



Alaska Department of Natural Resources Update

The Alaska Support Industry Alliance

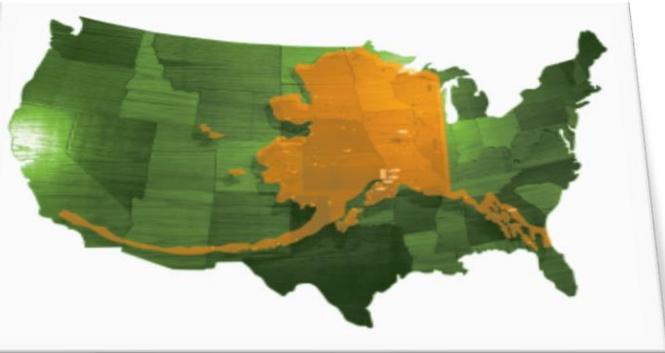
Presented by Corri Feige
Commissioner, Department of Natural Resources

January 10, 2019



STATE OF ALASKA

- LAND BASE & OWNERSHIP -

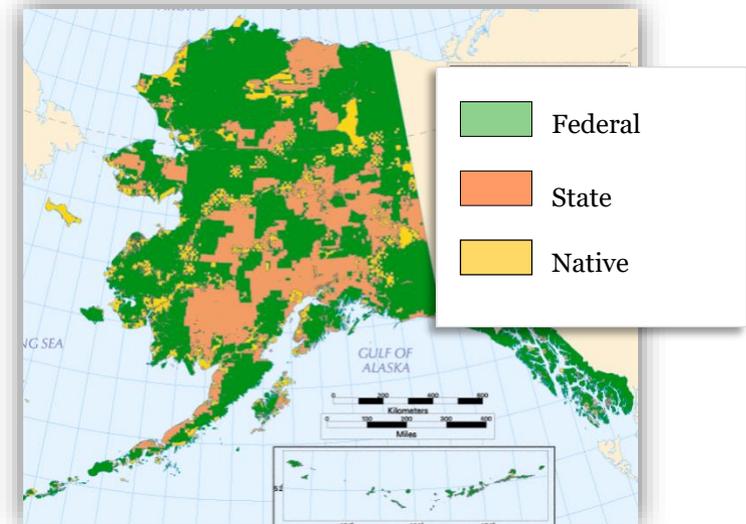


Land Base

- 586,412 sq. miles—more than twice the size of Texas
- Larger than all but 18 sovereign nations
- More coastline than all other 49 states combined
- More than 3 million lakes; half of world's glaciers

Land Ownership

- *Federal Land: (~60.3%)* more than 200 million acres
- *State Land: (~27.4%)* Approx. 100 million acres of uplands
- *Native Corporation Land: (~12%)* 44 million acres
- *Private: (<1%)* Approx. 1 million acres



STATE OF ALASKA

- OIL & GAS RESOURCE POTENTIAL -

North Slope

- More undiscovered, potentially recoverable oil than any other Arctic nation
 - **OIL:** Est. 40 billion barrels of conventional oil
 - **GAS:** Est. over 200 trillion cubic feet of conventional natural gas
- Untapped unconventional resource potential, including tens of billions of barrels of heavy oil, shale oil, and viscous oil, and hundreds of trillions of cubic feet of shale gas, tight gas, and gas hydrates

Cook Inlet

- Significant undiscovered resources remain
 - 19 trillion cubic feet of natural gas
 - 600 million barrels of oil
 - 46 million barrels of natural gas liquids

Sources: USGS & BOEM

Compared to most basins, Alaska is relatively underexplored, with 500 exploration wells on the North Slope, compared to Wyoming's 19,000.



