Success In Shallow Oil:
Pacesetter Energy's San Andres Horizontal Development

University Lands – 2018 Partner Forum
April 25, 2018

Company History/Management

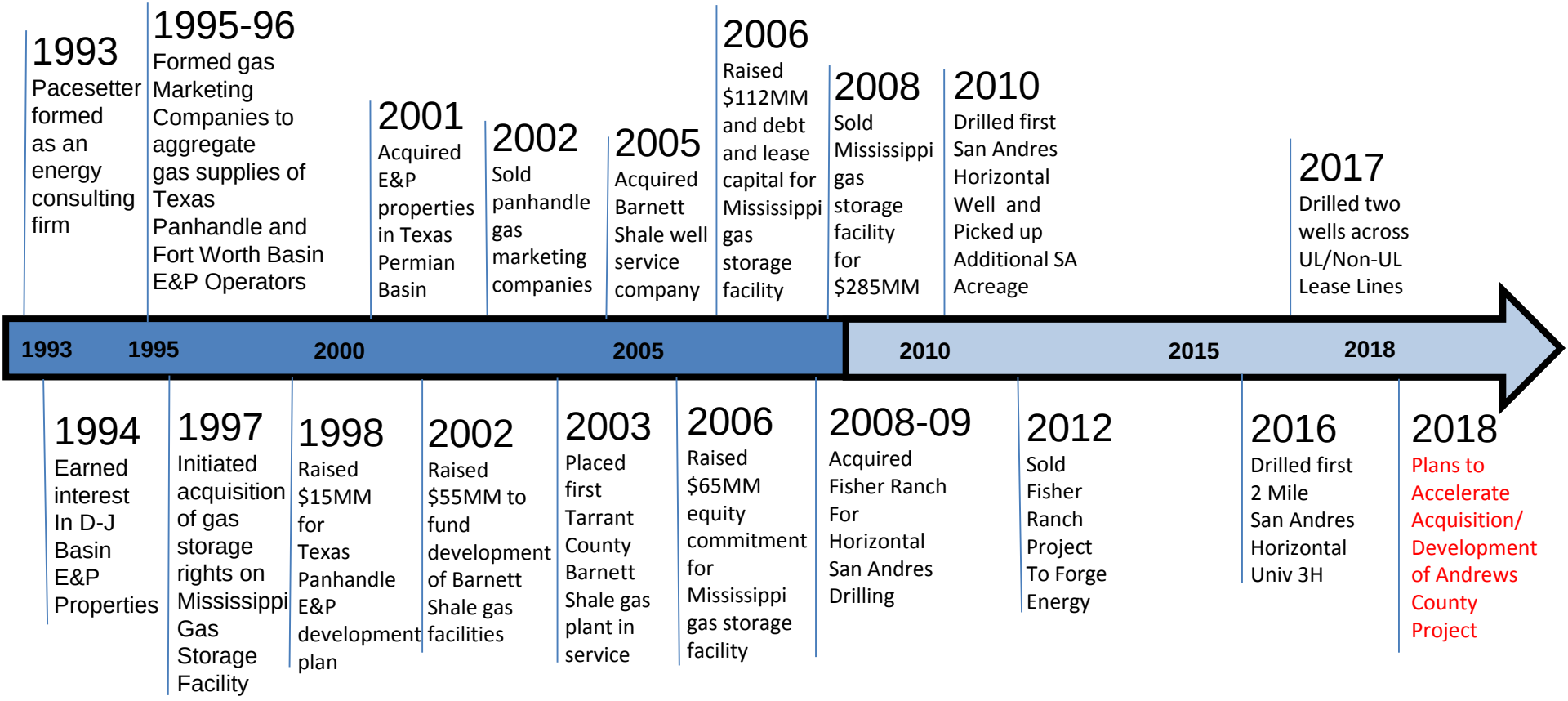
Founded by Bob Millard

- Petroleum Engineer with Amerada Hess in the Permian Basin and Fina in Dallas
- Obtained MBA from SMU and founded company in Flower Mound, TX in 1993
- Built and led company during its first 18 years in a variety of successful ventures in the energy industry (both upstream and midstream), including the implementation of the company's San Andres horizontal development plan
- Passed away in 2011

Current Management Team

- Kelly Anderson – Manager
- Paul Buckner – President
- Josh Bryant – VP Engineering
- Bryan Jones – VP Operations
- Teresa Whitson – Controller
- Ryan Millard – Land Manager

Project History/Milestones



San Andres Horizontal History

Pre-2008

- Pacesetter involved as a non-op partner with Chief O&G in Barnett Shale wells
- Bob Millard develops vision for applying horizontal drilling/fracing techniques to the "shallow oil" zone (San Andres) operated vertically by Pacesetter in Andrews Cty
- Pacesetter engineering team begins to develop initial plan for SA Horizontal wells

2008-2009

- Began acquiring ~4,000 NMA to the east of Shafter Lake known as Fisher Ranch as initial Horizontal SA target
- Continued to fine-tune initial well/frac design and lined up capital

2010-2011

- Drilled first 5 Horizontal SA wells on the Fisher Ranch acreage with solid results and improvement
- Schlumberger IPM Partnership – came in as financial partners, as well as completions service provider; critical to early success due to well design input and preferential pricing/scheduling
- Acquired ~2,500 NMA in Univ Lands Blk 13 (NW of Shafter Lake) for future SA Horizontal expansion

San Andres Horizontal History

2012

- Sold majority interest of Fisher Ranch and UL Blk 13 acreage and operations to Forge Energy; Maintained a non-op interest, which we still own in the Fisher Ranch wells today with Lime Rock (Forge's successor in 2017)
- Forge was a good operating partner in the area, and helped prove up the Shafter Lake area of Andrews Cty for SA Horizontal development, along with us, from 2012-17
- Began acquiring new positions to the south of the Fisher Ranch acreage, as well as what has now become our core growth position to the south/southwest and west of Shafter Lake, in and around UL Blk 14

2012-2015

- Drilled 9 SA HZ producers, 2 SWD wells and built out infrastructure on the ~2800 NMA we had acquired since the sale to Forge
- Utilized different rig sizes and completion techniques with varying degrees of success
- Wells were mostly one-mile laterals (one ½ mile & one 1 ¼ mile)
- Avg. 300-350MBOE/well

San Andres Horizontal History

2016

- Drilled two extended laterals, UL-8H (1½ mile) and UL-3H (2 mile), in the fall of 2016, with the following 90 day results:

