



PANTHEON
RESOURCES PLC

Webinar

Alkaid #2 well - mid testing update and Q&A

24 January 2023

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PANTHEON RESOURCES plc

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- Competent Person’s statement: Michael Duncan has sufficient experience relevant to the style of mineralisation and type of deposit under consideration, and to the activity which he is undertaking to qualify as a Competent Person in accordance with the guidance note for Mining, Oil & Gas Companies issued by the London Stock Exchange in respect of AIM Companies, which outlines standards of disclosure for mineral projects. Michael Duncan consents to the inclusion in this Presentation of the matters based on his information in the form and context in which it appears.





Key discussion points

- Alkaid potential commerciality
- Gas production and development implications
- Coil tubing work and update
- De-risking operations
- How will future operations look?
 - Liquids processing
 - Water handling
 - Gas handling



5 Can Alkaid Be Commercial at Current Rates and Composition

Illustrative Alkaid project economics at Production Rates and Value Stream reported on 30 Dec 2022

Full Field development on Alkaid anomaly – ignored SMD

No rate improvement or optimization

56 development wells

Current mix of Oil/Condensate and NGL’s at current estimated TAPS valuation

50% Drilling & Completion cost increase to \$19.5 mln per well

Maximum flow rate of 137 Bbl/day liquids per 1000’ of lateral

Conceptual development model for the Alkaid anomaly project only (i.e.. excluding SMD) to demonstrate potential project economics. Management estimate. Based upon Alkaid #2 update at the 40% cleanup stage of testing as reported on 30.12.2022 ie 137.5 bbls of liquid hydrocarbons (a combination of oil, NGL’s, condensate) per 1000ft of unblocked wellbore at the starting (and maximum) flow rate and declining from there. Assumptions: 56 development wells drilled, draining 68 million barrels of liquid hydrocarbons (vs current P50 estimate of 76.5 mmbbl). Modelled drilling and completion cost per well increased by 50% to \$19.5m. Hydrocarbon prices based upon the calculated value today of the liquid hydrocarbon mix encountered at Alkaid#2 held flat. Post production taxes and royalties, pre federal income tax.

	PANR adjusted mix per bbl		
WTI price held flat	\$60/bbl	\$70/bbl	\$80/bbl
IRR	11%	20%	30%
NPV(10)	\$12,000,000	\$223,000,000	\$423,000,000

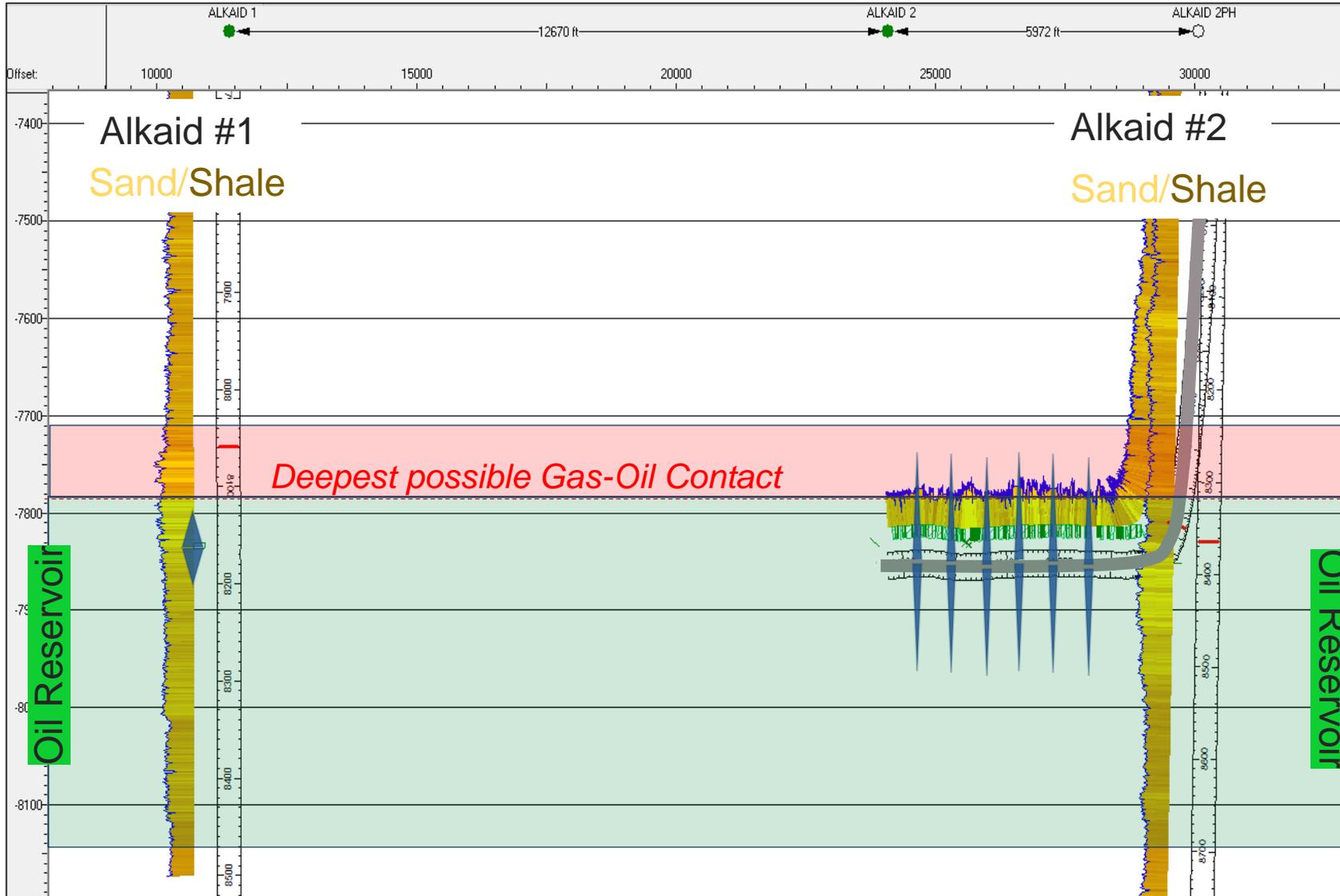
Note that this model is for illustrative purposes only. It is not intended to represent the Company’s estimate of full field economics; rather it models the actual flow rates and product mix reported on 30.12.2022. Should flow rates or the ratio of oil to other hydrocarbons improve, then we would expect the projections to improve materially.

Even at the tested flow rates Alkaid models indicate potential to be economic. There is great potential for material upside through increased flow, improved oil to liquids ratio, cost decrease, and efficiency gains!

Ultimate commerciality can only be assessed upon the conclusion of flow testing operations.

Possible Gas Cap and the Alkaid Wells

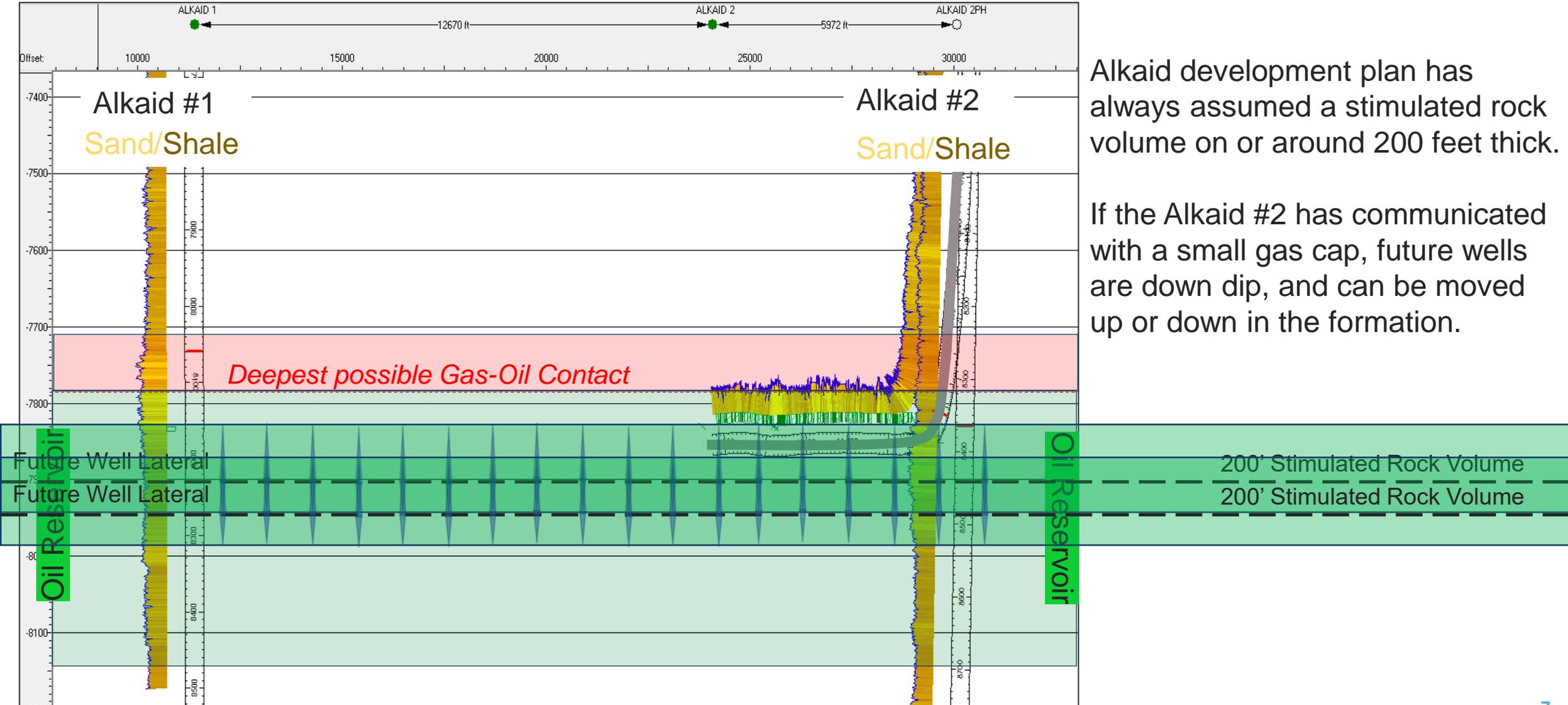
Alkaid 1 and 2



Alkaid #2 appears to have connected, via frac, with a gas cap.

