



# MIDLAND BASIN

# 2020

**EMERGING DRILLING TRENDS IN THE MOST ACTIVE BASIN IN THE WORLD**

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AADE MidCon Symposium 2/26/20



# Since We're in Oklahoma... A Look at the Old Devon Energy



Diamond Offshore – Ocean Endeavor



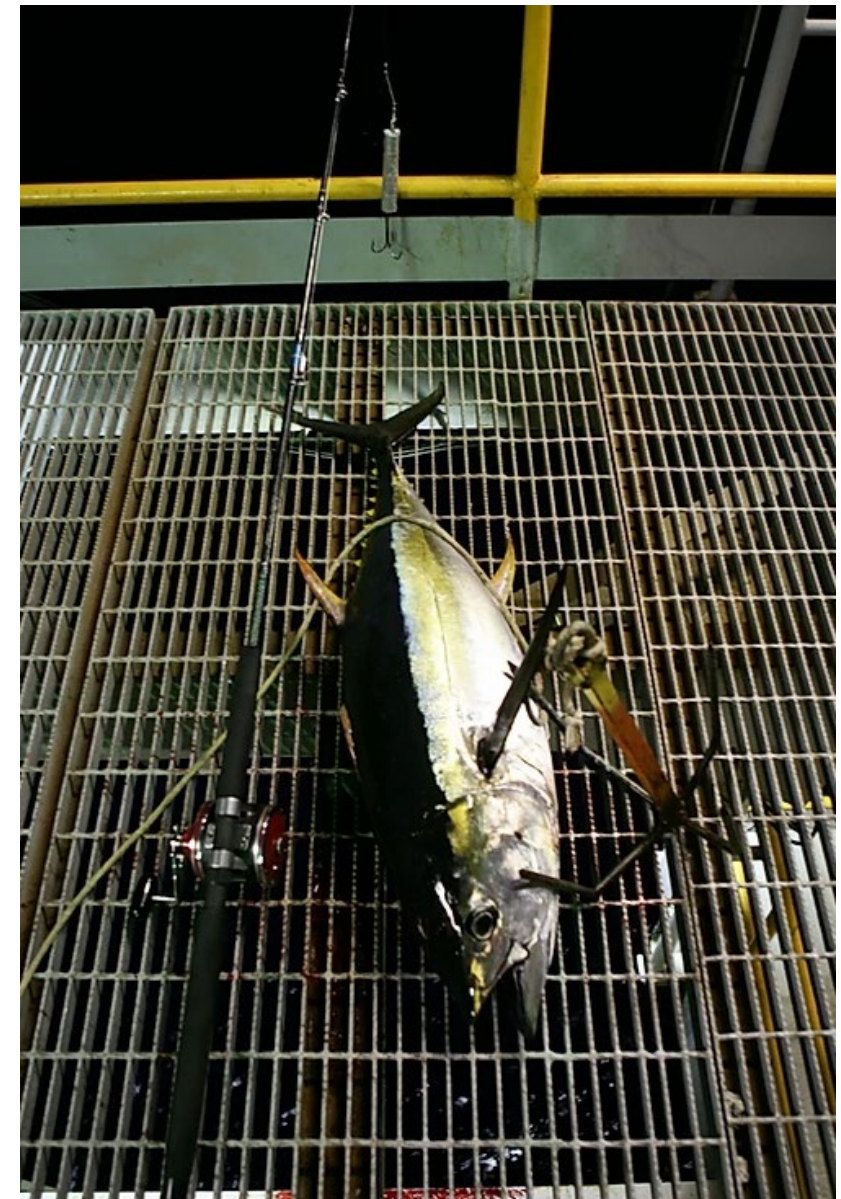
Seadrill West Sirius

Date	Well	Casing Design	Cost (\$MM)	Days	MD	MW	BHP
2007	Well 1	7 Strings	\$ 156	260	33,513	14.7	25,617
2008	Well 2	5 Strings	\$ 183	256	29,743	14.7	22,736
2009	Well 3	5 Strings	\$ 118	118	26,959	14.6	20,467
2009	Well 4	5 Strings	\$ 113	108	27,020	14.6	20,514
2009	Well 5	8 Strings	\$ 329	330	31,444	15.2	24,853
	<b>Total</b>		<b>\$ 898</b>	<b>1,072</b>			

- A Deepwater company can spend \$900 MM drilling 5 wells in 2.9 years, only 2 of them will ever produce oil, and its several more years to first production...if you think a central facility in the WTX desert is expensive try building a floating facility (FPSO) with subsea gathering in 7000' of water, 150 miles from land
- A Permian Basin company can spend the same \$900 million to drill and complete about 100 horizontal wells in about the same amount of time (20 days per well = 1,995 drilling days or 2.73 years with a 2 rig program)
- If you project production for 100 wells using Guidon's current gross BOE with 70 producing wells you're looking at producing nearly 50,000 BOE on year 4
- Which project would you rather invest in?
- Side note: Devon sold their working interest in these deepwater assets for \$1.3 Bn in 2009, just before the Macondo tragedy that killed 11 and spilled 4.9 MM bbls; my last hitch offshore was 2 weeks before the accident and I was fortunate to hit the horizontal revolution just as it was kicking off in the Haynesville

