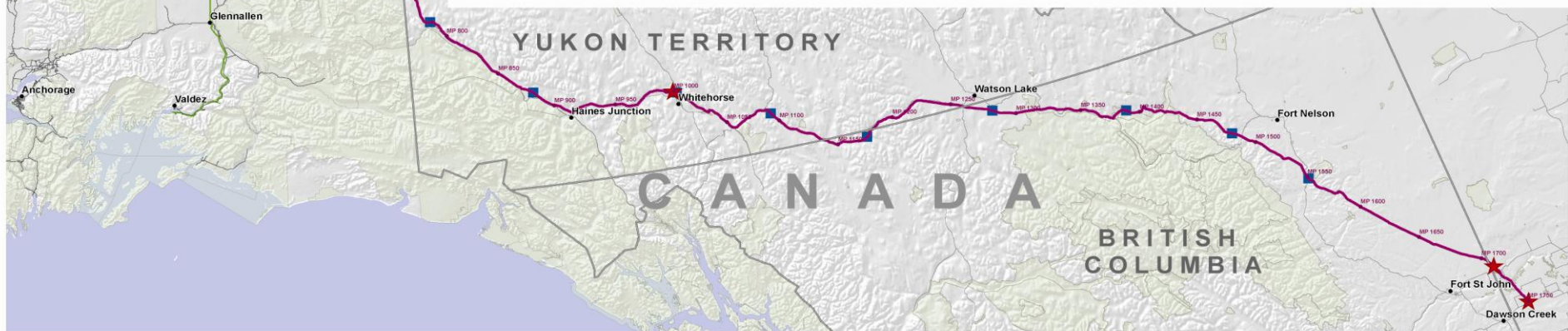




# Denali Project Update

## House and Senate Resources Committees

### June 16, 2010



# Presentation Agenda

- Introduction
- Overview
- Gas Treatment Plant (Roberto Reichard, VP GTP)
- Mainline (Kris Fuhr, VP Mainline)
- Commercial Offer (Scott Jepsen, VP Business Services)
- Summary

# Denali Open Season Plan

- Open season plan approved by FERC
- Open season to ***begin July 6*** and conclude on ***October 4, 2010***
- Denali seeking binding agreements
- High quality design and project execution plan
  - Over \$140 million and 670,000 man-hours invested by Denali since 2008
  - Decades of arctic, mega-project, pipeline experience
  - World-class engineering firms (Fluor/WorleyParsons, Bechtel, CH2MHILL)
  - Field data to support engineering efforts
  - Supported by hundreds of millions of dollars of historical studies
- Enormous undertaking with significant risk
- Competitive commercial offer that recognizes project risks

# Project Description

- Designed to deliver 4.5 BCFD to North America
- Planning 6 delivery points in Alaska and 4 in Canada
- Gas Treatment Plant (GTP)
  - Gas treating
  - Compression and chilling
- North Slope Transmission Lines
  - Prudhoe to GTP
  - Point Thomson to GTP
- Mainline
  - Prudhoe Bay to AK/Canada border (730 miles)
  - AK/Canada border to Blueberry Hill, Alberta (1020 miles)
  - Multiple options for shippers at Alberta terminus





# Key Metrics

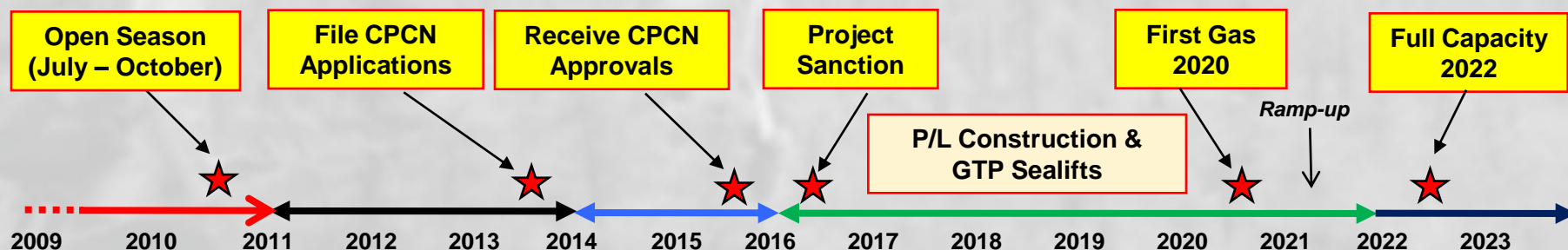
(All costs in 2009 \$)

- High quality Class 4\* cost estimate – \$35 billion
- Estimated rate GTP to Alberta \$2.67/MMBtu (excluding fuel)

## Cost and Rate Summary

	GTP	Alaska Mainline	Canada Mainline	Total
Cost, \$billions	12.2	10.4	12.5	35
Rate, \$/MMBtu	0.90	0.80	0.97	2.67

