

# Alaska LNG

*Legislative Update*

*June 16, 2015*

*Presented by Steve Butt*

# Alaska LNG

*An integrated liquefied natural gas export project that would provide access to gas for Alaskans*

## Gas Treatment Plant (GTP)

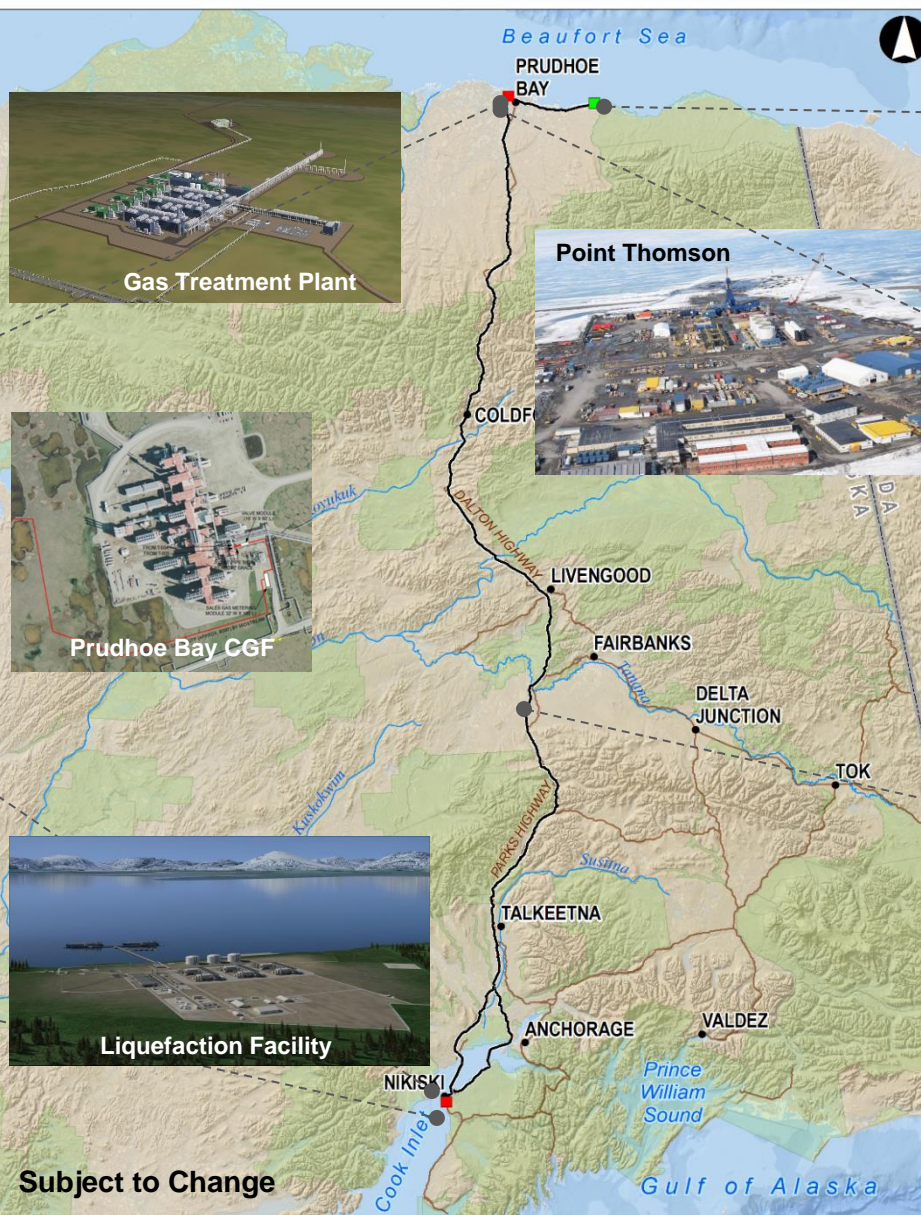
- 3.3 BCFD peak winter rate
- Three trains with compression, dehydration and chilling for gas conditioning (remove impurities)
- CO<sub>2</sub> removed, captured and compressed for injection at PBU

## LNG Storage & Marine Terminal

- LNG storage tanks
- Two jetties to accommodate 15-20 LNG carriers per month

## Liquefaction Facility

- Natural gas is cooled to -260 degrees to condense the volume 600 times
- 3 trains dehydrate, chill and liquefy gas to produce up to 20 million tons of LNG each year



