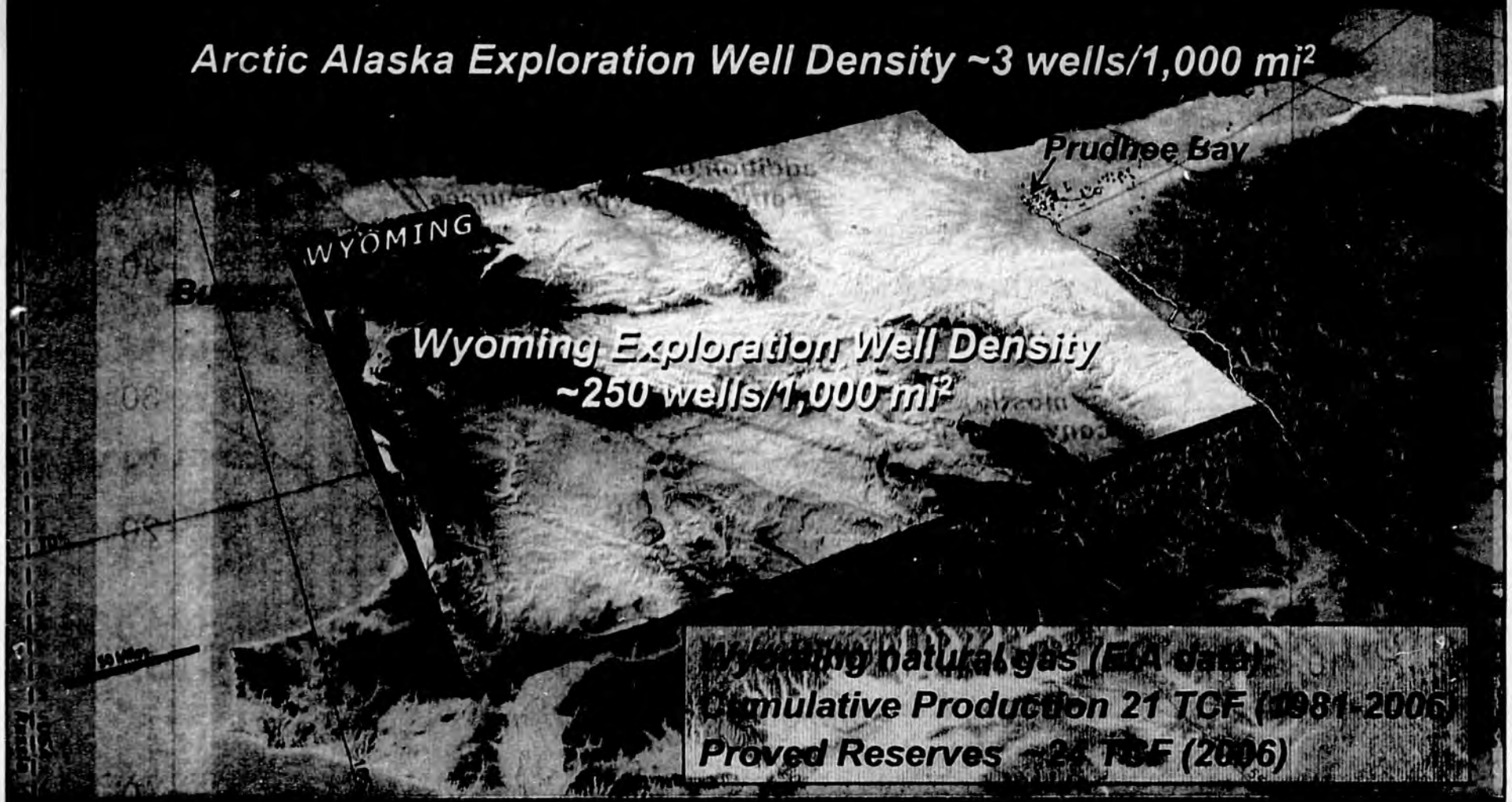
Market Price ($/MCF)	Economically Recoverable Gas (billion cubic feet) Sc. 2
2	0
3	0
4	10.9
5	19.9
6	23.7
7	25.2
8	26.2
9	27.1
10	27.6