STATE OF ALASKA

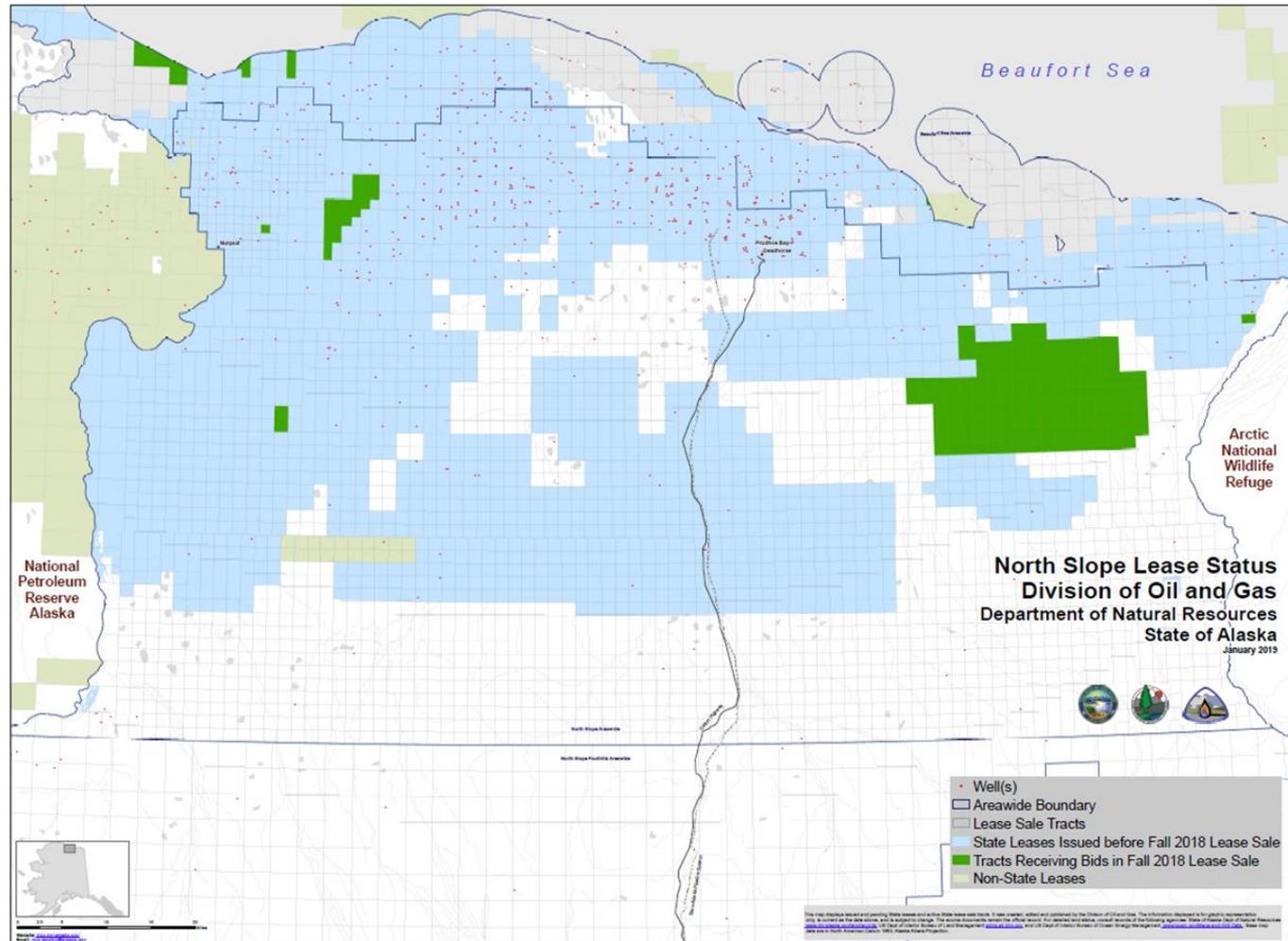
- OIL & GAS OUTLOOK -

2018 Fall Lease Sale brought the 3rd highest amount of winning bids since 1998

Total Bonus Bid:
\$29,234,028.10

Highest Bid Per
Acre: **\$586.00**

Total Leased Acres:
243,950

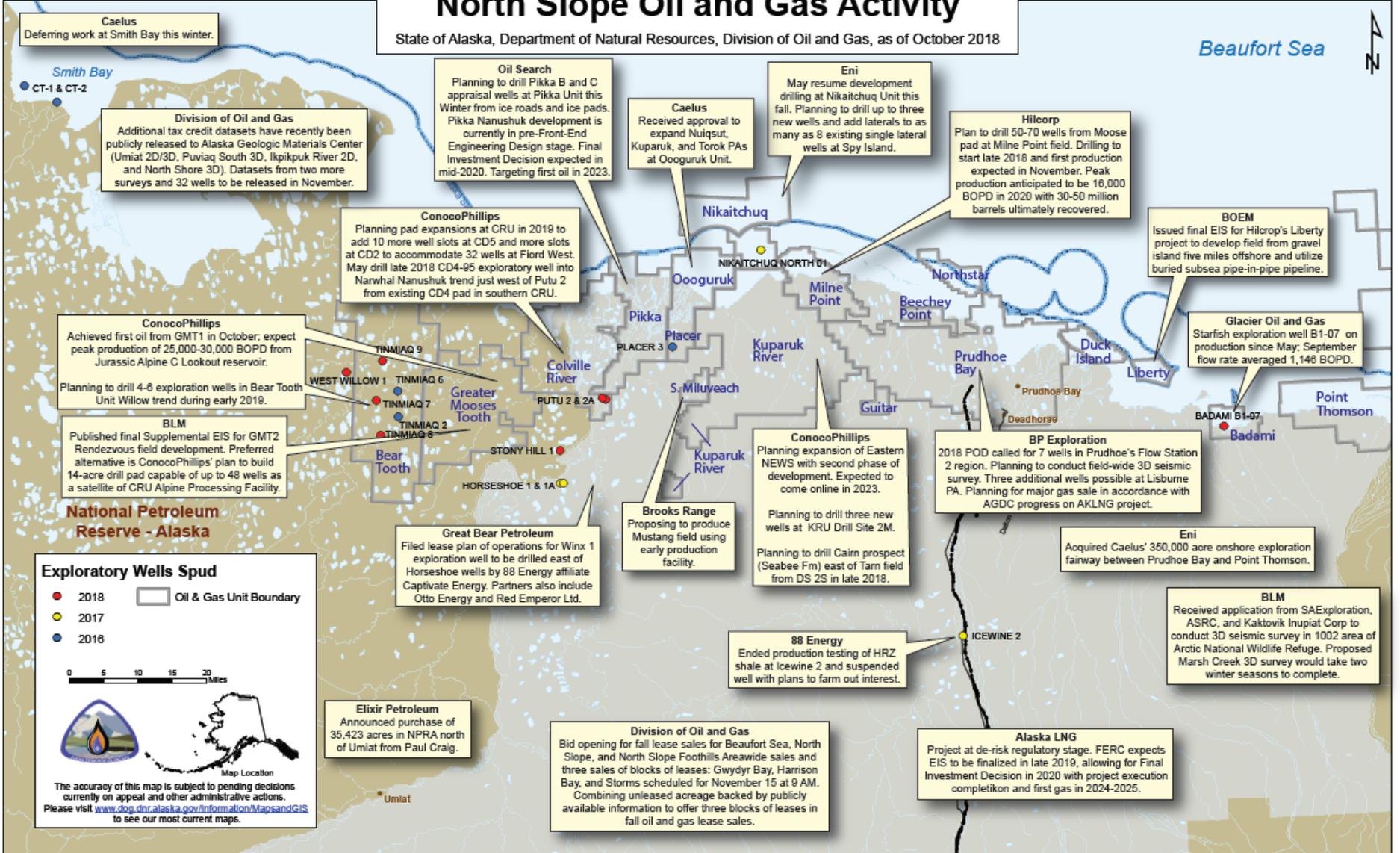


STATE OF ALASKA

- OIL & GAS OUTLOOK -

North Slope Oil and Gas Activity

State of Alaska, Department of Natural Resources, Division of Oil and Gas, as of October 2018



Caelus
Deferring work at Smith Bay this winter.

Smith Bay
CT-1 & CT-2

Division of Oil and Gas
Additional tax credit datasets have recently been publicly released to Alaska Geologic Materials Center (Umiat 2D/3D, Puviag South 3D, Ikpikuk River 2D, and North Shore 3D). Datasets from two more surveys and 32 wells to be released in November.

Oil Search
Planning to drill Pikka B and C appraisal wells at Pikka Unit this Winter from ice roads and ice pads. Pikka Nanushuk development is currently in pre-Front-End Engineering Design stage. Final Investment Decision expected in mid-2020. Targeting first oil in 2023.

Caelus
Received approval to expand Nuiqsut, Kuparuk, and Torok PAs at Oooguruk Unit.

Eni
May resume development drilling at Nikaichuq Unit this fall. Planning to drill up to three new wells and add laterals to as many as 8 existing single lateral wells at Spy Island.

Hilcorp
Plan to drill 50-70 wells from Moose pad at Milne Point field. Drilling to start late 2018 and first production expected in November. Peak production anticipated to be 16,000 BOPD in 2020 with 30-50 million barrels ultimately recovered.

BOEM
Issued final EIS for Hilcorp's Liberty project to develop field from gravel island five miles offshore and utilize buried subsea pipe-in-pipe pipeline.

ConocoPhillips
Planning pad expansions at CRU in 2019 to add 10 more well slots at CD5 and more slots at CD2 to accommodate 32 wells at Fiord West. May drill late 2018 CD4-85 exploratory well into Narwhal Nanushuk trend just west of Putu 2 from existing CD4 pad in southern CRU.

ConocoPhillips
Achieved first oil from GMT1 in October; expect peak production of 25,000-30,000 BOPD from Jurassic Alpine C Lookout reservoir.
Planning to drill 4-6 exploration wells in Bear Tooth Unit Willow trend during early 2019.

BLM
Published final Supplemental EIS for GMT2 Rendezvous field development. Preferred alternative is ConocoPhillips' plan to build 14-acre drill pad capable of up to 48 wells as a satellite of CRU Alpine Processing Facility.

Great Bear Petroleum
Filed lease plan of operations for Winx 1 exploration well to be drilled east of Horseshoe wells by 88 Energy affiliate Captivate Energy. Partners also include Otto Energy and Red Emperor Ltd.

Brooks Range
Proposing to produce Mustang field using early production facility.

ConocoPhillips
Planning expansion of Eastern NEWS with second phase of development. Expected to come online in 2023.
Planning to drill three new wells at KRU Drill Site 2M.
Planning to drill Cain prospect (Seabee Fm) east of Tarn field from DS 2S in late 2018.

BP Exploration
2018 POD called for 7 wells in Prudhoe's Flow Station 2 region. Planning to conduct field-wide 3D seismic survey. Three additional wells possible at Lisburne PA. Planning for major gas sale in accordance with AGDC progress on AKLNG project.

Glacier Oil and Gas
Starfish exploration well B1-07 on production since May; September flow rate averaged 1,148 BOPD.

Eni
Acquired Caelus' 350,000 acre onshore exploration fairway between Prudhoe Bay and Point Thomson.

BLM
Received application from SAExploration, ASRC, and Kaktovik Inupiat Corp to conduct 3D seismic survey in 1002 area of Arctic National Wildlife Refuge. Proposed Marsh Creek 3D survey would take two winter seasons to complete.