## Point Thomson Gas Expansion\*

- New wells
- New gas processing facilities

## Prudhoe Bay Tie-In\*

- Gas delivery to new gas treatment plant (GTP)
- Integration with existing CGF
- Injection of CO<sub>2</sub> from GTP

## Gas Pipeline

- 800+ mile 42" diameter gas pipeline from gas treatment plant to liquefaction facility
- 3.5 BCFD capacity
- 6-10 compressor stations
- ~5 in-state off-take points

\* Prudhoe Bay and Point Thomson Modifications/New Facilities are managed by Prudhoe Bay Unit and Point Thomson Unit Operators, respectively, and are connected actions to the Alaska LNG Project.

Artists renditions of LNG and GTP

## Safety, Health and Environment Report:

- ✧ Minor hydraulic fluid release (1 cup, non-toxic); remediated
- ✧ Good “culture of caring” reporting – 4 near misses, 5 first aids

## Executive Summary:

- ✧ Spend: \$294M to date, \$187M on pre-FEED through May15
- ✧ DoE authorized both FTA and non-FTA export (20MTA , 30yr)
- ✧ FERC accepted resource reports, initiated Env. Impact Statement
- ✧ FERC and other agency feedback on draft resource reports received
- ✧ Community open-house sessions continuing with FERC participation

## Key Messages:

- ✧ Alaska LNG is an integrated LNG project – *plants plus pipeline*  
98% of discovered NS gas “owners” are project participants  
Regulated under FERC Section 3; allows design integration
- ✧ Understanding the “ARC of Success” is critical to the project  
*Alignment* - State is a key participant (voting rights, data, etc)  
*Risk reduction* - Pre-FEED work to identify/mitigate risk  
*Cost reduction* - “Cost of Supply” defines competitiveness
- ✧ Match pre-FEED pace / spend to broader schedule / issues