Based on mean estimates of technically recoverable oil resources

Scenario 1 - No Gas Market

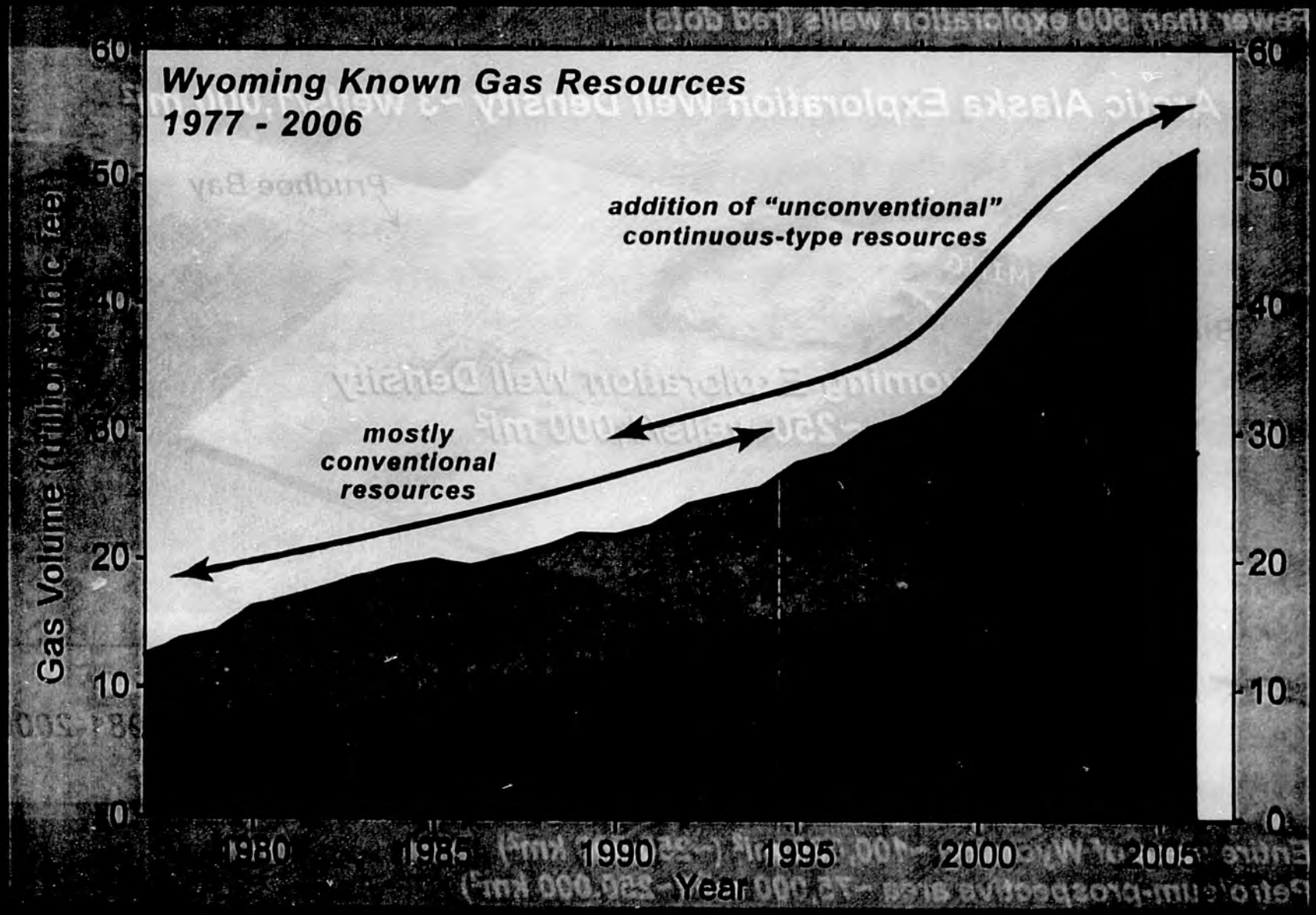
Arctic Alaska Exploration Maturity

- Prospective area onshore & offshore shelves ~ 150,000 mi² (~400,000 km²)
- Fewer than 500 exploration wells (red dots)



- Entire state of Wyoming ~100,000 mi² (~250,000 km²)
- Petroleum-prospective area ~75,000 mi² (~250,000 km²)
- ~19,371 exploration wells