88 Energy
Ended production testing of HRZ shale at Icewine 2 and suspended well with plans to farm out interest.

Division of Oil and Gas
Bid opening for fall lease sales for Beaufort Sea, North Slope, and North Slope Foothills Area-wide sales and three sales of blocks of leases: Gwydyr Bay, Harrison Bay, and Storms scheduled for November 15 at 9 AM. Combining unleased acreage backed by publicly available information to offer three blocks of leases in fall oil and gas lease sales.

Alaska LNG
Project at de-risk regulatory stage. FERC expects EIS to be finalized in late 2019, allowing for Final Investment Decision in 2020 with project execution completion and first gas in 2024-2025.

Elixir Petroleum
Announced purchase of 35,423 acres in NPRA north of Umiat from Paul Craig.

Exploratory Wells Spud

- 2018
- 2017
- 2016

Oil & Gas Unit Boundary

0 5 10 15 20 Miles

The accuracy of this map is subject to pending decisions currently on appeal and other administrative actions. Please visit www.dog.dnr.alaska.gov/information/MapsandGIS to see our most current maps.

STATE OF ALASKA

- OIL & GAS OUTLOOK -

Cook Inlet Oil and Gas Activity

State of Alaska, Department of Natural Resources, Division of Oil and Gas, as of October 2018

Division of Oil and Gas
 Issued call for substantial new information for Spring 2019 Alaska Peninsula Areawide oil and gas lease sale. Deadline for receiving information is October 26, 2018. Issued preliminary best interest finding for proposed Cook Inlet Areawide oil and gas lease sales, 2019-2028.

Visit
<http://list.state.ak.us/mailman/listinfo/DOG.Licensing> to subscribe to leasing announcements.

Division of Oil and Gas
 Soliciting Statewide Nominations of Lands with geothermal resources for potential future disposal.

Amaroq Resources (Previously Aurora Exploration)
 Nicolai Creek Unit 2018 plan included three well cleanouts and drilling NCU 12 well targeting Beluga and Upper Tyonek gas sands. Anticipated negotiating purchase of Apache's 3D seismic shot in 2012 to evaluate future exploration targets.

Hilcorp
 Planning to sidetrack a well from the Monopod platform in the Trading Bay Unit into the North Trading Bay field in an attempt to restore unit production. Sidetrack will target Tyonek G and Hemlock reservoirs.

Glacier Oil and Gas
 Requested that the state contract Redoubt Unit and form new participating area, South Stepout.

Doyon-CIRI
 Totohaket 1 drilled this summer, encountered several gas shows but did not find commercial quantities of oil or gas.

Division of Oil and Gas
 Approved exploration license application in Houston-Willow area to Samuel Cade and Daniel Donkel.

Furie
 Completed KLU A-1 development well in Corsair block, with initial gas production from lower and middle Sterling zones. Drilled the KLU A-4 development well into Tyonek to evaluate identified 3D amplitude targets. Added perforations to KLU 3 at the Beluga interval. Contracted new technical team to evaluate previously acquired 3D seismic data and propose exploratory drilling targets over next several years. May drill one new development well in 2019 to stratigraphic equivalent of Sterling flow tested zones and add perforations to KLU A-2A and 3.

Glacier Oil and Gas
 Requested that the state contract Redoubt Unit and form new participating area, South Stepout.

Hilcorp
 Evaluating well work opportunities and maintaining gas production from Beluga Upper Tyonek Formations at Cannery Loop Unit. Production anticipated to remain close to 10 MMSCF/D through July 2019.

BlueCrest Alaska
 Conducted multi-stage frac job on H14 well and brought well into production. Drilled H12 well with seven fish bone laterals and brought well into production. Plan to redrill H16 well this Fall. Plan to drill another well, H4, early 2019 to test southern extent of reservoir. After reviewing results of this well, plan to determine possible location for H11 well.

Hilcorp
 Completed development wells Kalotsa 1-4 and seven stratigraphic test wells in 2017. Data from the stratigraphic test wells are being used to design proposed Pearl 2A well which may be drilled mid-2019. Conducted Grassim Oskolkoff PA field study that identified six new drill well prospects within FA. Mandatory unit contract delayed until May 31, 2020.

Hilcorp
 Planning to drill two to four stratigraphic test wells targeting the Sterling and Beluga Formations by mid-2019. Exploratory drilling program in 2019 will be based on the results of the 2018 stratigraphic test wells. Delaying mandatory unit contract until May 31, 2019.

Hilcorp
 Fracture stimulation of Red 1 well in 2017 yielded a ten-fold initial gas rate increase followed by steep initial decline. 2018 plan anticipates continued production, which averaged 527 MSCF/D in September.

Hilcorp
 Planning to drill two gas exploration wells, Seaview 8 and 9, from Seaview pad. Wells will evaluate the Lower Tyonek, Hemlock and deeper formations. Previously drilled seven shallow stratigraphic test wells in the area last year.

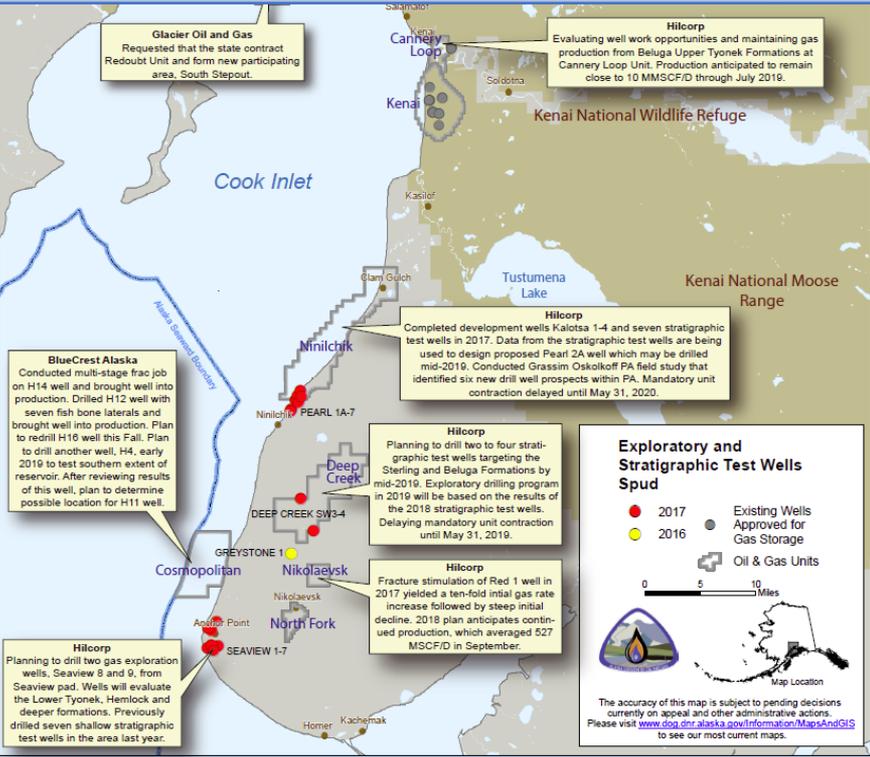
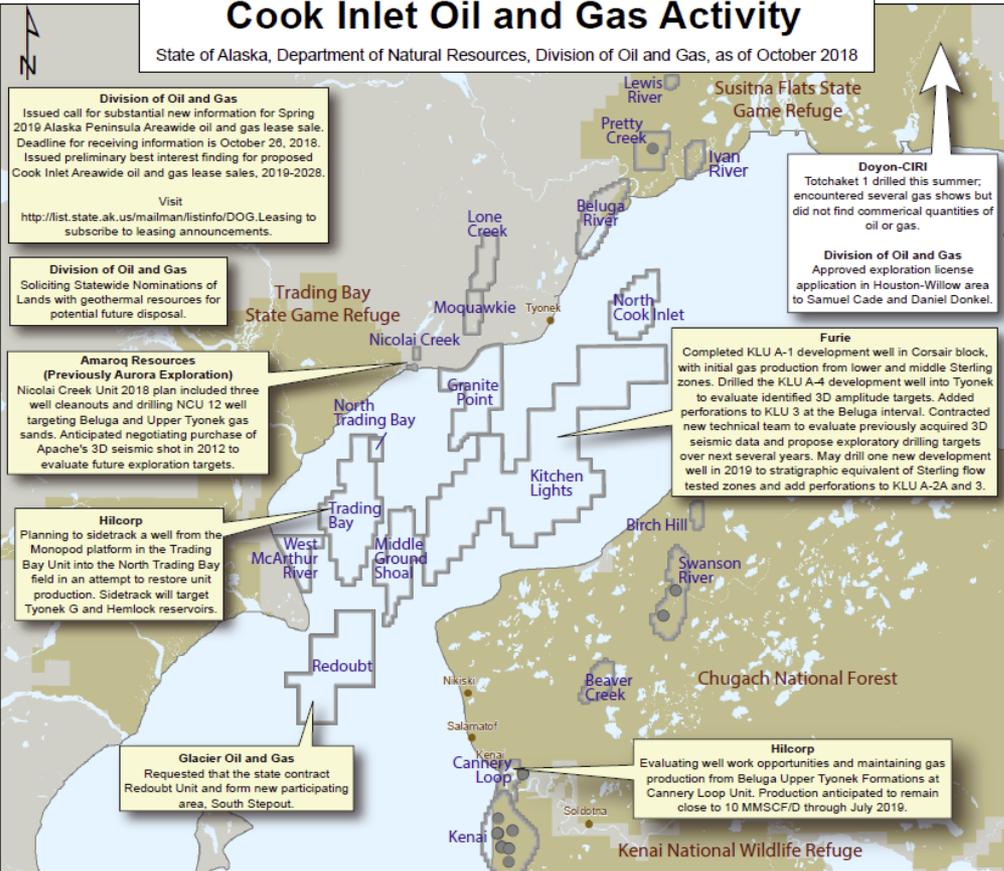
Exploratory and Stratigraphic Test Wells Spud