Completed design of GTP pad / camp

Confirmed access to required construction gravel

Evaluating water resource / availability

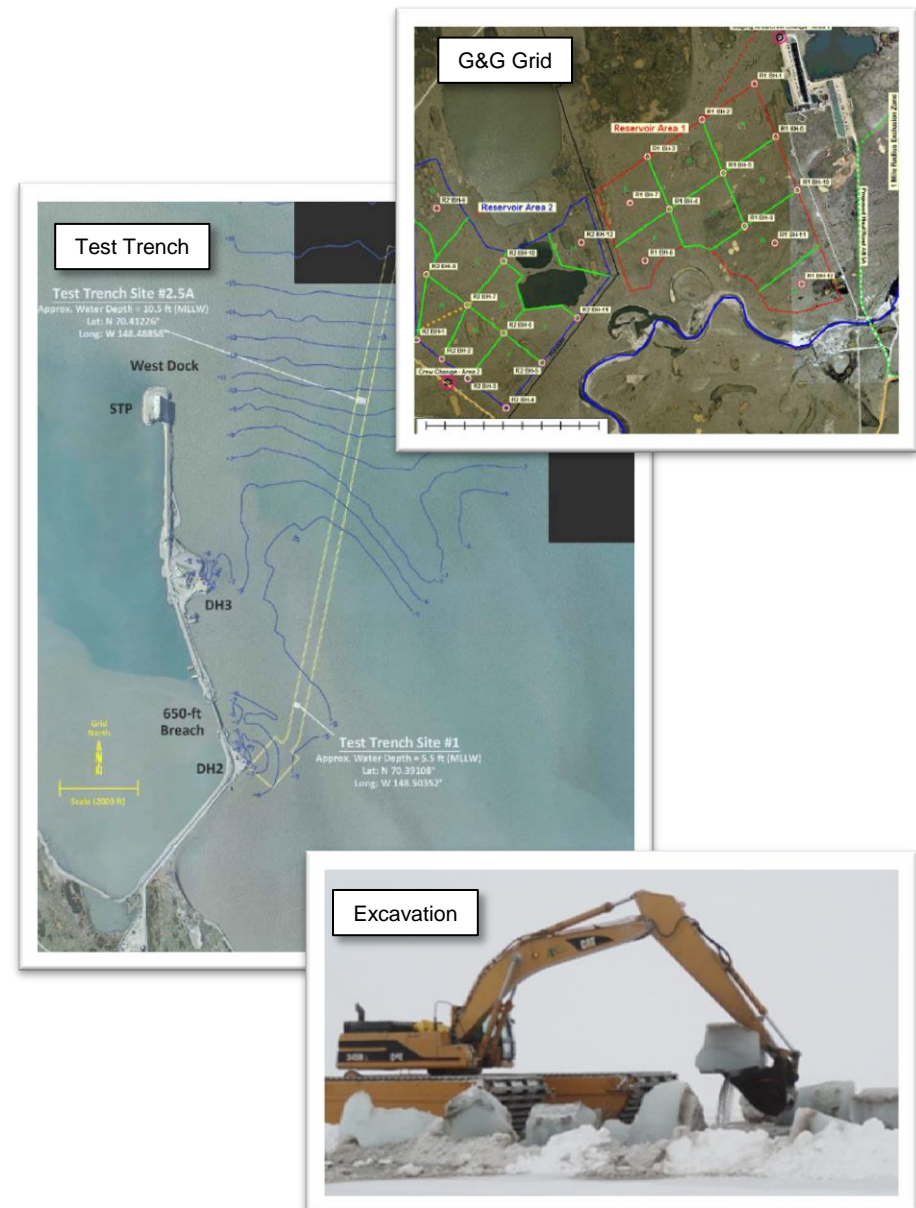
Continuing geotechnical assessment

- ✧ 28 boreholes complete
- ✧ Test soils / constructability
- ✧ Confirm road / haul design

Strong PBU integration; assessing permitting needs

Completed winter near-shore excavation program

- ✧ Test ability to increase access to PBU West Dock for module delivery
- ✧ Reduces cost / environmental impact
- ✧ Increases access in summer for offloading









## Pipeline route / design progressing well

- ✧ “RevB” route complete, aligned with AGDC
- ✧ Continued work on key areas – Atigun Pass, Glitter Gulch, Nikiski
- ✧ Selected Western route for Cook Inlet (Shorty Creek to Boulder Pt)
- ✧ Hydraulic and compressor/meter station designs nearly complete
- ✧ Execution and logistics plans ready for cost / schedule estimates

## Continued data exchange / collaboration with AGDC

## Pipeline materials design and testing in progress

- ✧ X70 with 0.72 design factor for Strain Based Design (SBD) sections
- ✧ X80 with 0.8 design factor, crack arrestors for conventional sections
- ✧ Evaluating weld development / procedures
- ✧ Evaluating alternative different coating designs / application options
- ✧ Completed good reviews with federal pipeline regulator (PHMSA)



AKLNG – Updated Pipeline Hydraulic Design (May, 2015)







## Route Updates - Onshore and Offshore:

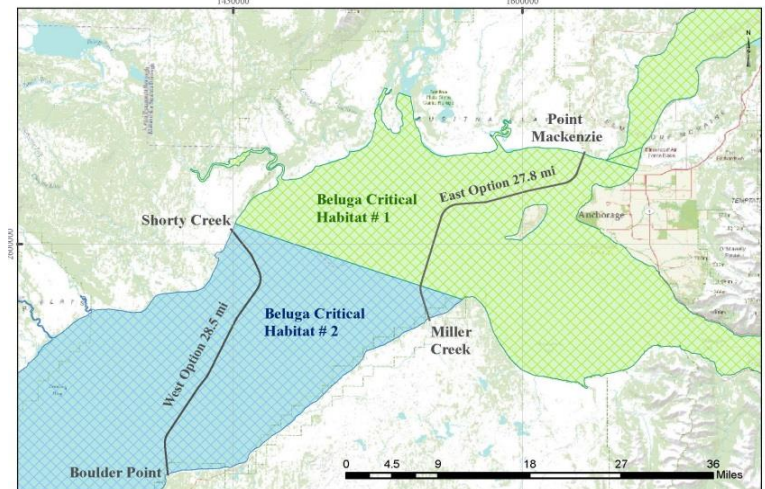
- ✧ Reviewed updated routing with State, Federal agencies 12 May
- ✧ Reviewed stream crossing methods with ADF&G 13 May