Wyoming Gas Reserves & Production History

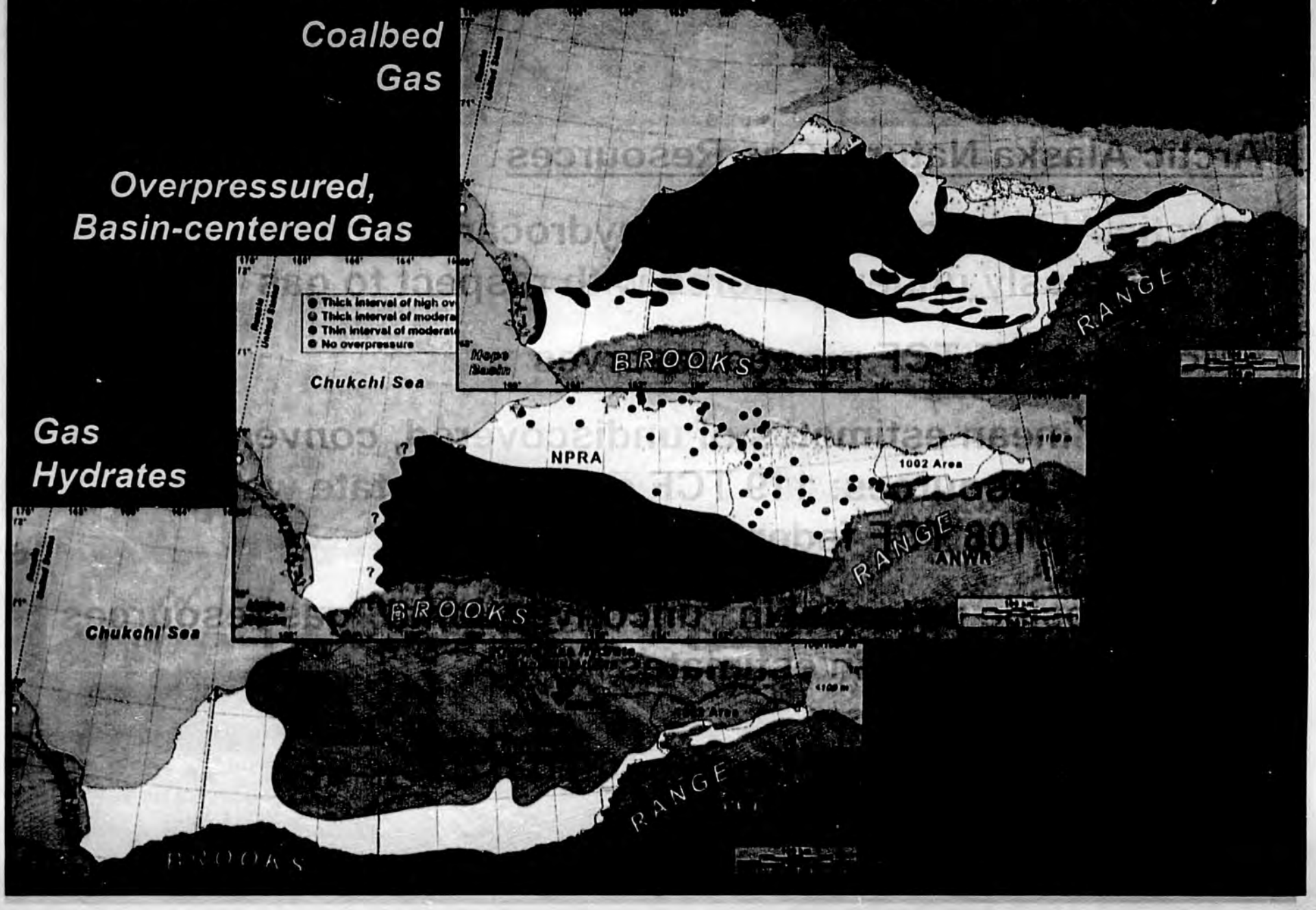


"Unconventional" Gas Resources (continuous resources)

Coalbed Gas

Overpressured, Basin-centered Gas

Gas Hydrates



Summary

Arctic Alaska Natural Gas Resources

- Arctic Alaska: supercharged hydrocarbon basin grossly under explored with respect to gas
- More than 35 TCF proved reserves
- Recent mean estimates of undiscovered, *conventional* gas resources: 119 TCF onshore & state waters plus 108 TCF federal offshore
- Huge upside potential in "unconventional" gas resources not included in estimates

SCOMM

155:6

ALASKA STATE LEGISLATURE

Senator Charlie Huggins, Chair
Senate Special Committee on Energy
State Capitol, Room 119
Juneau, AK 99801
Phone: 465-3878
Fax: 465-3265

Representative John Harris, Chair
House Rules Subcommittee on AGIA
State Capitol, Room 208
Juneau, AK 99801
Phone: 465-4859
Fax: 465-3799

Third Special Session
Twenty-Fifth Legislature

Gymnasium
Terry Miller Building, Juneau Alaska

Sunday June 8, 2008
1:00-6:30 p.m.

Joint Meeting AGENDA

- Presentations: Review of AGIA Findings and Determination; Natural Gas Pipeline Project as proposed by TransCanada Alaska Company, LLC and Foothills Pipelines Ltd. (TC Alaska) to the State of Alaska.

Administration and TransCanada: continued

- Summary of Findings & Determination: **Tom Irwin**, Commissioner, DNR

- Jobs and Training – **Clark Bishop**, Commissioner, DOL; **Conrad Mulligan**, ARCADIS;

- How to Get the Gas –
  Black & Veach; Greg Hopper
  TransCanada;
  Spencer Hosie (by phone), Hosie, MacArthur LLP;
  Allan Van Fleet, Greenburg Traurig;

- Pipeline Regulatory and Commercial Issues –
  Black & Veach; Greg Hopper
  Greenburg Traurig;
  Bill Sparger, Energy Project Consultants;
  Pat Anderson, Pingo Internationak;
  Kevin Banks, Actng. Dir. Division of Oil & Gas

Testimony: By Invitation
Teleconference

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Testimony: By Invitation
Teleconference

Gavel In & Call to order:

I CALL THE JOINT MEETING OF THE SENATE SPECIAL COMMITTEE ON ENERGY and THE HOUSE RULES SPECIAL SUB-COMMITTEE ON AGIA TO ORDER

Sunday, June 8, 2008

LET THE RECORD REFLECT THAT IT IS _____P.M.