- Projected first gas in 2020



\* Association for the Advancement of Cost Engineering International

# Highly Qualified Team

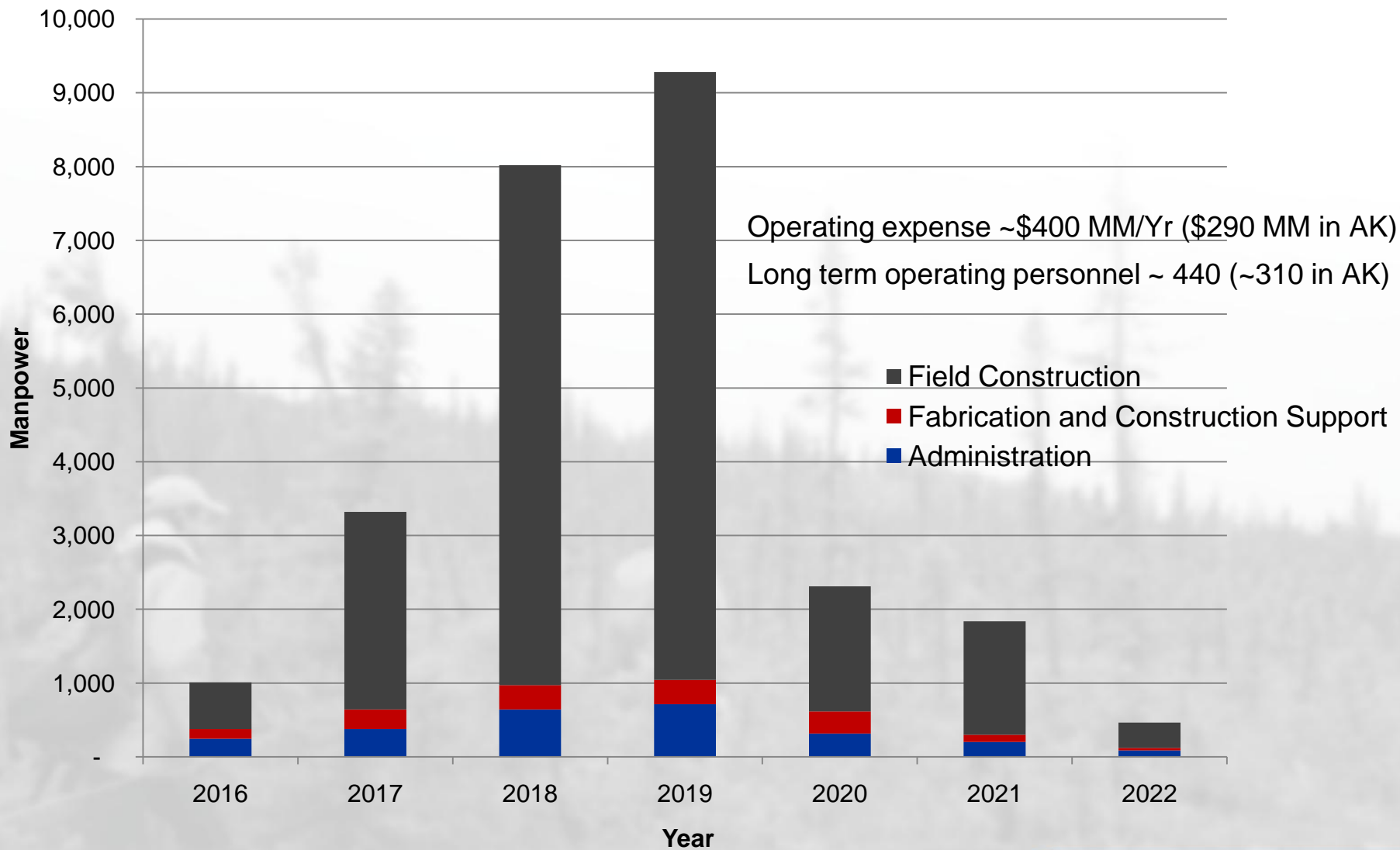
- Leveraged 30 years of historical work
- Experienced core team
  - Decades of projects and engineering experience
  - North Slope, arctic, global frontier mega-projects
- World-class capabilities
  - Management systems, tools and people
  - Pipeline, gas treating and processing technologies
- Experienced and highly regarded contractors
  - Pipeline engineering, pipeline construction, compressor station design, civil, and environmental
  - Geotechnical, GIS, logistics, and regulatory
  - Gas plant engineering and construction, facility modularization, sealift expertise
- Virtually every major project constructed on the North Slope managed and operated by BP or ConocoPhillips



# Denali has dozens of contractor companies supporting its work



# Construction Manpower (Alaska)





# Gas Treatment Plant (GTP)

- World-scale modularized plant to condition gas
  - Four processing trains of activated amine to remove  $\text{CO}_2$  and  $\text{H}_2\text{S}$
  - Dehydration, compression and chilling
  - 4.5 BCFD sales gas into the mainline
  - 0.3 BCFD treated fuel gas for North Slope users
  - $\text{CO}_2$  and  $\text{H}_2\text{S}$  returned for enhanced oil recovery, sequestration or other uses
  - Expandable to 5.8 BCFD sales gas
- Unbundled service options
  - Gas treating ( $\text{CO}_2$  and  $\text{H}_2\text{S}$  removal)
  - Compression and chilling
  - Treated fuel gas



# Gas Treatment Plant

## *State-of-the-Art Design*

- Emphasis on safety and environment
  - Latest Inherently Safer Design Norms
  - Energy efficiency
- High reliability and availability
- Meet steady state pipeline demand throughout the year, with ability to repack
- Expandable with additional trains
- Incorporate lessons-learned from arctic as well as other operating gas treatment plants



