PANTHEON RESOURCES PLC

Modelling Performance from Vertical to Horizontal Wells

Your attention is drawn to the disclaimer at the beginning and footnotes throughout this presentation

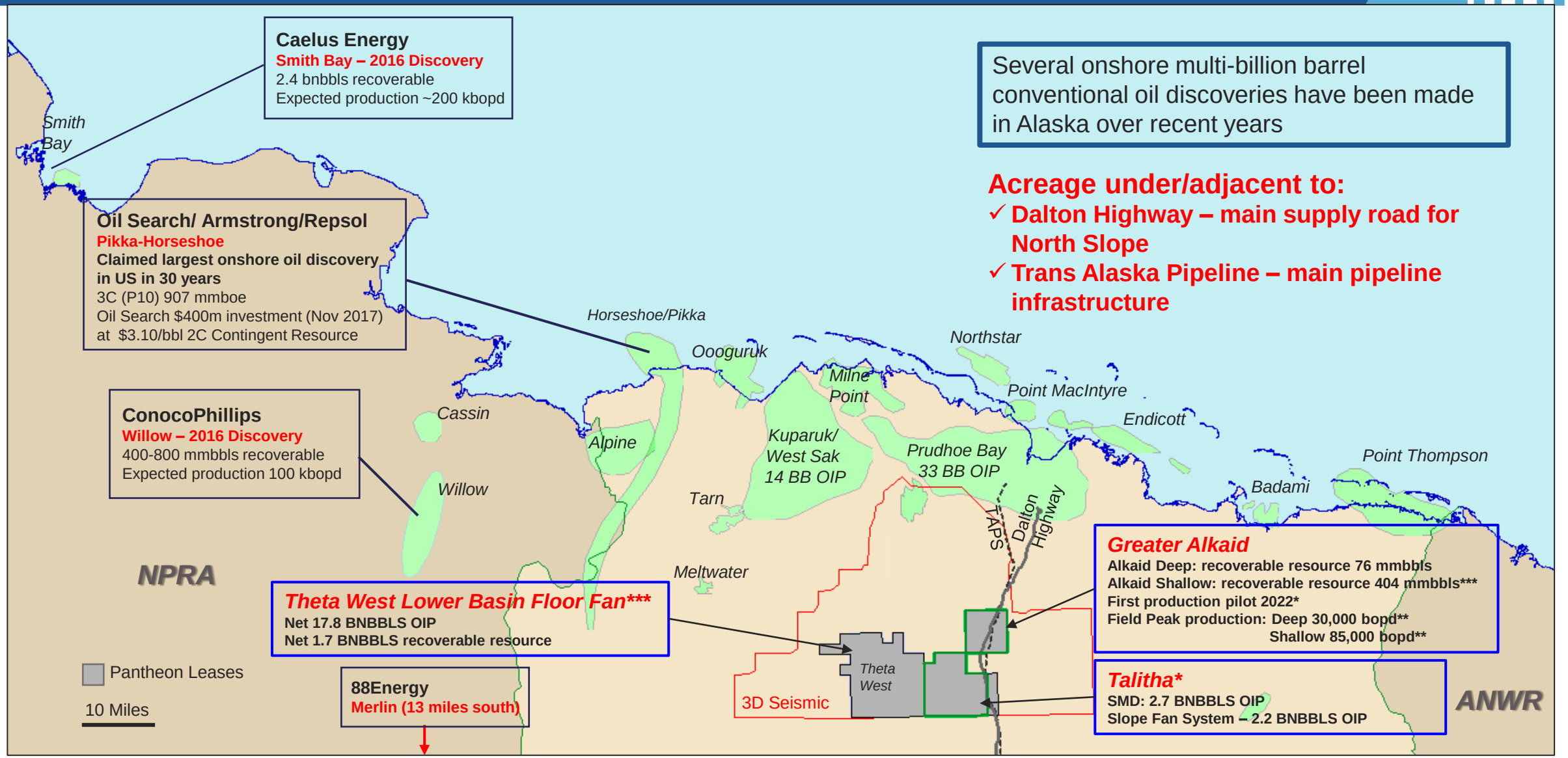
This presentation does not contain non public price sensitive information