## Mainline Onshore – Joint Effort with AGDC:

- ✧ Finalized “Rev B” of the pipeline route, 1 April
- ✧ Joint team working Atigun Pass and Glitter Gulch

## Mainline Offshore – Technical Rationale for Western Route:

- ✧ Shorter overall pipeline length than Eastern Route
- ✧ Onshore avoids Captain Cook State Park, Susitna Gunnery Range, agricultural impacts and critical wetlands
- ✧ Comparable onshore construction costs / schedule to East Route
- ✧ Significantly less offshore construction challenges (closer to deeper water, lower current, fewer shipping interruptions, less protected species impact, CEA buried power cables)
- ✧ Relatively stable seabed (active seabeds in East)



## Evaluating alternative layouts / designs

### Continuing geotechnical assessment

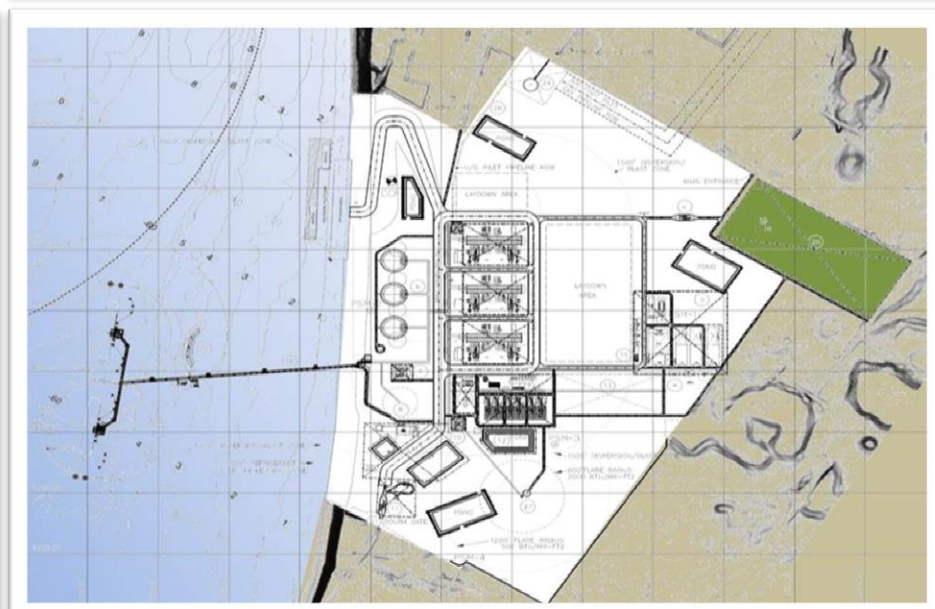
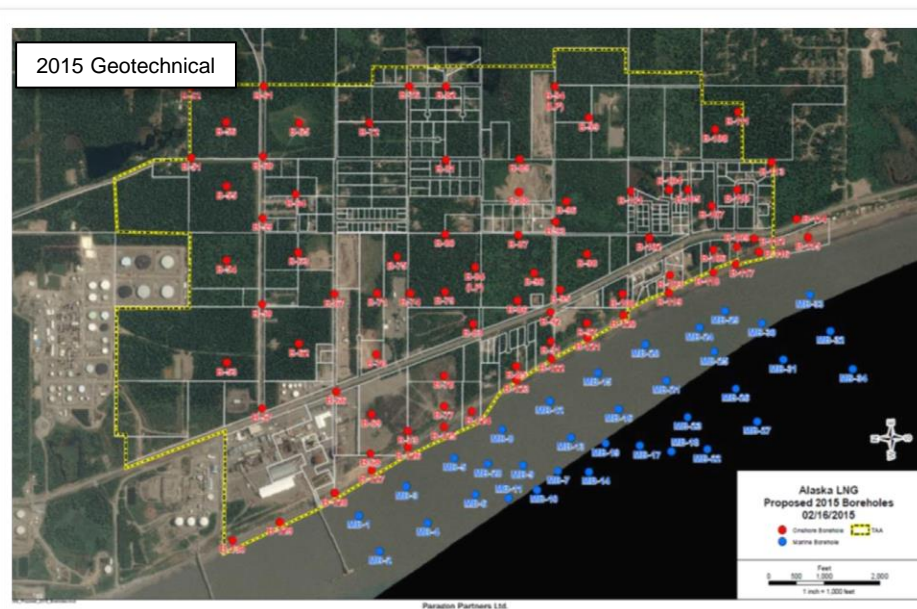
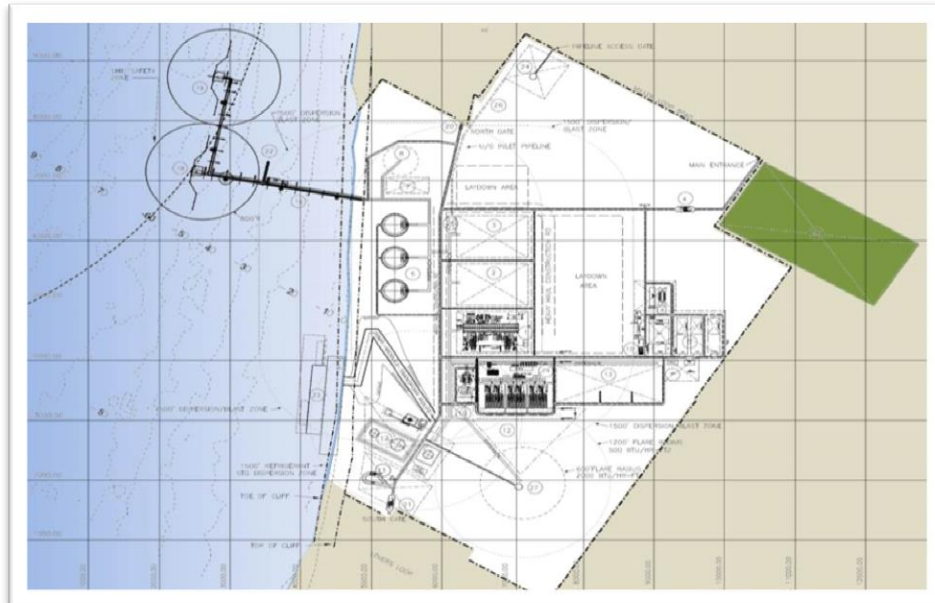
- ✳ 80 onshore boreholes
- ✳ 34 offshore boreholes