# Gas Treatment Plant

## *Key Deliverables and Studies*

- Key Deliverables

- Process Flow Diagrams
- Utility Flow Diagrams
- Material Selection Diagrams
- Case for Safety
- Master Equipment List
- Electrical Single Lines
- Telecommunications drawings
- Site and plot plans
- Structural/Civil drawings
- Module plan and elevation drawings
- Data Sheets for key equipment
- Design Basis
- Operations and Maintenance Strategy
- Cost Estimates (CAPEX and OPEX)
- Schedule
- Execution Plan

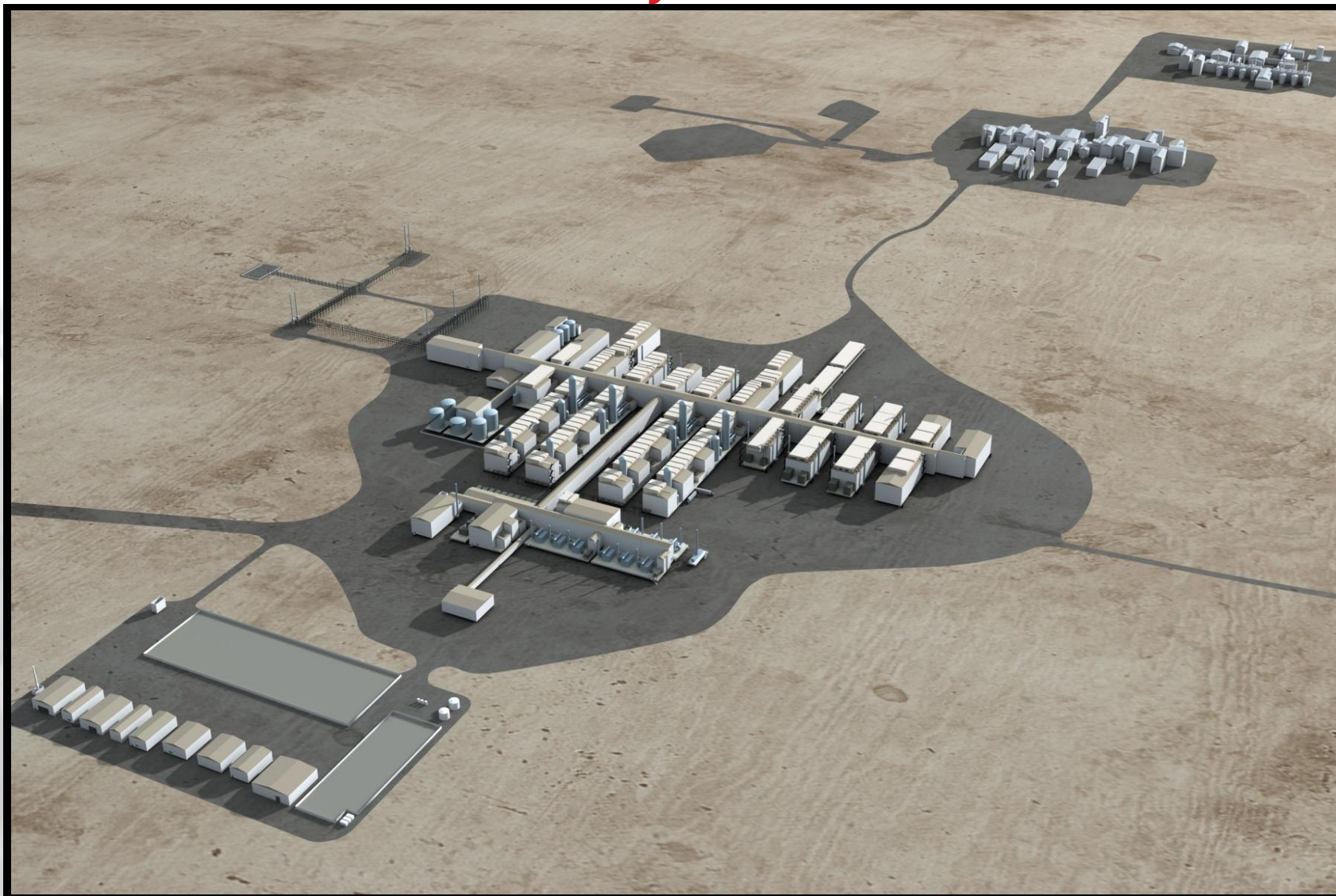
- Key Studies Completed

- Central Power – energy optimization
- Alternate AGR technologies
- Alternate aMDEA configurations
- Amine regeneration
- Driver/Driven equipment studies
- AGRU train size and configuration
- Utilities – make up water
- Flare sizing study
- Module size/weight and layout
- Logistics/Constructability
- NS & L48 construction
- HAZID, consequence analysis and QRA
- Materials of construction
- Deliverability and RAM
- Alternate refrigerants
- Energy optimization studies



