Nenana Basin Update
Oil and Gas Exploration

Doyon, Limited

James Mery

SVP Lands & Natural Resources

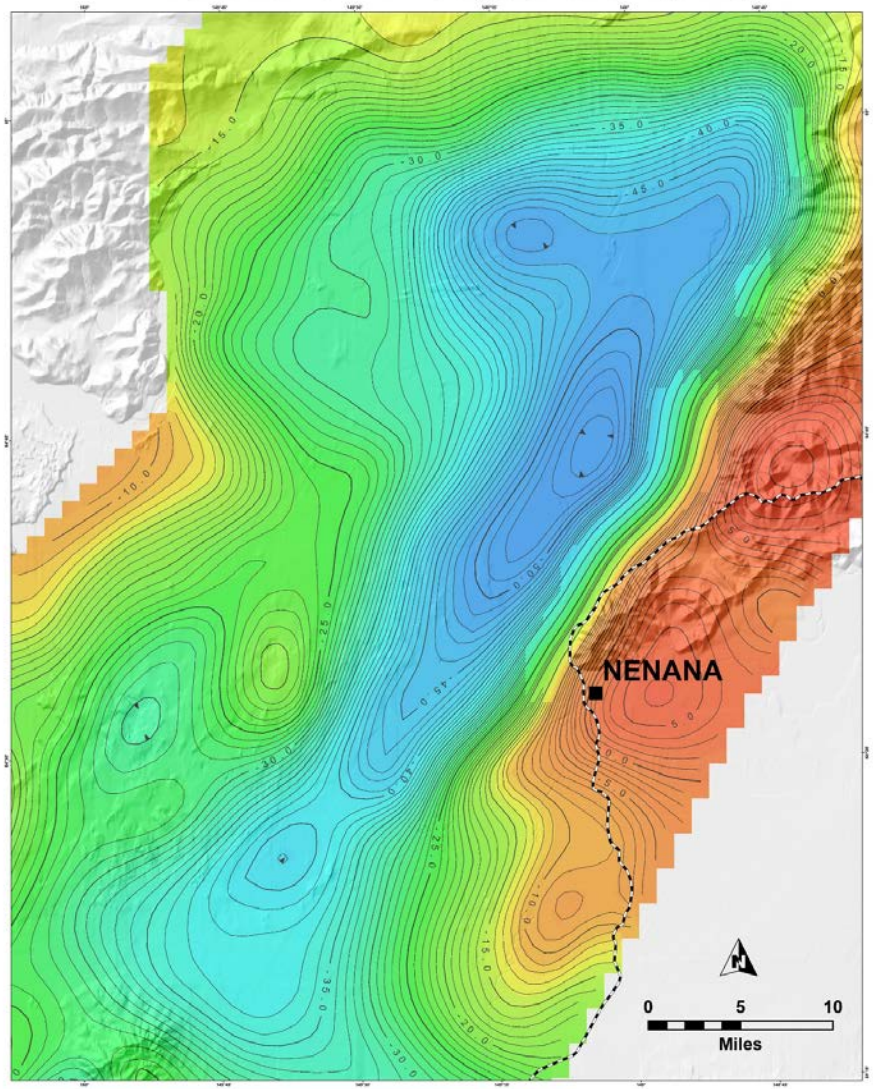
Resource Development Council of Alaska

January 18, 2018

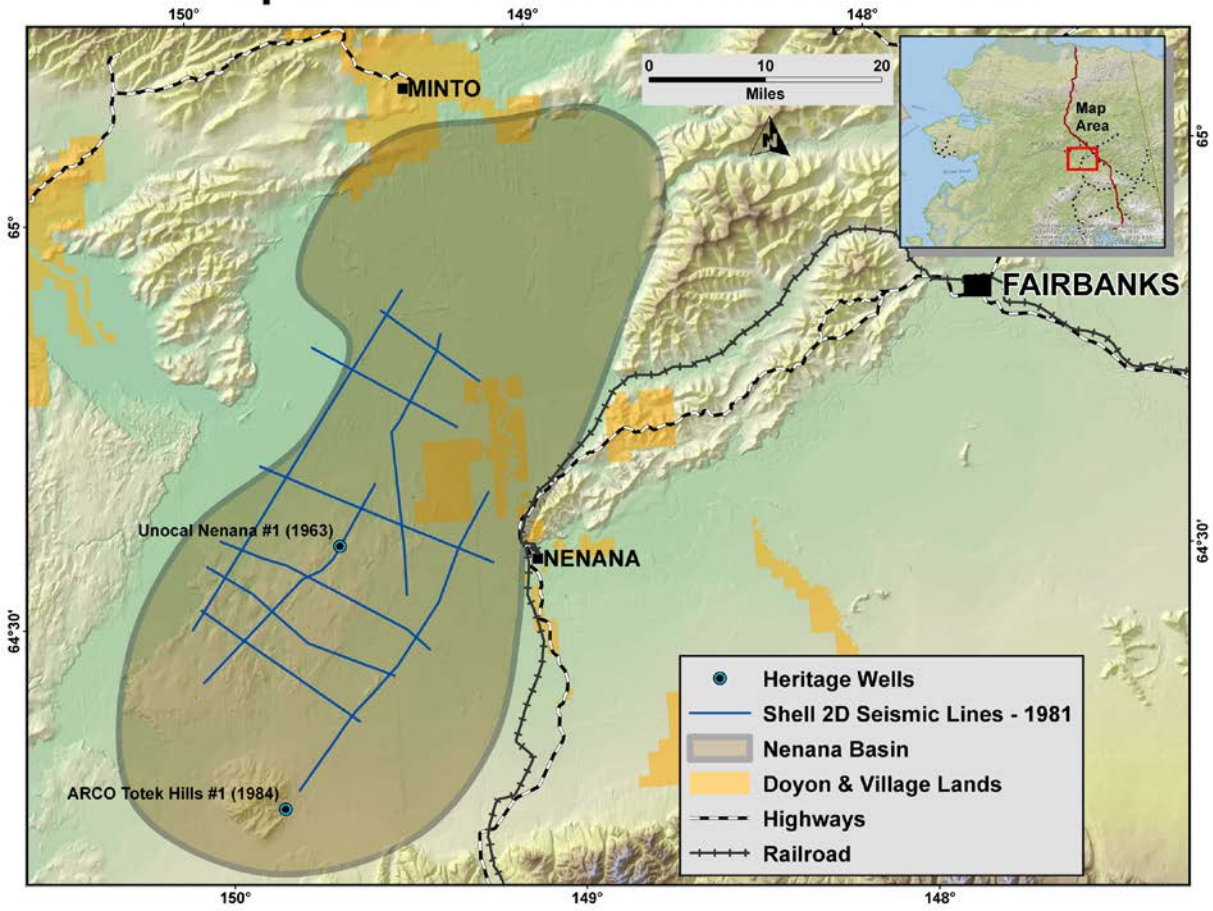
Today's Topics