Wells	**UL14-3H**	**UL14-8H**
Drilling Days (spud to TD)	9	9
Lateral Length	10,720	8,069
No. of Fracs	42	32
Cumulative Oil (bbls)	51,082	75,617
Cumulative Gas (mcf)	21,103	10,076
Cumulative BOE	54,599	77,296
BOED	607	859
BOED (1st 30 Days)	840	1,190
BOED (Max IP Rate)	1,274	1,363
Oil %	94	98
BWD	3,550	2,000
Oil Cut	11%	24%

2017

- Drilled two more 2-mile lateral wells at the end of 2017/beginning of 2018, with solid IP's
- Still evaluating for ultimate potential

University Lands Partnership

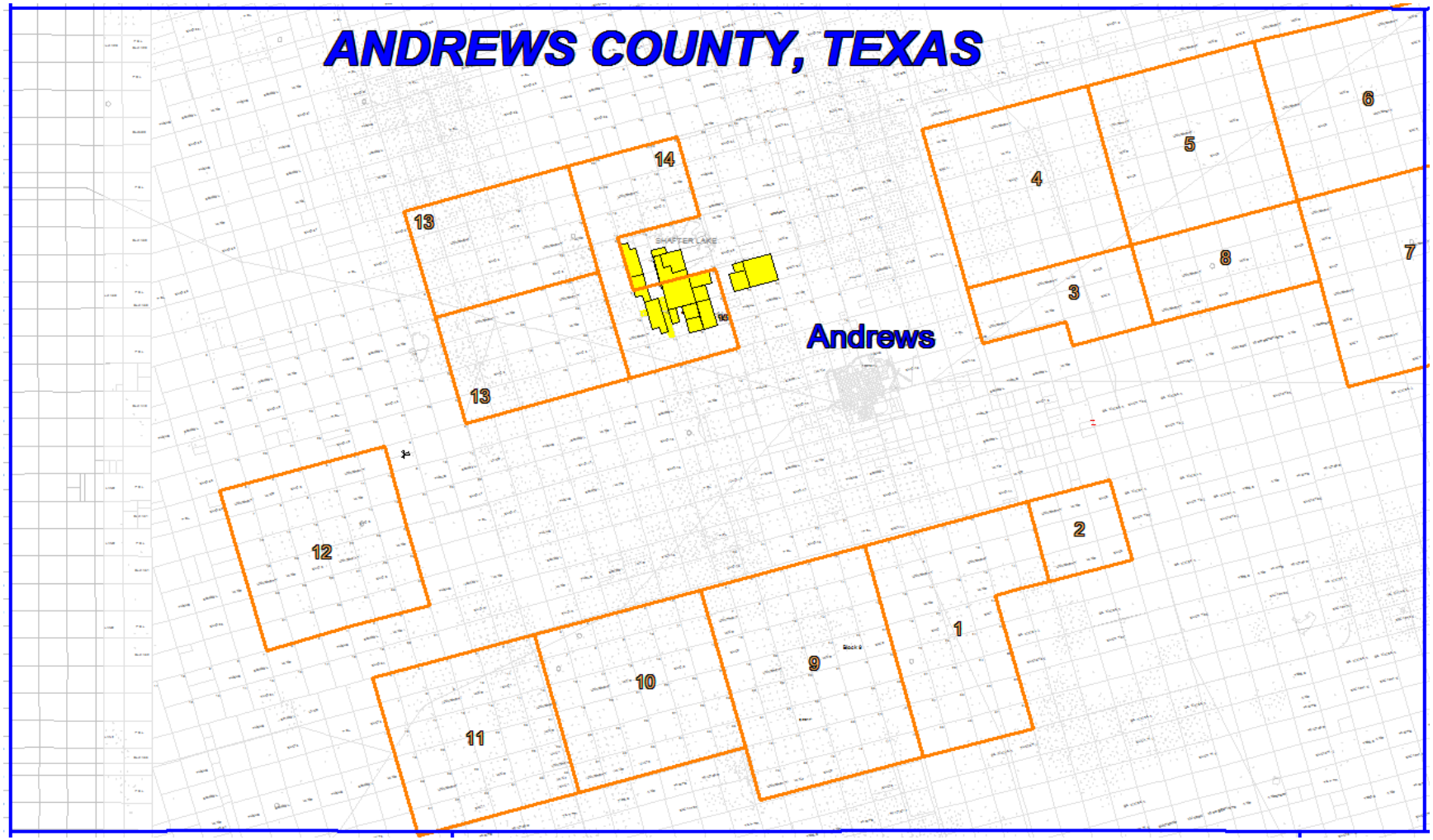
Early Days

- Pacesetter began leasing and operating on UL acreage in Andrews Cty in the early 2000's
- Vertical SA well development from 2001-10 just north of Shafter Lake provided the data and confidence we needed to acquire the Fisher Ranch and UL13 acreage to give the horizontal wells a try
- Primary benefits of predictability and reasonable cooperation to maximize development of the acreage, and have always enjoyed a great working relationship with everyone at UL over the years