Present at the table are:

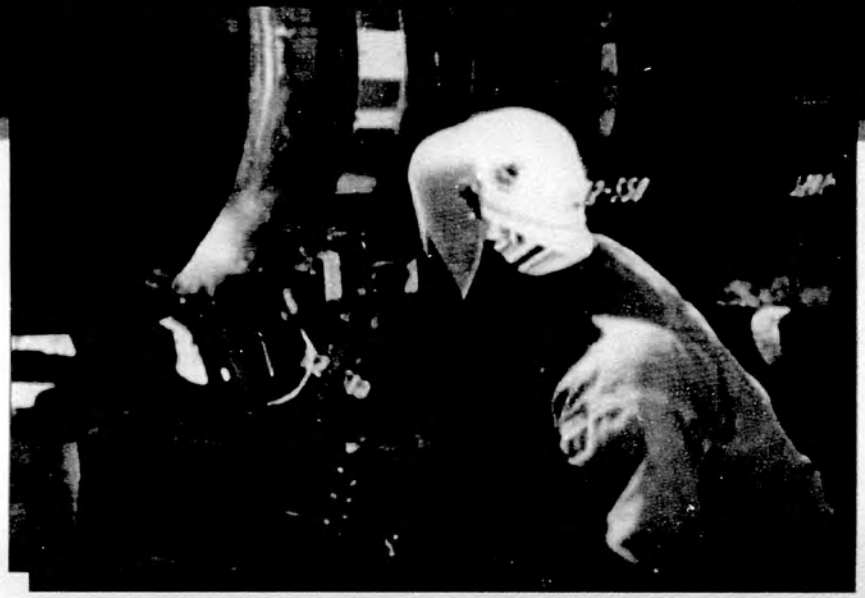
Schedule for today: Take a mid afternoon break 3.
Plan to adjourn by, latest, 6:30.

Welcome: Trans Canada and Administration members and consultants

Welcome to those listening at LIO's and on Gavel to Gavel around the state.

6:30 PM: Adjourn. Returning tomorrow @ 10 AM to hear about "LNG: Economics, Likelihoon of Success, and Path Forward."

AGIA Training Strategic Plan



Alaska Department of Labor and Workforce Development

Commissioner Click Bishop

June 6, 2008

"This gasline will fuel our homes, our economy and careers for Alaskans - for generations."

Governor Sarah Palin
2008 State of the State Address

Gasline Workforce Goal

Alaskans are trained and ready for a gas pipeline and other natural resource development jobs—and these jobs are made available to Alaskans.

Workforce Development Process

- Identify skills gaps
- Minimize gaps through career awareness, effective labor exchange, job center network, accessible training services

Result: Alaskans meet the needs of Alaska employers for legacy jobs and long term careers.

Training System at a Glance

Funding

- *Federal*
  - Workforce Investment Act
  - Denali Training
  - Pipeline Training
- *State*
  - STEP
  - TVEP
  - GF
- *Tuition*

Secondary Education

- Education & Early Development
- High Schools
- Adult Basic Education
- Youth First
- Construction Academies
- College Ready/Work Ready

Postsecondary Education

- University of Alaska
- AVTEC
- Regional Training Centers
- Private Training Providers

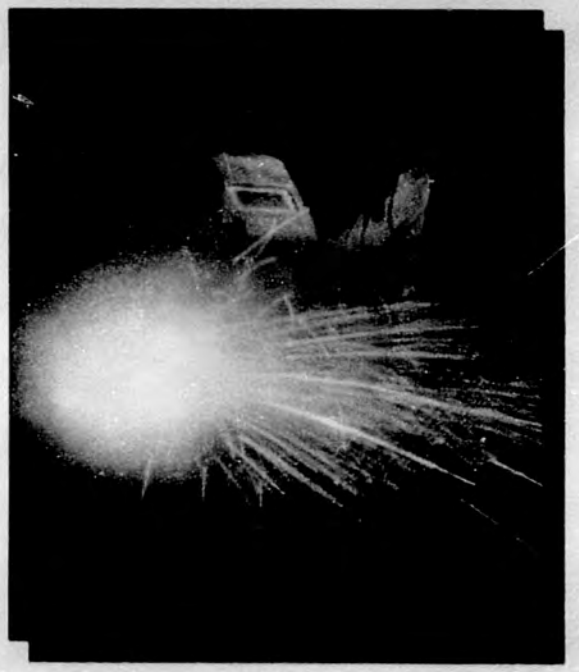
Employment Services

- Job Center Network
  - Counseling
  - Job/Training Referral

Grantees

- Competitive Selection

Challenges



- Economic Cycles
- Ebb and flow of workers
- Awareness—not just professional positions but high paying blue collar jobs
- Cost and accessibility of training
- Job barriers—drug free, driver's license, employability skills, transferrable certification