- 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

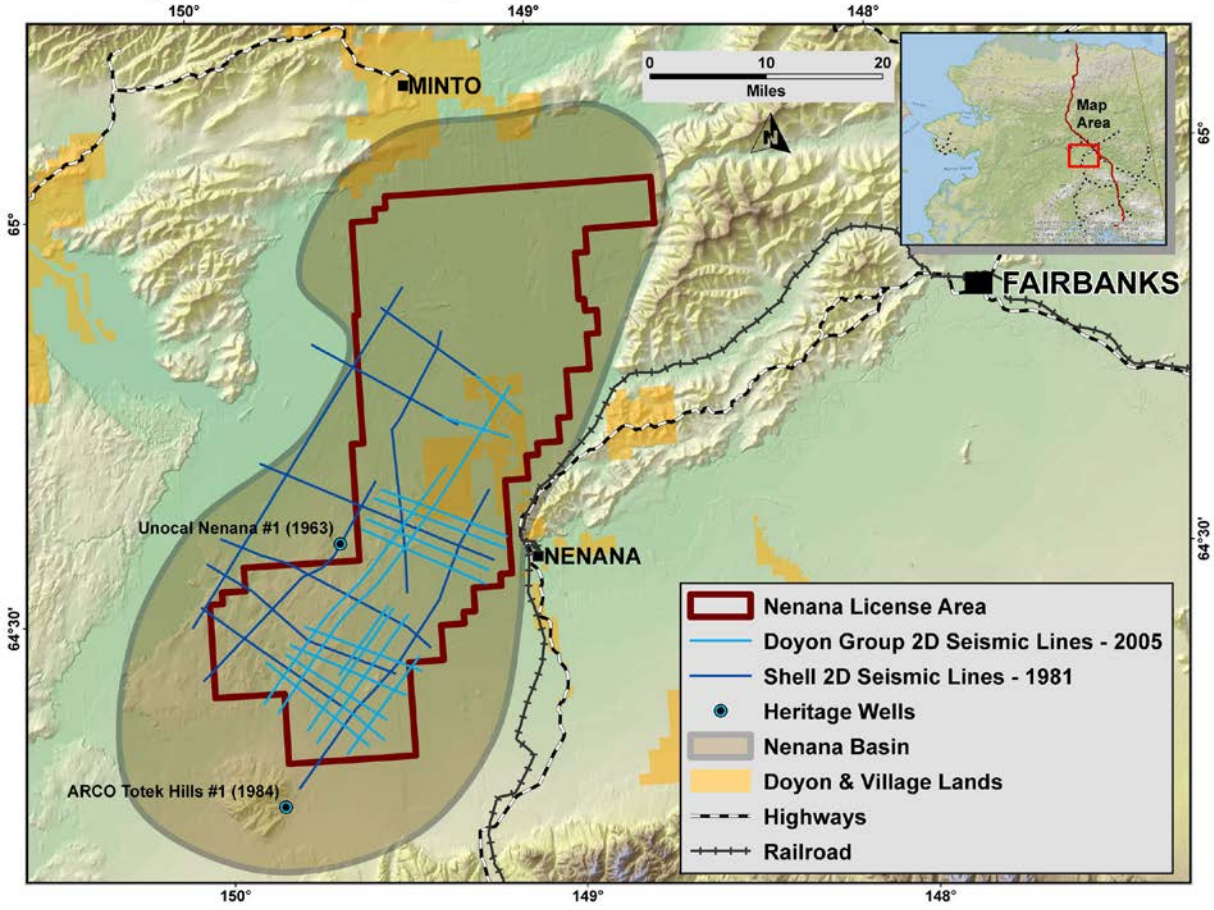
Nenana Basin Bouguer Gravity Map



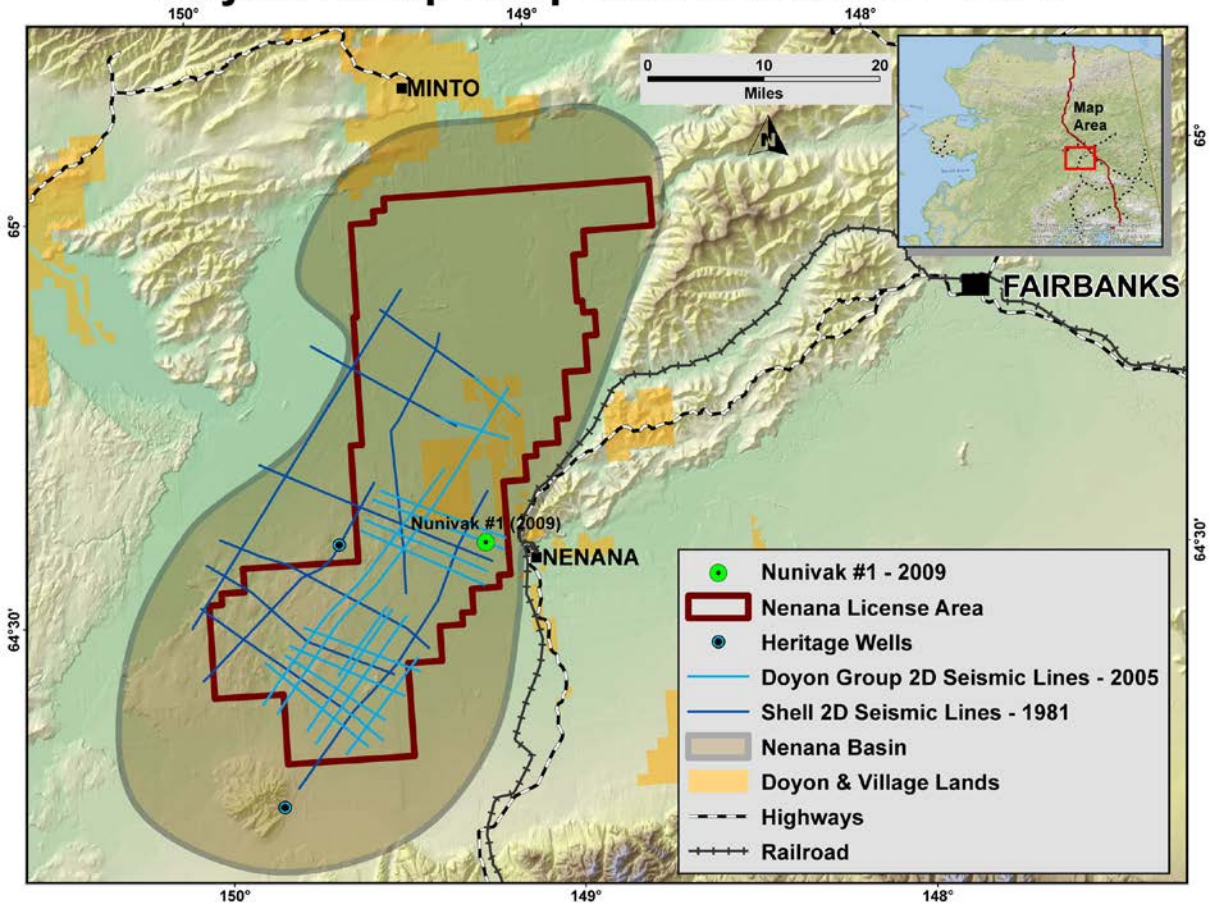
Exploration Of Nenana Basin Pre-2005



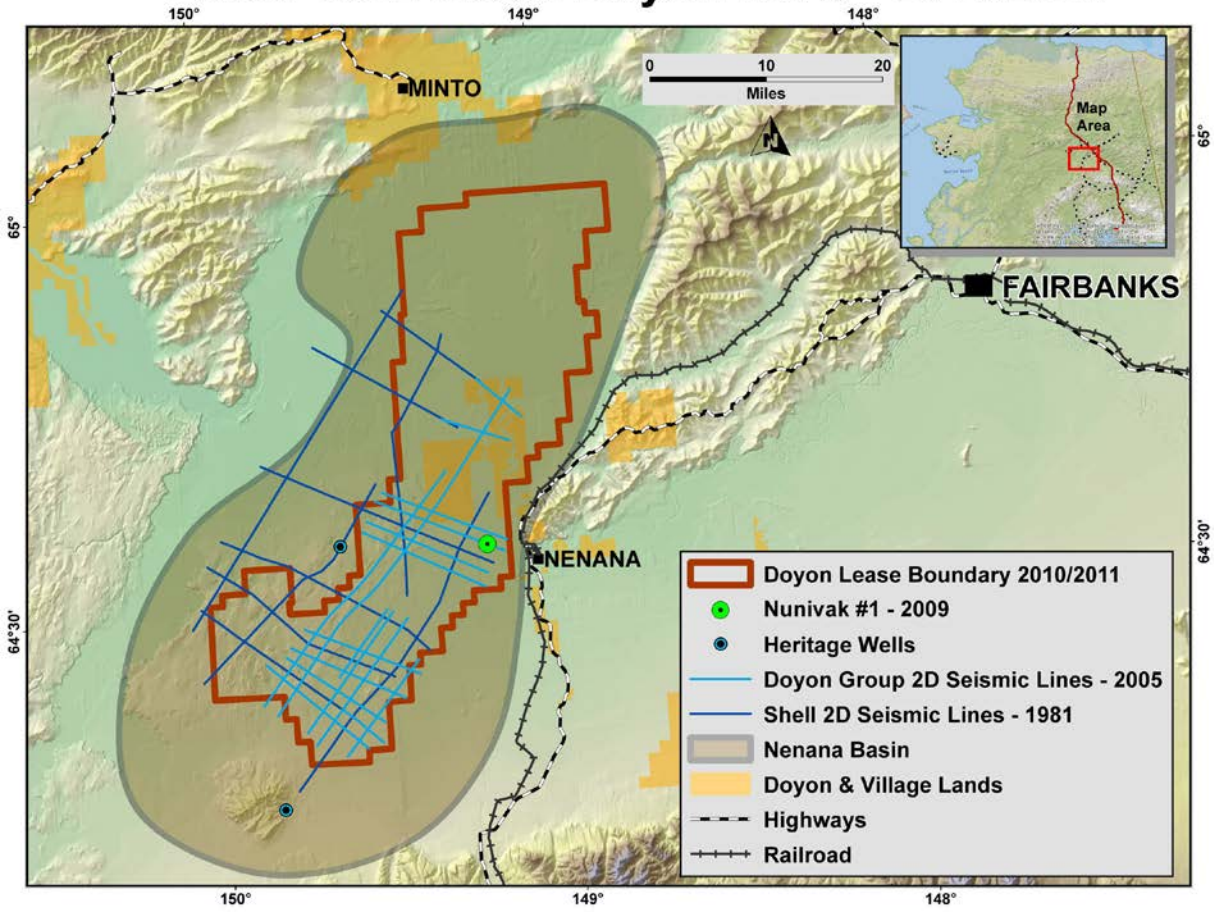
Doyon Group Exploration Of Nenana Basin 2005