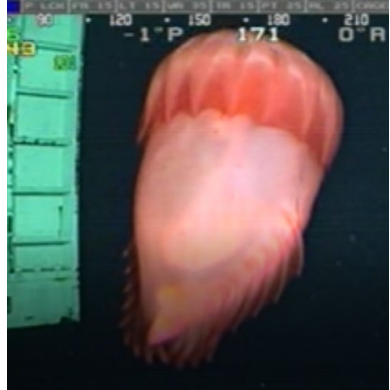
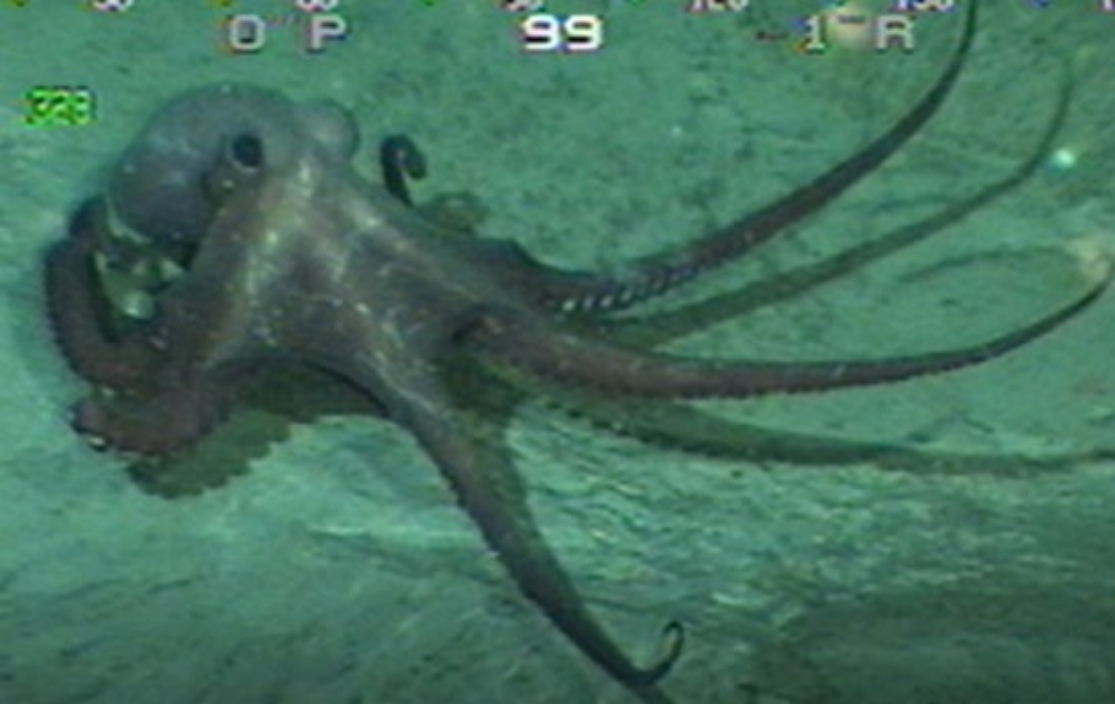


# Fishing from the Rig Was Allowed...Not Anymore





# Creatures of the Deepwater





# Forward Looking Statement

- The following slides outline our current best practices which are always subject to change based on new data and new observations
- We do not claim nor believe to be the best drillers in the basin but we're always striving for it
- We believe that all drillers benefit by sharing current best practices and strategies with peers and competitors (you get what you give)
- There is more than one way to drill a cost-effective well that meets objectives
- None of the technologies or services described herein are paid endorsements; we are simply sharing tools that we believe help us to drill more efficiently



# Guidon Overview

## Key Highlights

### Contiguous, operated scale land position with rights to all benches

- ~32,200 net acres (~38,700 gross acres)
- >95% operated w/ JOA in place
- 94% HBP/CDC: can satisfy minimal CDC/expiration with 0.5 rig per year
- 20–30% AMI partner under JOA (~5,200 additional net acres)

### Deep inventory of drill-ready, executable locations

- ~1,000 drill-ready locations (operated, >7,500', >95% WI control, offset economically proven zones in MSPBY, JM, LSPBY, WCA, WCB)
- 5 zones / 8 benches currently being developed
- 9,600' average lateral length for all future drill ready locations

### Robust current production profile and strong well results provide near-term cash flow

- Current production: 18,750 net boe/d (31,000 gross boe/d)
- Wells: 73 Hz producing<sup>1</sup> / 12 completing (4 Bessie & 8 GWW) / 8 drilling (Walker) / 0 WOC (GWW) / 0 SIFOI
- Active rigs: 2