# Gas Treatment Plant

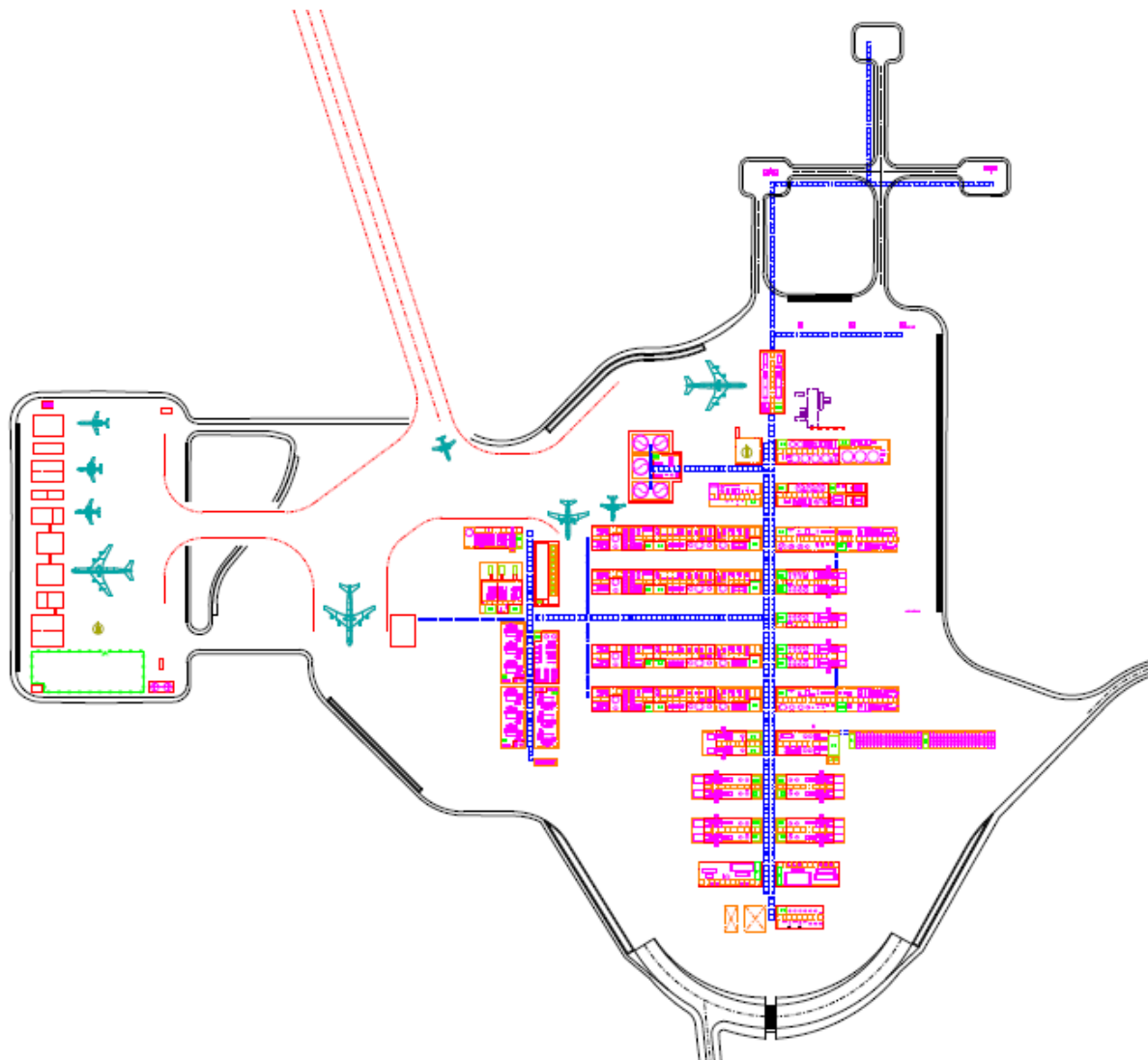
## *Fly-Over*





# Gas Treatment Plant

## *Plot Plan* (aircraft for scale only)



# Gas Treatment Plant *Construction Sequence*

**Fabrication Site**



**Module Loadout**



**Module Sealift**



**Final Location**



**Transportation to Site**

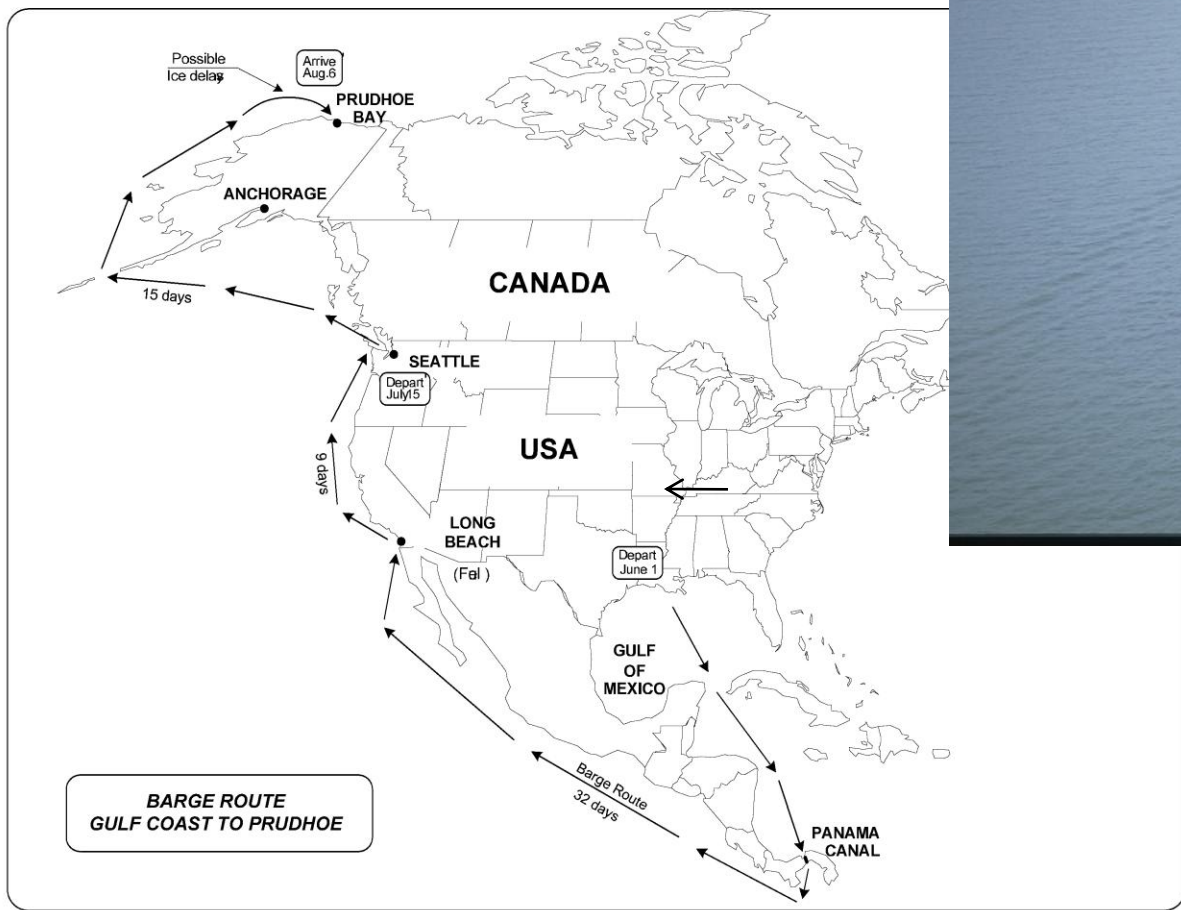


**Module Offload**



# Gas Treatment Plant

## *Sealifts - Gulf Coast to Prudhoe Bay*





# Gas Treatment Plant

## *The Largest of its Kind*

- 270,000 tons of modules (92)
  - Single heaviest module 8,200 tons
  - 137,000 tons of structural steel
- > 600,000 ft of pipe (50,000 tons)
- 2.5 MM cubic yards of gravel
- 250+ pressure vessels
- 230+ pumps and drivers
- 30+ compressors
- 850,000 horsepower
- 140 MW electrical
- Estimated job-hours:
  - 43 MM for module fabrication/assembly
  - 3.4 MM for North Slope installation
  - 5 MM for construction management services (L48 & NS)
  - 5 MM for engineering & procurement services





# Gas Treatment Plant *Summary*

- Mega-project – largest of its kind