PANTHEON RESOURCES
DISCLAIMER

- This document, together with any oral briefing which accompanies it, (the "Presentation") is being issued solely by Pantheon Resources Plc (the "**Company**").
- The Presentation does not constitute or form part of any offer or invitation to sell or issue, or any solicitation of any offer to purchase, subscribe for or otherwise acquire any securities of the Company or any of the business or assets described herein, nor shall any part of it nor the fact of its distribution form part of or be relied on in connection with any contract or investment decision relating to the securities of the Company, nor does it constitute a recommendation regarding the securities of the Company. In particular, the Presentation and the information contained in the Presentation do not constitute an offer of securities for sale in the United States.
- The Presentation is being supplied to you solely for your information. The information in the Presentation has been provided by the Company or obtained from publicly available sources. No reliance may be placed for any purposes whatsoever on the information, estimates, projections or opinions contained in the Presentation or on its completeness.
- Certain statements, beliefs and opinions in the Presentation are forward-looking, which reflect the Company's or, as appropriate, the Company's directors' current expectations and projections about future events. By their nature, forward-looking statements involve a number of risks, uncertainties and assumptions that could cause actual results or events to differ materially from those expressed or implied by the forward-looking statements. These risks, uncertainties and assumptions could adversely affect the outcome, financial and operational effects of the plans and events described herein. Forward-looking statements contained in the Presentation regarding past trends or activities should not be taken as a representation that such trends or activities will continue in the future. The Company does not undertake any obligation to update or revise any forward-looking statements, whether as a result of new information, future events or otherwise. You should not place reliance on forward-looking statements or estimated, which speak only as of the date of the Presentation.
- Nothing in this document or in the documents referred to in it should be considered as a profit or production forecast. Past performance of the Company or its shares cannot be relied on as a guide to future performance.
- Cautionary Statement: The estimated quantities of petroleum that may be potentially recovered by the application of a future development project relate to both discovered and undiscovered accumulations. These estimates have both an associated risk of discovery, appraisal and development. Further exploration, appraisal and evaluation are required to determine the existence of a significant quantity of potentially movable hydrocarbons. Similarly, macroeconomic, environmental and political factors as well as funding risk and geological risk may impact the performance of the Company. The estimates and other information contained within this presentation are only estimates based upon the Company's assessments at the time of this presentation, and there can be no guarantees that these estimates or outcomes will be realised.
- The Company has provided the information in the Presentation, which does not purport to be comprehensive and has not been verified. No representation or warranty, express or implied, is or will be made and no responsibility or liability is or will be accepted by the Company or by any of its respective directors, officers, advisers, agents or affiliates or by any other person as to or in relation to the accuracy or completeness of the Presentation or the information or opinions contained herein or supplied herewith or any other written or oral information made available to any party and no responsibility or liability is accepted for the accuracy or sufficiency of any of the information or opinions, for any errors, omissions or mis-statements, negligent or otherwise (other than in the case of fraud), or for any other communication, written or otherwise, made to anyone in, or supplied with, the Presentation. In particular, no representation or warranty is given as to the achievement or reasonableness of any mineral resource, future projections, management estimates, prospects or returns.
- Accordingly, neither the Company nor any of its respective shareholders, directors, advisers, agents or affiliates shall be liable for any direct, indirect or consequential loss or damage suffered by any person as a result of relying on any statement or omission in, or supplied with, the Presentation or in any future communications that are issued by the Company.
- The Presentation has been delivered to interested parties for information only and upon the express understanding that such information is of a general nature and does not relate to any specific transaction. The Presentation is subject to updating, revision and amendment. The information and opinions contained herein are provided as at the date of this Presentation and are subject to change without notice. The Company undertakes no obligation to provide the recipient with access to any additional information or to correct any inaccuracies or omissions which may become apparent.
- The content of the Presentation has not been approved for the purposes of section 21 of the Financial Services and Markets Act 2000 ("**FSMA**"). The Presentation is only being made available to the following:
    - persons having professional experience in matters relating to investments and who are investment professionals as specified in Article 19(5) of the Financial Services and Markets Act 2000 (Financial Promotion) Order 2005 (the "**Financial Promotion Order**"); and
    - persons to whom Article 49(2) of the Financial Promotion Order applies, being high net worth companies, unincorporated associations, partnerships or trusts or their respective directors, officers or employees as described in Article 49 of the Financial Promotion Order.
- It is a condition of your receiving the Presentation that you fall within, and you warrant to the Company that you fall within, one of the categories of person described above. If the recipient does not fall within one of the categories above, the recipient should either return, destroy or ignore the information in the Presentation.
- If you are in any doubt about the contents of the Presentation, you should consult a person authorised by the Financial Conduct Authority who specialises in advising on securities of the kind described in the Presentation.
- Neither the Presentation, nor any copy of it, may be taken or transmitted into the United States, Canada, Australia, South Africa or Japan or into any jurisdiction where it would be unlawful to do so. Any failure to comply with this restriction may constitute a violation of relevant local securities laws.
- By attending or reading the presentation to which this document relates or by accepting this document in any other way you agree to be bound by the provisions of this Disclaimer.
- 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.

REGIONAL CONTEXT – LOCATION, LOCATION, LOCATION…..

PANTHEON'S ACREAGE ON THE NORTH SLOPE



* Company estimate **Source: Modelled development plans, Lee Keeling & Associates ***Company estimate.

MODELLING RESERVOIR PERFORMANCE FROM VERTICAL TO HORIZONTAL WELLS (1)

BASED ON SPE* PUBLISHED METHODOLOGY AND IER**

The following slides describe methods used to forecast horizontal production rates. All numbers presented are estimations that follow SPE standard methodologies.

Three methods were used to estimate the potential production of a horizontal development well:

1. **Volumetric bracketing**
   Using observed reservoir parameters and standard SPE recovery calculation methods, an estimate of Oil in Place and Oil Recovered was made.

2. **Vertical to horizontal scaling estimates**
   Calculations from two SPE published methods were used to scale the test production rates seen in the Alkaid #1 to what a horizontal completion would be forecast to produce. These industry accepted methods indicate the 108 BOPD test production rate from the Alkaid #1 translates to 1600-2200 BOPD production rate from a horizontal development well. We believe that the same methodology applies to the other Pantheon reservoirs.