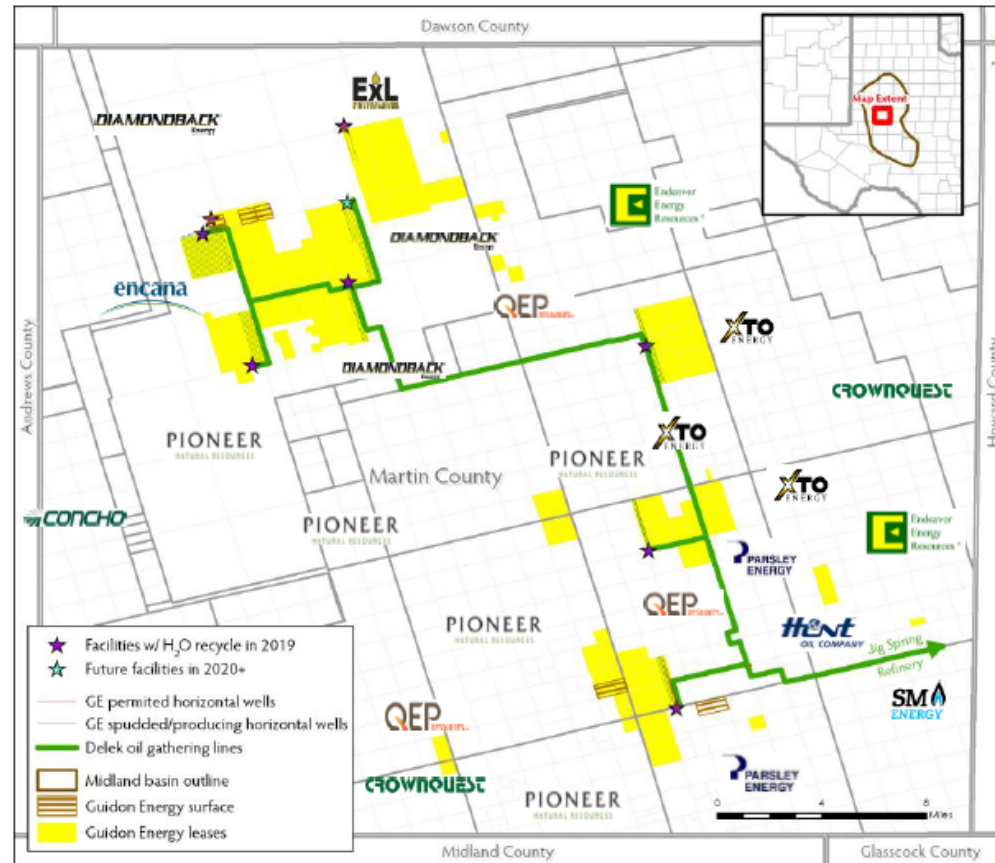
### Crude, water, and gas infrastructure in-place to support near-term full-field development

- 200,000 bbl/d of current water recycle capabilities
- Partnership with Waterfield for produced water disposal. Currently have three (3) Ellenberger SWD wells connected via large diameter poly lines throughout our development area.
- Developing acreage position with focus on efficiency through pad drilling, production corridors, water recycling and offtake pipeline capacity

### Proprietary science work and database across the asset to drive resource recovery

- Optimizing reservoir recovery through full core analysis across acreage and 330 mi<sup>2</sup> of high quality 3D seismic covering ~91% of leasehold
- 3,900' whole cores and extensive logs across the acreage position

## Asset Position



\* All data above as of February 18, 2020 and will change as development continues

<sup>1</sup> 8,600' average lateral length of the 73 producing / drilled wells

<sup>2</sup> SIFOI = shut-in for offset frac impact

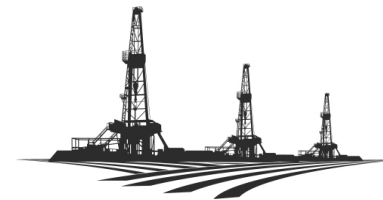


1. The Most Dangerous Job in America?
2. Pressing Circumstances
3. Sharing Info and Benchmarking
4. NextGen 4-string Well Design
5. Water Based Mud in the Lateral
6. 12-1/4" BHA with 8-3/4" Power Section
7. Lateral BHA Improvements (AST + 616SPL)
8. Old vs. New School Geosteering
9. AutoSlide Update
10. The New Morning Report
11. Other Wins I'm Hearing About