- World-class team
- State-of-the-art design
- High quality Class 4 capital cost estimate - \$12.2 Billion (2009 Dollars)



# Mainline and Transmission Lines

## *Description*

- Transmission lines

- Prudhoe: 1 mile, 60"
- Point Thomson: 62 miles, 36"
- Conventional above ground pipelines

- Mainline

- 48", 2500 psi, buried
- Base design 4.5 BCFD annual average sales
- 6 compressor stations in Alaska, 15 overall
- Expandable to 5.6 BCFD with added compression
- 730 miles in Alaska; 1020 miles in Canada
- Terminus Blueberry Hill, Alberta



*2001 -2002 trenching trials*

- Multiple delivery points

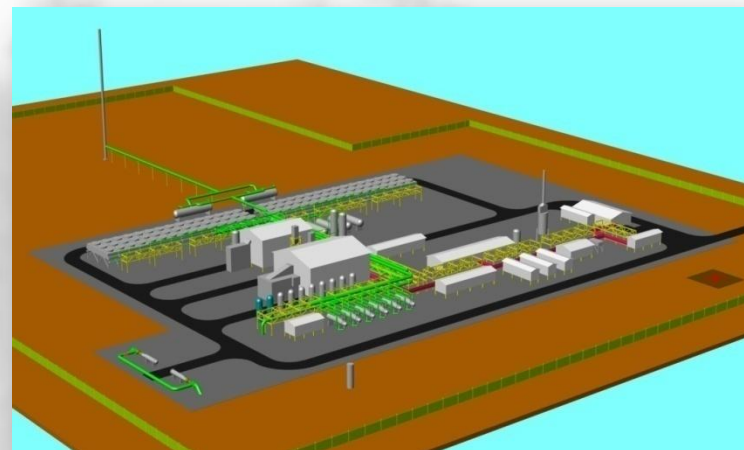
- Planning 6 delivery points in Alaska
- Planning 4 delivery points in Canada
- Additional delivery/receipt points possible based on shipper input

# Mainline Engineering

- Integration with GTP
- Route Engineering
  - Proprietary thermo/hydraulics
  - 12,000 boreholes
- Pipeline Design
- Compressor Station Design
- River Crossings
- Fault Crossings
- High Strength Steel
- Proprietary Geospatial System