- 2017
- Existing Wells
- Approved for Gas Storage
- Oil & Gas Units

0 5 10 Miles

Map Location

The accuracy of this map is subject to pending decisions currently on appeal and other administrative actions. Please visit www.dnr.alaska.gov/Information/MapsAndGIS to see our most current maps.



STATE OF ALASKA

- OIL & GAS OUTLOOK -

- 2019 is expected to be the busiest year in the last 10 years for exploration and production rig activity.
- Pikka, Mustang, and Placer finds demonstrate great potential.
- New data suggests enormous potential in Nanushuk and Torok formations.
- Legacy fields including Prudhoe and Kuparuk have exceeded internal expectations through infield work.
- Smaller companies, like Caelus, Great Bear & Armstrong, are engaging in exploration plans that will help maximize TAPS throughput into the future.
- New players, like Oil Search, indicate industry acknowledgment of large, viable fields that were unknown.
- Continuous work with North Slope communities, presidential administration, and Congressional delegation on Arctic energy policy and decision making that support responsible development (ANWR Coastal Plain, OCS, NPR-A)

STATE OF ALASKA

- ROYALTY RATE -

Offshore

Royalty Rate: 16.67%
SOA Royalty: 0 - 3 Miles 100%,
3 - 6 Miles 27%,
Greater than 6 Miles 0%

NPR-A

Royalty Rate: 12.5% or 16.67%
SOA Royalty: 0% (Mitigation Fund)

State Lands

Royalty Rate: 12.5% or 16.67%
SOA Royalty: 83% - 100%

ANWR Coastal Plain

Royalty Rate: 16.67%
SOA Royalty: 50%

Umiat

Nikaitchuk North
Nikaitchuk
Pitka Cooguruk
Milne Point
Northstar
Taktuk
Beechey Point
Kuparuk River
Prudhoe Bay
Deadhorse
Liberty
Badami
Point Thomson
Kaktovik