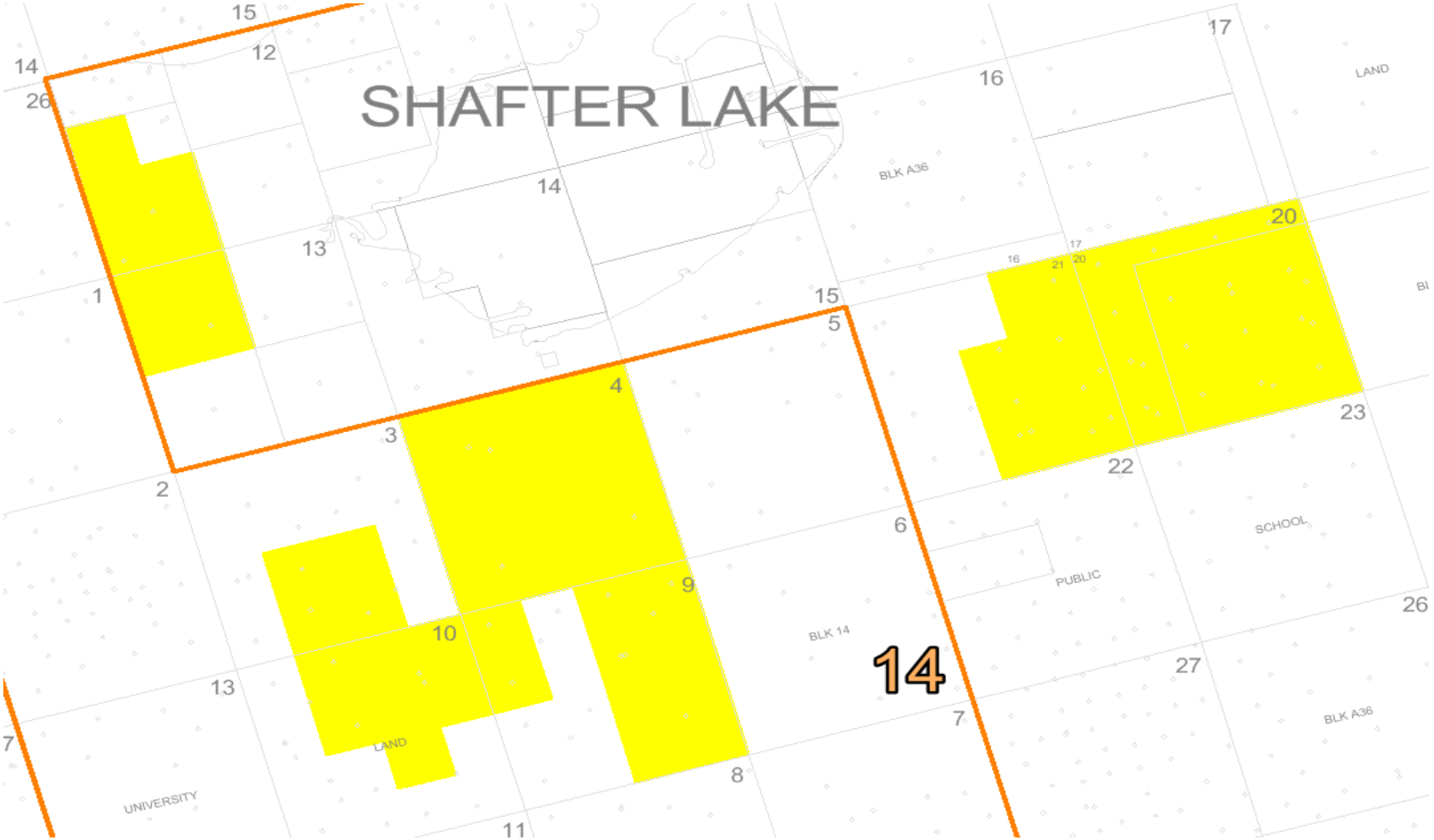
Horizontal Transition

- Pooling Agrmt to allow for efficient and cost effective development of horizontal wells with combined UL leases held by Pacesetter and Oxy in Blk 14 in 2014
- Drilled 5 wells and developed extensive infrastructure on Blk 14 in 2015-16
- Worked with Brian and the land/surface use staff at UL to come up with a plan to drill across UL/Non-UL leases lines for our two 2 mile laterals in 2017, under Production Sharing Agreements (PSA)
- PSA based on first and last take points, with significant benefits:
  - allows for full utilization of the capacity we had developed at our Blk 14 battery
  - improved the economics of the wells by not further burdening them with new infrastructure costs
  - allows for maximum development of the UL acreage by eliminating lost "lease line" acreage