# MIDLAND BASIN

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**EMERGING DRILLING TRENDS IN THE MOST ACTIVE BASIN IN THE WORLD**



# Is This The Most Dangerous Job in America?

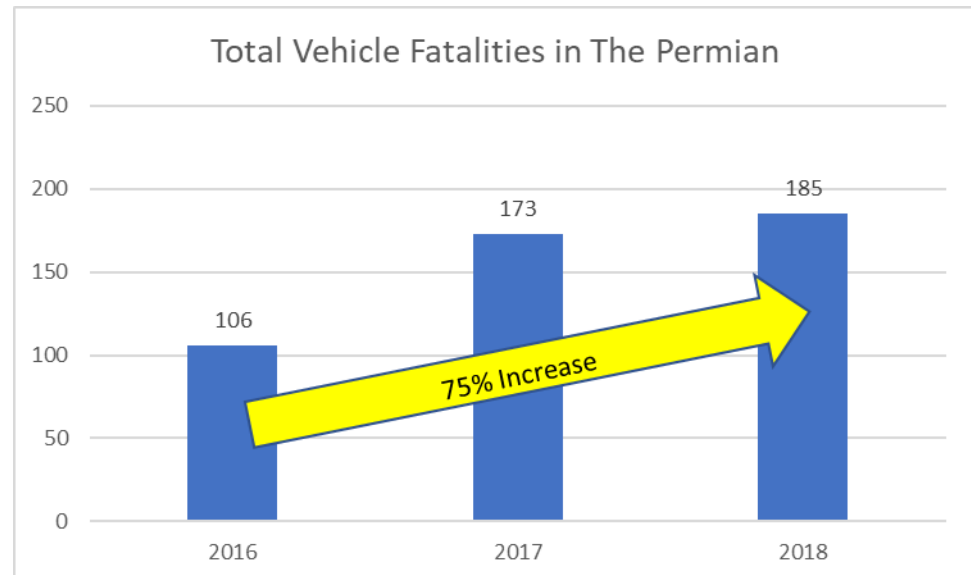
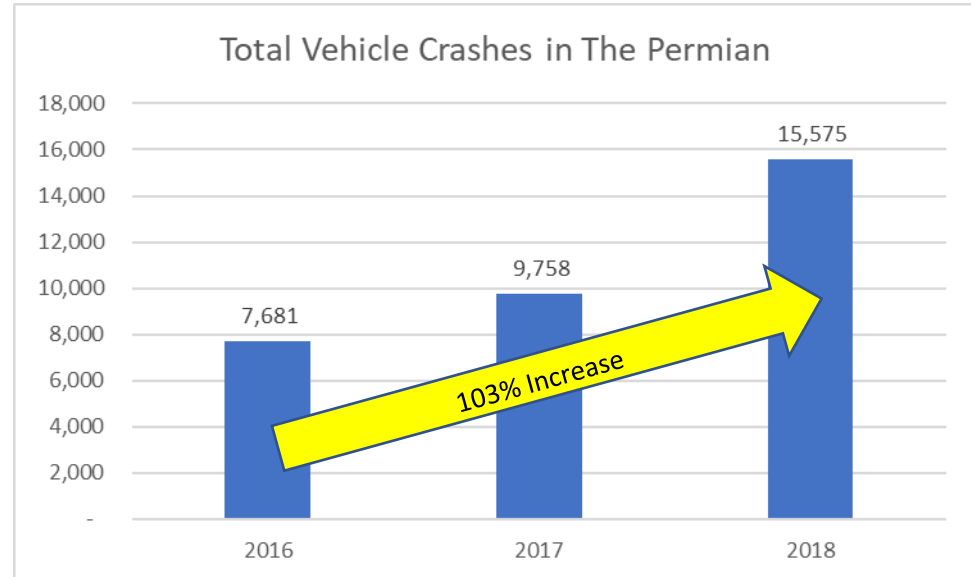
- While just 7% of Texans live in the Permian Basin, 13% of all the state's 2018 traffic fatalities occurred there
- 103% increase in crashes since 2016
- 75% increase in fatalities since 2016
- The biggest factor in traffic accidents is "poor driver behavior"
- One-third of wrecks are caused by driving while under the influence of alcohol or drugs
- Another third is caused by distracted driving
- Speeding and driving while tired are other contributing factors
- **This is one of the most concerning trends that we are facing as an industry and as a community**

<http://motran.org/wp-content/uploads/2018/05/DriveSMARTCampaign.pdf>

<https://www.txdot.gov/driver/share-road/be-safe-drive-smart/energy-sector.html>

<https://www.mrt.com/news/article/MOTRAN-Midland-County-has-most-fatal-crashes-in-13105919.php>

<https://www.mrt.com/news/article/TxDOT-11-percent-of-state-s-fatalities-happen-13649468.php>