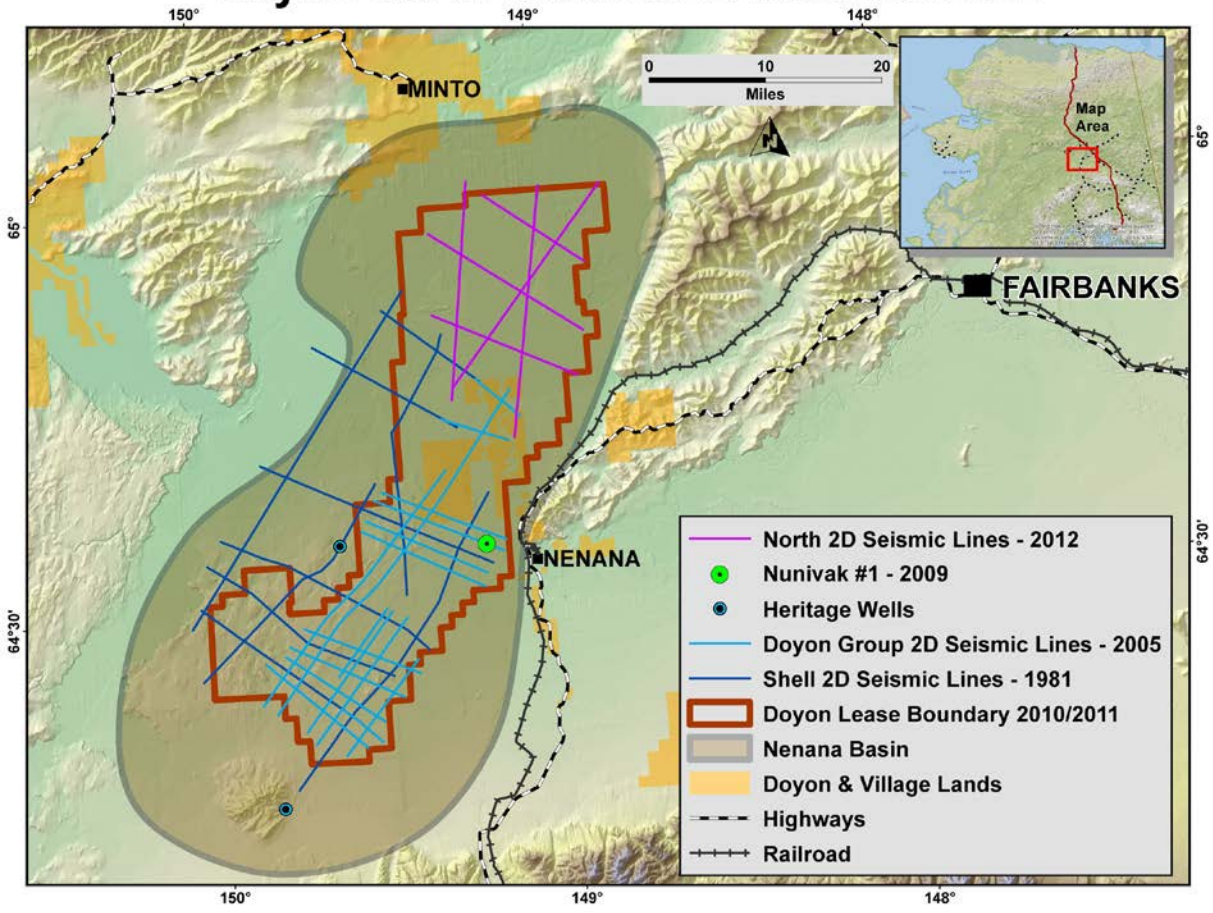
Doyon Group Deep Well Nunivak #1 2009



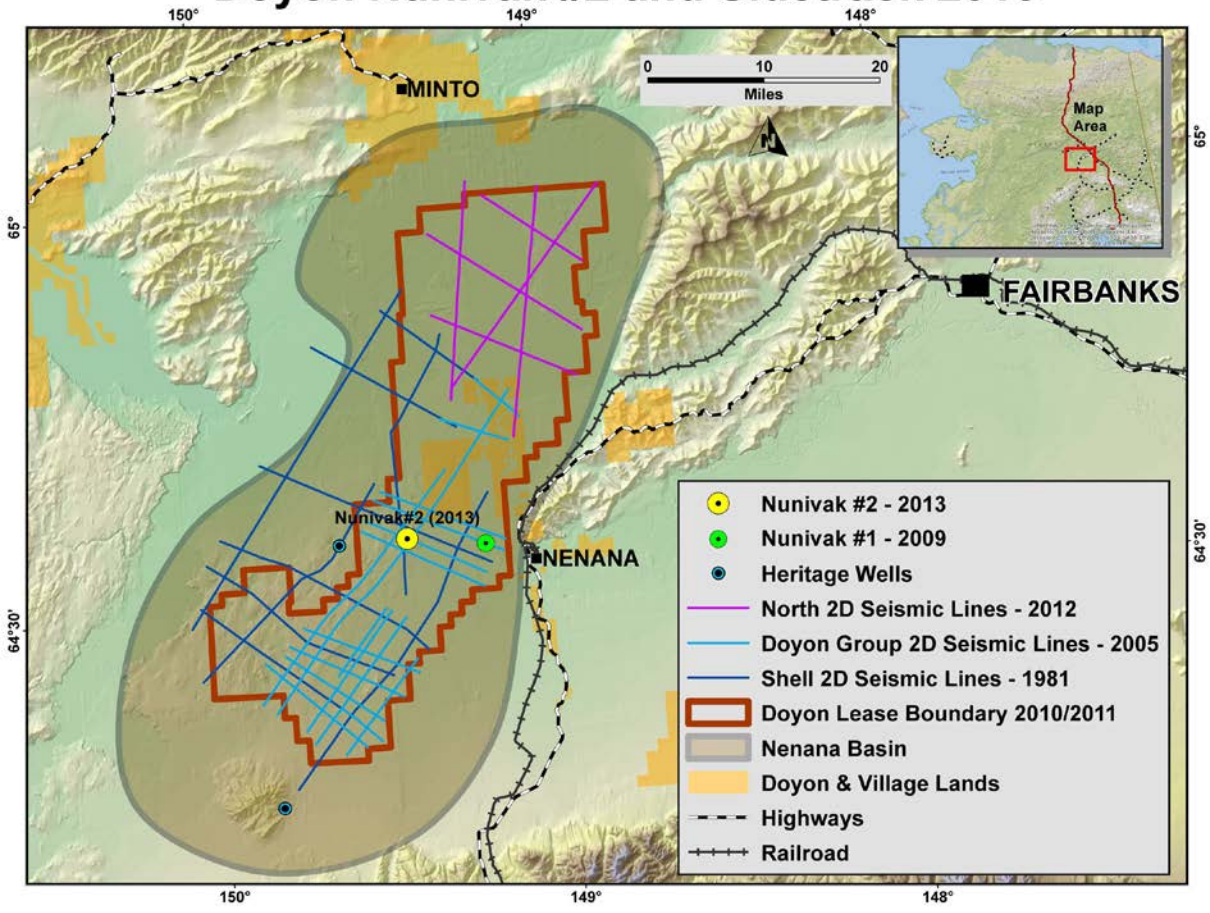
Lease Conversion Doyon 100% - 2010/2011



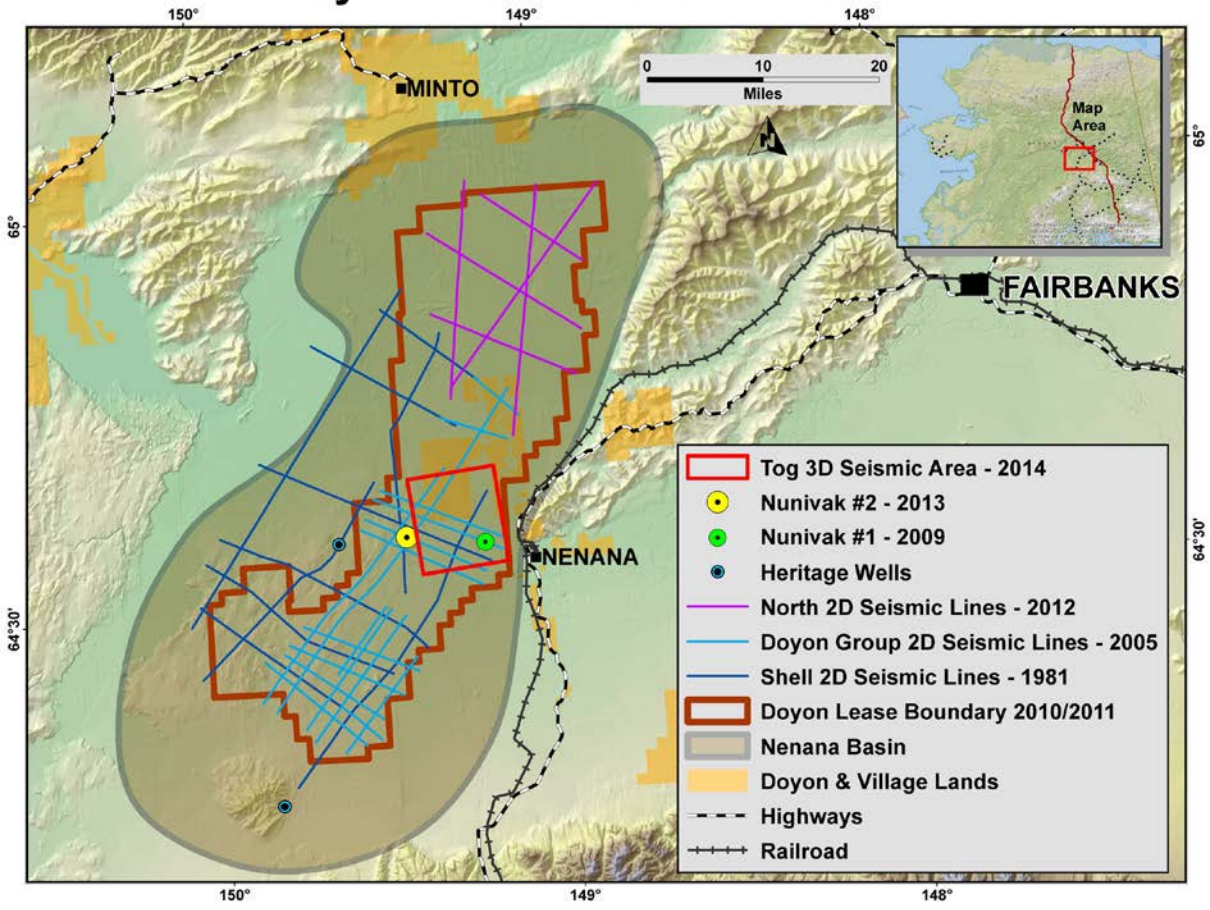