3. **Analog comparison**
   True analog fields are difficult to find. Similar reservoirs elsewhere were long ago developed with technology current at that time. Modern technologies and development methods have advanced materially are applied to reservoirs far less porous or permeable than the Alkaid or other Pantheon reservoirs. Nonetheless, an analog comparison has been made and gives reason for optimism.

Third party validation: Lee Keeling & Associates Independent Expert Report confirms forecast of deliverability at Alkaid

** Society of Petroleum Engineers ** Independent Expert Report*
(1) Modelled for illustrative purposes

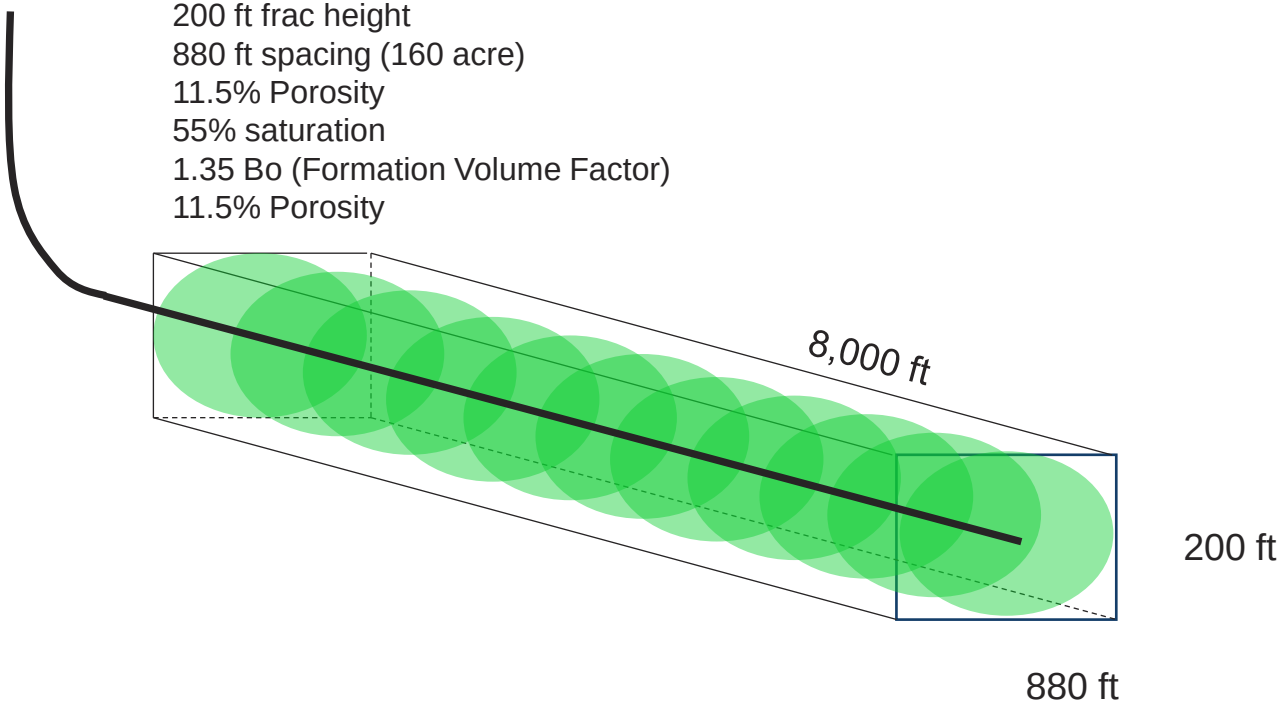
Method 1

Volumetric Bracketing

ILLUSTRATIVE EXAMPLE*

WELL ESTIMATED ULTIMATE RECOVERIES (EUR's) USING VOLUMETRICS

Assumptions:
8,000 ft well length
200 ft frac height
880 ft spacing (160 acre)
11.5% Porosity
55% saturation
1.35 Bo (Formation Volume Factor)
11.5% Porosity



Oil in Place calculation for an 8,000ft lateral well

200ft * 880ft * 8,000ft = 1,408,000,000 cubic feet of rock

At 11.5% porosity = 161,920,000 cubic feet porosity

At 55% saturation = 89,056,000 cubic feet oil =

15,874,509 bbl OIP (million barrels of oil in place)

At 10% recovery = 0.10 * 15,874,509 / 1.35 Bo = 1,175,889 bbl recovered (EUR)

At 15% recovery = 0.15 * 15,874,509 / 1.35 Bo = 1,763,833 bbl recovered (EUR)

*Example for illustrative purposes only

PANTHEON RESOURCES
VALIDATION OF RECOVERIES BASED ON JJ ARPS SPE PUBLICATION

ESTIMATION of PRIMARY OIL RESERVES

J. J. ARPS
MEMBER AIME

BRITISH-AMERICAN OIL PRODUCING CO.
DALLAS, TEX.