Four AGIA Strategies

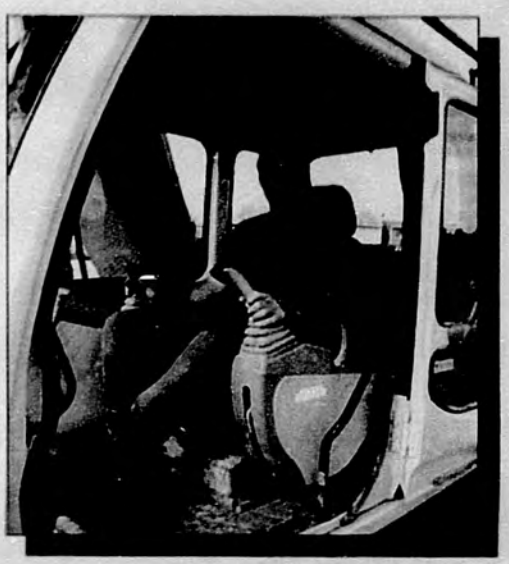
- Increase awareness of and access to careers in natural resource development
- Develop comprehensive career and technical education system
- Increase registered apprenticeships and on-the-job training opportunities
- Increase training for operations, technical and management workers

1. Increase Awareness of and Access to Careers in Natural Resource Development

- Job awareness program
- One stop information on jobs and training
  - Received funding in FY 09 budget to develop training web site and improve on-line job service

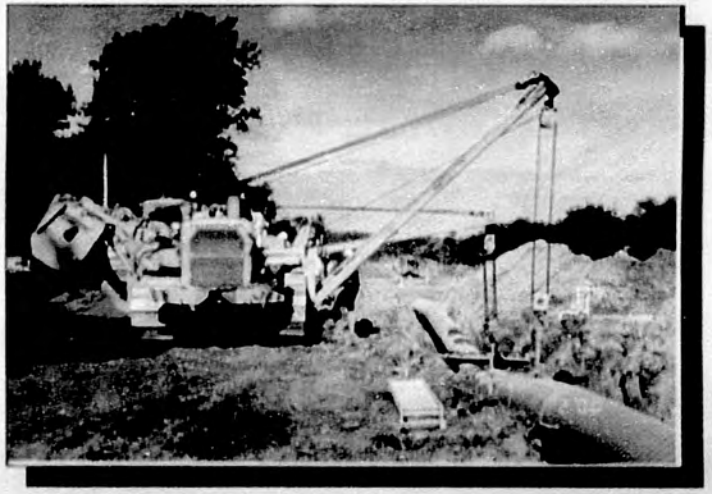
2. Develop Comprehensive Career and Technical Education System

- Career pathways and skill standards
  - FY 09 Budget includes coordinator
- Work Keys DEED/DOLWD partnership
  - FY 09 funding in DEED
- K-12 career planning and counseling
  - Alaska Youth First funded
- Integrated system for youth and adults
  - Construction academies funded
- Coordinate existing training programs



3. Increase Registered Apprenticeships and On-the-Job Training Opportunities

- Increase job training for entry level jobs
- Increase apprenticeships in construction
- Employer incentives for apprenticeships and OJT
  - Funding received to support apprenticeships and OJT—targeted federal grant and general fund



4. Increase Training for Operations, Technical and Management Workers

- Expand programs for critical jobs
  - FY 09 for UAA engineering program expansion
- Recruit more Alaska high school grads
- Better articulation between job training and management programs
- Help workers keep pace with technology and skill upgrades

Our Focus

- Current skills gap
- Legacy and long-term jobs

Identifying the AGIA Skills Gap

Working with industry partners, DOLWD:

- Identified 113 AGIA occupations
- Used existing occupational supply and demand data to help identify potential gaps

Alaska's AGIA Skills Gap

- Current gap: In 2006 nonresidents accounted for more than16% of the workers in the AGIA identified occupations
- Future gap: More than 37% of individuals working in AGIA occupation were 45 years old or older in 2006

AGIA Occupational Data

	Percent Nonresident Workers (2006)	Percent Workers Age 45+ (2006)	Average Hourly Wage (May 2007)
Carpenters	17.0%	34.6%	$26.33
Civil Engineers	12.4%	43.9%	$36.64
Electricians	24.2%	32.7%	$31.47
Operating Engineers and Other Construction Equipment Operators	18.3%	49.9%	$28.10
Surveyors	18.1%	45.2%	n/a
Truck Drivers, Heavy and Tractor-Trailer	13.6%	48.8%	$21.66
Welders, Cutters, Solderers, and Brazers	34.8%	40.4%	$25.05

For More Information

- Web: labor.state.ak.us
- Click on: AGIA Training Strategic Plan

June 8, 2008
Sunday

DOR Commissioner Galvin
DNR " (Irwin) spoke w/o slides

AGIA

Commissioners' Findings and Determination Summary

Special Session
June 6, 2008

8

Commissioners' AGIA Findings and Determination

AGIA
The Alaska Gasline Inducement Act

Overview from Commissioner Irwin

Commissioners' AGIA Findings and Determination

AGIA
The Alaska Gasline Inducement Act

- The pipeline project proposed by TC Alaska's application
  - will sufficiently maximize the benefits to the people of Alaska, and
  - merits issuance of an AGIA license.
- Issuing an AGIA License to TC Alaska maximizes benefits to Alaskans more than pursuing an LNG project or the Producers Project.