Alkaid #1 test data has a much lower GOR than Alkaid #2

Alkaid 1 and 2

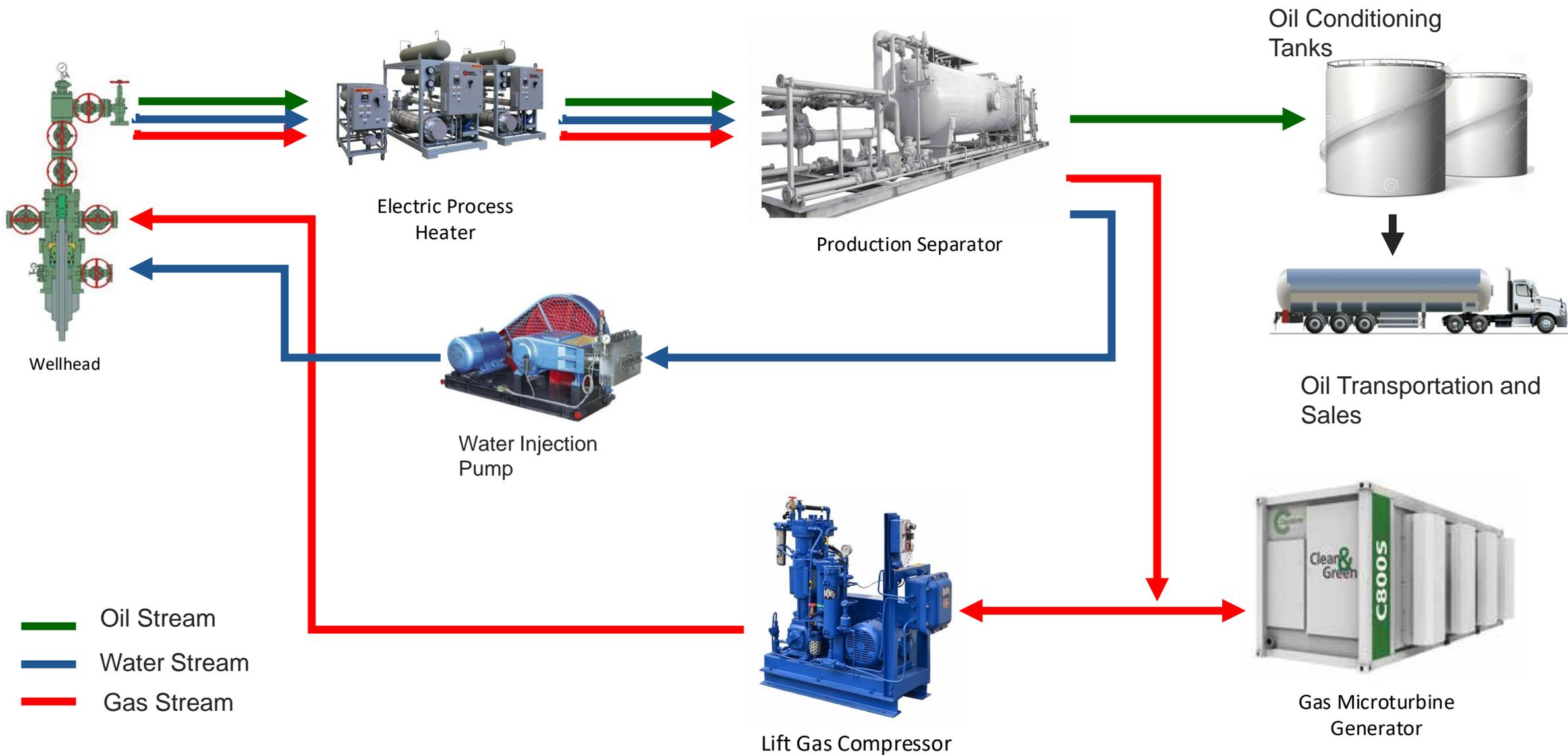


Alkaid development plan has always assumed a stimulated rock volume on or around 200 feet thick.

If the Alkaid #2 has communicated with a small gas cap, future wells are down dip, and can be moved up or down in the formation.

Alkaid #2 – 2,000 BOPD PROCESSING FACILITY

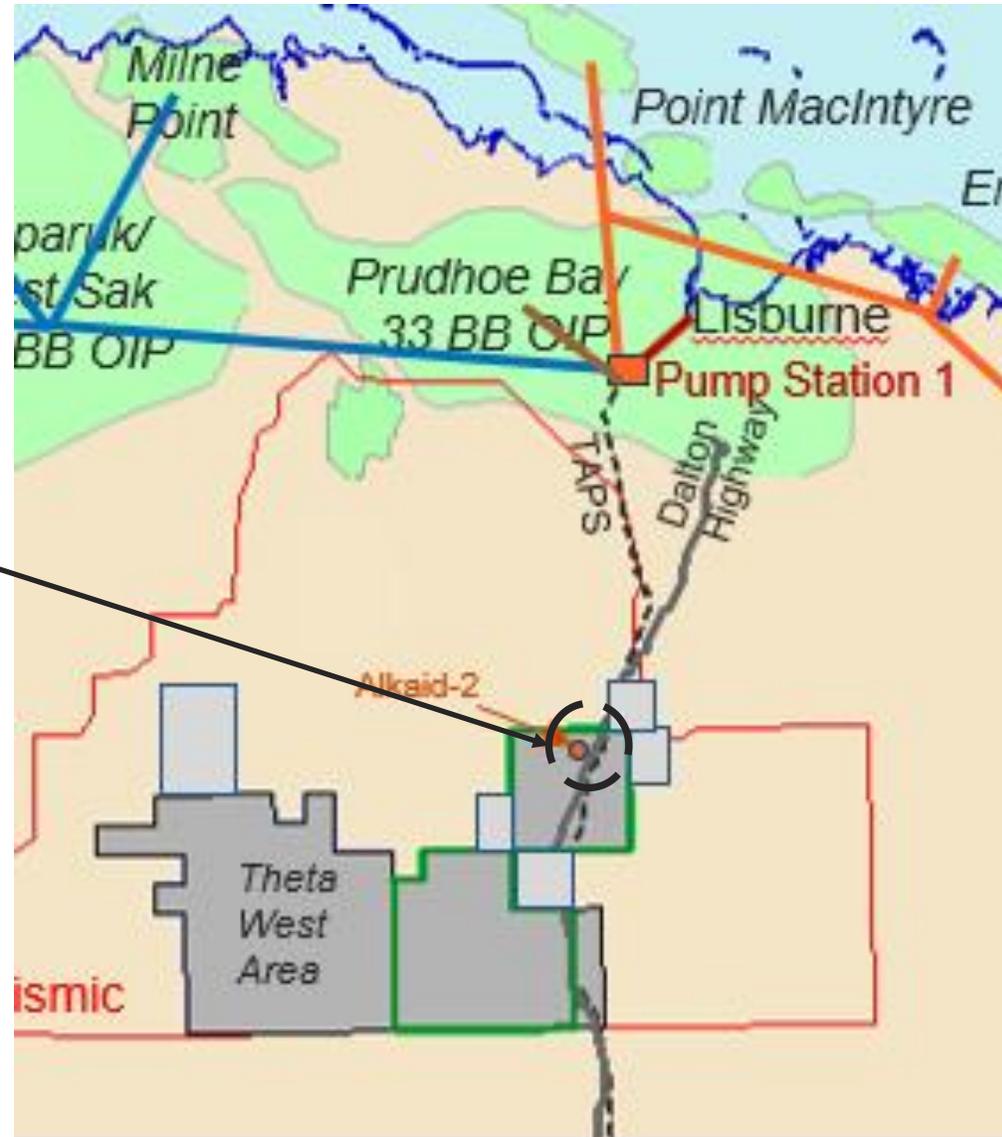
Facilities can be modified to efficiently process NGLs





Future production to go directly into TAPS without ever being exposed to atmospheric pressure or conditions.