Nuiqsut

Bear Tooth
Greater Mooses Tooth

STATE OF ALASKA

- STATUS OF MINERAL INDUSTRY -

12%

**Value of Alaska's
Mineral Industry
(\$3.15 Billion)**

105%

**Exploration
Expenditures
(\$120.8 million)**

38%

**Development
Expenditures
(\$299.5 Million)**

7%

**Estimated
Revenue to Industry**

16%

State Mining Claims

230%

**New
Claims**

5%

**Full-Time
Employment**



STATE OF ALASKA

- 2017 MINERAL PRODUCTION -

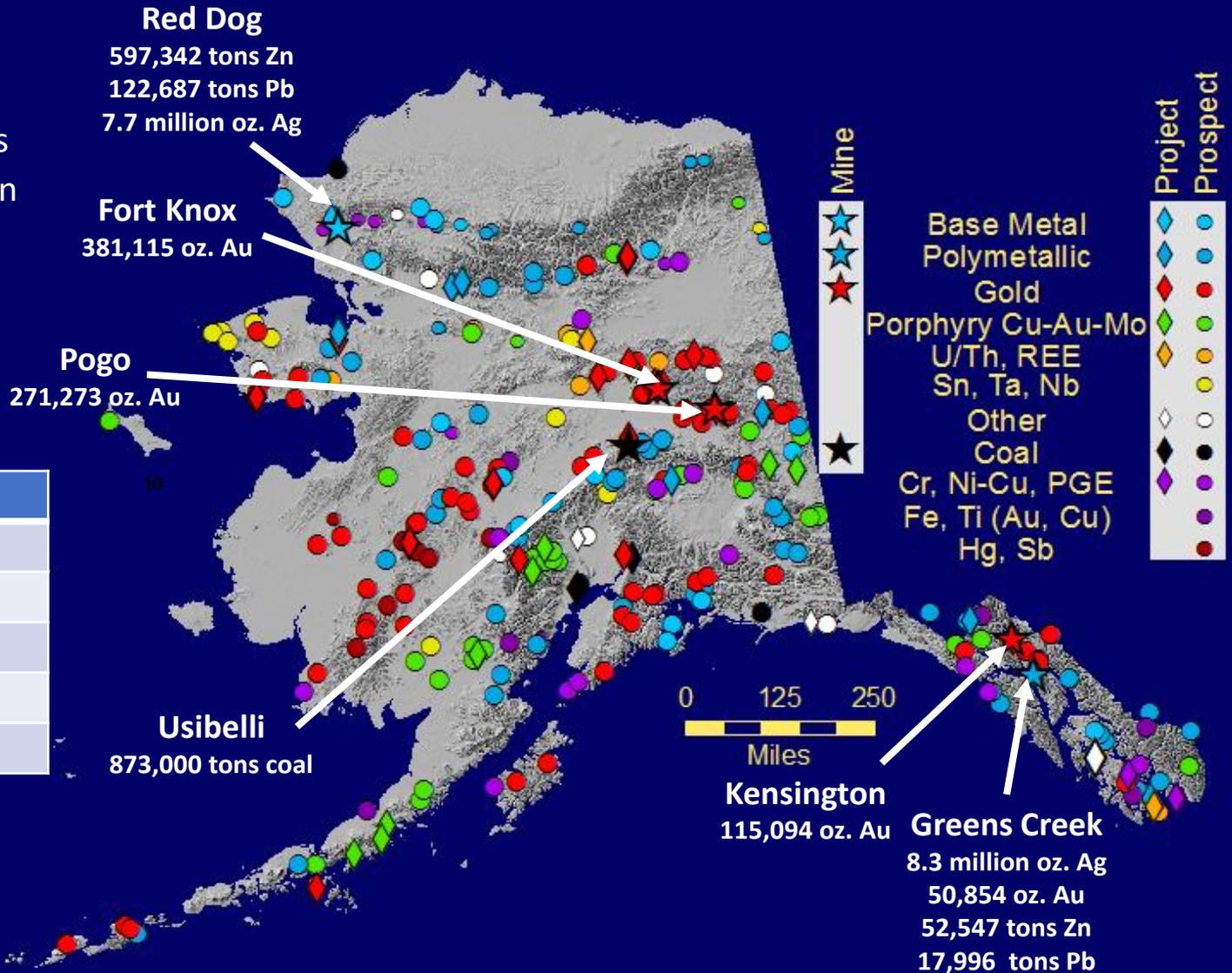
5 major lode mines

1 coal mine

~ 230 placer Au mines

~ 52 active exploration projects

	2017 Production
Zinc	649,889 tons
Lead	140,683 tons
Gold	>818,336 ounces
Silver	16 million ounces
Coal	873,000 tons



STATE OF ALASKA

- AKTIGIRUQ ZN-PB-AG [TECK]-

Sediment-hosted massive sulfide deposit

Anarraaq resource:

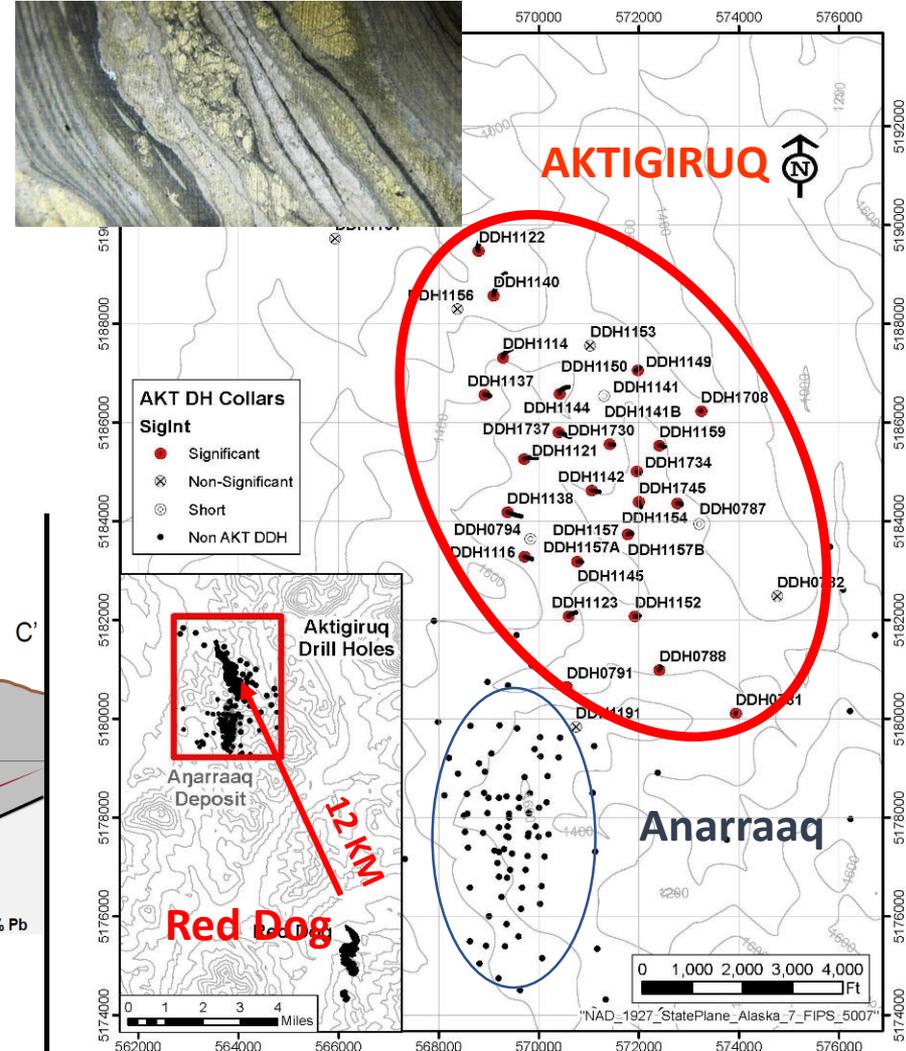
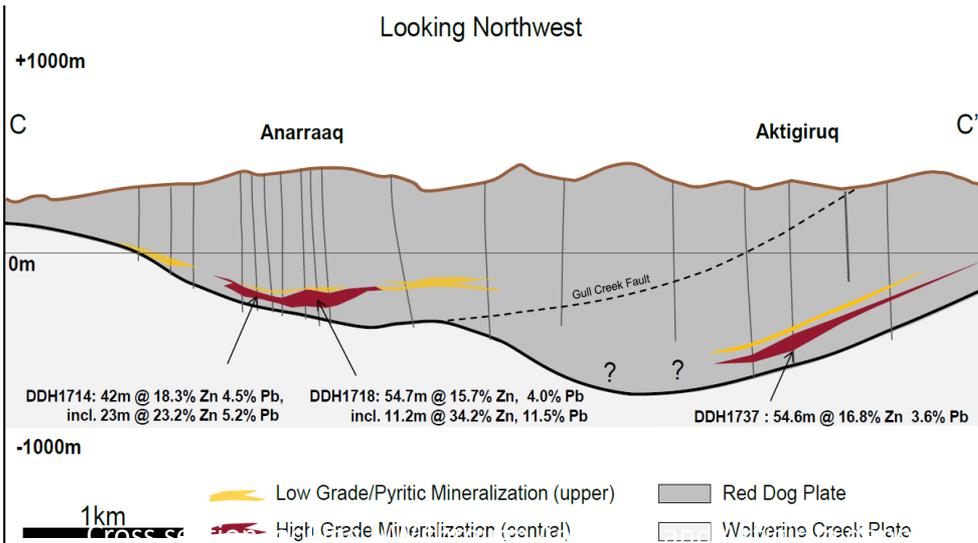
-Inferred: 26 M tonnes @ 13.8% Zn, 4.3% Pb, 84.3 g/T Ag