Doyon North Nenana 2D Seismic 2012



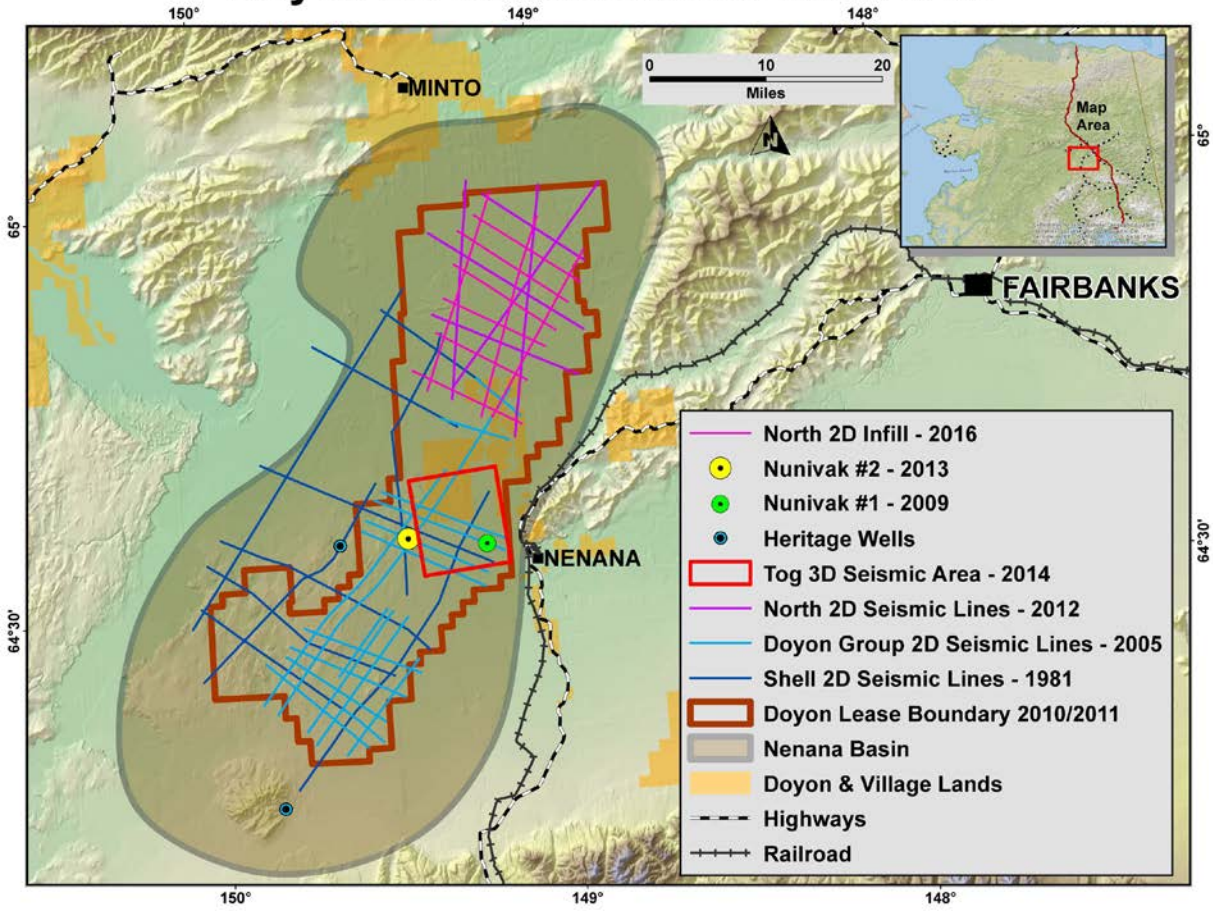
Doyon Nunivak #2 and Sidetrack 2013



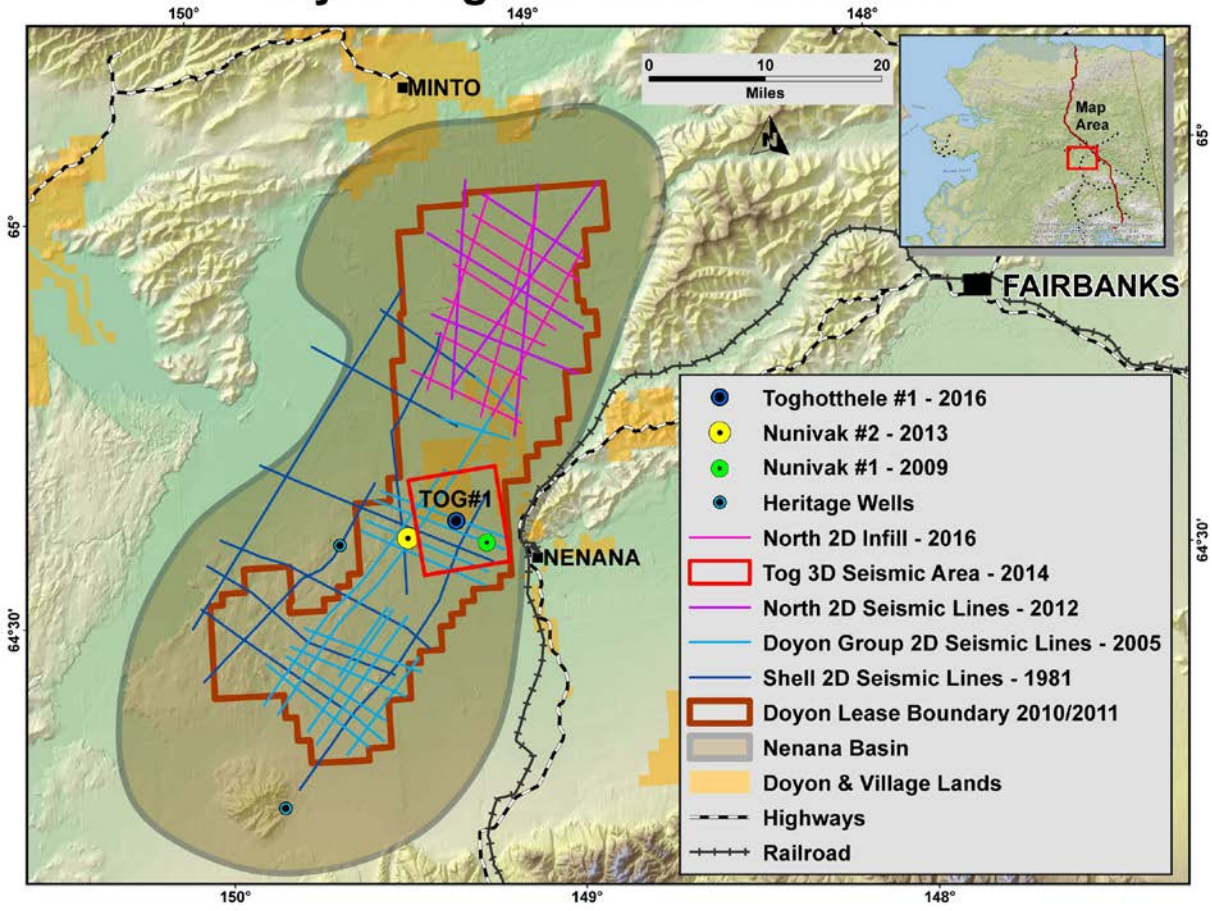
Doyon TOG 3D Seismic 2014



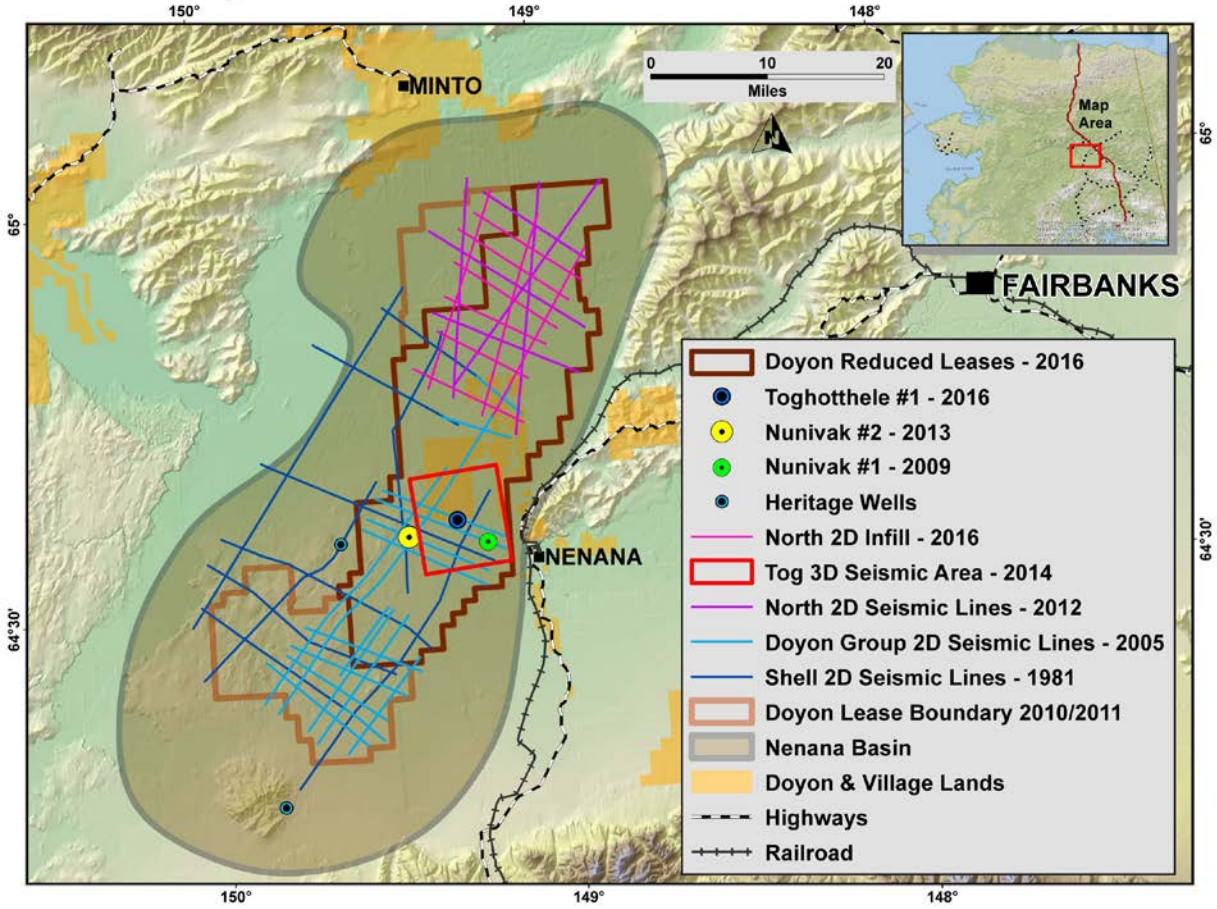