The close proximity offers advantages to development timescales, capex and project NPV

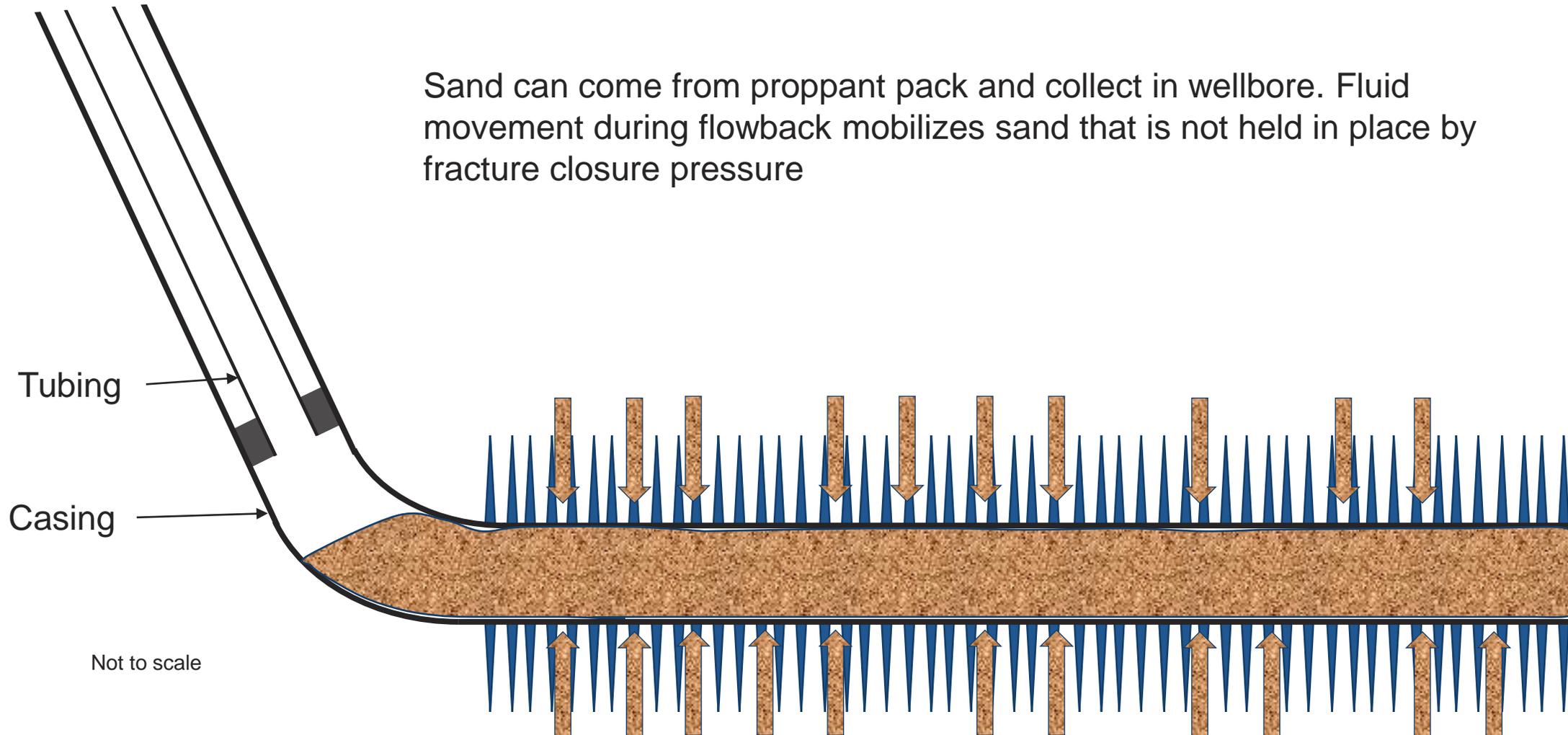


Sand Accumulation

10



Sand can come from proppant pack and collect in wellbore. Fluid movement during flowback mobilizes sand that is not held in place by fracture closure pressure

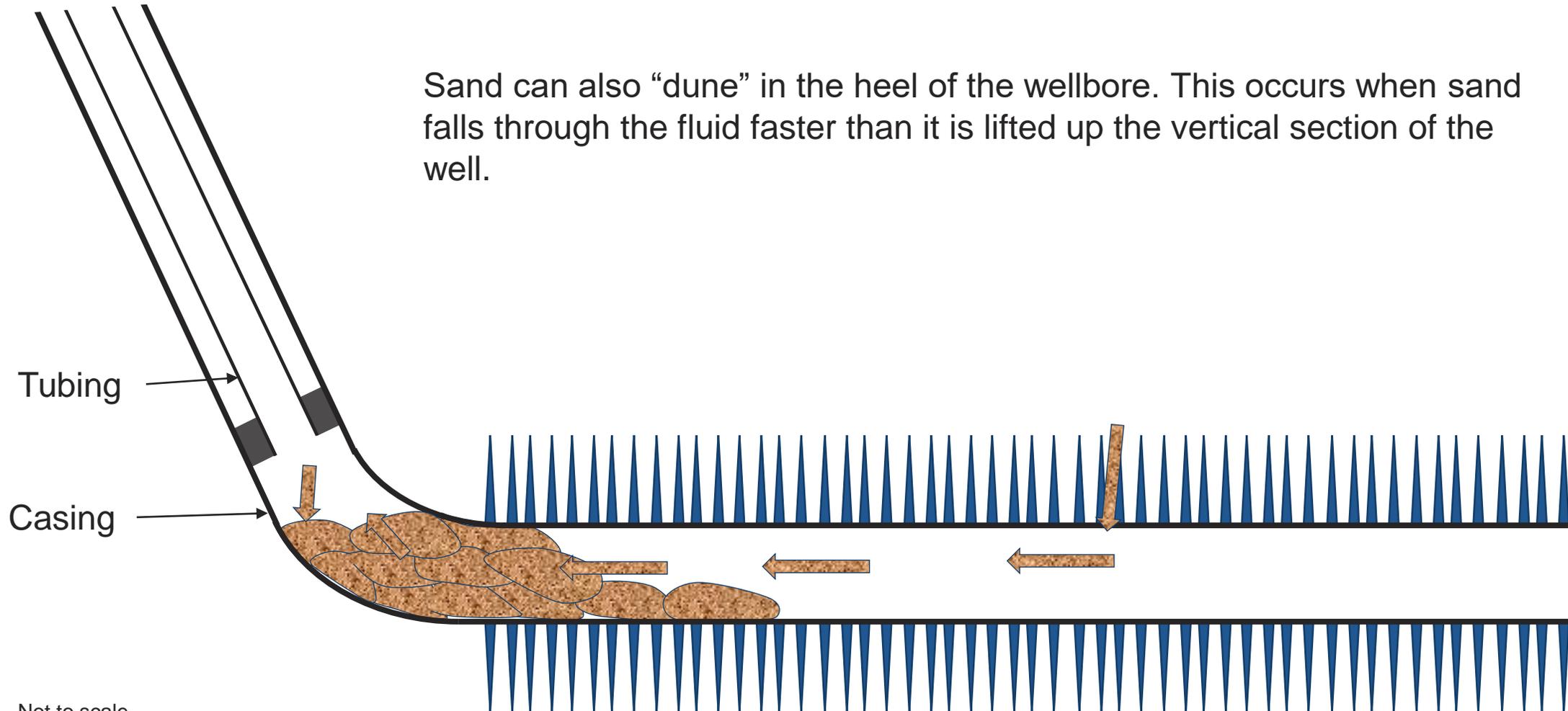


Sand Duning

11



Sand can also “dune” in the heel of the wellbore. This occurs when sand falls through the fluid faster than it is lifted up the vertical section of the well.