2018 Aktigiruaq program:

-Drilling program

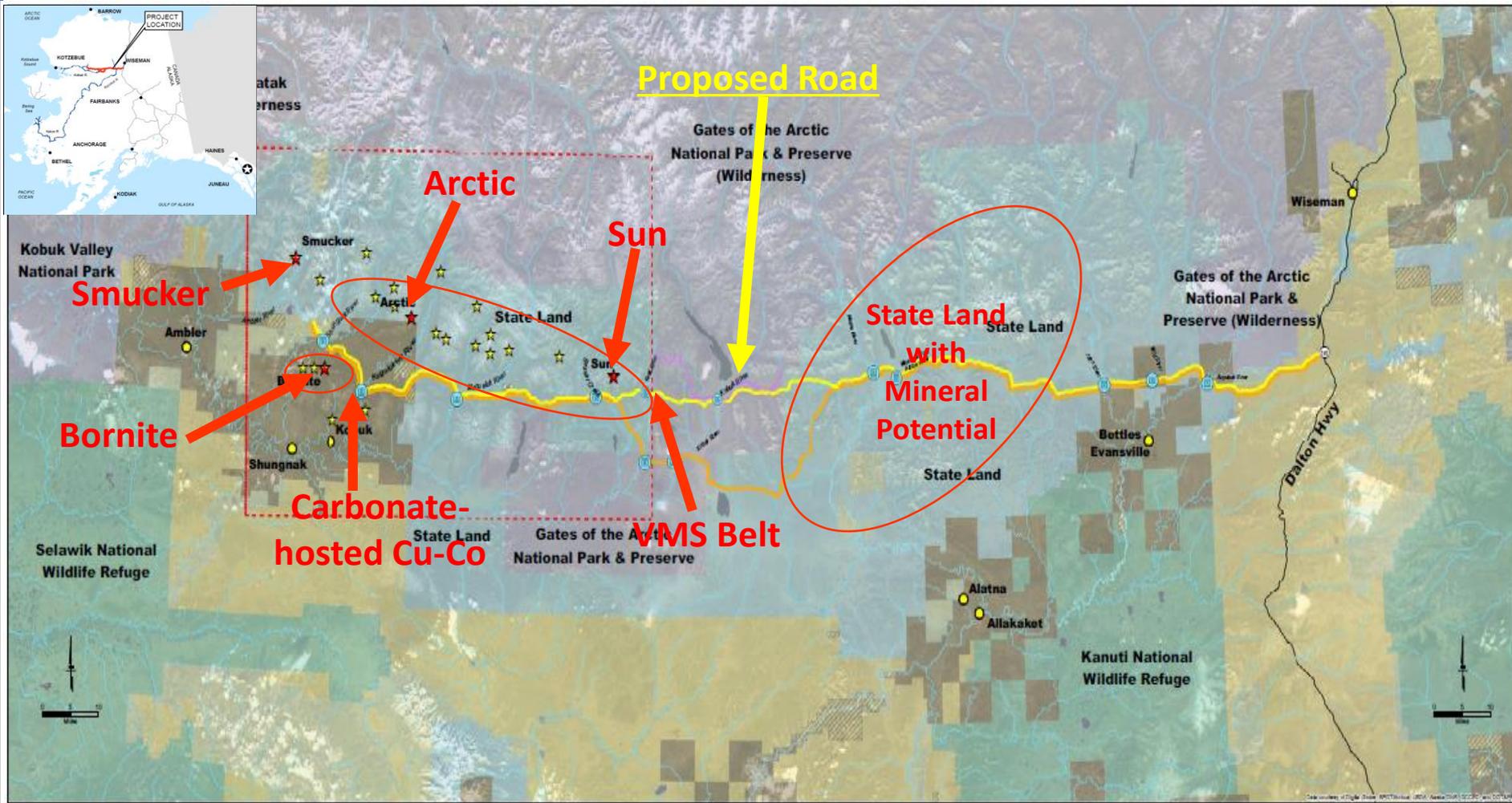
-Ore body is 400 to 1,000 m below surface

-2016 drilling encountered 54.6 m @ 16.8% Zn, 3.63% Pb (DDH1737)



STATE OF ALASKA

- AMBLER MINING DISTRICT INDUSTRIAL ACCESS PROJECT [AIDEA]



AMBLER MINING DISTRICT INDUSTRIAL ACCESS PROJECT

- | | | | | | | |
|------------------------|---|---------------------|--------------------------------------|--|---------------------------------|----------------|
| Ambler Mining District | AMDIAP Preferred Corridor (211 Miles) | Existing Roads | Proposed Large Bridge | Bureau of Land Management (Federal Land) | ANCSA (Native Corporation Land) | State Land |
| Major Mineral Deposit | AMDIAP Alternative Corridor (228 Miles) | Milepost 161 | Cities | Fish and Wildlife Service (Federal Land) | ANCSA Selected | State Selected |
| Mineral Resources | Rivers and Streams | Wilderness Boundary | National Park Service (Federal Land) | | | |

Source: Ambler Mining District, Design and Documentation of the Ambler Freeway, Ambler District, Copper River, Ambler District, Northern Gateway, Inc., 2011. Mineral Resources: USGS Mineral Resources, 2012, and USGS, 2012. Report on Minerals, Minerals, Alaska, Alaska, Northern Gateway, Inc., 2012.

STATE OF ALASKA

- ARCTIC VMS (TRILOGY METALS / SOUTH32 LIMITED)-

New PFS:

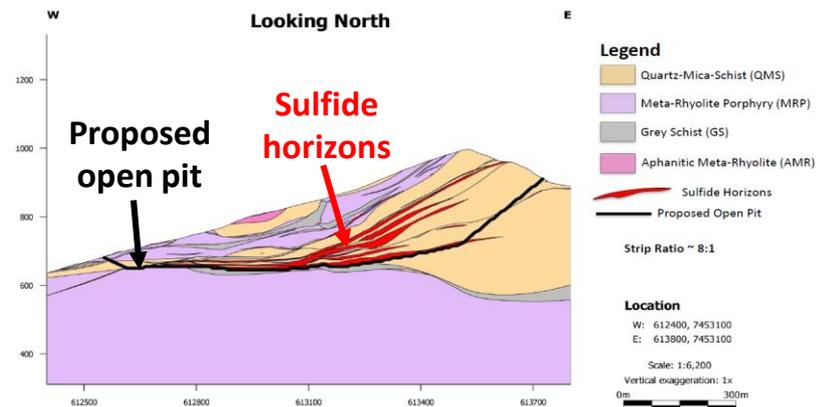
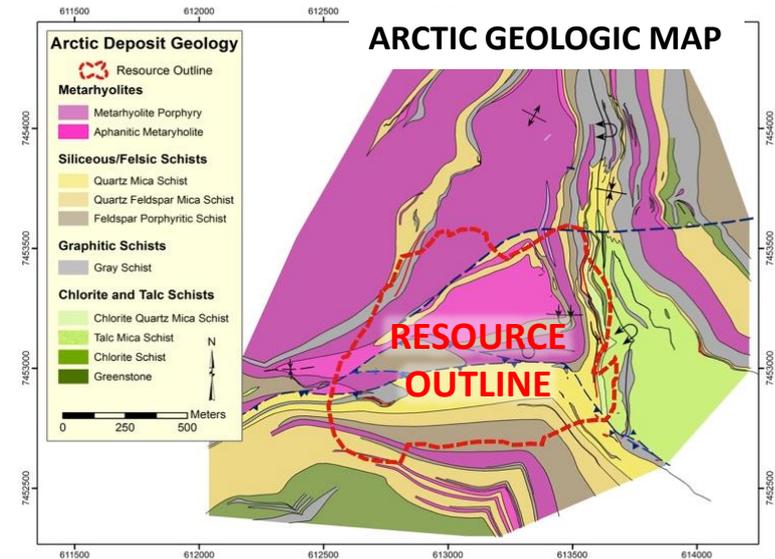
- Ave. annual payable production: >159 M lbs. Cu, 199 M lbs. Zn, 33 M lbs. Pb, 30,600 oz. Au, & 3.3 M oz. Ag
- 12-year mine life
- Estimated pre-tax & after-tax payback of 2 years
- Converted indicated mineral resources to probable reserves
- Pre-tax 38.0% IRR; \$1,935 million NPV at 8%

Resource: (based on 152 DDH)

Oct 2017	Million Tonnes	Cu %	Zn %	Pb %	Au g/T	Ag g/T
Indicated	36	3.07	4.23	0.73	0.63	47.6
Inferred	3.5	1.71	2.72	0.6	0.36	28.7
Total	39.5	2.95	4.09	0.73	0.61	45.9

2018 program (US\$6.7 million):

- Completed ore-sorting program
- Geotechnical & hydrological studies
- Preparing for feasibility study & starting permitting in 2019
- Working with AIEDA to advance the Ambler Mining District Industrial Access Road Project; BLM working on EIS.