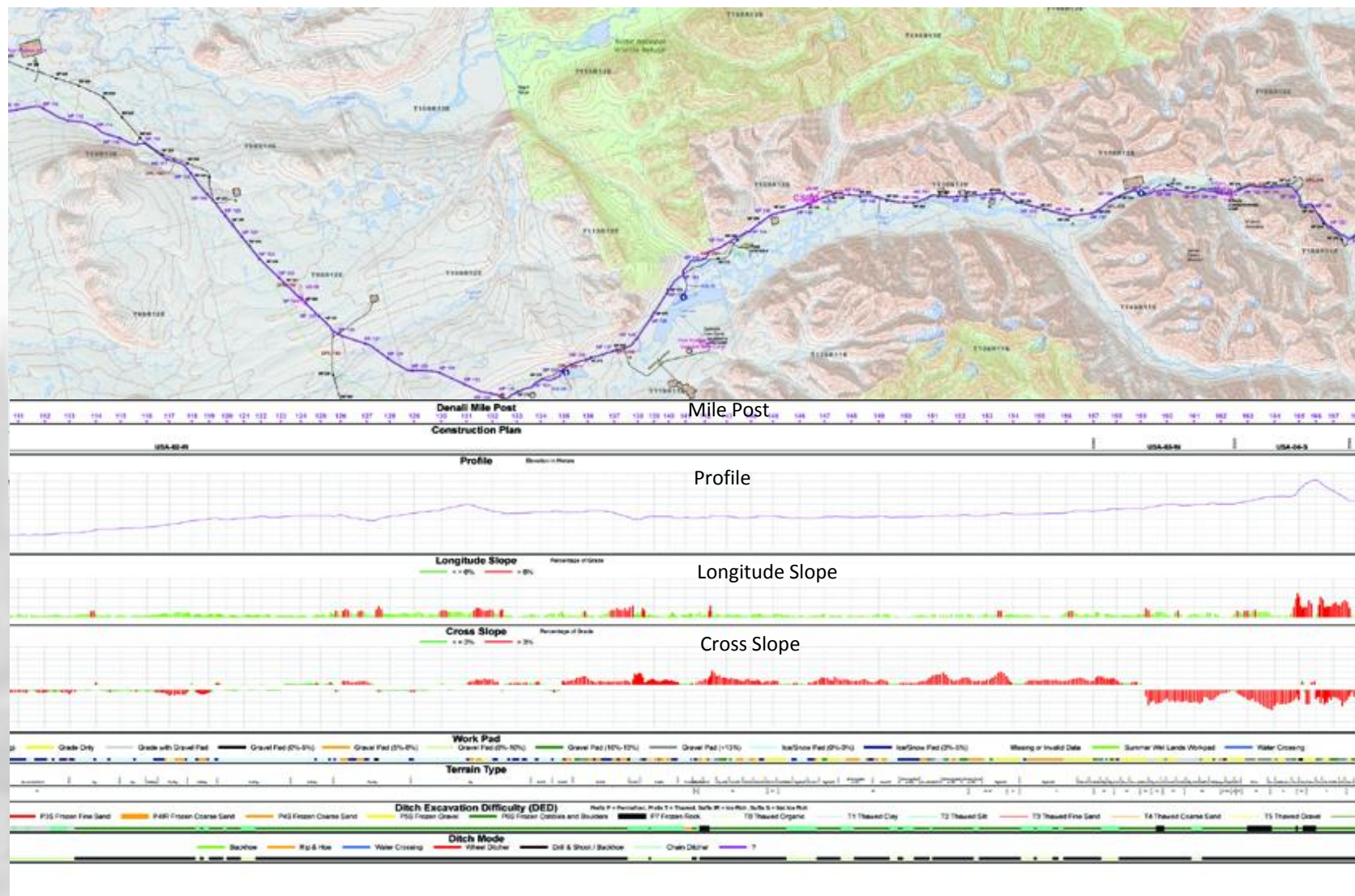
Aerial photo with proposed pipeline route



Schematic of refrigerated compressor station



# Mainline Route *Characterization and Alignment*





# Mainline Construction

## *Mega-Project*

ITEM	ALASKA	CANADA	TOTAL
Mainline block valves	38	52	90
Concrete weights	16,183	38,994	55,177
Major river crossings	22	59	81
Gravel Summary – Cubic Yards	10,439,274	10,124,278	20,563,552
Road, railroad, pipeline crossings – significant (total)	246 (752)	455 (920)	701 (1,672)
Crack arrestors	7,492	3,861	11,353
Pig launchers and receivers	7	11	18
Access Roads (miles)	49	231	280
Processed Bedding and Padding (Cubic Yards)	1,610,318	3,778,896	5,389,214
Pipe quantities (tons)	947,164	1,289,079	2,236,243

# Mainline Construction

## *Multiple Activities*

- Survey
- Access road
- Clearing
- Graded ROW
- Gravel work pad
- Frost packing
- Ice or snow pad
- Stringing
- Bend and set up
- Line up and weld
- AUT inspection
- Crack arrest
- Field coating
- Trenching
- Drill and shoot
- Hoe ditch
- Bedding/padding production
- Bedding
- Lower in
- Padding and backfill
- Stream and river crossing
- MLV installation
- Tie-in
- Clean up
- Restoration
- Camp move
- Construction support
- Contractor staff
- Denali inspection
- Clean, hydro-test and dry
- CS Fabrication
- CS construction

# Mainline Cost Estimate

## *Crew Method*

- Productivity benchmarking
- Lay rate assumptions
- Winter/summer season length
- Construction plan and schedule by season
- Terrain conditions
- Joint length
- Spread length



# Mainline Cost Estimate

## *Vendor Request for Information*

### **Mechanized Welding Equipment**

- RMS Welding Systems
- CRC Evans Automatic Welding
- SERIMAX North America
- Vermaat Technics, B.V.