Maximizing Benefits to Alaskans

AGIA
The Alaska Gasline Inducement Act

- Get a Pipeline
- Jobs and long-term careers
- Opportunity of affordable energy for Alaskans
- Maximize state revenue and create opportunity for future growth of state economy

Maximizing Benefits to Alaskans

AGIA
The Alaska Gasline Inducement Act

- Get a Pipeline
  - A feasible project plan, sponsored by a capable pipeline company
  - An economic project likely to attract firm transportation commitments and secure financing
- Jobs and long-term careers
- Opportunity of affordable energy for Alaskans
- Maximize state revenue and create opportunity for future growth of state economy

Maximizing Benefits to Alaskans

AGIA
The Alaska Gasline Inducement Act

- Get a Pipeline
- Jobs and long-term careers
  - True "open access" for explorers
- Opportunity of affordable energy for Alaskans
- Maximize state revenue and create opportunity for future growth of state economy

True "Open Access"

AGIA
The Alaska Gasline Inducement Act

- Explorers have Confidence that
  - Pipeline capacity will be expanded if new gas is found
  - New gas will pay a fair transportation rate
- "Expansion Provisions"
- "Rolled-in Rates"

Maximizing Benefits to Alaskans

AGIA
The Alaska Gasline Inducement Act

- Get a Pipeline
- Jobs and long-term careers
- Opportunity of affordable energy for Alaskans
  - Off-Take Points, and Distance-Sensitive Rates
  - Expansion Provisions
  - Does not interfere with "Bullet Line" project
- Maximize state revenue and create opportunity for future growth of state economy

Maximizing Benefits to Alaskans

AGIA
The Alaska Gasline Inducement Act

- Get a Pipeline
- Jobs and long-term careers
- Opportunity of affordable energy for Alaskans
- Maximize state revenue and create opportunity for future growth of state economy
  - Lowest Reasonable Transportation Rates (tariff)
  - Expansion Provisions

TC Alaska Project Evaluation

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- Net Present Value (NPV)
- Likelihood of Success

Project Economic Analysis

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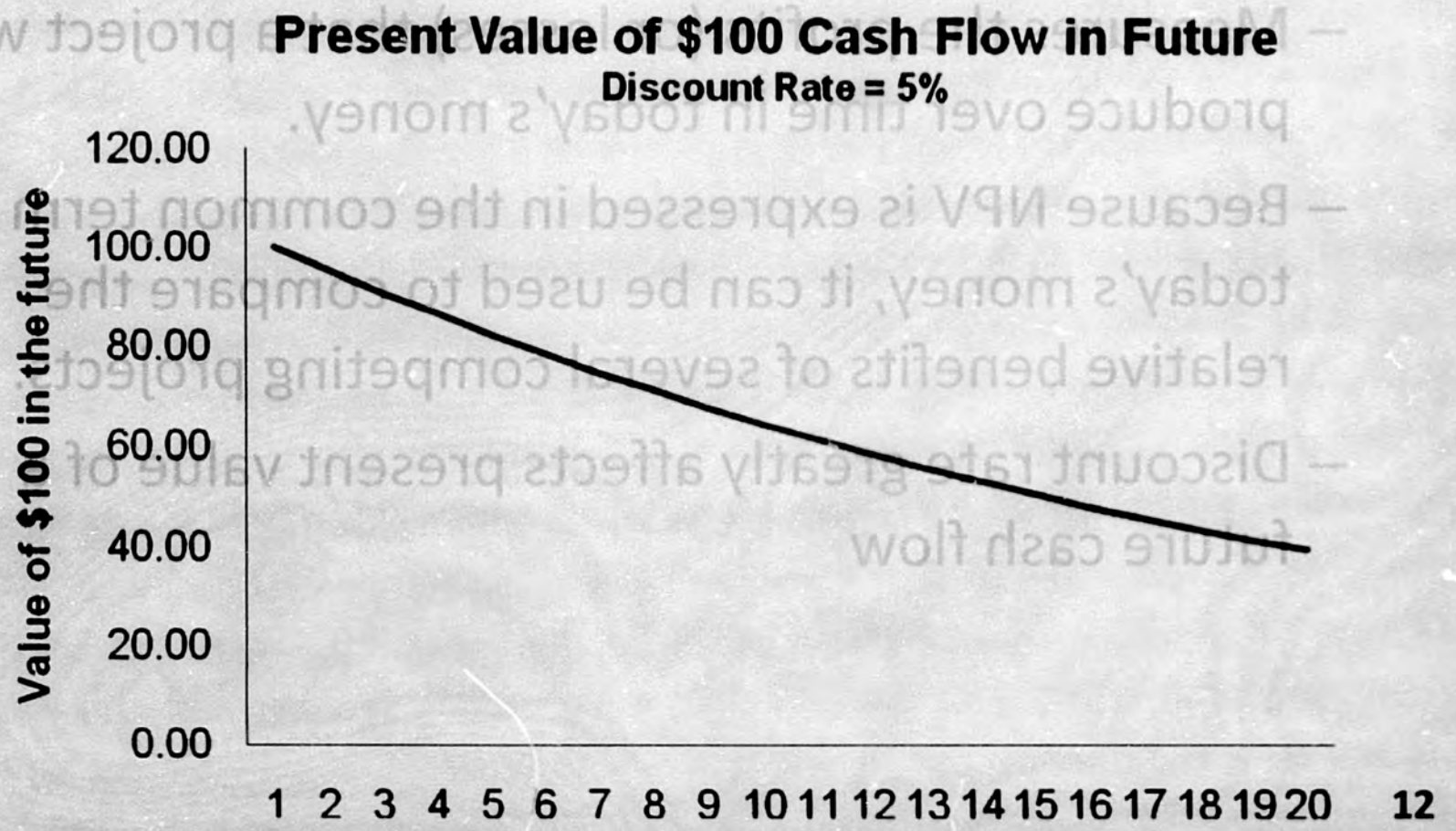
- Net Present Value (NPV) Analysis
  - Measures the profits (or losses) that a project will produce over time in today's money.
  - Because NPV is expressed in the common term of today's money, it can be used to compare the relative benefits of several competing projects.
  - Discount rate greatly affects present value of a future cash flow