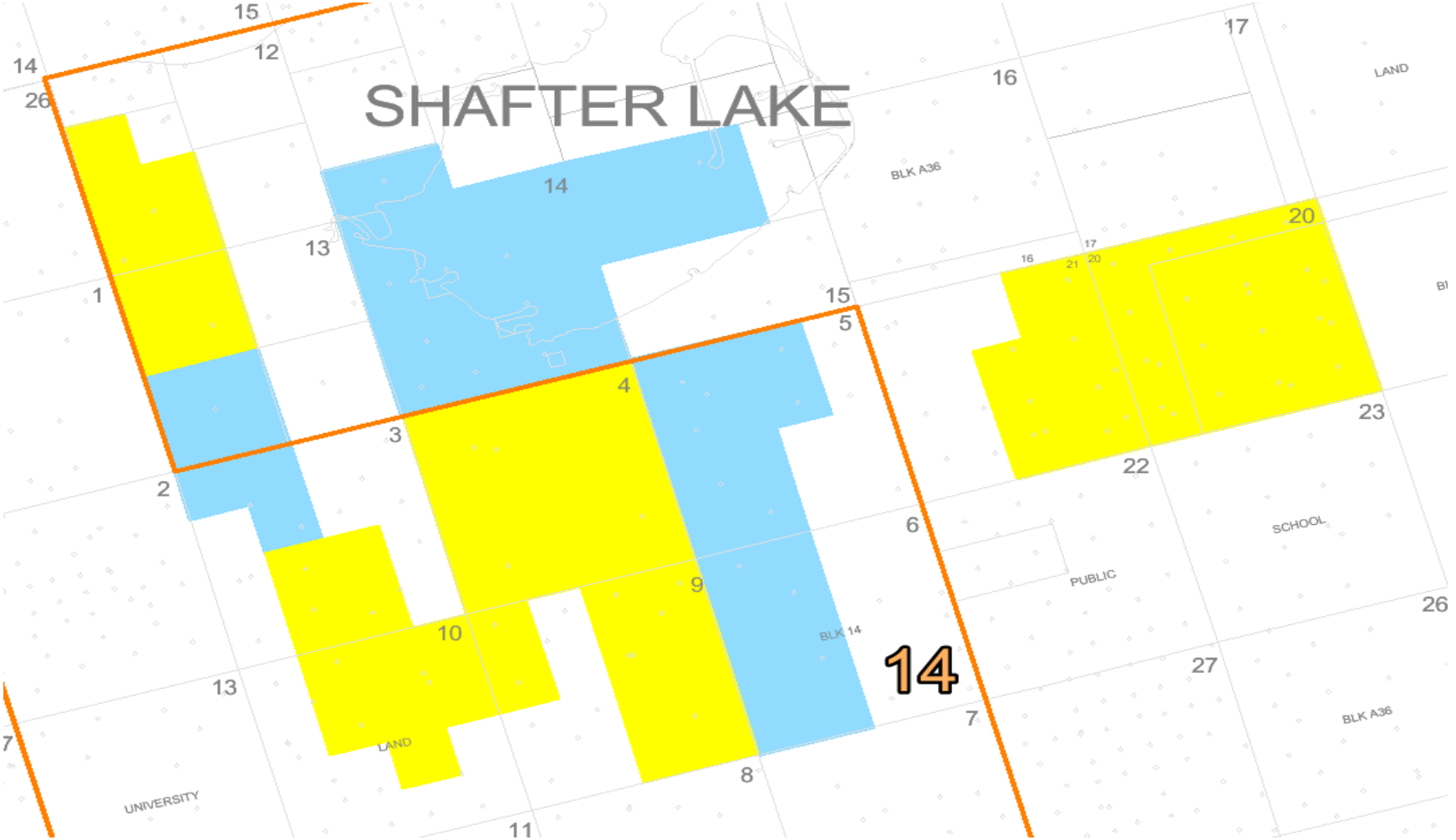
Project Location



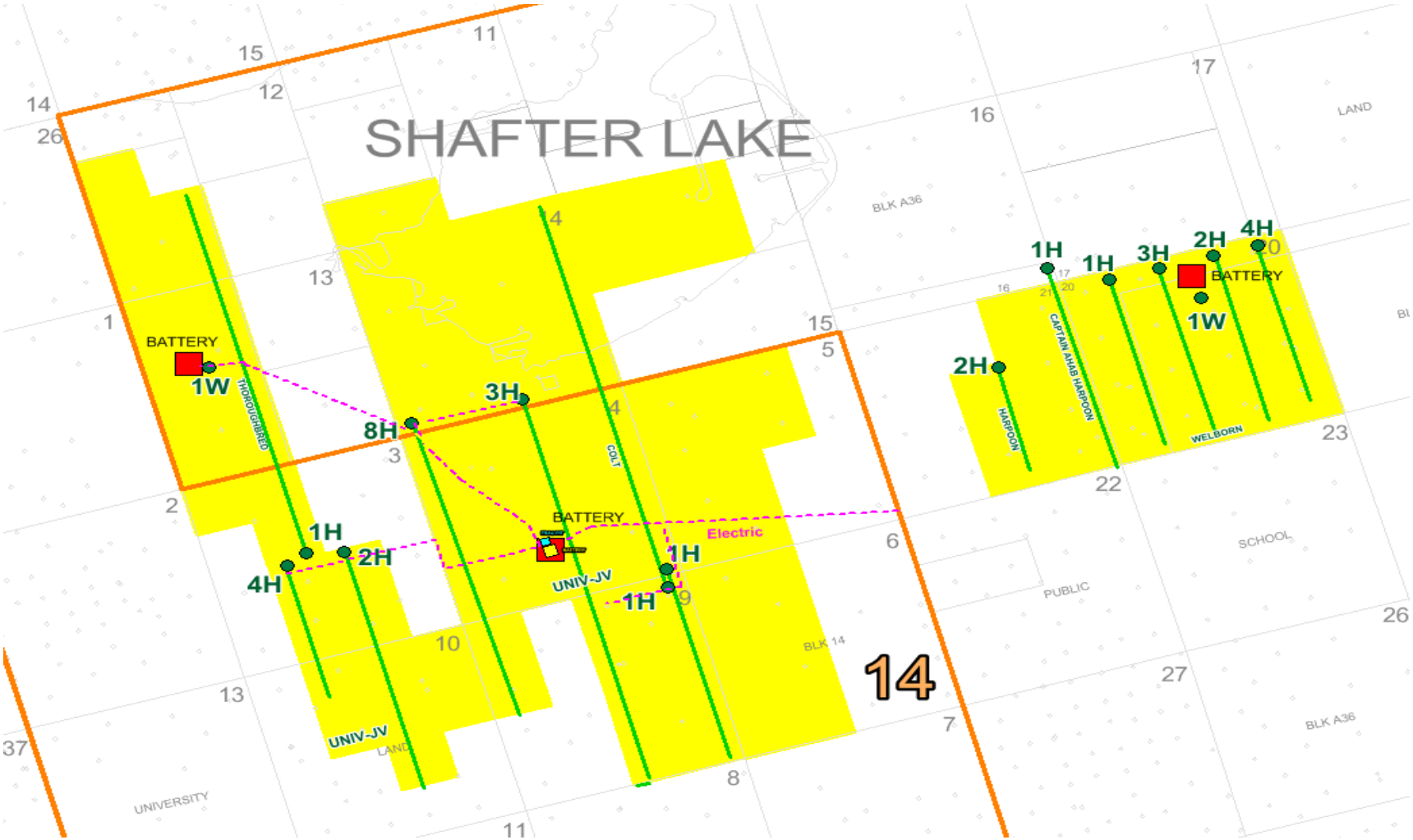
Acreage Acquisition 2012-2015
2800 NMA



Acreage Acquisition 2016-Present
Additional 1960 NMA



Wells & Infrastructure

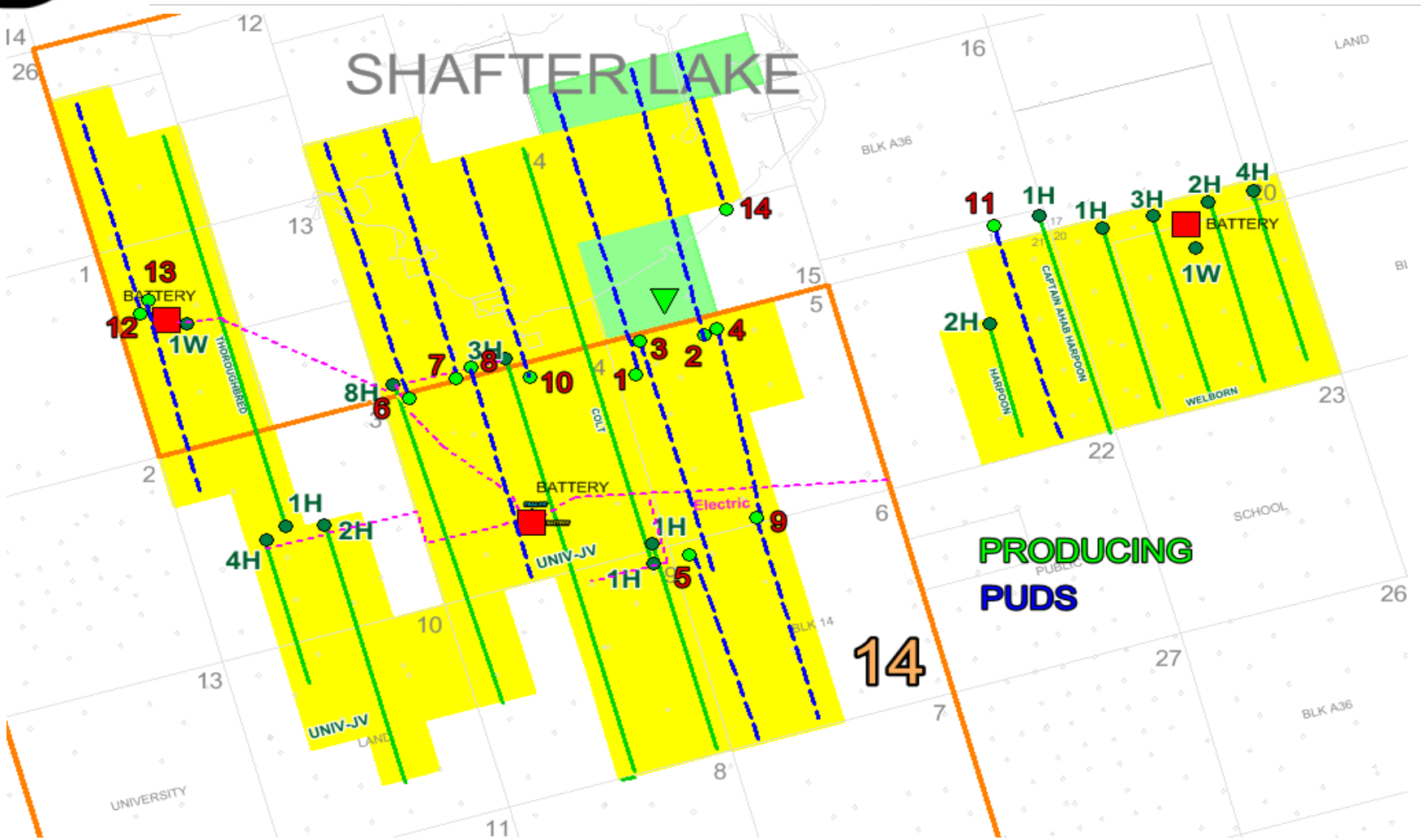


Future Development

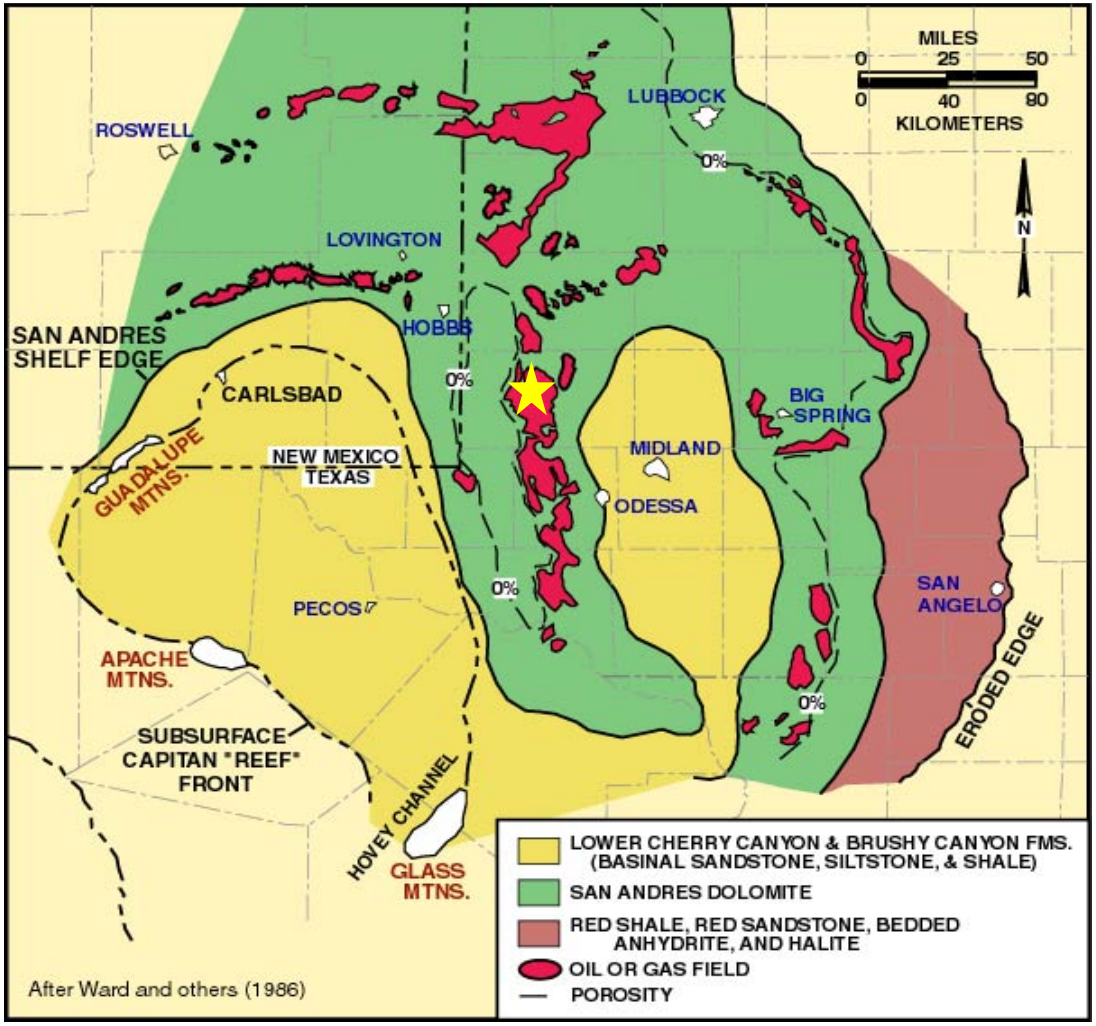
Future Plans

- Plans to fully develop our existing/in negotiations ~5000 NMA, and add to the existing 13 SA Horizontal producers that have produced 1.2MMBOE to date.
- In process of lining up additional capital to accelerate development of the 14 PUDS we currently have on the board; Used our own capital, along with non-op partners, to date, drilling 2-3 wells/year
- Excellent infrastructure and cost effective water handling in place for further growth
- Plan to continue our mutually beneficial relationship with UL as we grow this asset in Andrews County

Future Development Plans



SIZEABLE



- *San Andres producing since the 1920's*
  - *Andrews Co. discovery - 1929*
- *San Andres productive across several counties*
- *Large data set*
  - *Maps, logs, production, core/PVT, etc*
- *Offers scalability*

Ward, R., C.G.St. C.Kendall, and P.M. Harris, 1986, Hydrocarbon occurrence in Guadalupian sediments, the Permian Basin, West Texas and New Mexico. Am. Assoc. Petroleum Geol. Bull. v. 70, p. 239-262.