Doyon 2D North Seismic Infill 2016



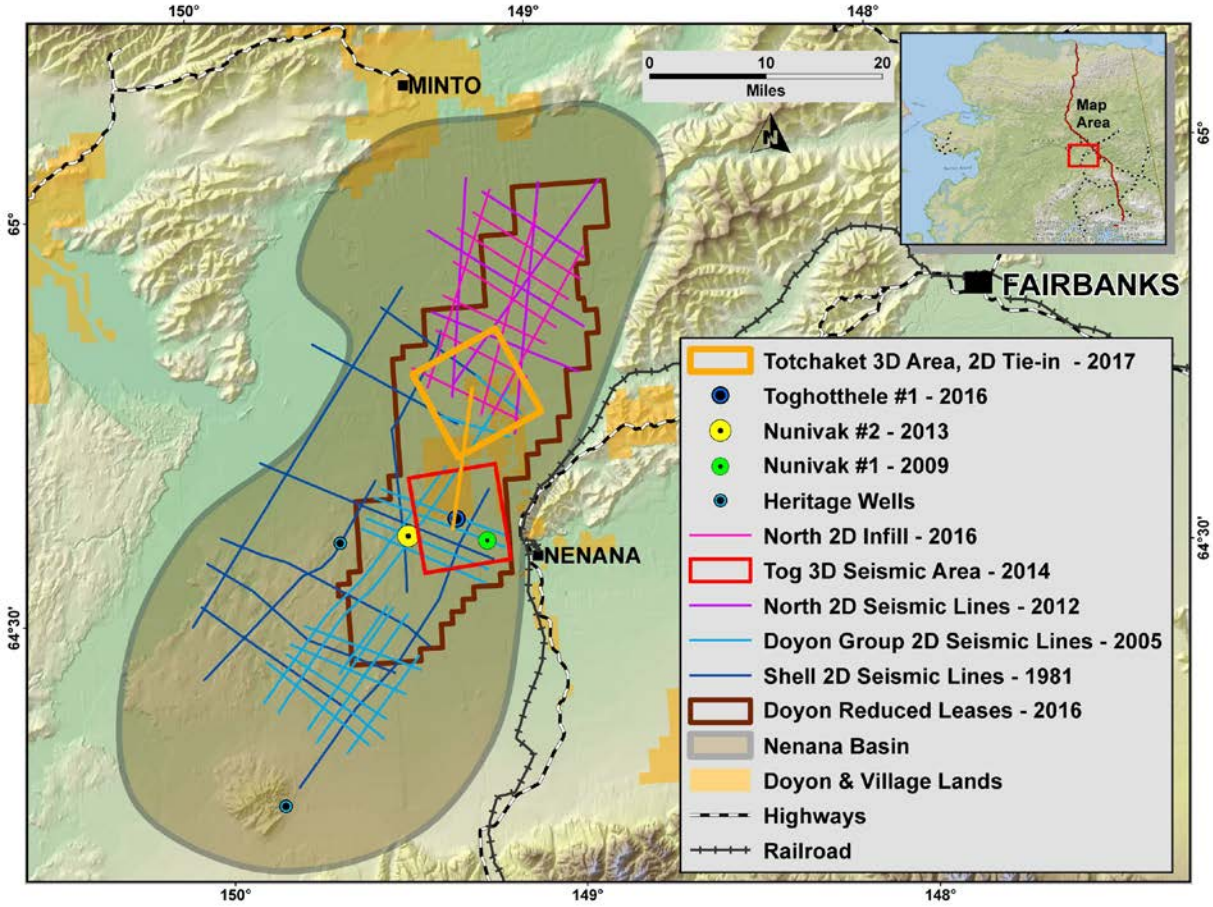
Doyon Toghotthele #1 Well 2016



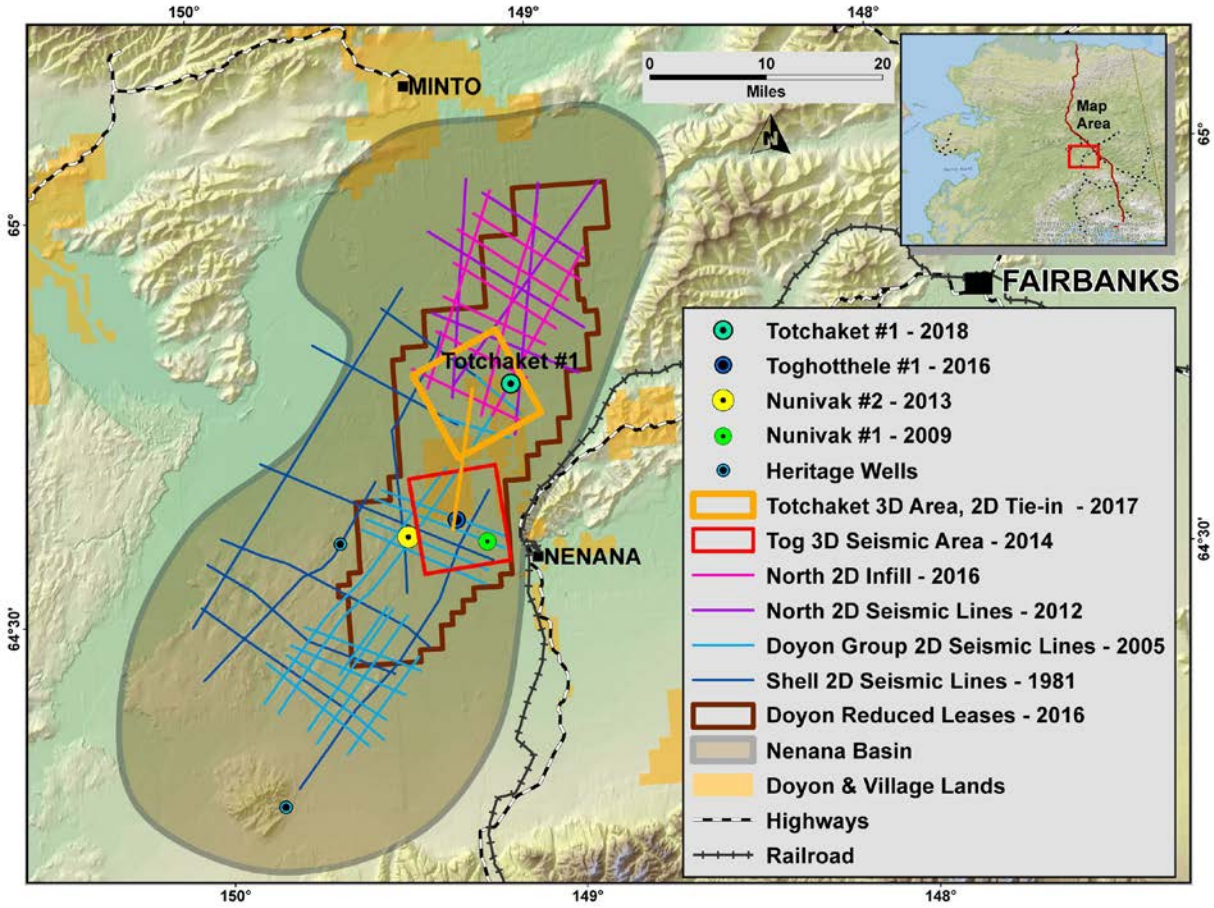
Doyon State O&G Leases Reduction 2016



Totchaket 3D Seismic 2017