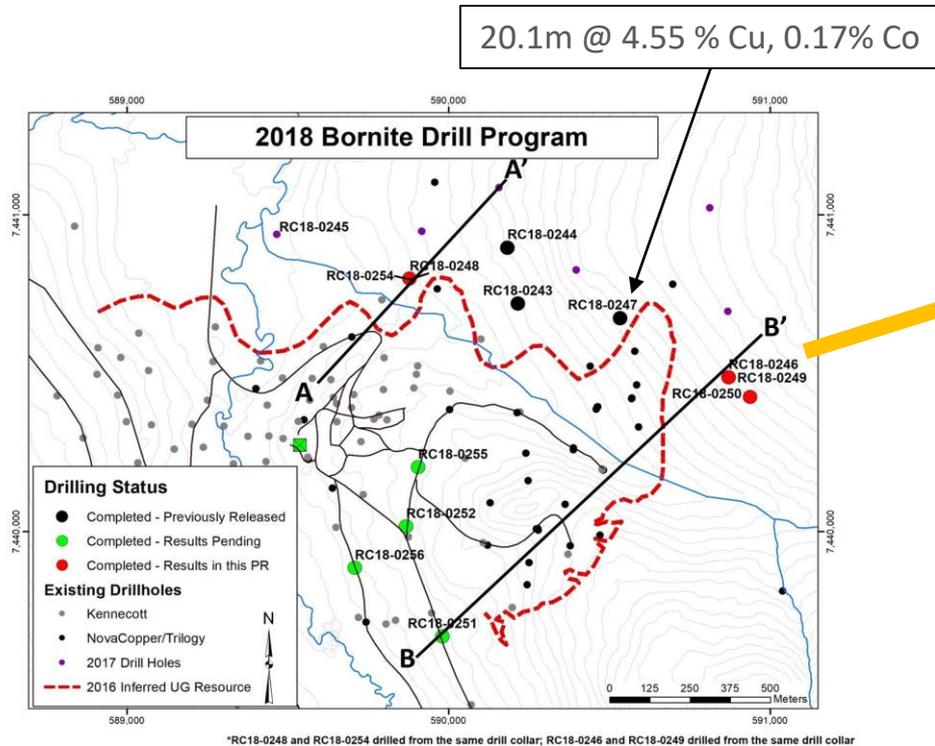
STATE OF ALASKA

- BORNITE CARBONATE-HOSTED CU-CO (TRILOGY METALS / SOUTH32 LIMITED)-

2018 program (US\$10.8 M):

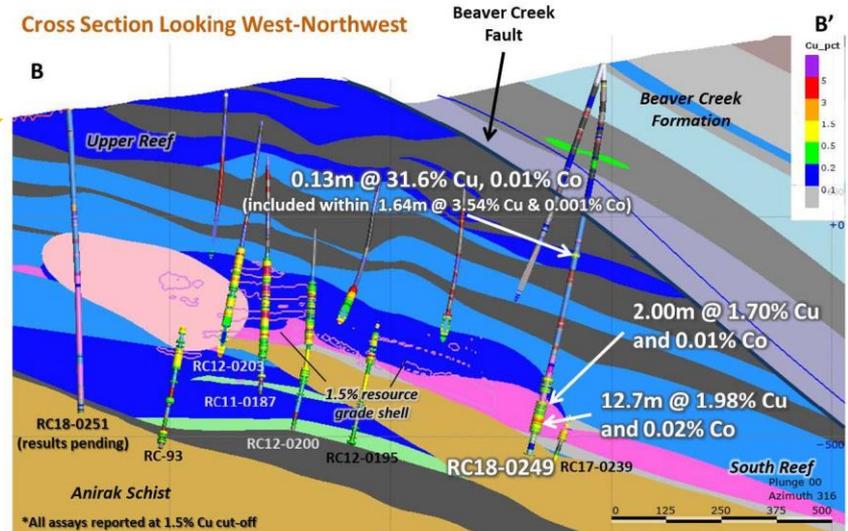
- 12 holes; total 10,123 m of infill & off-set drilling
- Seismic survey
- Metallurgical testing: produce Cu concentrates of 24% - 33% Cu; & no deleterious metals

2019 program: Anticipated ~US\$9.2 million budget



	Million Tonnes	Cu %	Co %
Indicated	40.5	1.02	0.017
Inferred	141.9	1.74	0.025
Total	182.4	1.24	0.019

Contained metal: 77 M lbs. Co & 5.45 B lbs. Cu



STATE OF ALASKA

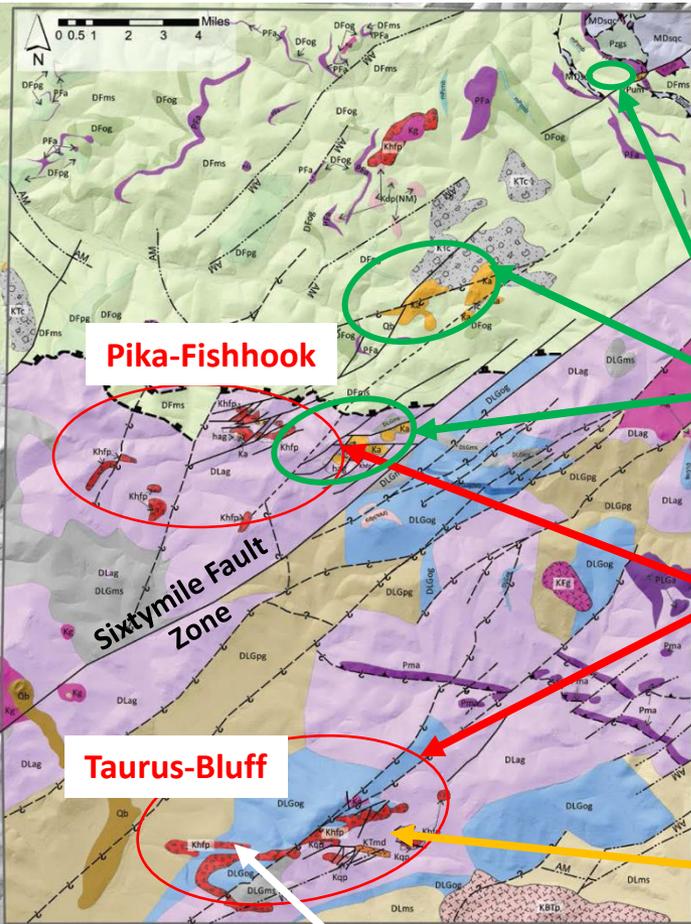
- DGGs MAPPING TANACROSS QUADRANGLE PORPHYRY DISTRICT-

Taurus Porphyry Cu-Mo-Au Deposit

Unofficial resource: 75.2 M tons @ 0.275% Cu, 0.032 Mo, 0.166 g/T Au

Notable intercepts (2008) East Taurus:

- 772 feet of 0.309% Cu, 0.036% Mo, 0.245 g/T Au
- 179 feet of 0.258% Cu, 0.026% Mo, 0.149 g/T Au