# Playing Not To Lose (2017-2019)

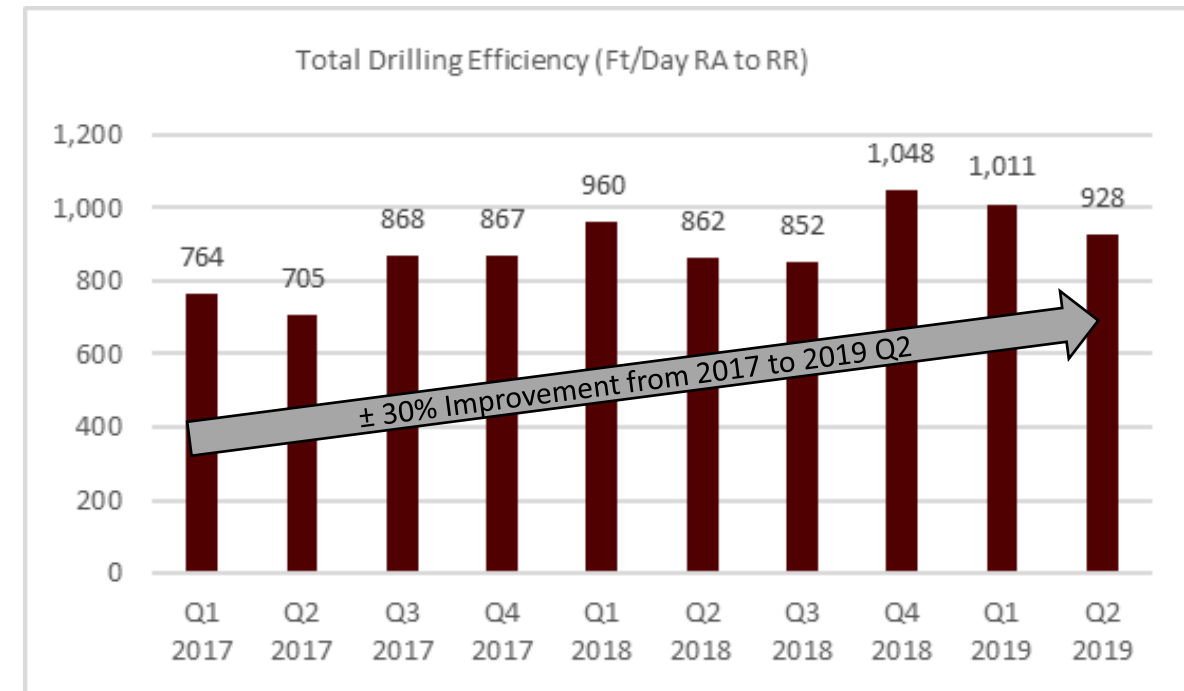
“**The most important decision is to not lose money.** Some people care about the upside. They don’t worry about the downside if they think the upside is great... if you lose a lot of money then you have to have a really great deal next to make it up. **You’re better off never losing.**”

Stephen A. Schwarzman

Chairman, CEO & Co-Founder of Blackstone

## Examples of Playing Not To Lose at Guidon (2017-2019)

- Operate at 80% of max drilling parameters so you don’t break tools
- Always use 4-string well design where the San Andres is over-pressured
- Don’t let the San Andres flow when drilling intermediate interval
- Don’t drill ahead without returns
- Use oil-based mud because its more forgiving
- Over-design casing connections
- Drill at the high end of the mud weight window for hole stability



# Pressing Circumstances (2019-2020)

**“In Q2 2019 only 10% of a group of 40 U.S. shale drillers were free cash flow positive.” – Rystad Energy**

“Often we become satisfied with an established procedure and only the press of circumstances will bring about improvement in that procedure.”

J.H. Marsee, Phillips Petroleum, 1952

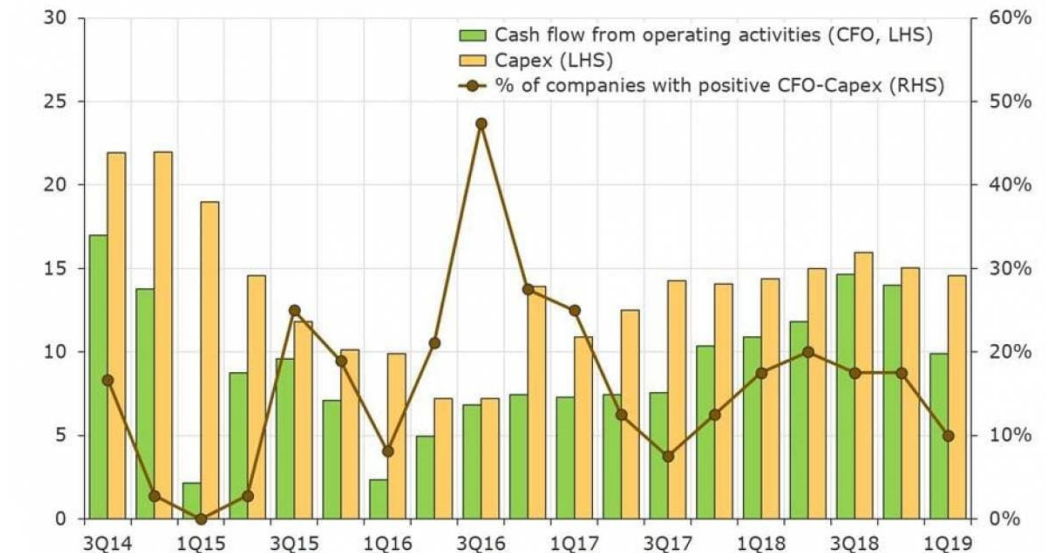
SPE - Drilling and Completion Practices, Spraberry Trend, Leonard Franklin