### Focus on selecting compressor driver design

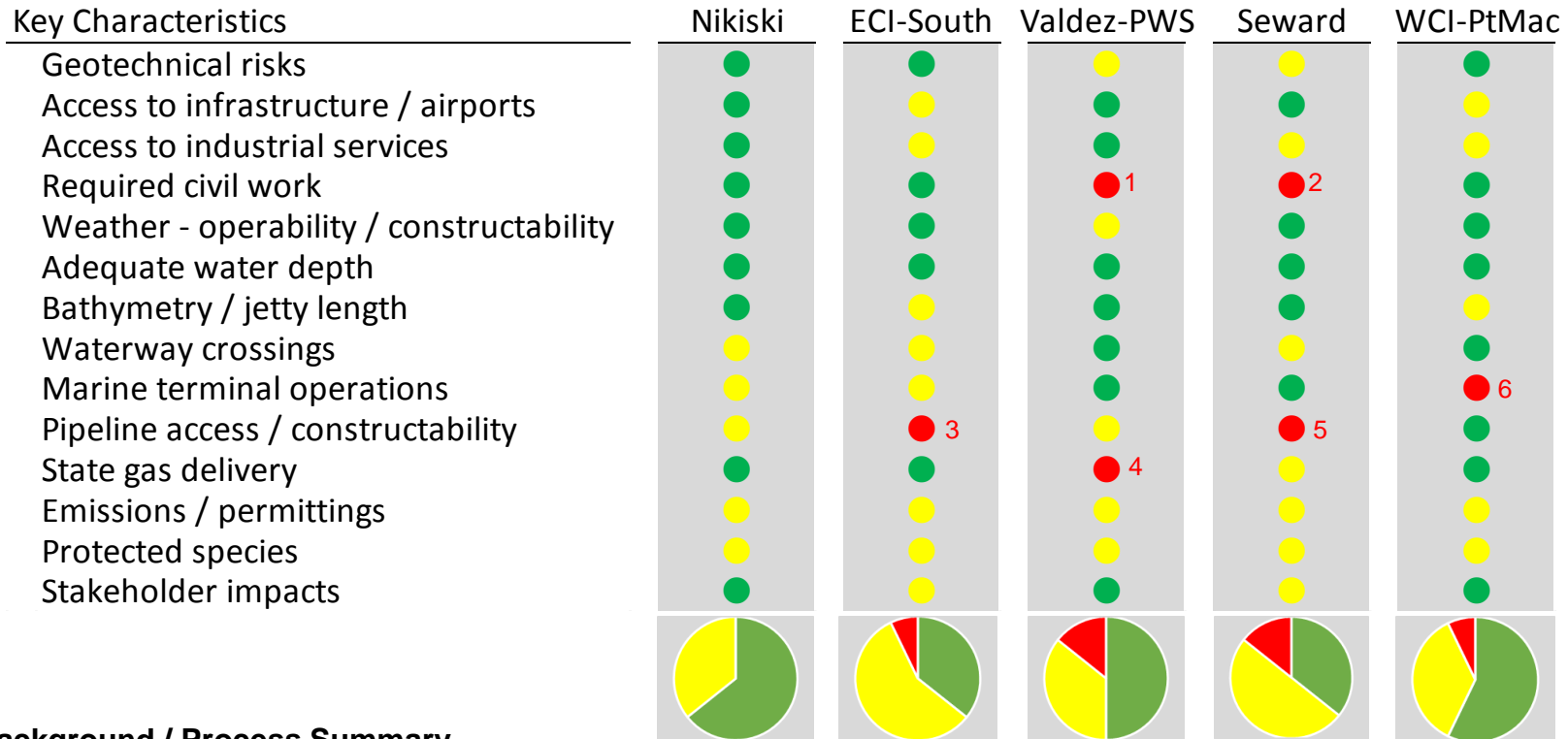
- ✳ 250,000 HP required for 3 LNG trains