Project Economic Analysis

AGIA
The Alaska Gasline Inducement Act

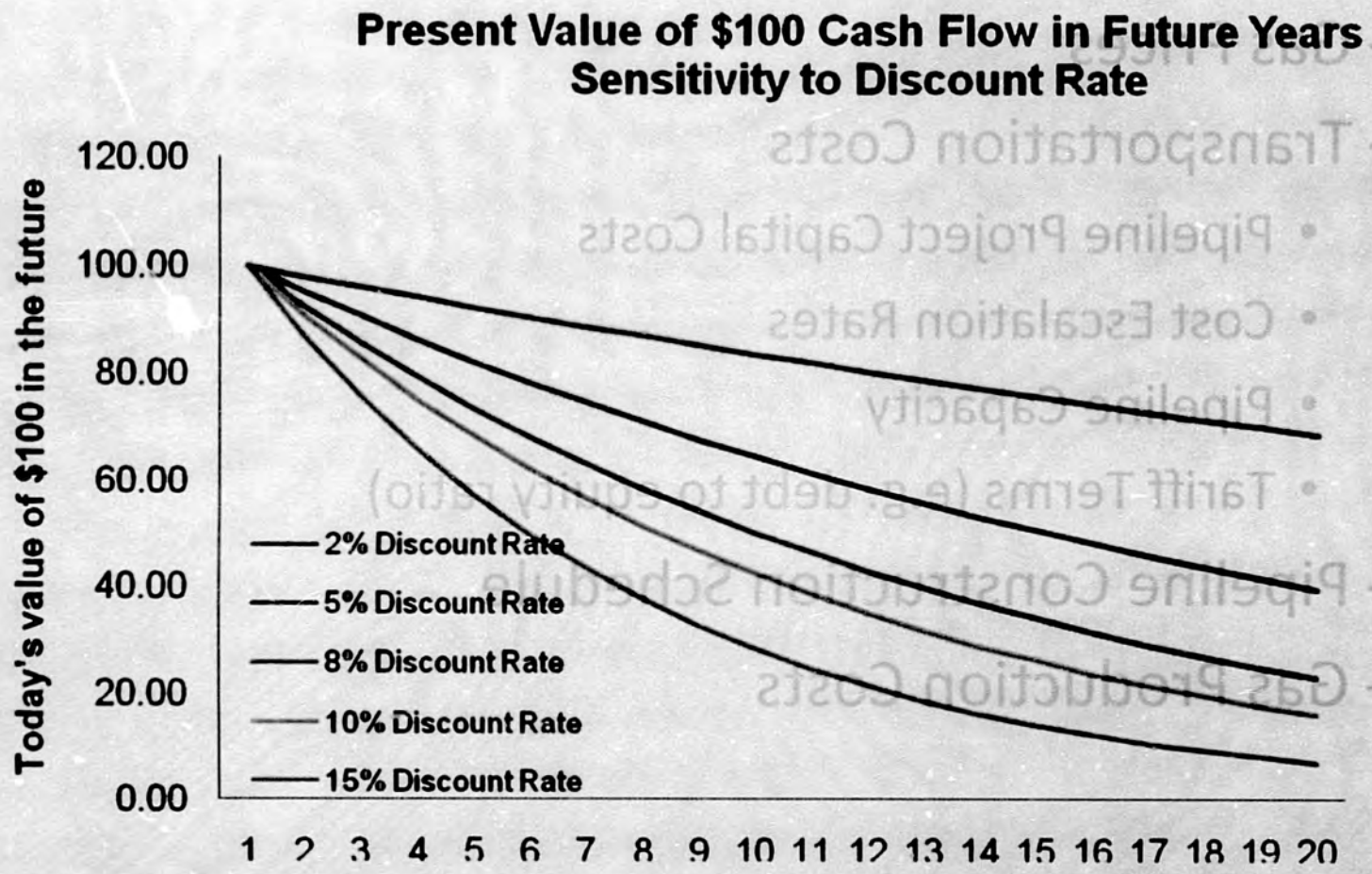
- Net Present Value (NPV) Analysis



Project Economic Analysis

AGIA
The Alaska Gasline Inducement Act

- Net Present Value (NPV) Analysis



Project Economic Analysis

AGIA
The Alaska Gasline Inducement Act

- Factors in NPV Analysis
  - Gas Prices
  - Transportation Costs
    - Pipeline Project Capital Costs
    - Cost Escalation Rates
    - Pipeline Capacity
    - Tariff Terms (e.g. debt to equity ratio)
  - Pipeline Construction Schedule
  - Gas Production Costs

Project Economic Analysis

AGIA
The Alaska Gasline Inducement Act

- Two "Base Cases" Reported for TC Alaska's Project
  - "Proposal Base Case"
    - 4.5 Bcf/d (including 0.9 Bcf/d from Pt. Thomson)
    - 75/25 debt to equity
    - 14% return on equity
    - 25 year shipping contracts
  - "Conservative Base Case"
    - 4.0 Bcf/d (No gas from Pt. Thomson)
    - 75/25 debt to equity
    - 14% return on equity
    - 20 year shipping contracts

Project Economic Analysis

AGIA
The Alaska Gasline Inducement Act

- Gas Price Models
  - Separate price forecasts were obtained from
    - US DOE's Energy Information Administration (EIA)
    - Wood Mackenzie
    - Gas Strategies Consulting
    - Black and Veatch

Project Economic Analysis

AGIA
The Alaska Gasline Inducement Act

- Project Cost and Schedule
  - "Technical Team", included
    - Westney Consulting
    - Energy Project Consultants
    - Pingo International
    - AMEC Paragon
    - Colt Engineering
    - Mustang Management
    - Energy Operations Consulting
    - Black and Veatch
    - Merlin Associates

Project Economic Analysis

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The Alaska Gasline Inducement Act

- Project Cost Estimates – Mid-Range
  - Proposal Base Case
    - $31 Billion in today's dollars
      - $3.19 tariff
    - $45 Billion in dollars spent
      - $4.73 tariff
  - Conservative Base Case