## Examples of How Pressing Circumstances Influenced Our Drilling Strategy (Q3 2019 to Present)

- Operate at max drilling parameters even if it's riskier
- Transition to new 4-string design proven by peer operator
- Use water-based mud proven by peer operators
- Performance based rig contracts
- Drill in the low end of the mud weight window when necessary

## Cash flow statement evolution for US shale oil companies\*

Billion USD



\*Based on a peer group of 40 dedicated US shale oil companies

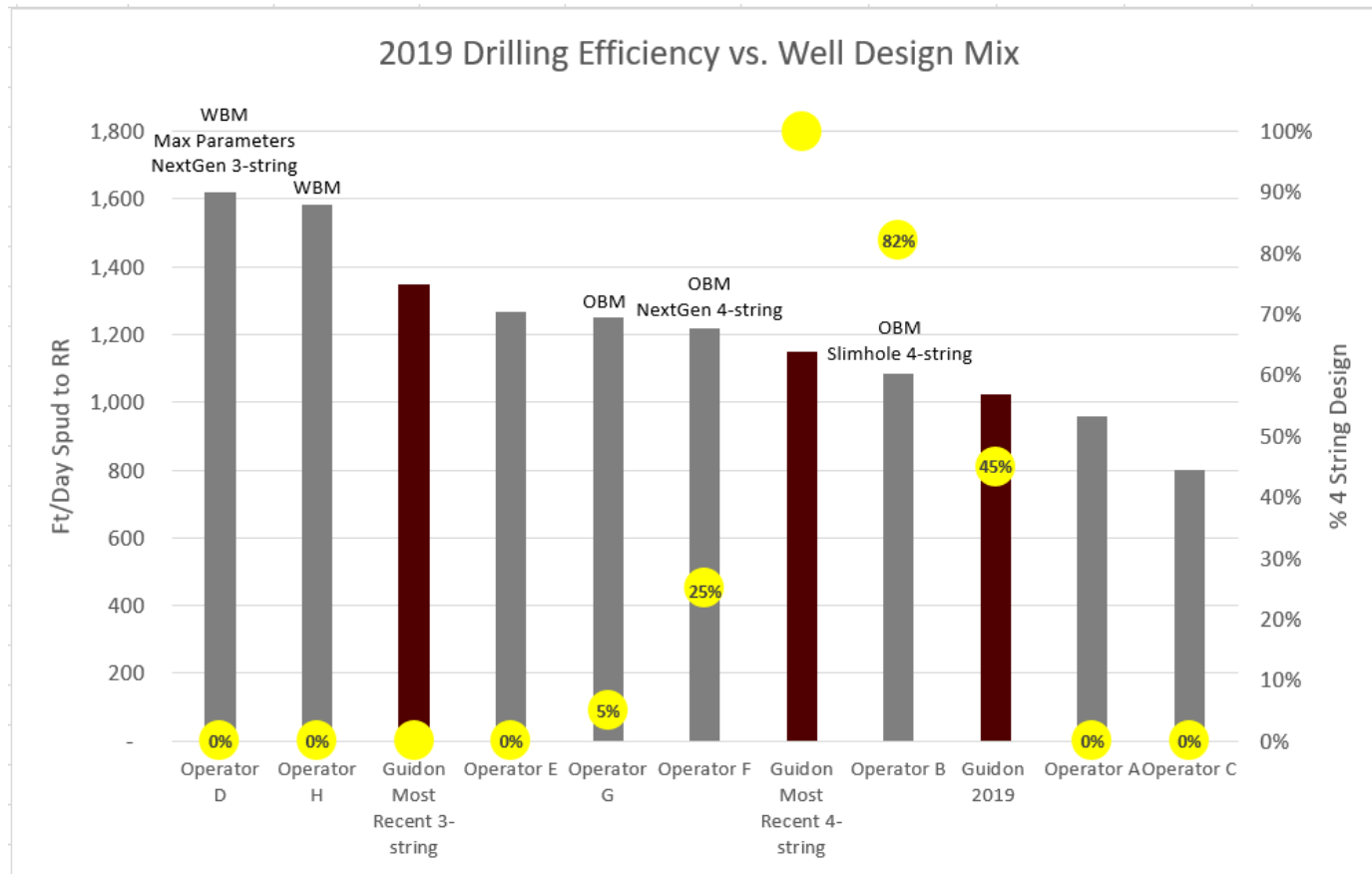
Source: Rystad Energy research and analysis