SHALLOW

Generalized stratigraphic correlation chart for the Permian Basin region

SYSTEM	SERIES/ STAGE	NORTHWEST SHELF	CENTRAL BASIN PLATFORM	MIDLAND BASIN & EASTERN SHELF	DELAWARE BASIN	VAL VERDE BASIN
PERMIAN	OCHOAN	DEWEY LAKE RUSTLER SALADO	DEWEY LAKE RUSTLER SALADO	DEWEY LAKE RUSTLER SALADO	DEWEY LAKE RUSTLER SALADO CASTILE	RUSTLER SALADO
	GUADALUPIAN	TANSILL YATES SEVEN RIVERS QUEEN GRAYBURG SAN ANDRES GLORIETA	TANSILL YATES SEVEN RIVERS QUEEN GRAYBURG SAN ANDRES GLORIETA	TANSILL YATES SEVEN RIVERS QUEEN GRAYBURG SAN ANDRES SAN ANGELO	DELAWARE MT GROUP BELL CANYON CHERRY CANYON BRUSHY CANYON	TANSILL YATES SEVEN RIVERS QUEEN GRAYBURG SAN ANDRES
	LEONARDIAN	CLEAR FORK YESO WICHITA ABO	CLEAR FORK WICHITA	LEONARD SPRABERRY, DEAN	BONE SPRING	LEONARD
	WOLFCAMPIAN	WOLFCAMP	WOLFCAMP	WOLFCAMP	WOLFCAMP	WOLFCAMP
PENNSYLVANIAN	VIRGILIAN	CISCO	CISCO	CISCO	CISCO	CISCO
	MISSOURIAN	CANYON	CANYON	CANYON	CANYON	CANYON
	DESMOINESIAN	STRAWN	STRAWN	STRAWN	STRAWN	STRAWN
	ATOKAN	ATOKA — BEND	ATOKA — BEND	ATOKA — BEND	ATOKA — BEND	(ABSENT)
	MORROWAN	MORROW	(ABSENT)	(ABSENT ?)	MORROW	(ABSENT)
MISSISSIPPIAN	CHESTERIAN MERAMECIAN OSAGEAN KINDERHOOKIAN	CHESTER MERAMEC OSAGE KINDERHOOK	CHESTER MERAMEC OSAGE "BARNETT" KINDERHOOK	CHESTER MERAMEC OSAGE "BARNETT" KINDERHOOK	CHESTER MERAMEC OSAGE "BARNETT" KINDERHOOK	MERAMEC OSAGE "BARNETT" KINDERHOOK
DEVONIAN		WOODFORD DEVONIAN	WOODFORD DEVONIAN	WOODFORD DEVONIAN	WOODFORD DEVONIAN	WOODFORD DEVONIAN
SILURIAN		SILURIAN (UNDIFFERENTIATED)	SILURIAN SHALE FUSSELMAN	SILURIAN SHALE FUSSELMAN	MIDDLE SILURIAN FUSSELMAN	MIDDLE SILURIAN FUSSELMAN
ORDOVICIAN	UPPER	MONTOYA	MONTOYA	SYLVAN MONTOYA	SYLVAN MONTOYA	SYLVAN MONTOYA
	MIDDLE	SIMPSON	SIMPSON	SIMPSON	SIMPSON	SIMPSON
	LOWER	ELLENBURGER	ELLENBURGER	ELLENBURGER	ELLENBURGER	ELLENBURGER
CAMBRIAN	UPPER	CAMBRIAN	CAMBRIAN	CAMBRIAN	CAMBRIAN	CAMBRIAN
PRECAMBRIAN						

Source: Yang and Dorobek 1995).

EST TVD (ft)

500’ – 3,000’

3,000’ – 7,000’

SAN ANDRES
4,500’ – 5,500’

7,000’ – 10,000’

10,000’ – 12,000’

12,000’ – 14,000’

14,000’ +

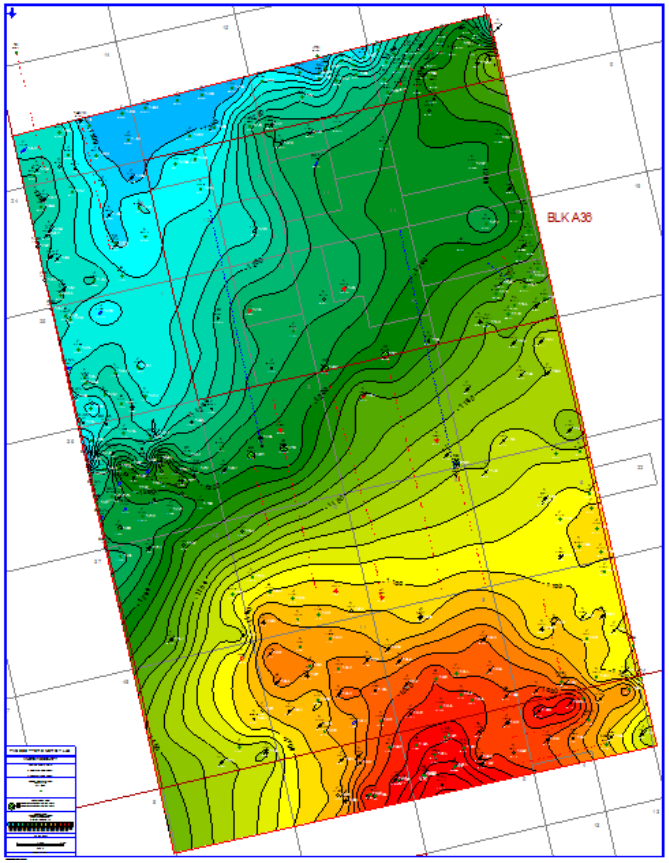
Image credit: Society for Sedimentary Geology (www.sepmstrata.org)