Trans. 207 (01): 182–191.
Paper Number: SPE-627-G
https://doi.org/10.2118/627-G

TABLE 1 — PRIMARY RECOVERY IN PER CENT OF OIL IN PLACE FOR DEPLETION-TYPE RESERVOIRS

Oil Solution GOR (Cu ft/bbl)	Oil Gravity (°API)	Sand or Sandstones			Limestone, Dolomite or Chert		
		Maximum	Average	Minimum	Maximum	Average	Minimum
60	15	12.8	8.6	2.6	28.0	4.0	0.6
	30	21.3	15.2	8.7	32.8	9.9	2.9
	50	34.2	24.8	16.9	39.0	18.6	8.0
200	15	13.3	8.8	3.3	27.5	4.5	0.9
	30	22.2	15.2	8.4	32.3	9.8	2.6
	50	37.4	26.4	17.6	39.8	19.3	7.4
600	15	18.0	11.3	6.0	26.6	6.9	1.9
	30	24.3	15.1	8.4	30.0	9.6	(2.5)
	50	35.6	23.0	13.8	36.1	15.1	(4.3)
1,000	15	—	—	—	—	—	—
	30	34.4	21.2	12.6	32.6	13.2	(4.0)
	50	33.7	20.2	11.6	31.8	12.0	(3.1)
2,000	15	—	—	—	—	—	—
	30	—	—	—	—	—	—
	50	40.7	24.8	15.6	32.8	(14.5)	(5.0)

Pantheon est. GOR/API

Glossary
API = American Petroleum Institute
GOR = Gas Oil Ratio

Conclusion from JJ Arps SPE paper:

Based on Alkaid/SMD/BFF GOR's, Estimate of Recovery:

Average = 15.1%
Range = 8.4% to 24.3%

For conservatism, Pantheon's modelling is based upon 10% Recovery Factor

Method 2

Vertical to Horizontal scaling

PANTHEON RESOURCES
ESTIMATED INITIAL PRODUCTION VERTICAL TO HORIZONTAL CALCULATIONS

Horizontal Well Inflow Performance Spreadsheet - Transgressive Test

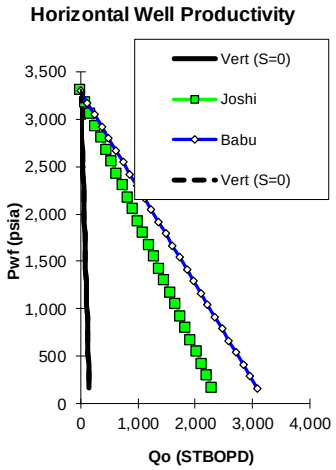
Compares Several Analytical IPR models to predict horizontal well performance

General reservoir parameters

Well (OIL or GAS)	**OIL**
Reservoir Pressure (psia)	**3300**
Reservoir Temperature (deg f)	**165**
Viscosity (cp)	**0.55**
FVF (RB/STB)	**1.3**
Rw (ft)	**0.51**
Area(vert) (acres)	**40**
vertical permeability	**0.05**
horizontal permeability across well path	**0.16**
horizontal permeability along well path	**0.16**
classic Mechanical Skin Factor	**0**
formation thickness (ft):h	**200**

Specific Horizontal Well Properties

drainage length along well path (ft):b	**8000**
drainage width across well path (ft):a	**880**
Area(horiz.) (Calculated Acres)	161
horizontal section Length (ft):L	**8000**
distance to drainage end from well heel(ft):y1	**0**
distance to well axis from closest side (ft):x0	**400**
distance to well axis from formation top(ft):z0	**15**
PWF of interest (psia)	**1000**



Results Drawdown	Pwf	Vert (S=0)	Joshi	**Babu**	Vert (S=0)
0	3,300	0	0	**0**	0
125	3,175	6	92	**123**	6
251	3,049	12	184	**247**	12
376	2,924	18	277	**370**	18
502	2,798	24	369	**494**	24
627	2,673	30	461	**617**	30
752	2,548	36	553	**740**	36
878	2,422	42	645	**864**	42
1,003	2,297	48	738	**987**	48
1,129	2,171	54	830	**1,111**	54
1,254	2,046	60	922	**1,234**	60
1,379	1,921	66	1,014	**1,357**	66
1,505	1,795	72	1,106	**1,481**	72
1,630	1,670	78	1,198	**1,604**	78
1,756	1,544	84	1,291	**1,728**	84
1,881	1,419	90	1,383	**1,851**	90
2,006	1,294	96	1,475	**1,974**	96
2,132	1,168	102	1,567	**2,098**	102
2,257	1,043	108	1,659	**2,221**	108
2,383	917	114	1,752	**2,345**	114
2,508	792	120	1,844	**2,468**	120
2,633	667	126	1,936	**2,591**	126
2,759	541	132	2,028	**2,715**	132
2,884	416	138	2,120	**2,838**	138
3,010	290	144	2,213	**2,962**	144
3,135	165	150	2,305	**3,085**	150
User Pwf	1,500	#NAME?	#NAME?	**#NAME?**	#NAME?