RYSTAD ENERGY



# Sharing Info and Benchmarking Are Critical

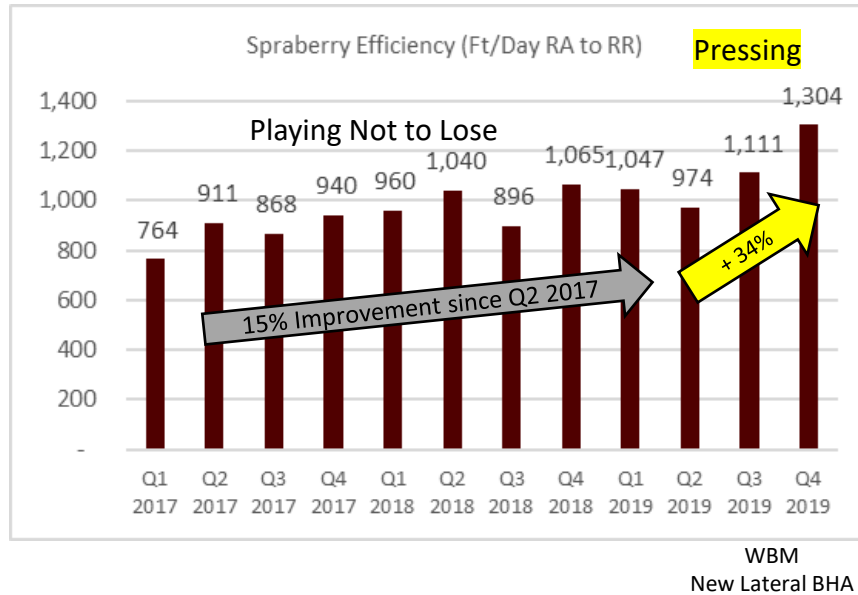


“Hey man can I have your magic procedure for freeing stuck pipe?”

## Takeaways:

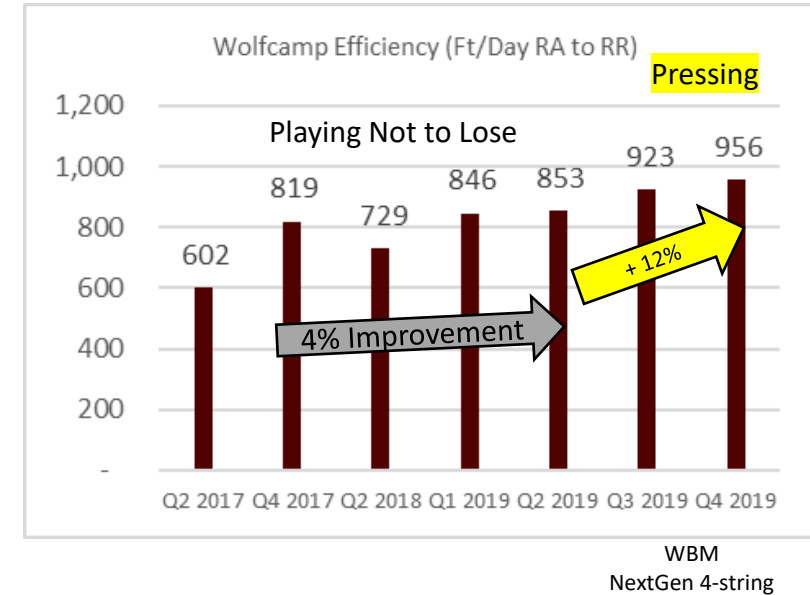
- Top 2 drillers in the Midland Basin are utilizing WBM and 100% 3-string well design
- New 4-string well design outperforming old “slim-hole” design
- Use max flowrate, max drilling parameters, and the most powerful motor that will fit in the hole
- Networking with lots of drilling engineers who are smarter than you is a good idea; if a drilling engineer calls me and asks for help I always go above and beyond

# Transition to the Press



## Spraberry Summary

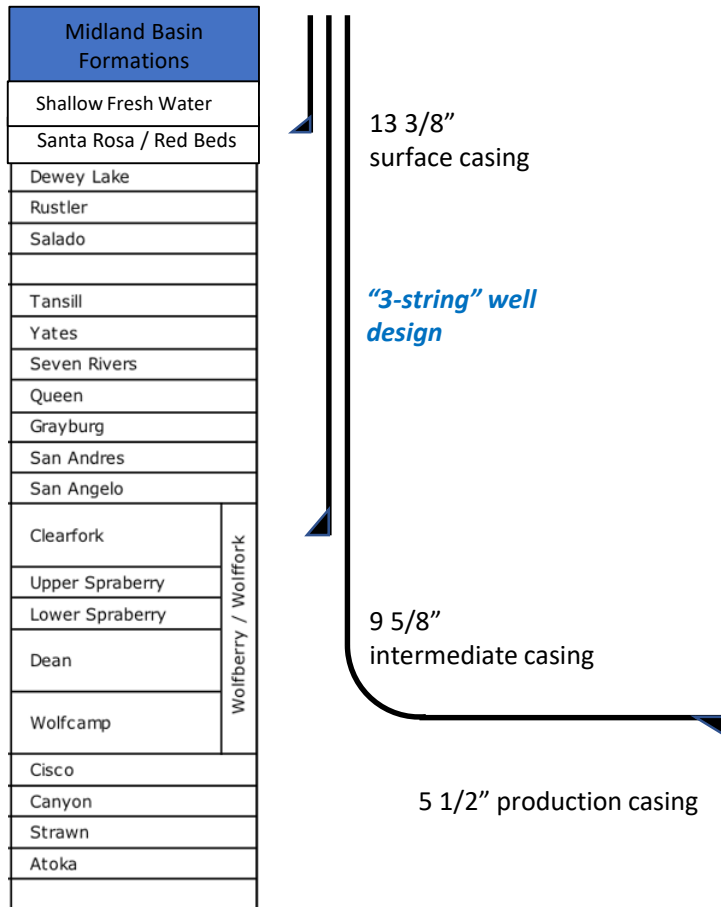
- Implemented water-based mud and new lateral BHA strategy in Q3 2019
- 13-3/8" x 9-5/8" x 5-1/2" (3-string)
- 56 wells to date (64%)