SIMPLE**

- *Geologically benign*
  - *Minimal faulting, hole stability issues, etc.*
- *Normally pressured*
  - *Slightly below fresh water gradient*
- *Low temperature environment*
- *Low GOR/GLR*
- *Allows for basic drilling and completion operations*
  - *Two string casing designs, water based mud systems, etc.*

***Relatively*

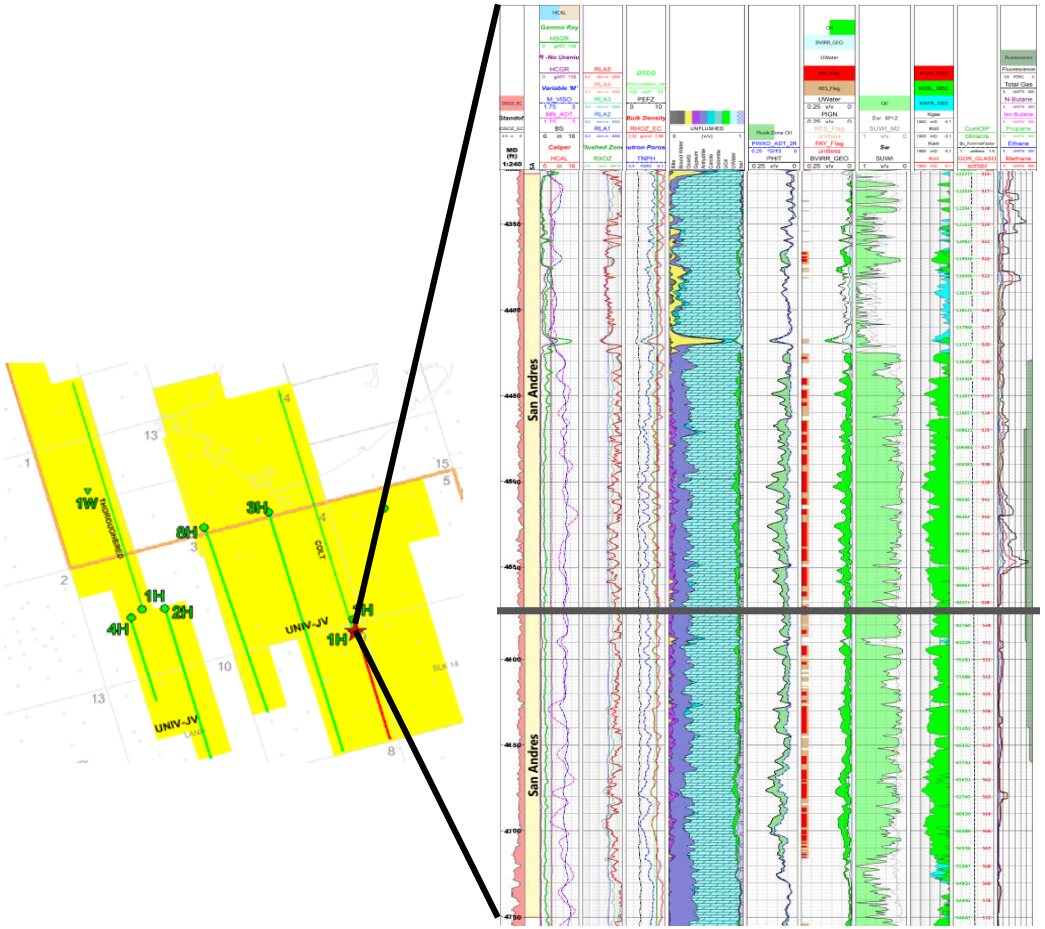
PROJECT OVERVIEW



PACESETTER SHAFTER LAKE SAN ANDRES PROJECT AREA

- ***~10,000 acres***
- ***UL Blk 14, Andrews Co.***
- ***Directly offset San Andres production to the N, S, E, and W***
- ***Consistent pay thickness, variability in structure***

PROJECT OVERVIEW



Processed pilot hole log – University JV 14 #1H

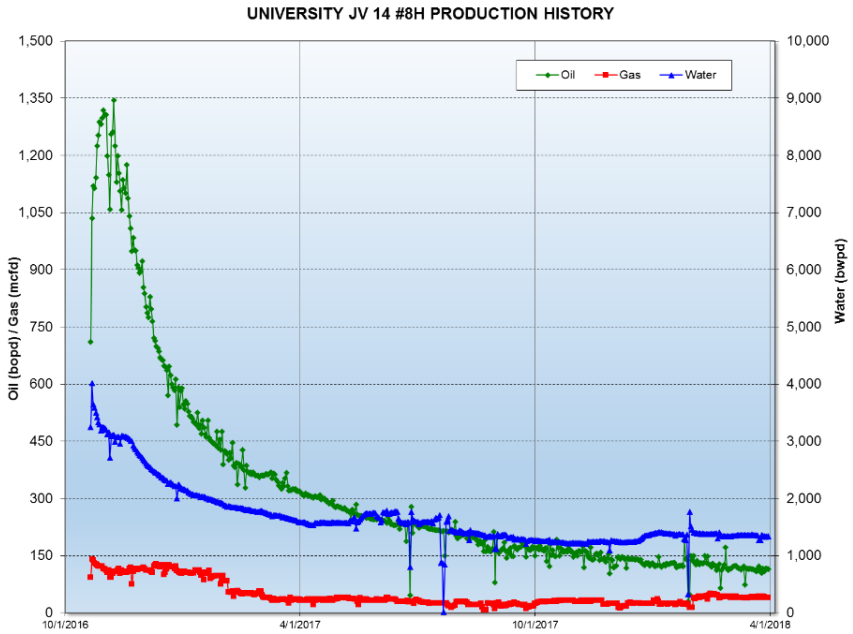
- *Easily accessible historical data*
- *Sizeable gross/net pay thickness*
- *Good phi-h*
- *Favorable Sw/BVW*
- *High carbonate content*
- *Favorable mud log show quality*
- *Predictable structural variability*

PROJECT DESIGN - CONSIDERATIONS

- *Data gathering*
  - *Geological information*
- *Wellbore design*
  - *Tubular MAWP*
  - *Production rate vs sizing*
  - *Artificial lift – today and the future*
- *Completion design*
  - *Frac water supply and pit design*
- *Battery design and gathering infrastructure*
  - *Expansion*
  - *Crude and natural gas pipeline locations*
  - *Crude gathering station locations*
- *Power supply and capacity*
  - *Reliability*
  - *Sizing - today and the future*
  - *Timing of upgrades*