### **Aut Contractors**

- Shaw Pipeline Services
- TEAM / AITEC
- UT Quality, Inc.
- Weldsonix, Inc
- RTD Quality Services
- RTD Pipeline Services USA, LP

### **Trenching Contractors**

- ARB, Inc
- H. L. Chapman Pipeline Construction
- Sheehan Pipeline Construction Co.
- US Pipeline, Inc.
- Welded Construction, L.P.
- ECC-VECO
- Snamprogetti Canada (Saipem)

### **Bending Equipment**

- CRC
- IPEC
- Worldwide Machinery

### **HDD Contractor**

- Direct Horizontal Drilling
- Laney Directional Drilling Co.
- Michels Corporation
- Southeast Directional Drilling

### **Trenching Manufacturers**

- Vermeer Manufacturing Co.
- Tesmec Usa, Inc.
- Rocksaw International, Inc
- Aztec Underground
- Trenchor, Inc.
- Mastenbroek, Ltd

### **Equipment Purchase And Rental Rates**

- Equipment Watch – Online Service
- Bechtel Pipeline Construction Group
- Caterpillar
- John Deere
- Komatsu
- Worldwide Machinery

### **US Pipeline Contractors**

#### **Pica (Union) Affiliated**

- ARB, Inc.
- Associated Pipe Line Contractors
- Price Gregory Construction, Inc
- Price Gregory International, Inc.
- Sheehan Pipeline Construction Co.
- US Pipeline, Inc.
- Welded Construction, L.P.
- AES-Houston Contracting Company
- Appalachian Pipeline Contractors,
- Henkels And Mccoy, Inc.
- Latex Construction Company
- Michels Corporation
- Minnesota Limited, Inc.
- Precision Pipeline, Llc
- Rockford Corporation
- Willbros Construction (US) LLC

#### **Non-union Affiliated**

- Rogers Phillips, Inc.
- Ledcor (Us)



# Mainline Cost Estimate

## *Vendor Request for Information*

### **US Civil Contractors**

#### **Union Affiliated**

- Ahtna Construction
- Alaska Frontier Constructors
- Brice Companies
- Cruz Construction
- Granite Construction
- Great Northwest Inc
- Quality Asphalt Paving
- Kiewit Pacific Company
- Goodfellow Bros., Inc.

### **US Civil Contractors**

#### **Non-union Affiliated**

- ASRC Energy Services, Inc.
- Conam Construction Company
- Peak Oilfield Service Company
- AES-Houston Contracting
- Alaska Interstate Construction, LLC
- Brice Companies
- Cruz Construction
- Peak Oilfield Service Company
- Alaska Frontier Constructors/Nanuq

### **Canadian Pipeline Contractors**

- Ledcor Pipeline, Ltd
- Robert B. Somerville Co., Ltd.
- North American Construction Group
- OJ Pipelines
- Waschuk Pipeline Construction, Ltd.
- Willbros Canada
- Banister/Louisbourg Group
- Michels Canada Company
- Aecon Civil And Utilities Group

### **Canadian Civil Contractors**

- Ledcor Pipeline, Ltd.
- North American Construction Grp, .
- Flint Energy Services, Ltd.
- PCL Constructors
- Graham Industrial
- Peter Kiewit Sons
- Stuart Olson
- Sureway Construction
- Voice Construction
- Aecon Civil and Utilities Group



# Mainline Cost Estimate

## *Material Vendor Quotes*

### **Mainline Pipe**

- Sumitomo
- JFE
- Nippon
- Europipe
- Welspun

### **Pipeline Compressors**

- General Electric

### **Air Cooler Heat Exchangers**

- Hudson

### **GTG**

- Solar Turbines

### **Heavy Wall Vessels**

- ATB
- Cessco
- Dacro
- Daekyung
- HICO
- IPS
- Taylor Forge

### **Glycol Heaters**

- BIH
- HRC
- Pig Launcher
- TD Williamson

### **Propane Refrigeration Package**

- Solar Turbines (Elliott compressor)
- General Electric

### **HP Chillers**

- Koch Italy
- Hughes Anderson

### **Light Wall Vessels**

- Custom Fab
- Hanover
- Melloy
- Lisung
- HICO

### **Buildings**

- CH2M Hill
- ASRC
- Tarpon
- Brytex Bldg.

### **Custody Meter System**

- Daniel

### **Diesel Engineering Generator Sets**

- NC Power Systems Co.

### **Fuel Gas Conditioning Skid**

- Cobey

### **Oil Handling and Storage Skids**

- Cobey

### **Instrument Air Compressor Packages**

- Atlas Copco

### **Flare Stack**

- Callidus

### **SCADA**

- Bechtel Historical

### **Telecommunication**

- AT&T
- GCI

# Atigun Pass Fly-Through





# Mainline Cost Estimate *Summary*

- Non-factored
- Resource loaded
- Construction modes defined
- Equipment loaded
- Quantity based
- Mile by mile design
- Current industry cost and productivity inputs were benchmarked
- World class team - major US and Canadian pipeline construction contractors integrated into project team
- High quality Class 4 capital cost estimate - \$22.9 Billion (2009 Dollars)
  - \$10.4 billion in Alaska
  - \$12.5 billion in Canada



# Commercial Offer

(All costs in 2009 \$)

- High quality Class 4\* cost estimate – \$35 billion
- Estimated rate GTP to Alberta \$2.67/MMBtu (excluding fuel)

## Cost and Rate Summary

	GTP	Alaska Mainline	Canada Mainline	Total
Cost, \$billions	12.2	10.4	12.5	35
Rate, \$/MMBtu	0.90	0.80	0.97	2.67