### Continuing to improve marine facility design and operational capability

- ✳ Collecting sea floor and meta-ocean data
- ✳ Completed navigation simulation work / ice modeling
- ✳ Commenced marine transportation modeling







## Background / Process Summary

- Screened South Central Alaska tidewater locations for geotechnical, marine suitability – identified 22 potential sites
- Site acceptability criteria (67 factors) used to narrow focus to 5 sites / areas for conceptual engineering evaluation

## Critical Issues (Red Criteria Notes)

- 1) Prince William Sound (PWS) locations require extensive civil work (130 million m<sup>3</sup> cut, \$3-4B cost), higher snow loads
- 2) Seward has limited land for plant, requires creation of level site / civil work (only suitable site occupied by prison)
- 3) East Cook Inlet (ECI) South sites extend pipeline length / costs, impact waterways / fishing, increase permitting risk (\$1B+)
- 4) Valdez – PWS location requires a pipeline spur through Glennallen to supply rail-belt population centers (~\$1B)
- 5) Seward pipeline access extremely difficult to construct, main routes occupied, increases costs, permitting risks (\$2B+)
- 6) Point MacKenzie marine terminal / channel shallow; subject to additional ice load / pack; compromises winter operability



# Alaska LNG – 2015 Summer Field Program

## 2015 Summer Field Season progressing well (~\$60M)

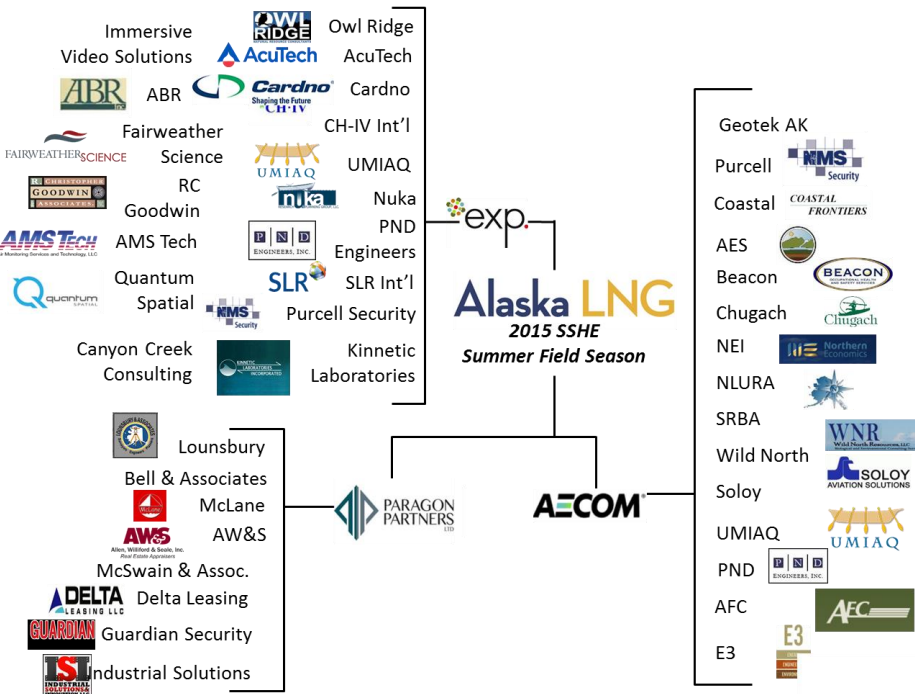
- ✧ Geotechnical scope (250+ boreholes); reduces execution risk
- ✧ Cultural fisheries (51), waterways/wetlands (20k+ acres)
- ✧ Cultural resource surveys (22k acres) led by Native heritage experts
- ✧ 7 archaeological sites identified, 9 under evaluation
- ✧ 2015 SFS scope slightly larger than 2014 SFS

## Continue to coordinate data acquisition / ROW work with AGDC



House pit with crew members at four corners

Cache pit documented in field



250+ Workers / 220,000 + Hours

75% Alaska Content in Summer Field Season

## Community

- ✧ 80+ community sessions in last 12 months
- ✧ Community meetings continuing to support summer field program / FERC 2015
- ✧ FERC scoping meetings – Fall 2015

## Alaska Business

- ✧ Using Alaska vendors, equipment, residents provides access to valuable local expertise, can reduce cost
- ✧ Business information sessions in Barrow, Fairbanks, Kenai and Anchorage in April with ~ 700 participants