Totchaket #1 Well 2018



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:

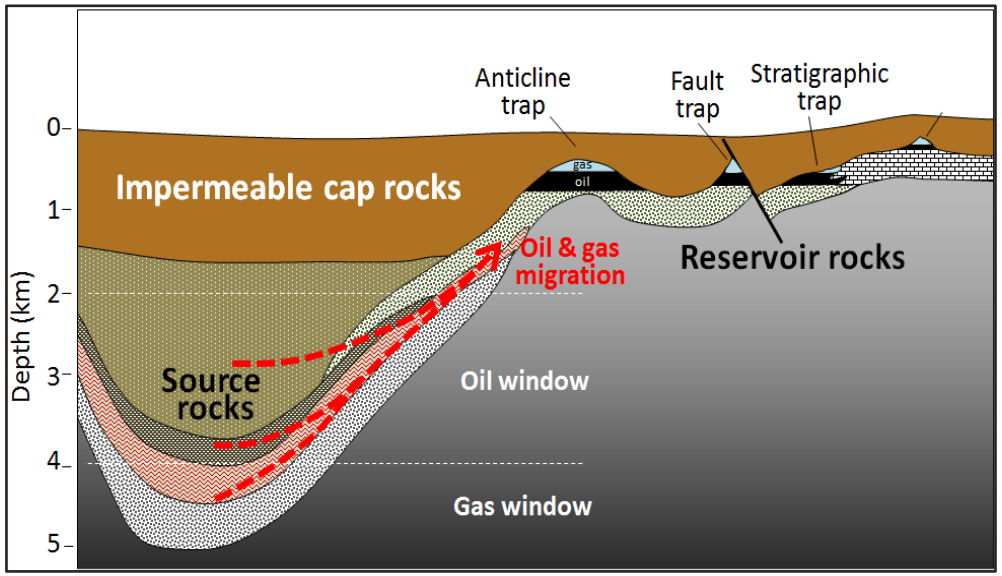
- State of Alaska
  - Via exploration incentive credits
    - Diminishing role