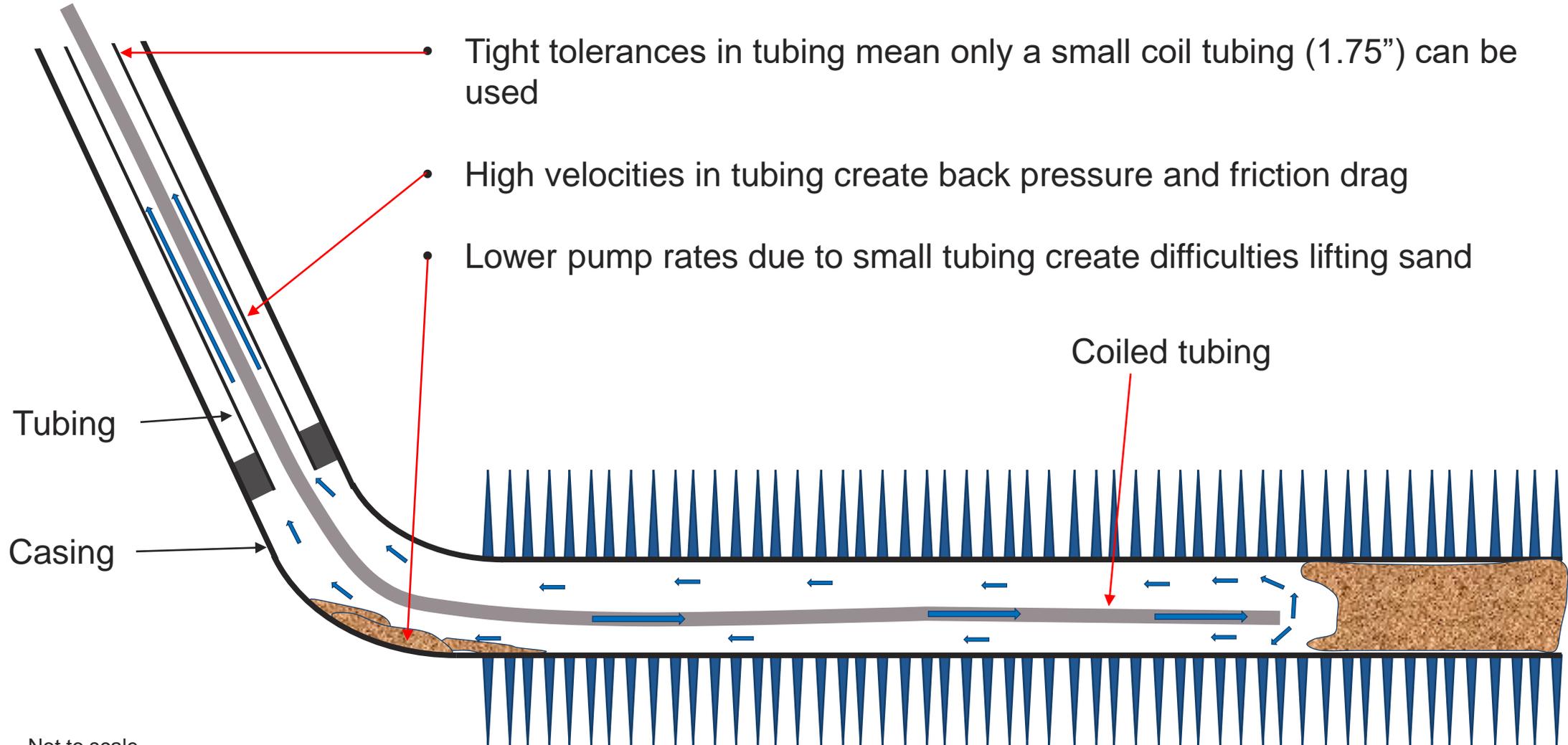


Not to scale

Source: Pantheon Resources plc

Through Tubing Sand Cleanout

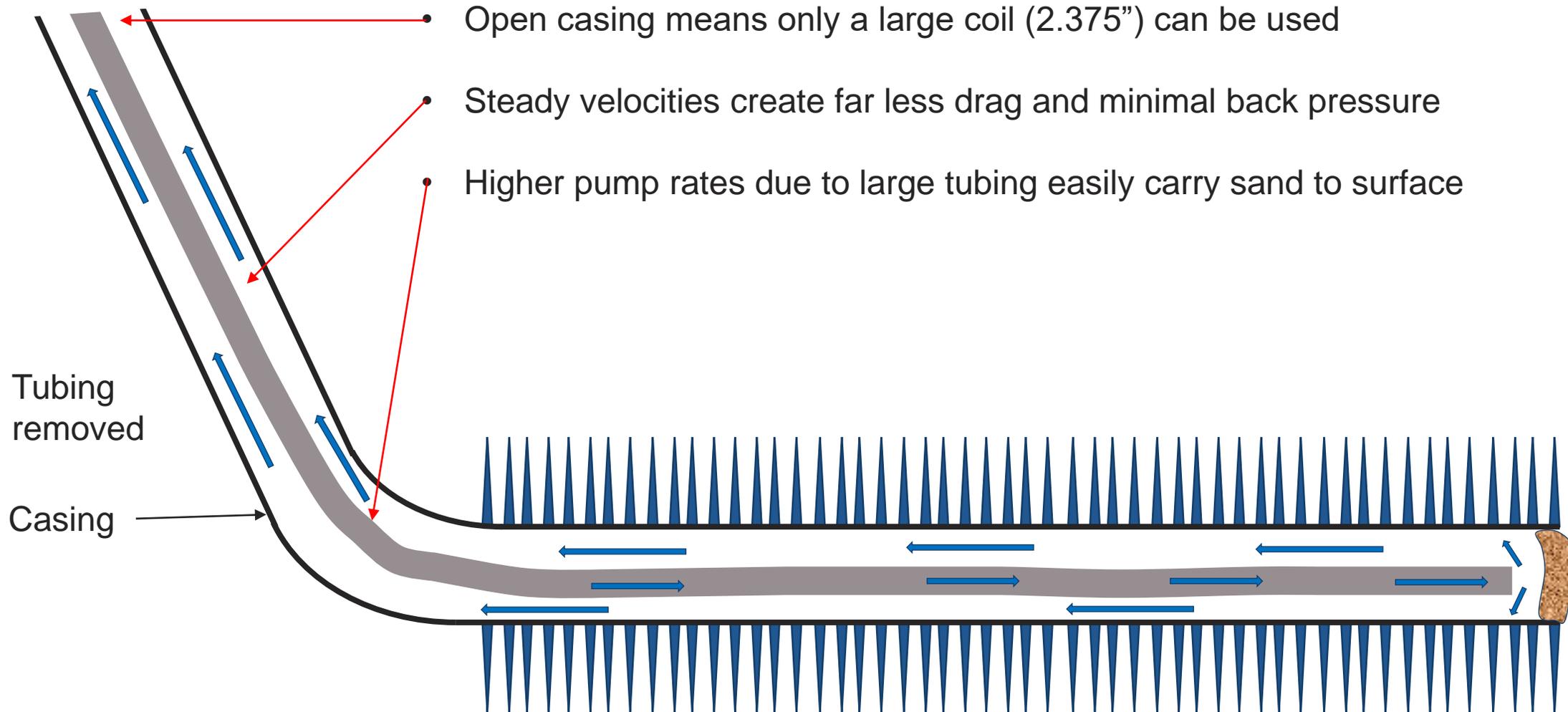
12



Not to scale

Source: Pantheon Resources plc

Casing Sand Cleanout, Next Step



Not to scale



Drilling

- Horizontal hole stability
- Shale stability at angles
- Reach
- PPFG window
- Two-string design
- Landing in and following reservoir

Completion

- Slick water fracing
- Pump down capabilities on the north slope
- Water supply and deliverability

Production

- Lifting capabilities
- Oil quality for crude
- Sizing configuration
- Water returns



Drilling

- ✓ Horizontal hole stability
- ✓ Shale stability at angles
- ✓ Reach
- ✓ PPFG window
- ✓ Two-string design
- ✓ Landing in and following reservoir

Completion

- ✓ Slick water fracing
- ✓ Pump down capabilities on the north slope
- ✓ Water supply and deliverability

Production

- ✓ Lifting capabilities
- ✓ Oil quality for crude
- ✓ Sizing configuration
- ✓ Water returns



Reservoir

- Reservoir presence

- Would the reservoir be where we think it is?

Yes, Spot on.

- Reservoir continuity

- Would the reservoir follow the geologic model and span the mapped extent?

Yes, as evidenced by the pilot hole and by the reservoir quality encountered while drilling the lateral

- Oil quality

- Is the produced oil easily processed?

Yes. Pipeline quality oil is processed on location

- Does oil quality reflect that of the Alkaid #1

Yes. Oil quality does, however the composition of the production stream was unexpected

- Are hazards such as waxes or sulfur present?

No significant hazards seen

- Reservoir deliverability

- Will the fluid move through the rock at commercial rates

Based on all current observations and modeling, YES.

Current production rates can be commercial, and there are significant ways to improve deliverability.



- Supports commerciality at current rates and product value stream ⁽¹⁾ ⁽³⁾
- Significant room for improvement. Alkaid#2 is only at 40% (max) cleanup ⁽²⁾
- Sand blockage cleanout to commence shortly...

(1) Refer slide 5 for assumptions. The Alkaid development was modelled for illustrative purposes only, based upon the flow rates of 137.5 bbls per 1000ft and produced hydrocarbon mix (not pure oil), as reported on 30 December, 2022, at current ANS pricing, to demonstrate potential commerciality assuming these inputs – ie ignoring potential improvements that may arise as the well continues to clean up.

(2) Whilst improvements are typically expected as a well cleans up from the present 40%, there can be no guarantee.

(3) A definitive assessment of commerciality can not be made until the completion of flow testing operations. Alkaid #2 is believed to be at a maximum 40% in its cleanup.