Assumptions:
8,000 ft lateral
880 ft Spacing
Drawdown and initial production (**IP**) match vertical production

Conclusion

Joshi & Babu Modeling Estimate based on 108 BOPD vertical production predicts:

Initial Production (IP) = 1,659 - 2,221 BOPD @ 8000 ft Lateral

Pantheon's Alkaid estimates
1,200 BOPD IP estimate for an 8,000 ft lateral

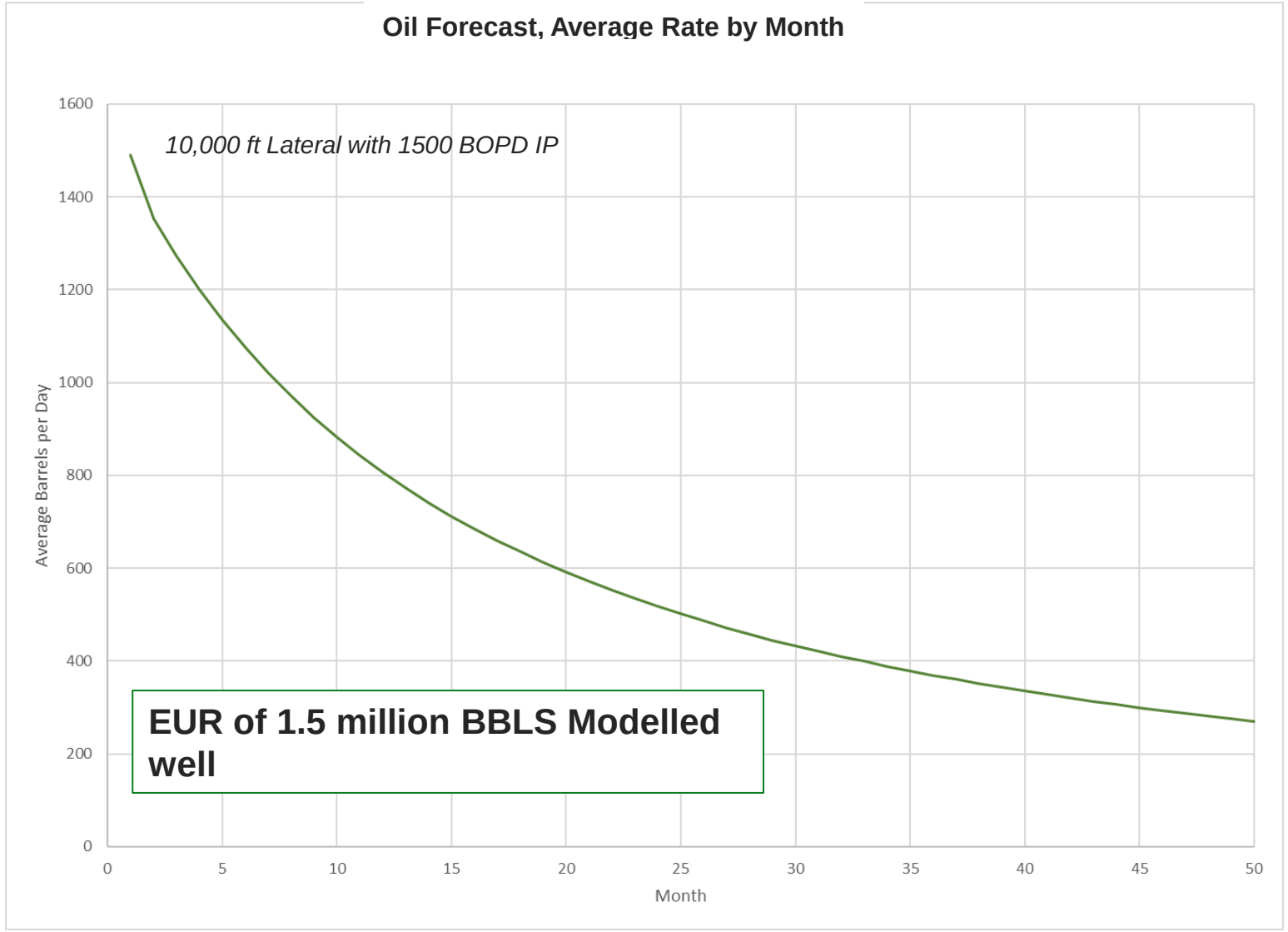
Future development wells estimated at 10,000 ft and 1,500 BOPD IP

Horizontal Well," Babu and Odeh, SPERE (Nov., 1989) pp.417-421; "Horizontal Well Technology," Joshi, Pennwell Books, pp. 78 - 79.

Spreadsheet originally built by Scott Wilson (5/90), modified by Frank Bergren (4/93), updated for gas (10/93) sjw, updated Joshi model (6/96) sjw