- ✧ Over 300 businesses registered at ak-lng.com

## Alaska Native Groups

- ✧ Village and tribal outreach ongoing
- ✧ Engagement with Alaska Native Regional Corporations

## Regulatory

- ✧ Waterway assessment with U.S. Coast Guard
- ✧ Continued reviews with State, Federal regulators
- ✧ Developing second draft of Resource Reports for FERC NEPA Pre-File process





## Alaska LNG Committed to:

- ✧ Environmental responsibility
- ✧ Compliance with all applicable regulations
- ✧ Relentless identification, elimination and responsible management of safety, security, health, environmental risks
- ✧ Seeking balance between economic growth, social development and environmental protection

## Commitment in Action – Marine Mammals

- ✧ Consultation with National Marine Fisheries Service (NMFS) and other stakeholders
- ✧ Avoidance of areas most likely to have concentrations of beluga whales during periods of peak feeding activity
- ✧ Selecting data gathering equipment with lower potential for interaction with wildlife
- ✧ Use marine mammal observers to advise operations regarding potential adaptations or periodic shutdown
- ✧ Cooperation with other projects to avoid duplication of effort and environmental interactions required for early field studies



Cook Inlet beluga whale with calf.

Photo: Chris Garner, U.S. Army, Ft. Richardson.





## Construction Craft Labor

### Labor study in progress to understand Alaskan capacity:

- ✧ Research / interfaces with key stakeholders:
  - Labor unions, state government officials, Alaska Native regional and village corporations, and others
- ✧ Initial focus on construction-related craft labor:
  - Pipefitters, welders, ironworkers, carpenters, scaffolders, sheet metal workers, boilermakers, equipment operators, truck drivers, instrument technicians, insulators, electricians, laborers, etc.
- ✧ Assess gaps between supply / demand, develop strategies



### Infrastructure & logistics studies underway:

- ✧ Focus areas include aviation operators / support, logistics infrastructure / routes / management, supply ports, etc.
- ✧ Enable execution planning for
  - Trucking, barging, rail, air, storage/laydown areas, fuel support
  - Camp management, personnel travel, catering, housekeeping,
  - Ice road construction, maintenance & support