## • Denali offering multiple services

- Prudhoe Bay and Point Thomson transmission lines (0.4¢, 26¢/MMBtu)
- Unbundled GTP services; treated gas for North Slope use
- Distance sensitive rates for in-state deliveries

GTP Services	
Treating \$/MMBtu	0.67
Compression \$/MMBtu	0.23

In-State Deliveries (Pipeline only)	
Fairbanks \$/MMBtu	0.50
Delta Junction \$/MMBtu	0.59

\* Association for the Advancement of Cost Engineering International

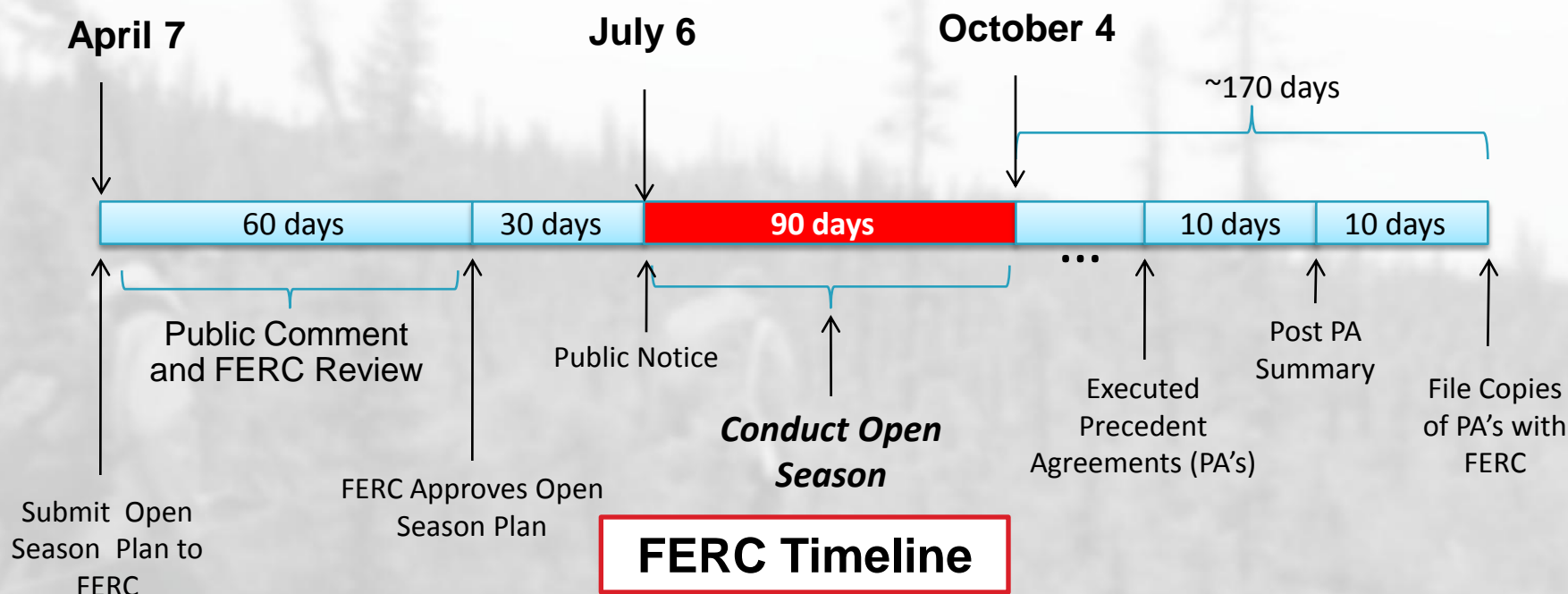
# Key Terms

- **Key Foundation Shipper qualifications**
  - Meet credit worthiness standards
  - Execute precedent agreement—minimum term 20 years
  - No minimum volume requirement
  - Denali terms encourage smaller leaseholders, State, explorers, end users to participate in open season
- **Foundation Shipper benefits**
  - 5 year extension option
  - Negotiated, levelized rates
  - “Most favored nation” clause
  - Recognition of project uncertainty - decision points as new information is developed
- **Depreciation over 25 years**
  - Denali taking risk that remaining 20% of capital can be recovered from late life shippers
  - Unrecovered depreciation recouped over remaining life
- **Responsive to shipper concerns**
  - Denali will not require existing shippers to subsidize expansion shippers
  - Willing to consider project alternatives (e.g., reduced capacity project, LNG pipeline)



# Open Season

- Open season provides:
  - Open access to capacity on the pipeline
  - Customer/transporter negotiations
  - Binding commitments for the next steps in project development
- Overseen by the FERC in the U.S. and by the NEB in Canada
- Simultaneous open season process in Canada



# Key Elements for Success

- Cost and schedule management
- Defined regulatory processes
- Commercial agreements with customers
- ❑ Resolution of stakeholder interests
- ❑ Attractive financing
- ❑ Resolution of State of Alaska issues
  - Resource uncertainty
  - Fiscal terms
- ❑ Natural gas market outlook

# Summary

- Denali's Open Season Plan approved by FERC
- Denali's open season scheduled to begin July 6, 2010
- Quality cost estimate and execution plan to provide customer confidence
- Attractive commercial terms designed to recognize risks
- Open season results should signal market's assessment of Alaska North Slope gas competitiveness
- Next steps will be determined by level of customer support



For additional information, please visit:

[www.denalipipeline.com](http://www.denalipipeline.com)

. . . and sign up to receive email updates