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Pantheon's Liquid Production Valuation



Alkaid-2 NGL's and Valuation of Liquid Hydrocarbons Questions



- Transport NGL's to market? **YES**
- How are NGL's priced on the North Slope? **Via a robust and sophisticated methodology**
- What value would Pantheon receive for the **Current** production mix of oil/condensate and NGL's from Alkaid-2?
80%-90%+ of Alaska North Slope crude price

Alkaid-2 NGL's and Valuation of Liquid Hydrocarbons Questions



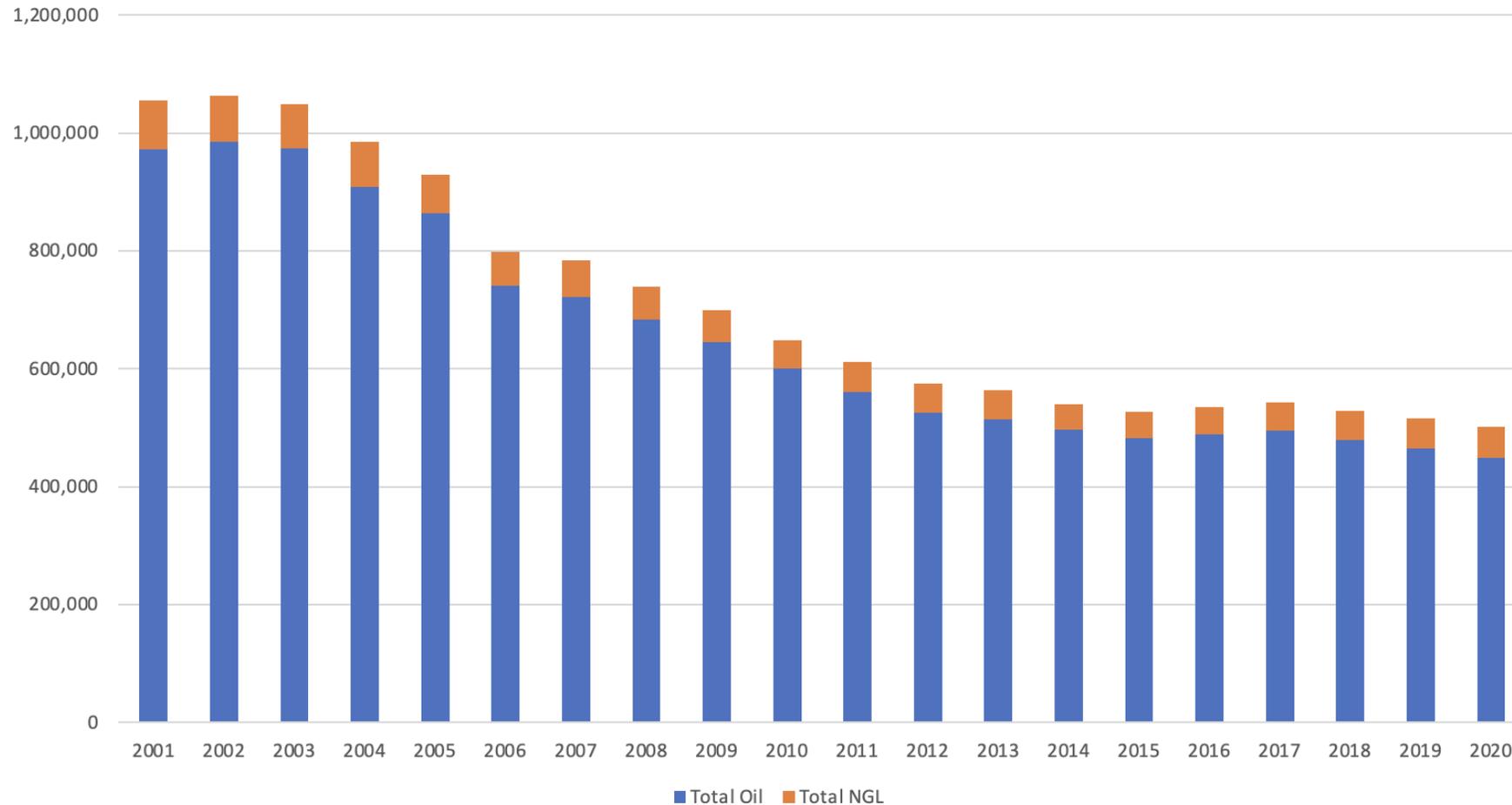
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NGL's on the North Slope

NGL's Have Long Been A Material and Growing Portion of TAPS Throughput



TAPS Production (2001-2020)



“ANS Crude” =

The Oil, Condensate, and NGL's that are transported through TAPS and sold as a mix to refineries

NGL's on the North Slope

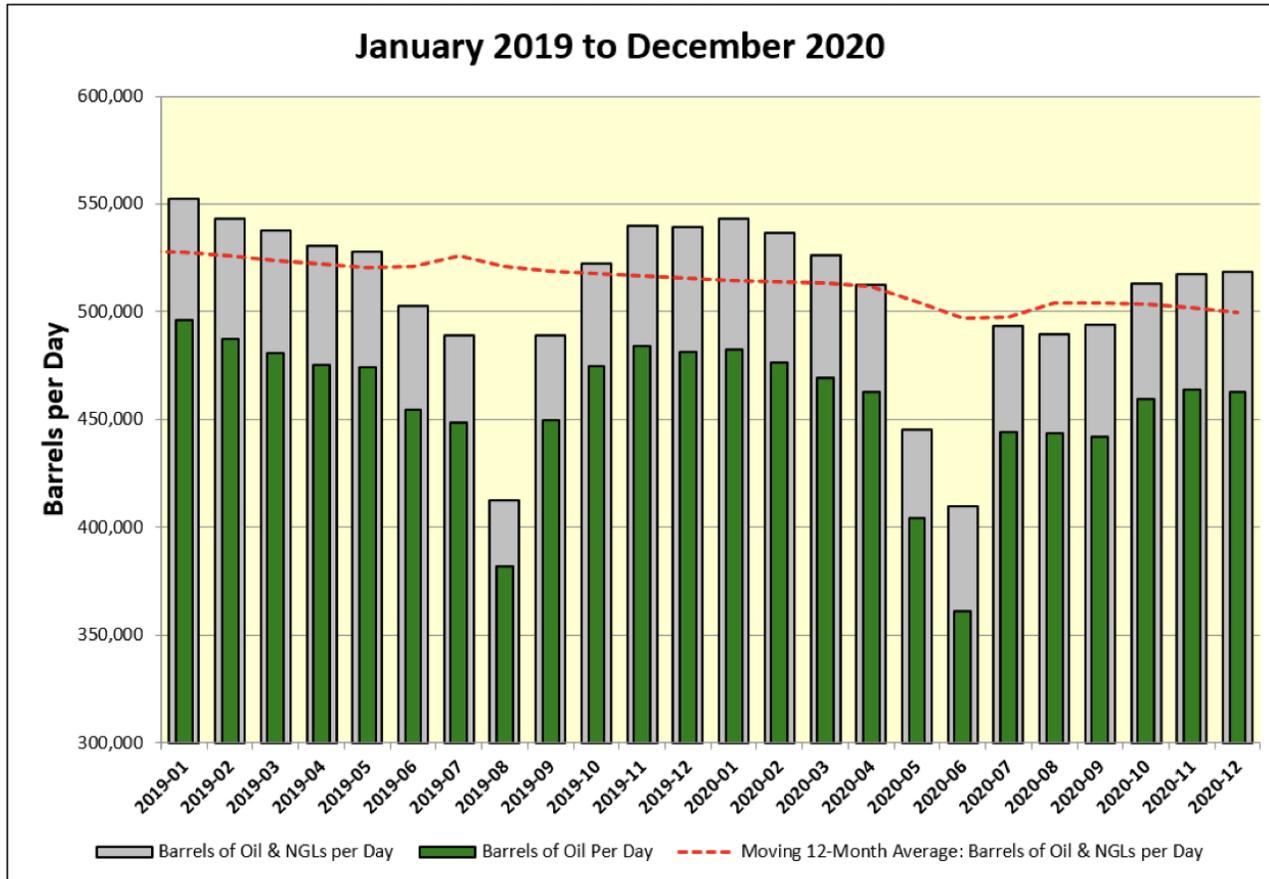
NGL's Portion of TAPS Throughput Continues to Grow