    - $29 Billion in today's dollars
      - $3.59 tariff
    - $42 Billion in dollars spent
      - $5.33 tariff

Project Economic Analysis

AGIA
The Alaska Gasline Inducement Act

Project Cost Estimates – Why Higher than TC Alaska's?

- Different Purposes – Project Planning vs. Risk Assessment
- Difference Between Assumptions Mandated in the RFA and the final analysis assumptions
  - Exchange rate, cost escalation rate
- Assumed "Neutral Competence" of Operator
- Cost of the GTP
  - One vs. Two seasons of sea-lift
- TC Alaska's Cost Estimates are "realistically aggressive" and appropriate for project planning

Project Economic Analysis

AGIA
The Alaska Gasline Inducement Act

- Project Schedule
  - Mid-range probability put first gas in 2020
  - State's Canadian Counsel advised on expected regulatory timeline in Canada, including First Nation issues
  - TC Alaska's schedule (first gas in 2017) is "realistically aggressive"

Project Economic Analysis

AGIA
The Alaska Gasline Inducement Act

NPV Calculation Summary – Proposal Base Case

- Gas Prices (WoodMac)
- Transportation Costs
  - Pipeline Project Capital Costs ($31.5 billion)
  - Cost Escalation Rates (4%)
  - Pipeline Capacity (4.5 Bcf/d)
  - Tariff Terms (e.g. debt to equity ratio[75/25])
- Pipeline Construction Schedule (2020)
- Gas Production Costs

Project Economic Analysis

AGIA
The Alaska Gasline Inducement Act

Proposal Base Case Results

- The State of Alaska would realize an estimated cash flow of $261.5 billion, and an estimated NPV of approximately $66.1 billion at a discount rate of 5%.
- The Major North Slope Producers would realize an estimated cash flow of $147.4 billion, and an estimated NPV of approximately $13.5 billion at a discount rate of 10%.

Project Economic Analysis

AGIA
The Alaska Gasline Inducement Act

Conservative Base Case Results

- The State's NPV decreases by 8% from the Proposal Base Case to $60.7 billion.
- The Major North Slope Producers NPV decreases by 9% to $12.3 billion.