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

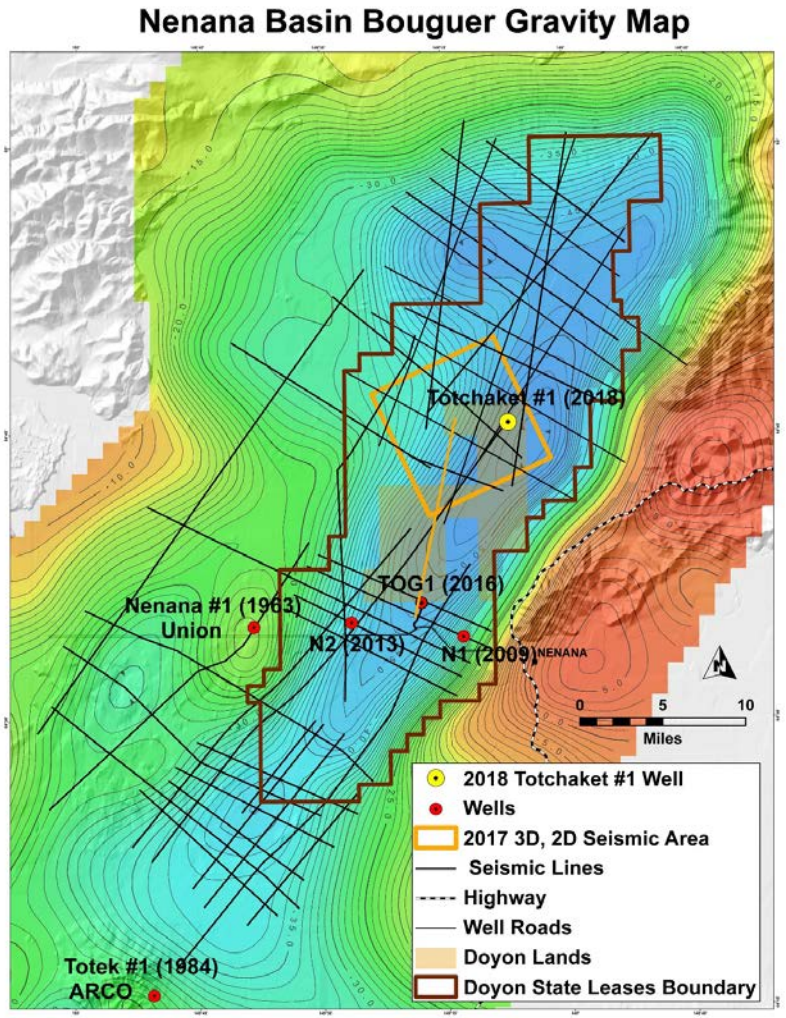
- *Recent* basin structural movement
  - N#2: Trap breached → gas leaked off
  - Tog#1: Trap formation shut off generation and migration→ structure is dry

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

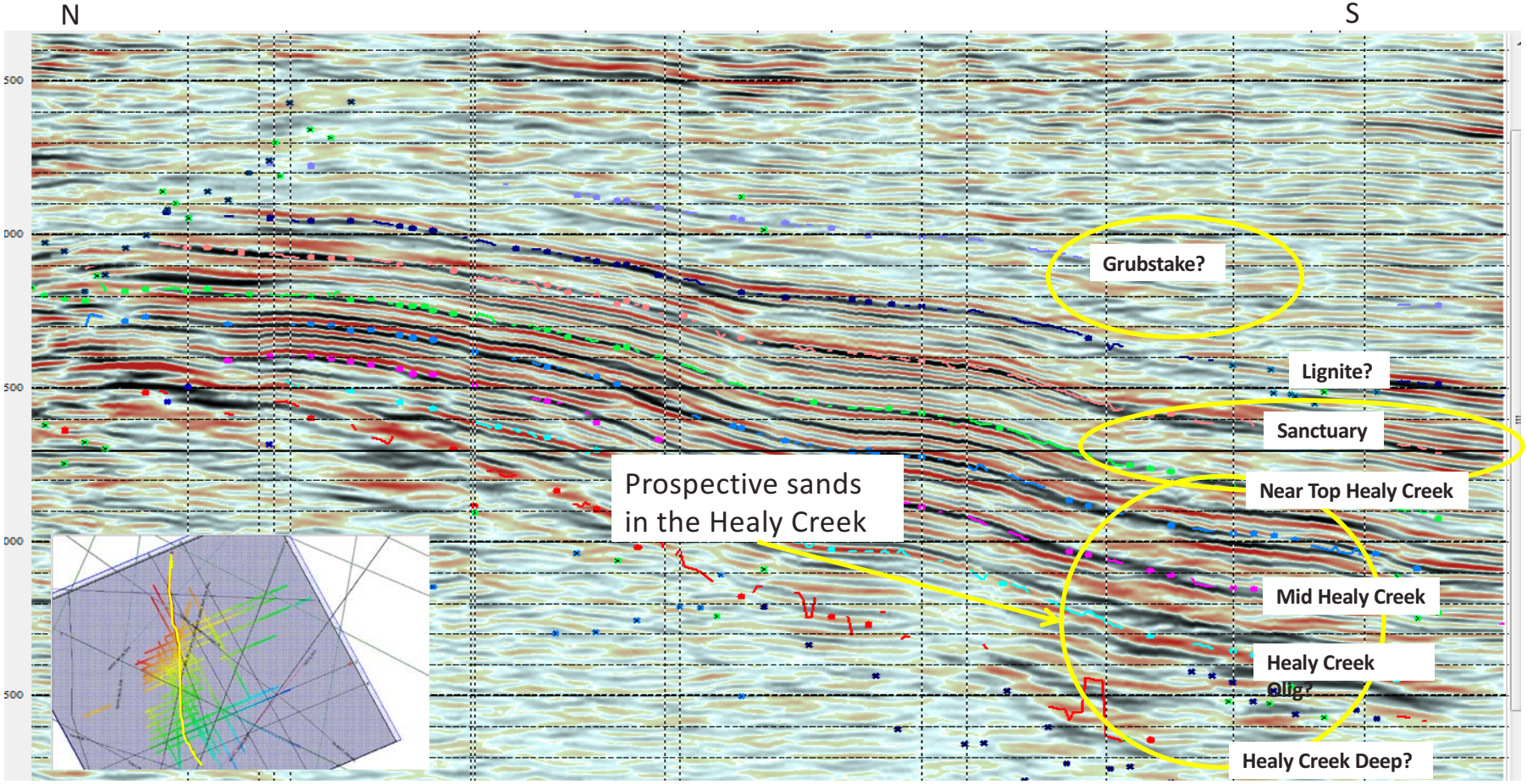
- 64 square mile 3D survey
- 5 potential drill prospects identified
- Totchaket East prospect ranked highest
- Recommendation:
  - Summer 2018—drill Totchaket #1
  - Part Doyon, part State lease