PROJECT DESIGN – EXAMPLE WELL

UNIVERSITY JV 14 #8H



- *Wellbore design*
  - *9-5/8”, 36# surface casing to ~1,650’ TVD*
  - *5-1/2”, 17#, L-80 production casing to ~12,260’ TMD*
  - *2-7/8”, 6.5# EUE IPC tubing*

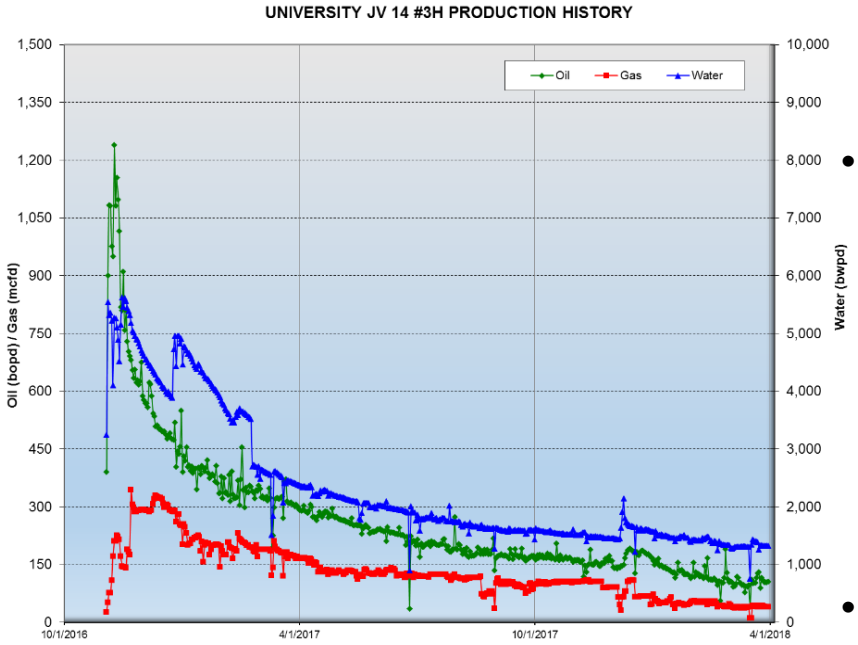
- *Completion design*
  - *Plug and perf technique*
  - *33 stages (single cluster, single stage)*
  - *~5.2 MM lbs of 20/40 sand at ~680#/ft*
  - *20# X-link fluid system*
  - *Hybrid frac plug design (composite and dissolvable)*
  - *D4300N series ESP*

- *Gathering infrastructure*
  - *6” OD SDR7 flowline with dedicated 6’ x 20’ 3PH vessel*

- *Spud to TD in 9 days*
- *IP – 1,363 BOEPD*
- *IP30 – 1,190 BOEPD*
- *Cumulative to date – 170 MBOE*

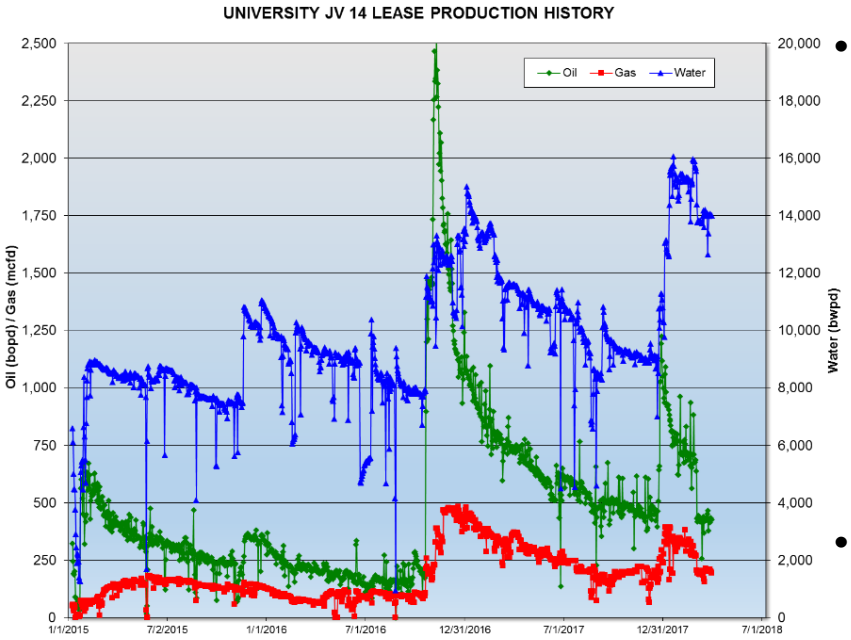
PROJECT DESIGN – EXAMPLE WELL

UNIVERSITY JV 14 #3H



- *Wellbore design*
  - *9-5/8”, 36# surface casing to ~1,650’ TVD*
  - *5-1/2”, 17#, L-80 production casing to ~14,950’ TMD*
  - *2-7/8”, 6.5# EUE IPC tubing*
- *Completion design*
  - *Plug and perf technique*
  - *44 stages (single cluster, single stage)*
  - *~6.7MM lbs of 20/40 sand at ~660#/ft*
  - *20# X-link fluid system*
  - *Hybrid frac plug design (composite and dissolvable)*
  - *D5800N series ESP*
- *Gathering infrastructure*
  - *6” OD SDR7 flowline with dedicated 6’ x 20’ 3PH vessel*
- *Spud to TD in 9 days*
- *IP – 1,274 BOEPD*
- *IP30 – 840 BOEPD*
- *Cumulative to date – 147 MBOE*

PACESETTER SHAFTER LAKE PROJECT CURRENT STATUS



- *Size*
  - *~3,800 ac total*
  - *20 total horizontal locations (PDP and PUD)*
- *Production*
  - *First production – Jan 2015*
  - *5 - horizontal wells (all UL)*
    - *2 - ≤ 1 mi lateral section*
    - *2 - ≤ 1-1/2 mi lateral section*
    - *1 – 2 mi lateral section*
  - *2 - horizontal wells (partial UL)*
  - *Currently producing ~700 boepd, 14,000 bwpd*
  - *610 MBOE cumulative to date*
- *Infrastructure*
  - *1 - central battery facility sized for expansion*
  - *1 - fresh water frac pit*
  - *Adjacent to crude, gas gathering, and fresh*
  - *water supply pipelines*
  - *Power transmission upgrades in progress*