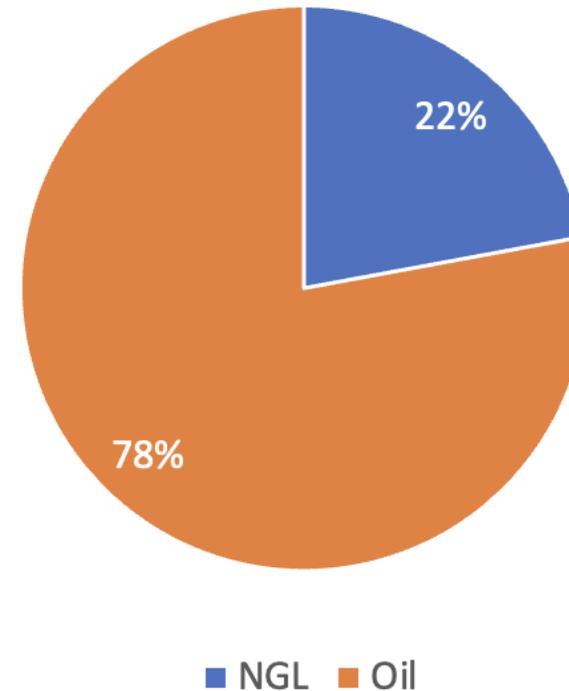
Alaska's Statistics

ALASKA OIL and NGL PRODUCTION

January 2019 to December 2020



Prudhoe Bay Production 2021



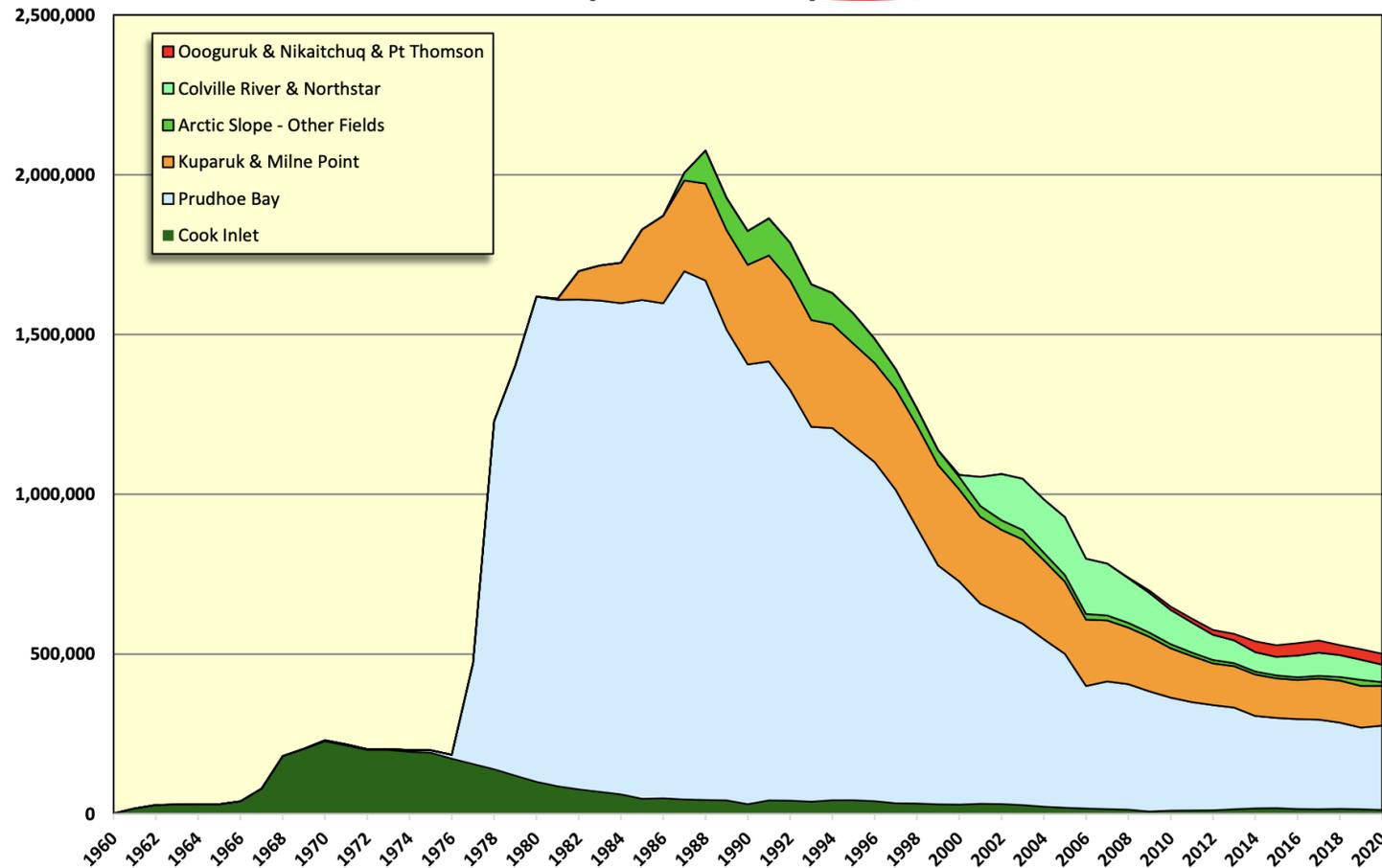
NGL's on the North Slope

NGL's (and Condensate) are typically reported simply as part of Alaska Production



**Alaska's Average Daily Oil & NGL Production Rate
(1960 - 2020)**

*Condensate is reported as oil



Alkaid-2 NGL's and Valuation of Liquid Hydrocarbons Questions



•Transport NGL's to market? **YES**

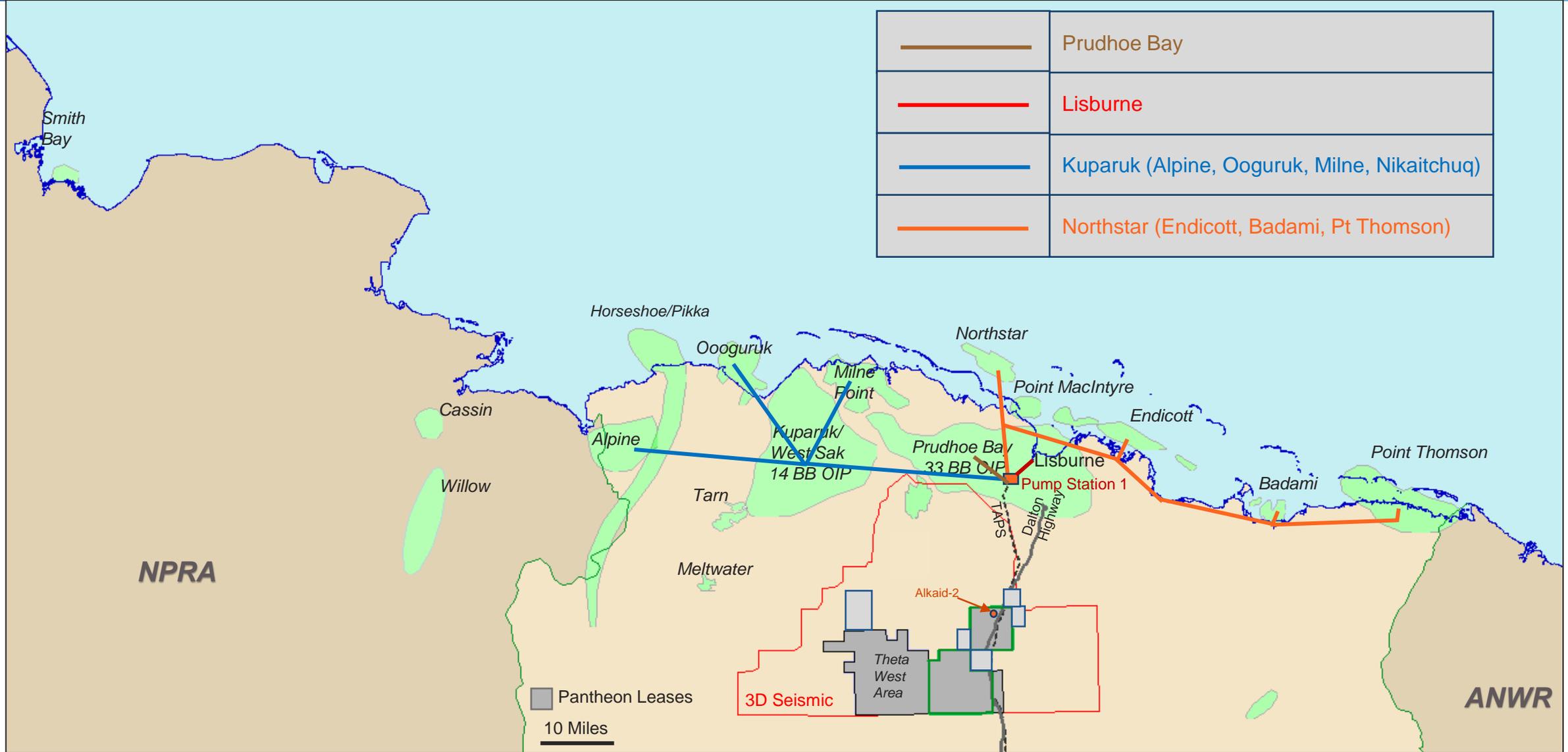
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•What value would Pantheon receive for the **Current** production mix of oil/condensate and NGL's from Alkaid-2?

80%-90%+ of Alaska North Slope crude price

North Slope Crude/Condensate/NGL Distribution

Four Pipelines Feed TAPS Pump Station 1 – From 11 Different Fields



Refineries Change the TAPS Mix Midstream

PetroStar's two refineries take out the full stream and return the unused portion to TAPS