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



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

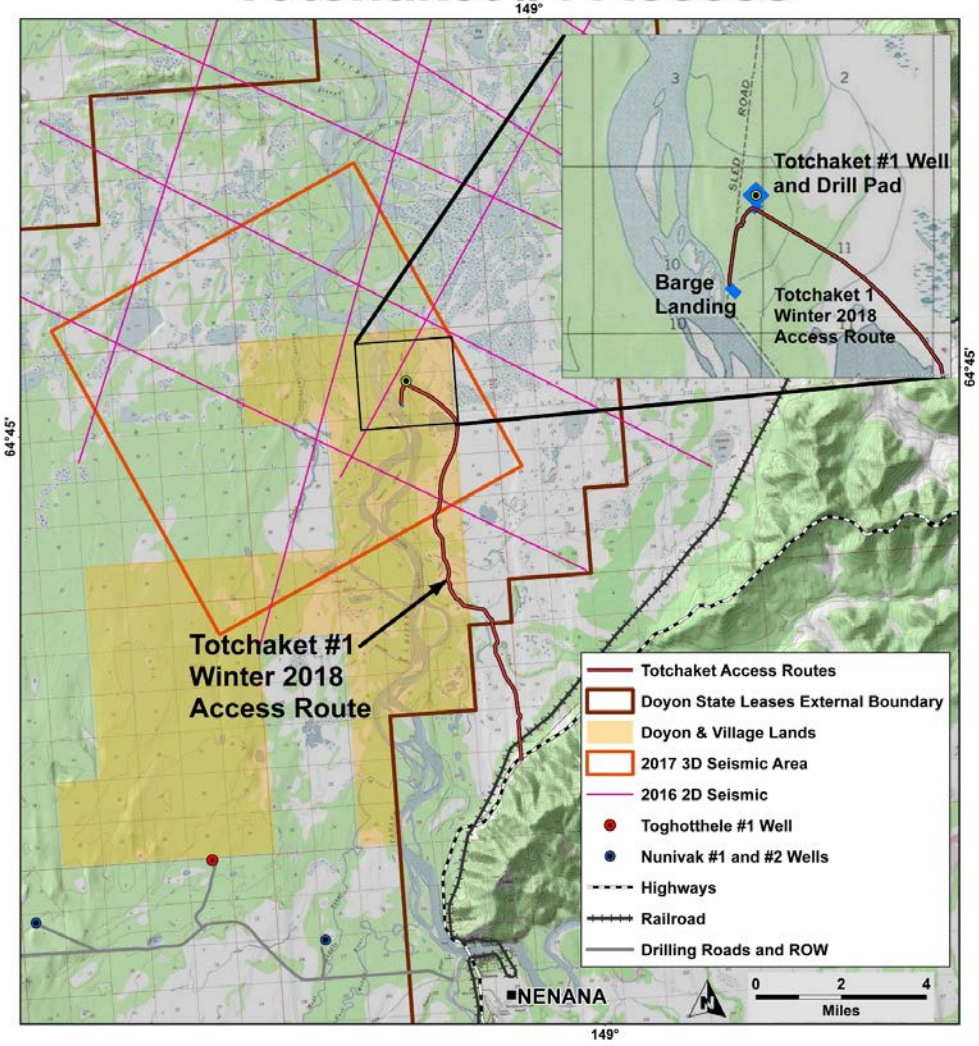
Summer drilling: Late May-October 2018

- 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 #1 Access



Totchaket East Location

Development Advantages

Adjacent to Existing:

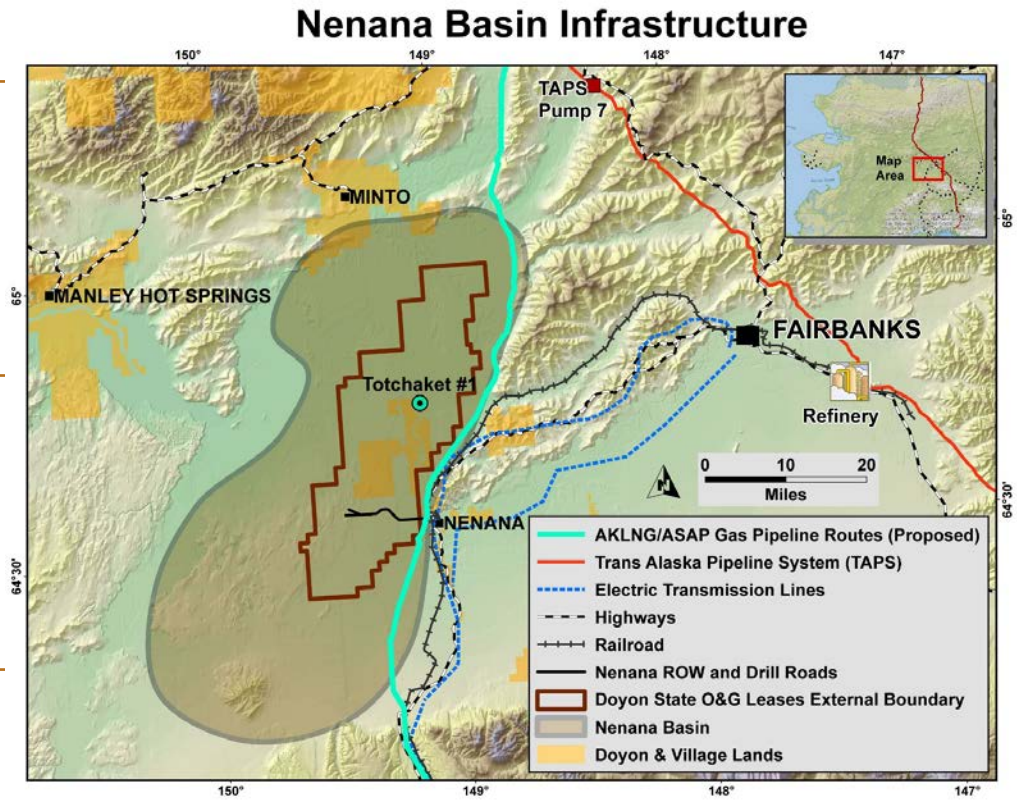
- Roads
- Rail
- High-line power

Advantages:

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

Future needs:

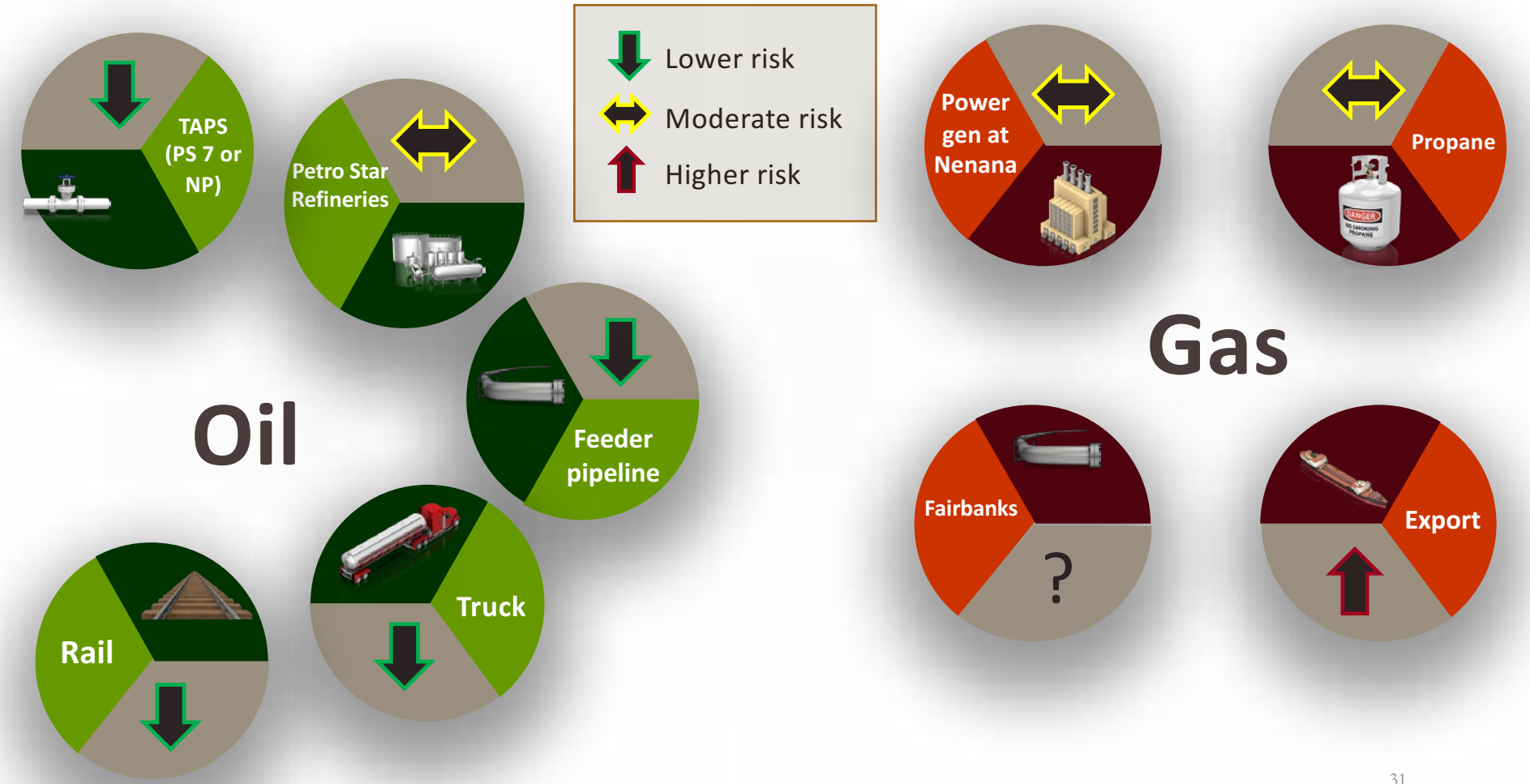
- Pipeline to FBX/NP or TAPS PS 7 (~50-60 miles)
- All-season road to Parks Highway (~10 miles)



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



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?