Nenana Basin Update
Oil and Gas Exploration

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Resource Development Council of Alaska
January 18, 2018
Today’s Topics

• Exploration overview
  • Heritage, recent and planned
• Land Tenure
  • State leases, MHT lease and Doyon ANCSA lands
• Doyon objectives
• Exploration team
• Partners/Investors
• What we know about the basin and remaining geologic risks
• Winter 2017 3D seismic results
• Drilling-Summer 2018
• Commercial Options
Exploration Of Nenana Basin Pre-2005
Doyon Nunivak #2 and Sidetrack 2013
Doyon Exploration and Development Rights

• 240,000 acres State of Alaska oil and gas leases (Doyon lessee)
• 40,000 acres Doyon ANCSA lands
  • Doyon subsurface (oil and gas)
  • Toghotthele Corporation surface
• 9,500 acres Mental Health Trust lease
Doyon Objectives

More reasons to make Nenana work

- Investment profits from oil and gas production
  - State, MHT and Doyon lands
- New markets for Doyon oil field support companies
- New Doyon investments
  - Propane to villages? Power generation into Grid? Pipeline ownership?
- Shareholder and local hire and training
- New opportunities for local businesses
Current Investors

Direct:
- Doyon, Limited
  - Managing partner or “operator”
- CIRI Energy LLC

Indirect:
- State of Alaska
  - Via exploration incentive credits
    - Diminishing role
Doyon Exploration Team

- **Geoscience and Economic Evaluation**
  - Petrotechnical Resources Alaska
    - Pete Stokes, Gerry Van Kooten, Jon Konkler, Mike Helton
    - International Reservoir Technology

- **Drilling**
  - Fairweather
    - Tim Flynn, David Ross, Justin Shields

- **Permitting and Civil Engineering**
  - Owl Ridge NRC
    - Glenn Ruckhaus
  - ReCon
    - Steve and Isaac Rowland

- **Senior Advisor**
  - Michael Richter
Petroleum System Requirements

- **Source rocks** generate oil/gas at the right temperature
- **Expulsion and Migration** (movement updip) of oil and gas
- **Reservoir rocks** with porosity and permeability for storage
- **Traps** capture hydrocarbons and seals prevent escape
- **Timing** of migration and trap formation
What Do We Know Today?

*From seismic, drilling and other studies through 2016*

**We have:**

- Excellent **source rocks** and high temperatures at depth
  - coals, coaly shale yield both oil and thermogenic gas in wells and lab
- Source rock **expulsion and migration**
  - Oil/gas shows in 3 wells indicate hydrocarbon movement
- Outstanding **reservoir sands** are thick and widespread
- Well defined structural **traps** are visible on seismic

**But trap risks remain**

- Recent basin structural movement
  - N#2: Trap breached $\rightarrow$ gas leaked off
  - Tog#1: Trap formation shut off generation and migration $\rightarrow$ structure is dry
Trap Risk Reduction

• Move north in basin
  • Less structural movement
  • Adjacent to basin “kitchen”
    • Hydrocarbon generation today
    • Less distance to migrate to traps

• Look for Direct Hydrocarbon Indicators (DHIs) on seismic
  • Direct evidence of trapped gas and/or light oil
    • Amplitude anomalies
  • Though no guarantee of commercial success

• North basin campaigns:
  • 2016 2D seismic (DHIs) and 2017 3D
Winter 2017 Seismic

- 64 square mile 3D survey
- 5 potential drill prospects identified
- Totchaket East prospect ranked highest
- Recommendation:
  - Summer 2018—drill Totchaket #1
  - Part Doyon, part State lease
More 2017 3D Seismic

• Within “Totch East” we have
  • Direct Hydrocarbon Indicators (DHIs)--all targets zones
  • 3 “stacked” oil targets
  • 4 “stacked” gas targets (include the 3 oil targets)
• Other 4 prospect areas
  • DHIs
  • All on Doyon State leases to west
  • Multi-year drilling inventory if Tochaket #1 works for oil
3D Seismic: Stratigraphic Picks & Stacked Reservoir Targets

Prospective sands in the Healy Creek

Grubstake?
Sanctuary
Near Top Healy Creek
Mid Healy Creek
Healy Creek
Healy Creek Deep?
Lignite?
Totchaket #1 Drilling Summary

• Well sanctioned to drill summer 2018
• Drill pad on Toghotthele Corporation surface
• Nabors Rig 105
• Hit all promising zones
• Well depth ~13,000 ft.
Schedule Overview

Winter construction: Jan-March 2018
• Access via snow/ice road
• Build drill pad, barge landing and connector road, set conductor pipe
  • Tog-Mid-State JV
• Move rig other items to pad, as available

Summer drilling: Late May-October 2018
• Mobilize to pad
• All support by barge/crew boat fleet ~20 mi. run each way
• Main personnel camp in Nenana area

Overall
• Schedule maximizes opportunities to test all productive zones
**Totchaket East Location**

*Development Advantages*

**Adjacent to Existing:**
- Roads
- Rail
- High-line power

**Advantages:**
- Shorter development lead time
- Lower costs
- No Nenana River bridge needed now

**Future needs:**
- Pipeline to FBX/NP or TAPS PS 7 (~50-60 miles)
- All-season road to Parks Highway (~10 miles)
Oil Drives Nenana Exploration, not Gas

- Financial returns far greater for oil
  - More valuable commodity
  - No market limits—space available in TAPS
- No available gas markets
  - We assume no Doyon gas into Fairbanks
  - IGU/FNG/AIDEA commitments to LNG by truck
    - But we could beat FNG/IGU city gate price
- Other possible gas options
  - New life with AGDC export line--unattractive sales price
  - Propane sales--not stand alone
  - Power gen into grid? Sales volume dependent
Commercial Options & Risk Factors

Oil
- TAPS (PS 7 or NP)
- Petro Star Refineries
- Feeder pipeline
- Truck
- Rail

Gas
- Power gen at Nenana
- Propane
- Fairbanks
- ?
- Export

Risk Factors
- Lower risk
- Moderate risk
- Higher risk
Production Start-up Windows

*Commercial discovery summer 2018*

**OIL**
- Production via pipe 2023-2025
- Earlier production via truck or rail
- Economics work at $50/bbl oil

**GAS**
- Production via pipe 2022-2024, if we are wrong about Fairbanks
- Economics work at $12-$15 mcf at city gate
Questions?