## Module Movement and Logistics Planning



## Progress Pre-FEED deliverables, per JVA / SB138

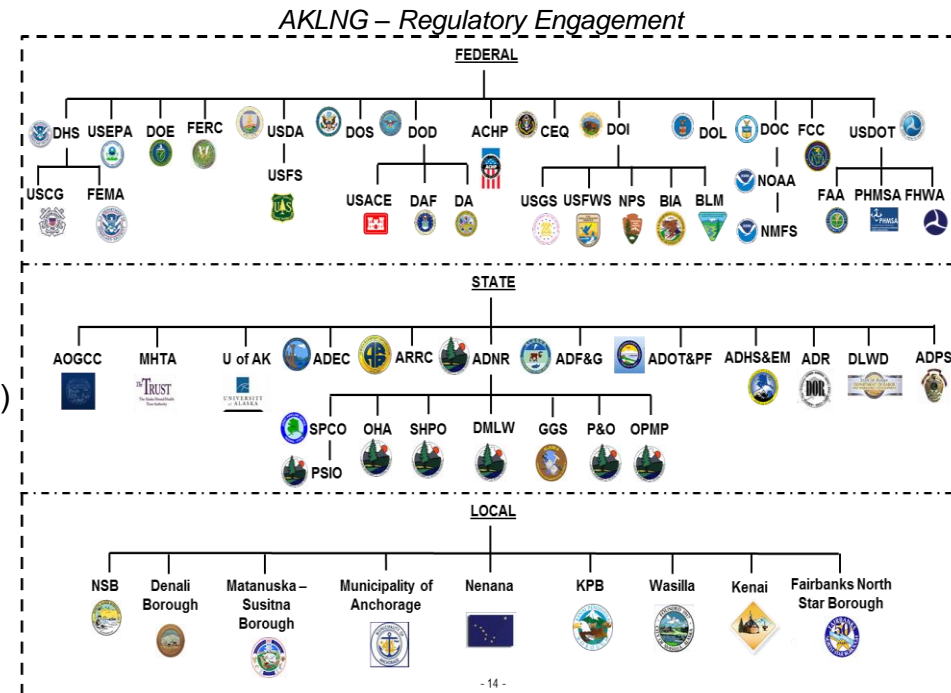
- Develop cost / schedule updates
- Continue regulatory / community engagement for FERC EIS

## Improve alignment with State on key issues:

- Understand / manage potential midstream agent transition
- Define offtake locations / in-state demand (“Gas to Alaskans”)
- Confirm project design (pipeline size / route, plant site)
- Complete support of Administration’s “45 day review”

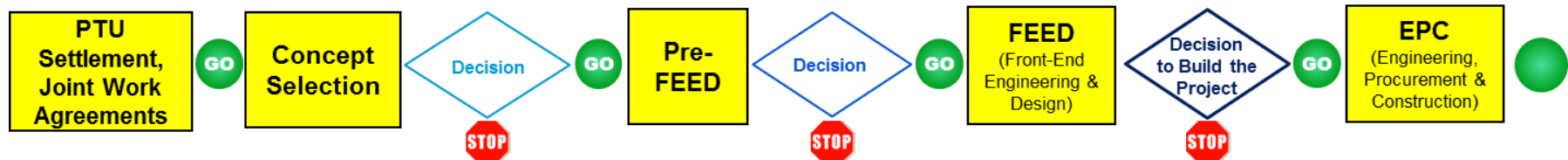
## Position for FEED decision when open issues are resolved

- Match project spend / pace to all issues to minimize cost



## AKLNG – Phased / Gated Project Management Process (Oct12)

- ☐ Viable Technical Option(s) Identified
- ☐ Government Support
- ☐ Permits / Land Use Achievable
- ☐ Potential Commercial Viability
- ☐ Viable technical option
- ☐ Key Commercial Agreements
- ☐ Government Support
- ☐ Permits / Land Use Underway
- ☐ Potential Commercial Viability
- ☐ Secure Permits / Land Use / Financing / Commercial Agreements
- ☐ Confirm Commercial Viability
- ☐ Execute EPC contracts



<b>Peak Staffing:</b>	~200	400 - 500	500 – 1,500	9,000 – 15,000
<b>Cost (\$):</b>	Tens of Millions	Hundreds of Millions	Billions	Tens of Billions
<b>Est. Engineering / Technical Duration*:</b>		12 - 18 Months	2 - 3 Years	5 - 6 Years