PANTHEON RESOURCES

MODELED TYPE CURVE – ILLUSTRATIVE TYPESET DECLINE CURVE



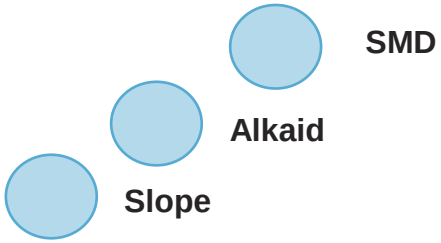
* For illustrative purposes only

Method 3

Comparison of Permian to Pantheon

PANTHEON RESOURCES

COMPARING THE PERMIAN BASIN (BONE SPRING & WOLFCAMP) TO THE BROOKIAN*



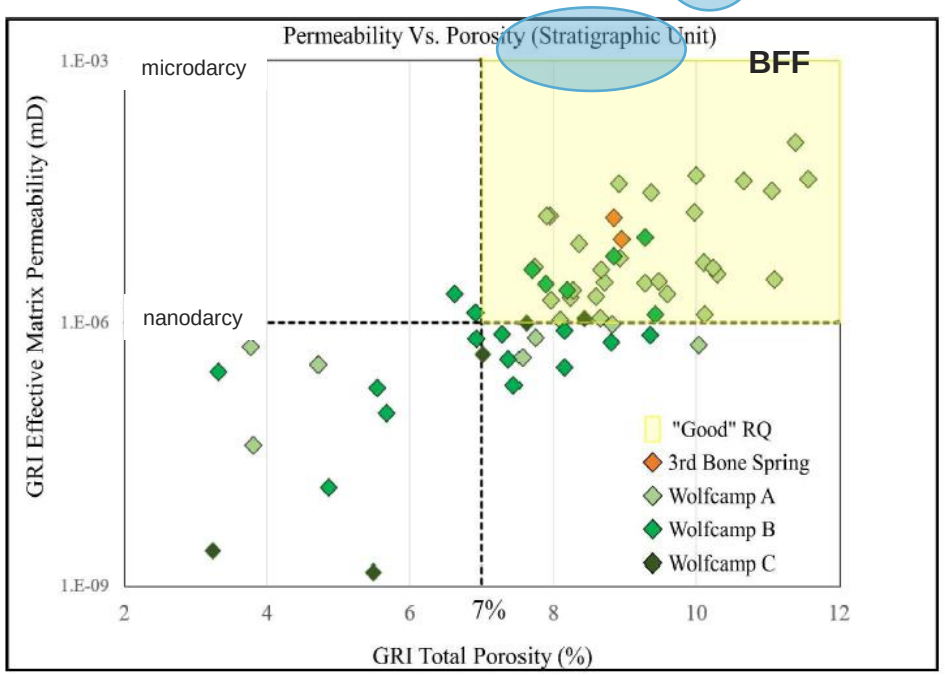


Figure 4.14 GRI core-based measurements of effective matrix permeability versus total porosity. Arbitrary cutoffs were used to delineate "good" reservoir quality. The 3rd Bone Spring, and Wolfcamp A mostly contain "good" reservoir quality. Wolfcamp B is mixed and Wolfcamp C does not contain points with good porosity or permeability values.

RESERVOIR CHARACTERIZATION OF THE BONE SPRING AND WOLFCAMP FORMATIONS, DELAWARE BASIN, WARD COUNTY, WEST TEXAS

by

April Bievenour

Masters Thesis at Colorado School of Mines, 2019

Average Bone Spring EUR = 720 kboe
IP = 1,000 bo/d, 2 mmcf/d
Break-even oil price =$30 wellhead

	OIL EUR	GAS EUR	BOE EUR	WELLS	IP OIL	IP GAS
2017	489,560	2,288,365	697,594	2,289	979	1,962
2018	518,725	2,174,927	716,446	1,972	1,007	2,037
2019	535,085	2,227,375	737,574	1,442	1,059	2,219
2020	553,123	2,233,237	756,145	918	1,051	2,292
WTD AVG	516,975	2,233,652	720,034	6,621	1,015	2,086

Bone Spring-Wolfcamp Quick-Look EUR & Economic
Art Berman, April 2022

COMPARISON TO PERMIAN BASIN

Basin Floor Fan has permeabilities **> 100x that of analogs** Wolfcamp and 3rd Bone Spring

Other reservoirs **up to 10,000x** Wolfcamp and Bone Spring

The conclusion is that with 20%-80% more pore space (i.e. higher porosity) and 100x-10,000x the permeability, there is substantial reason for optimism and considerable upside.

* For illustrative purposes. Shaded blue areas on chart not to exact scale.

PANTHEON RESOURCES

GREAT BEAR PETROLEUM RESERVOIR ANALYSIS - ORIGINAL PRESENTATION 2013

Prepared By: Larry K. Britt, NSI Fracturing, LLC

- This work was contracted to **NSI in 2013.**
- NSI was Halliburton's preferred provider for reservoir simulation and frac modeling.
- Haliburton was Great Bear's WI partner and engineering lead in a portion of the original northern lease holding. Great Bear is 100% owned by Pantheon.

Background: Larry K. Britt is an engineering consultant and owns and operates Britt Rock Mechanics Laboratory at the University of Tulsa. Prior to joining NSI Britt was the fracturing team leader at Amoco's Technology Center charged with managing the development and application of fracturing technology for their worldwide operations. Britt is a Distinguished Member of the SPE, has twice served as an SPE Distinguished Lecturer, as a JPT editor, and on numerous SPE Committees. In addition, Larry has authored over forty technical papers as well as co-authored the SPE Primer on the "Design and Appraisal of Hydraulic Fractures." Larry has a B.S. in Geological Engineering and a Professional Degree in Petroleum Engineering from the Missouri University of Science and Technology where he is an adjunct professor, a member of both the Petroleum Department and Engineering Advisory Boards, and a member of the Academy of Mines and Metallurgy.