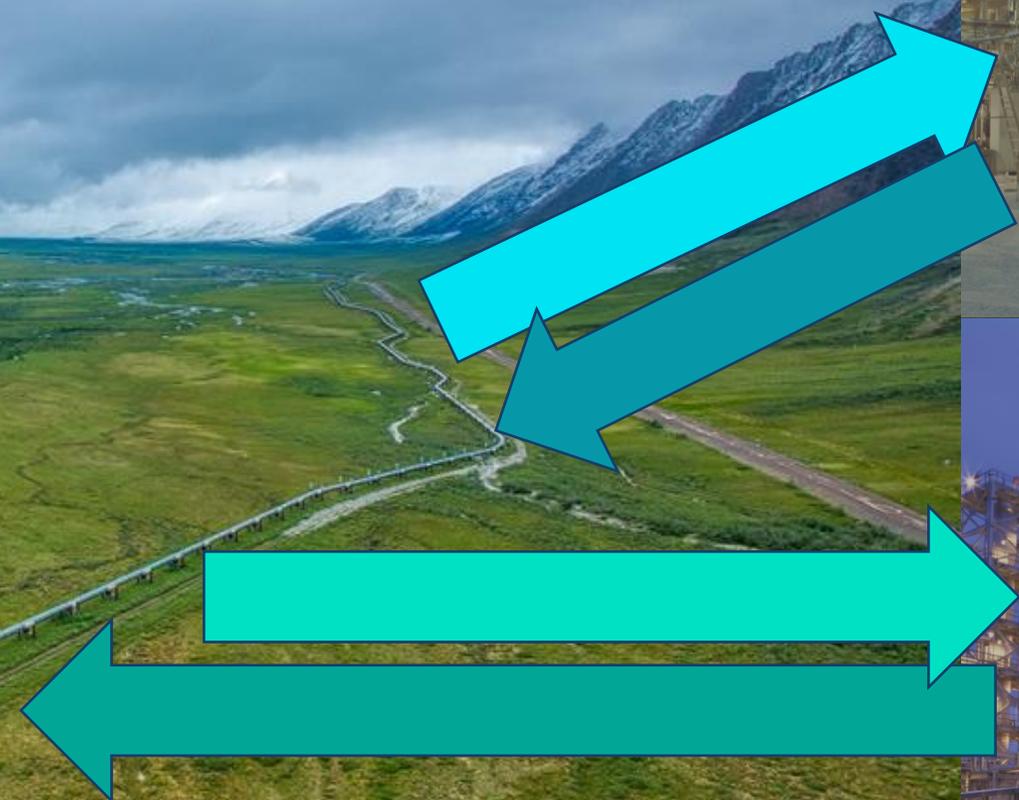
North Pole

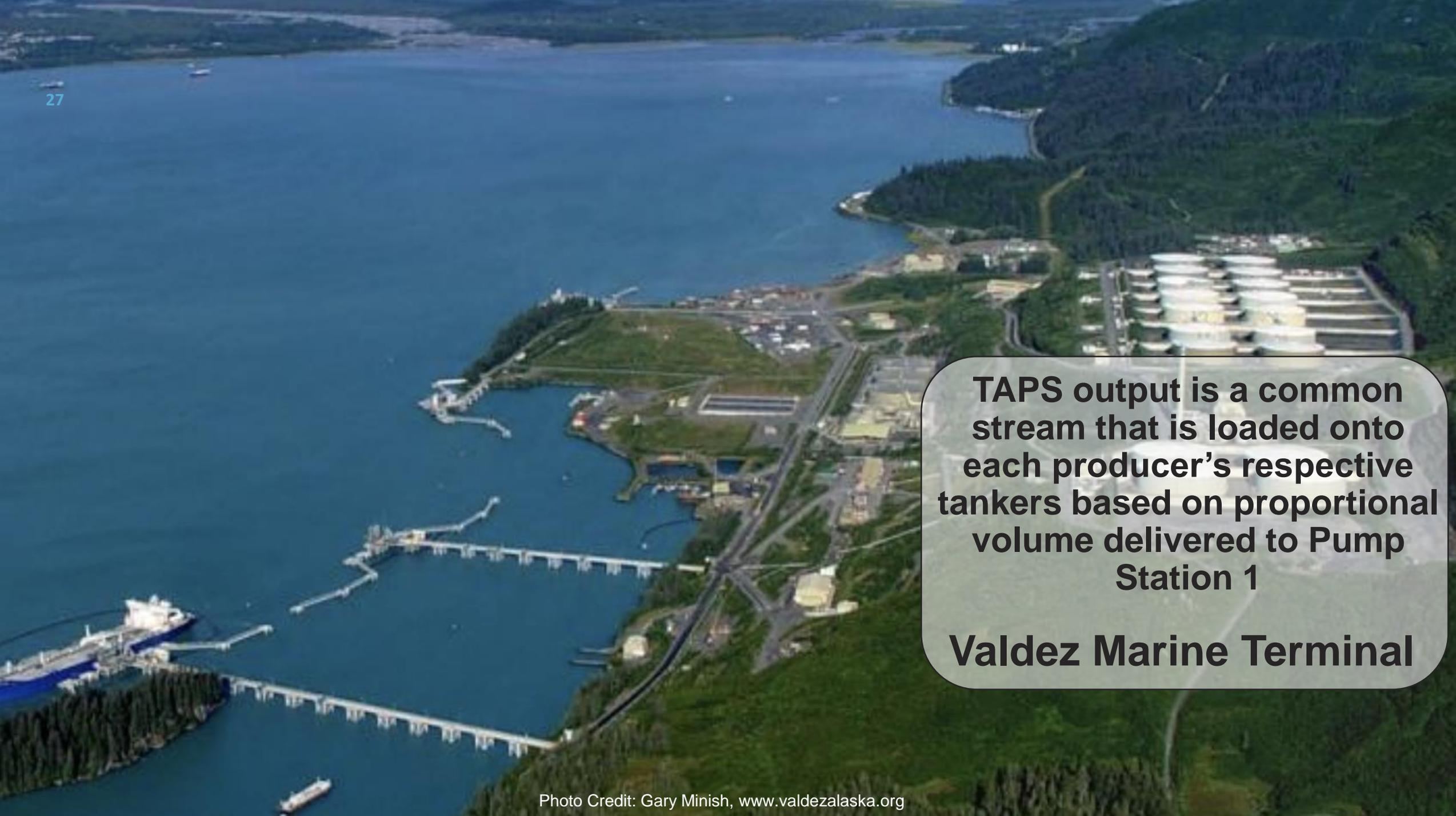
Photo Credit: petrostar.com



Valdez

Photo Credit: petrostar.com





TAPS output is a common stream that is loaded onto each producer's respective tankers based on proportional volume delivered to Pump Station 1

Valdez Marine Terminal

Alaska North Slope (ANS) Crude Market

How to Fairly Compensate Those Contributing The Highest Quality Fluids



- In order to compensate (or charge) the producers for the difference between the value of what they delivered to Pump Station 1 and what they receive at the Valdez Marine Terminal, they have collectively established the TAPS Quality Bank.
- The TAPS Quality Bank is managed by a third-party to test each of the inflowing streams and establish a relative value for each based on a distillation method to determine the expected refinery value for the component hydrocarbon parts of the stream.



Component	TBP Boiling Range °F	% Vol	Specific Gravity
Propane (C3)		X	X
I-Butane (iC4)		X	X
N-Butane (nC4)		X	X
LSR	C5-175	X	X
Naphtha	175-350	X	X
Light Distillate	350-450	X	X
Heavy Distillate	450-650	X	X
Gas Oil	650-1050	X	X
Resid	1050+	X	X
Full Petroleum Stream			X

- Analysis is done on each contributing stream to establish the relative proportion of each component hydrocarbon in that stream
- A value is assigned to each component based on the estimated value at the refinery
- The full stream is then assigned a value per barrel based on the aggregate value of the component hydrocarbons

TAPS Quality Bank Methodology



<u>LOCATION</u> <u>CRUDE TYPE</u>	<u>VOLUME</u> <u>(Bbls)</u>	<u>STREAM</u> <u>VALUE</u> <u>(\$/BBL)</u>
PUMP STATION #1 QUALITY BANK		
PBU IPA	1,000,000	1,000,000
KUPARUK - KUPARUK	1,000,000	1,000,000
KUPARUK - MILNE POINT	1,000,000	1,000,000
KUPARUK - NIKAITCHUQ	1,000,000	1,000,000
KUPARUK - OOGURUK	1,000,000	1,000,000
LISBURNE	1,000,000	1,000,000
NORTHSTAR - BADAMI	1,000,000	1,000,000
NORTHSTAR - ENDICOTT MAIN PROD	1,000,000	1,000,000
NORTHSTAR - NORTHSTAR MAIN PROD	1,000,000	1,000,000
NORTHSTAR - POINT THOMSON	1,000,000	1,000,000

- Each contributing field is assigned a calculated volume and relative stream value
- The volume and value then determine how much of a charge or credit is delivered to the producer

Alkaid-2 NGL's and Valuation of Liquid Hydrocarbons Questions



- Transport NGL's to market? **YES**
- How are NGL's priced on the North Slope? **Via a robust and sophisticated methodology**
- What value would Pantheon receive for the **Current** production mix of oil/condensate and NGL's from Alkaid-2?
80%-90%+ of Alaska North Slope crude price



80%-90%+ of ANS For Full Stream

- Additional data and analysis to come
- Alkaid-2 is not yet cleaned out, and the NGL component mix will likely change
- Our collection of NGL data will improve and likely lead to higher valued components being captured in the count



Alkaid 2 from the Dalton Highway – It really is that close!





ALKAID WELLS 1&2

- Large volume, high quality accumulation – as predicted
- Source rock lying immediately beneath the Alkaid trap is mature at Peak oil generation - as predicted
- Our focus is on understanding reservoir performance
- Long-term (ca 6 months) testing critical to advancing how to move to full field development

ALKAID ACCUMULATION

- Assessment based on more than a decade of work
- Conclusion of work from world class geochemists, geoscientists and reservoir modelers
- Extensively sampled & analyzed - past and ongoing
- Our proprietary 3D seismic illustrates a continuous trap geometry
- Possibility of a volumetrically insignificant gas cap in the very highest point in the trap

TEST PRODUCTION TO DATE

- High quality, light oil >36° API at reservoir conditions
- High value condensate and natural gas liquids
- Natural Gas



Petroleum Geochemistry of Great Bear/Pantheon Oils North Slope Alaska -- updated with the new Alkaid 2 oil

Pantheon **management** believe there is not another company on the North Slope that can match the oil resource volume and oil quality of our discoveries that we have made over recent years.