Pika-Fishhook

**Andesite
(66 Ma?)**



**Potassic Alteration
with Cu-Mo-Au**



Quartz-sericite-pyrite

**Hbl porphyry
(66.3 Ma)**



**Taurus
Qtz-Feldspar
Porphyry
(70-72 Ma)**

Taurus-Bluff

**Qtz Monzonite
Hbl-Feldspar Porphyry
(68-70 Ma)**

STATE OF ALASKA

- GRAPHITE CREEK (GRAPHITE ONE RESOURCES) -

USA's largest, large-flake graphite deposit

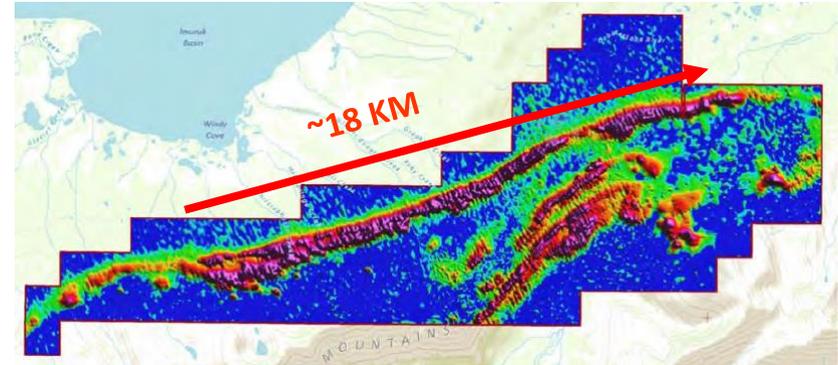
2018 Program:

- 6 holes, 800 m of in-fill drilling
- Additional metallurgical testing
- Alternative access routes
- Initiate environmental surveys
- Collect data for future PFS



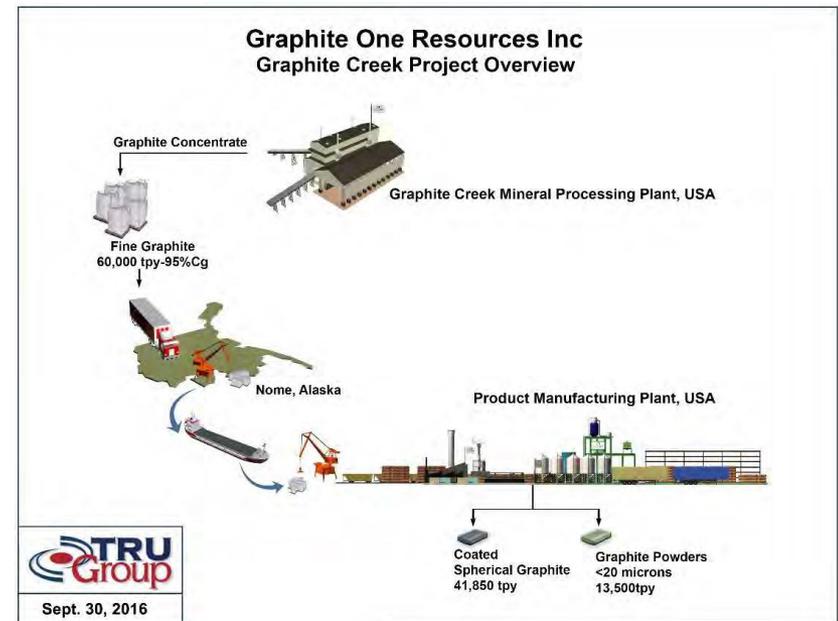
2017 PEA:

- Open-pit: 1.11 M tonnes graphite-bearing material/year
- 40-year mine life
- 41,850 tonnes of high-grade coated spherical graphite/year for lithium-ion battery applications
- 13,500 tonnes of refined, sub-20-micron graphite powder/year for various end-uses.



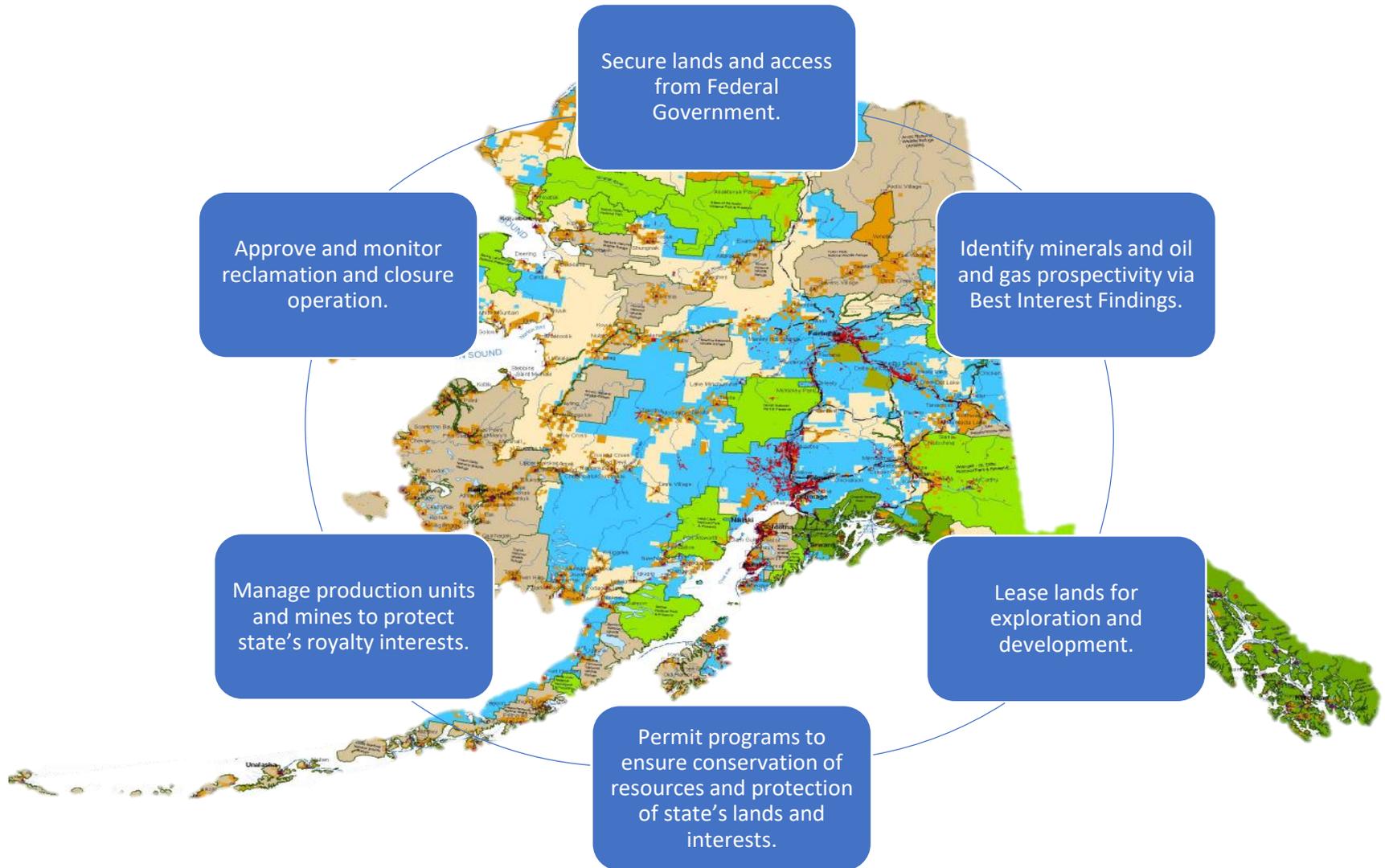
Time-Domain Electromagnetic Survey
(red=conductive graphitic units)

6% cutoff	Million Tonnes	Cg %
Indicated	10.3	7.2
Inferred	71.2	7.0
Total	81.5	7.0



STATE OF ALASKA

- DEPARTMENT OF NATURAL RESOURCES LAND LIFE CYCLE -



THANK YOU!