Brookian Fans* Model Assumptions

Formation	Depth (ft)	Net h (ft)	Pi (psi)	S_w (%)	ϕ (%)	k (md)	k_v / k_h (frac)	Oil (^oAPI)	Oil (cP)
Brookian Fans	9,000	70	4950	40	12	0.40000	0.1	26	3.0

Also assumes 320 acre drainage and 250 psi bottom hole flowing pressure

*Brookian Fans includes SMD, Slope Fan System, and Basin Floor Fan reservoirs

Source: Larry K. Britt, NSI Fracturing, LLC

Brookian Fans* Vertical Well Simulation Results

Formation	Depth (ft)	IP (30) (BOPD)	First Year Rate (BOPD)	Cum. Oil (MBO)
Brookian Fans	9,000	49	43	569

Also assumes 320 acre drainage and 250 psi bottom hole flowing pressure

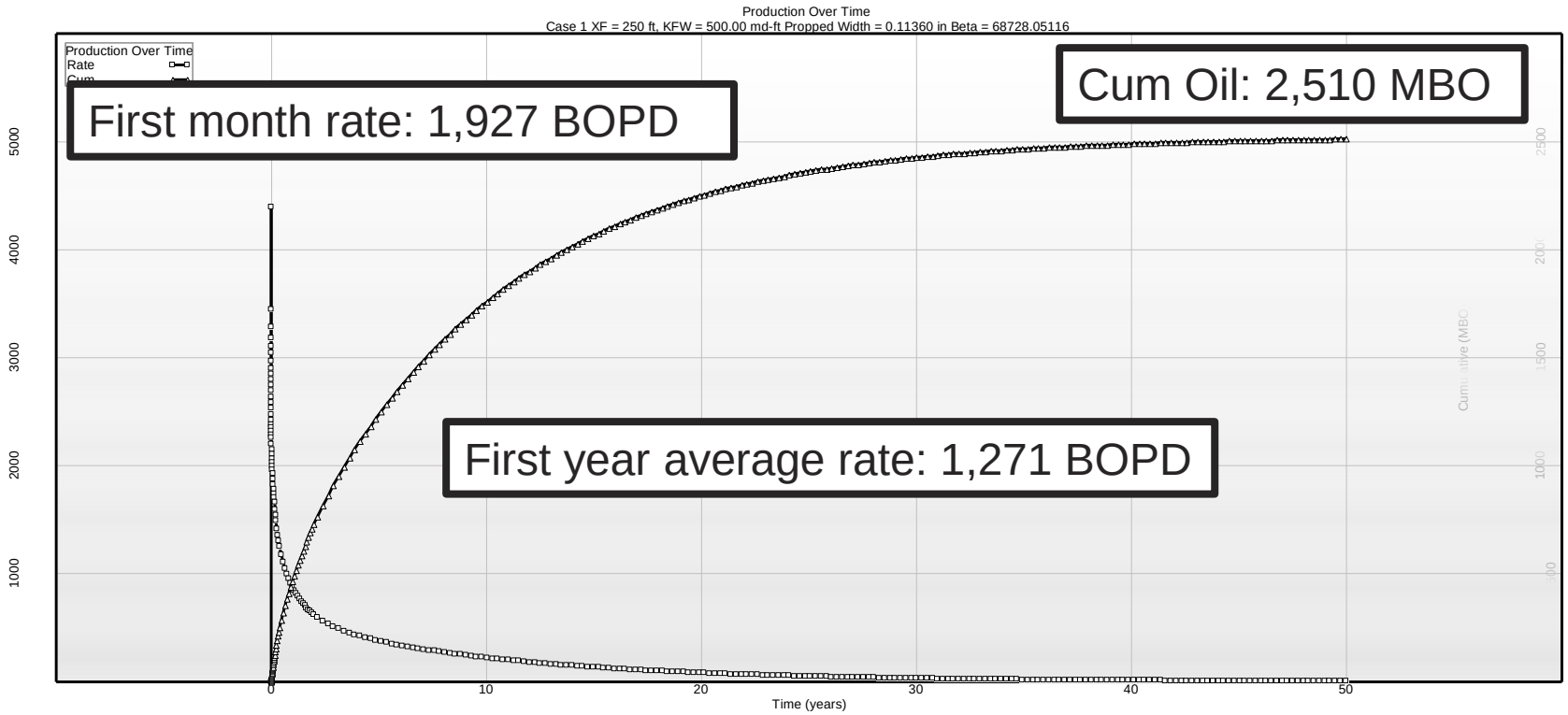
*Brookian Fans includes SMD, Slope Fan System, and Basin Floor Fan reservoirs

Source: Larry K. Britt, NSI Fracturing, LLC

PANTHEON RESOURCES

GREAT BEAR RESERVOIR ANALYSIS ORIGINAL PRESENTATION 2013

Brookian Fans Horizontal Well Simulation Results



Source: Larry K. Britt, NSI Fracturing, LLC

Brookian Fans Horizontal Well Simulation Results

Formation	Depth (ft)	IP (30) (BOPD)	First Year Rate (BOPD)	Cum. Oil (MBO)
Brookian Fans	9,000	1,927	1,271	2,510

Assumes 320 acre drainage and 250 psi bottom hole flowing pressure

This work was the basis of the pursuit of conventional plays on current acreage, and supports internal Pantheon modeling based on current vertical well performance and observed reservoir parameters