Theta West BFF Oils



Talitha Z#2 (L.SMD)



Talitha Z#3 (U.SMD)

Talitha BFF



Alkaid-1



Kerosene/
Diesel



Interpretive Report
Houston Texas
29 November 2022

GEOMARK



Summary Table

Great Bear-Pantheon Oils

New Alkaid-2 Oil



Our oils are geochemically very similar with variations primarily attributable to differences in source rock maturity over the vast area of our discoveries

GM_ID	API Well #	Well Name	Reservoir Fm	Depth ft	Reservoir Age	Comments	API Gravity (60°F)	Sat/Aro	Projected Source Rocks	%VREB	%VREQ
AS0498	50223200360000	Theta West 1	LBFF		Cretaceous Campanian	3/21/2022 23:30	37.6	1.63	Hue/GRZ+Pebble Sh.	0.80	nd
AS0500	50223200360000	Theta West 1	LBFF			3/21/2022 1:30	37.1	1.67	Hue/GRZ+Pebble Sh.	0.79	nd
AS0502	50223200360000	Theta West 1	LBFF			3/21/2022 3:30	37.0	1.64	Hue/GRZ+Pebble Sh.	0.80	nd
AS0504	50223200360000	Theta West 1	LBFF			3/21/2022 5:30	37.7	1.81	Hue/GRZ+Pebble Sh.	0.80	nd
AS0487	50223200350000	Talitha A	Zone #2 L.SMD			2/16/2022	37.2	1.70	Hue/GRZ+Pebble Sh.	0.79	nd
AS0486	50223200350000	Talitha A	Zone #3 U.SMD	6965		2/28/2022	36.2	1.86	Hue/GRZ+Pebble Sh.	0.81	nd
AS0489	50223200350000	Talitha A	Zone #3 U.SMD			3/4/2022	36.2	1.79	Hue/GRZ+Pebble Sh.	0.81	nd
AS0491	50223200350000	Talitha A	Zone #3 U.SMD			3/1/2022	39.8	2.31	Hue/GRZ+Pebble Sh.	0.81	nd
AS0484	50223200350000	Talitha A	Zone #1 LBFF	9400			38.1	2.33	Hue/GRZ+Pebble Sh.	1.05	nd
AS0497	50223200350000	Talitha A	Zone #1 LBFF 'PB'			0204201G	39.4	2.43	Hue/GRZ+Pebble Sh.	0.97	nd
AS0432	50223200290000	Alkaid #1	Alkaid Anomaly	8050			35.1	1.61	Hue/GRZ+Pebble Sh.+Kingak Sh.	0.74	nd
AS0518	50223200270000	Alkaid #2	Alkaid Anomaly	8050			36.6	1.51	Hue/GRZ+Pebble Sh.+Kingak Sh.	0.69	0.82
AS0470		kerosene/diesel					OBM	42.3	5.03		

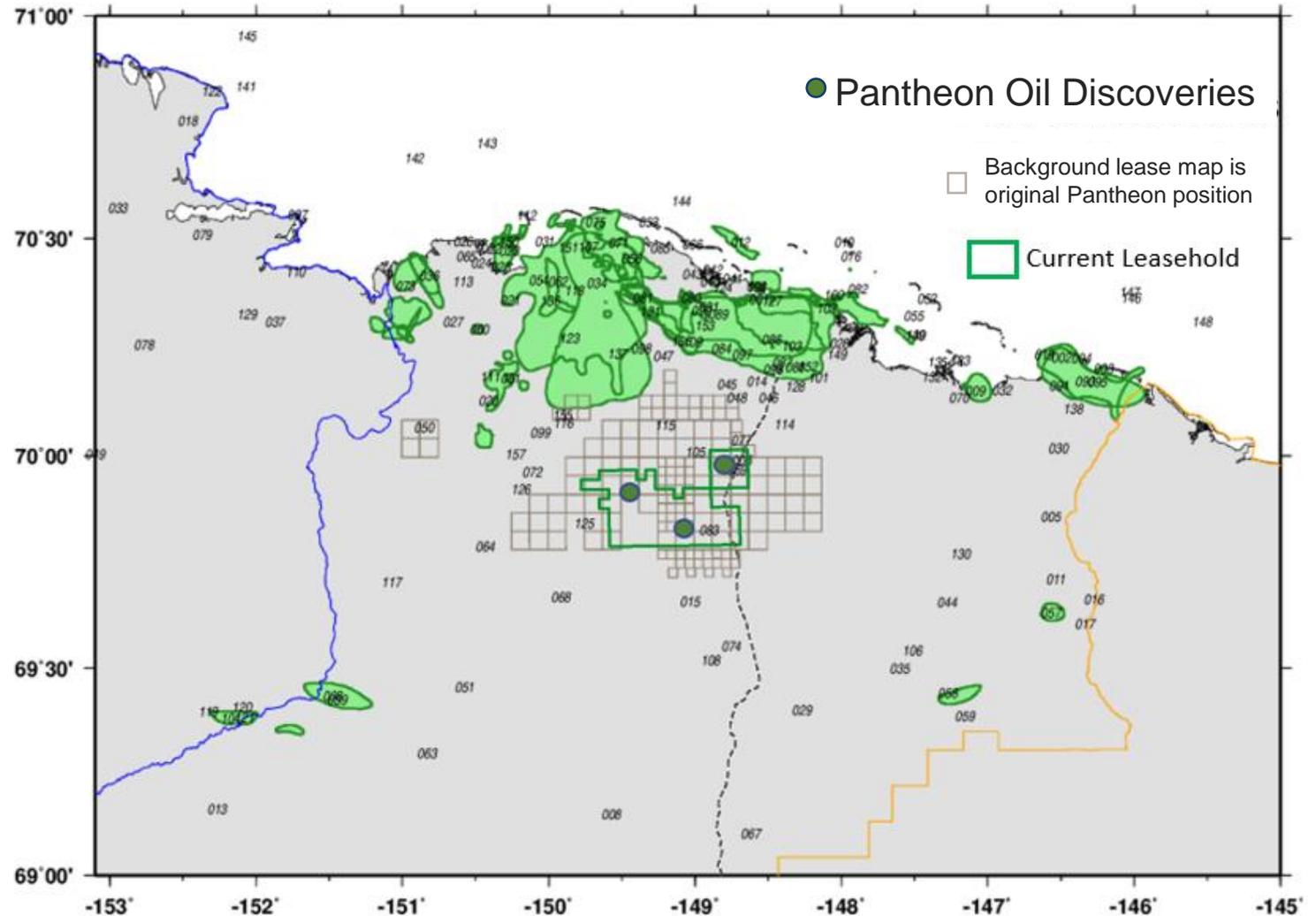
BFF: Basin Floor Fan
SMD: Shelf Margin Deltaic

% VREB: Oil maturity as Vitrinite Reflectance Equivalent (based on heavy-end terpane & sterane biomarkers)
% VREQ: Oil maturity based on alkyl aromatics (QQQ analysis)
Sat/Aro: saturate to aromatic hydrocarbon ratio



We have invested the time and effort to understand the petroleum systems we are exploiting.

- >162 wells with geochemistry data
- Includes well from USGS compilations and Pantheon wells
- Pantheon has resampled >21 wells in the immediate project area
- The database is evergreen – continuously updated as wells are drilled





ALKAID WELLS 1&2

Large volume, high quality oil accumulation – as predicted

Source rock lying immediately beneath the Alkaid, Talitha and Theta West trap is mature at Peak oil generation

Our focus is on understanding reservoir performance

Long-term testing critical to advancing how to move to full field development at Alkaid and beyond

ALKAID ACCUMULATION

Assessment based on more than a decade of focused Petroleum Systems evaluation and regional 3D seismic acquisition

Integration of work from world class geochemists, geoscientists and reservoir modelers

Extensively sampled & analyzed - past and present

Continuous across map geometry

Possibility of a volumetrically insignificant gas cap in the very highest points in the trap

GAS PRODUCED DURING TESTING

Rich in light end liquids

WHAT IS THE STATE OF OUR PORTFOLIO RIGHT NOW:

Proven extremely significant, multibillion barrel light oil accumulations across Alkaid, Talitha, Theta West

Proven that we can identify light oil accumulations with our 3D seismic data (4 for 4)

Engaged with SLB: static and dynamic “evergreen” portfolio-wide model with ca. 13,000,000 individual cells

This model will be updated with results as the extended flow test proceeds at Alkaid and eventually expanded across all of our discoveries to aid in optimization of drilling, completions and production.



- Phase 2 SLB dynamic model across all reservoirs
 - Accurate EUR
 - Components of production stream
 - Facility design
- Engaging Competent Person candidates for IER's
 - Prioritize Theta West and Alkaid
- **SLB to set up a virtual data room (run by SLB)**
 - **CP's, potential partners, farminees**
- Post Alkaid 2 test
 - SMD test at Alkaid pad
 - Test of Phecda block
 - Updip Theta West



Q & A