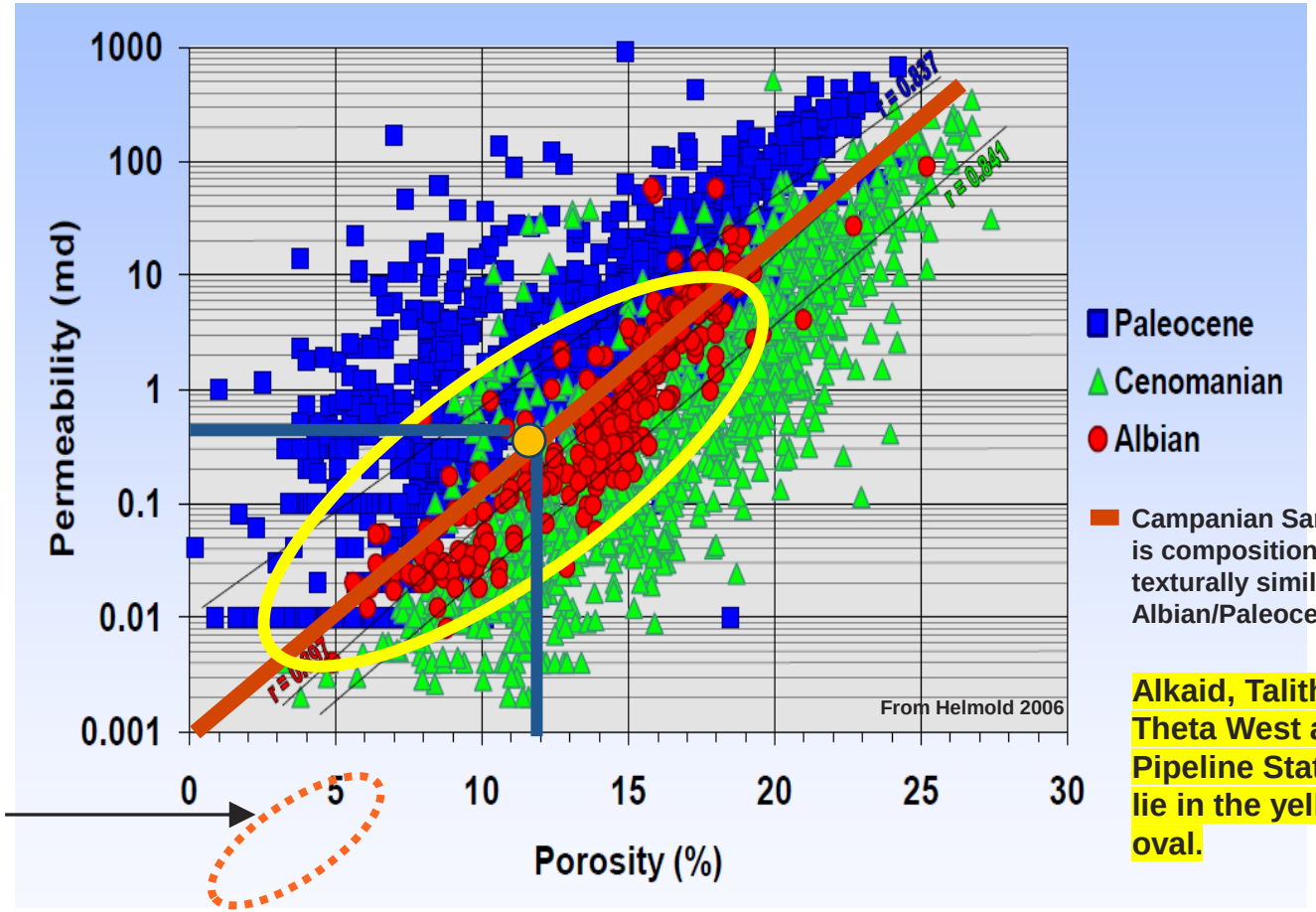
Source: Larry K. Britt, NSI Fracturing, LLC

PANTHEON RESOURCES
POROSITY AND PERMEABILITY

Brookian Sandstone Phi-K (Porosity & Permeability) Trends

More than 50% of the Theta West Fan Gross Rock Volume has porosity >11% and projected permeability >0.5md

Halliburton Assumptions



Permian Basin

Alkaid, Talitha, Theta West and Pipeline State #1 lie in the yellow oval.

Effective reservoir limits have evolved significantly over the last 15 years as a result of advancements in horizontal drilling & completion methods.

Our approach has been to integrate geological characterization with modern reservoir engineering to guide our volumetrics, drilling and completions.

PANTHEON RESOURCES
ALKAID #2 WELL

- **Spud July 2022 with two objectives:**
  - SMD Appraisal - Oil in Place 2.6 billion bbl & 404 million bbl Recoverable (Company estimate)(1)
  - Alkaid Production Test - 76.5 MMBO Contingent Resources (recoverable)(2)
- **On production October 2022**
- **Will establish production profile**
- **Modeling 150 BOPD per 1000 ft lateral**

(1) Management believe resource estimate meets the classification of Contingent Resource. (2) Lee Keeling & Associates (Independent Expert) estimate