## Wolfcamp Summary

- Implemented NextGen well design and water-based mud in Q3 2019
- 13-3/8" x 9-5/8" x 7-5/8" x 5-1/2" (2017 – Q2 2019)
- 13-3/8" x 10-3/4" x 8-5/8" x 5-1/2" (Q3 2019 - Present)
- 31 wells to date (36%)

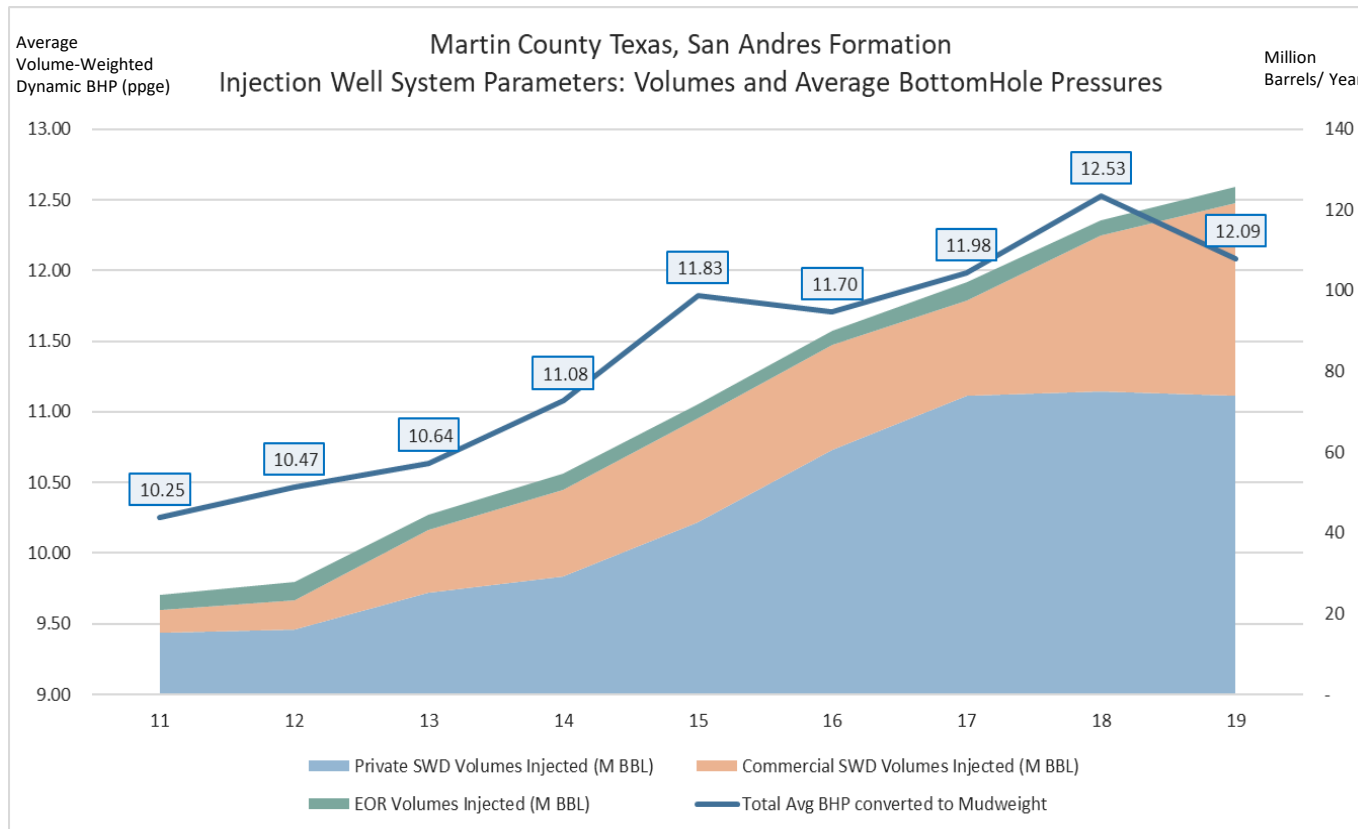
# Refresher on the 3-string Well Design



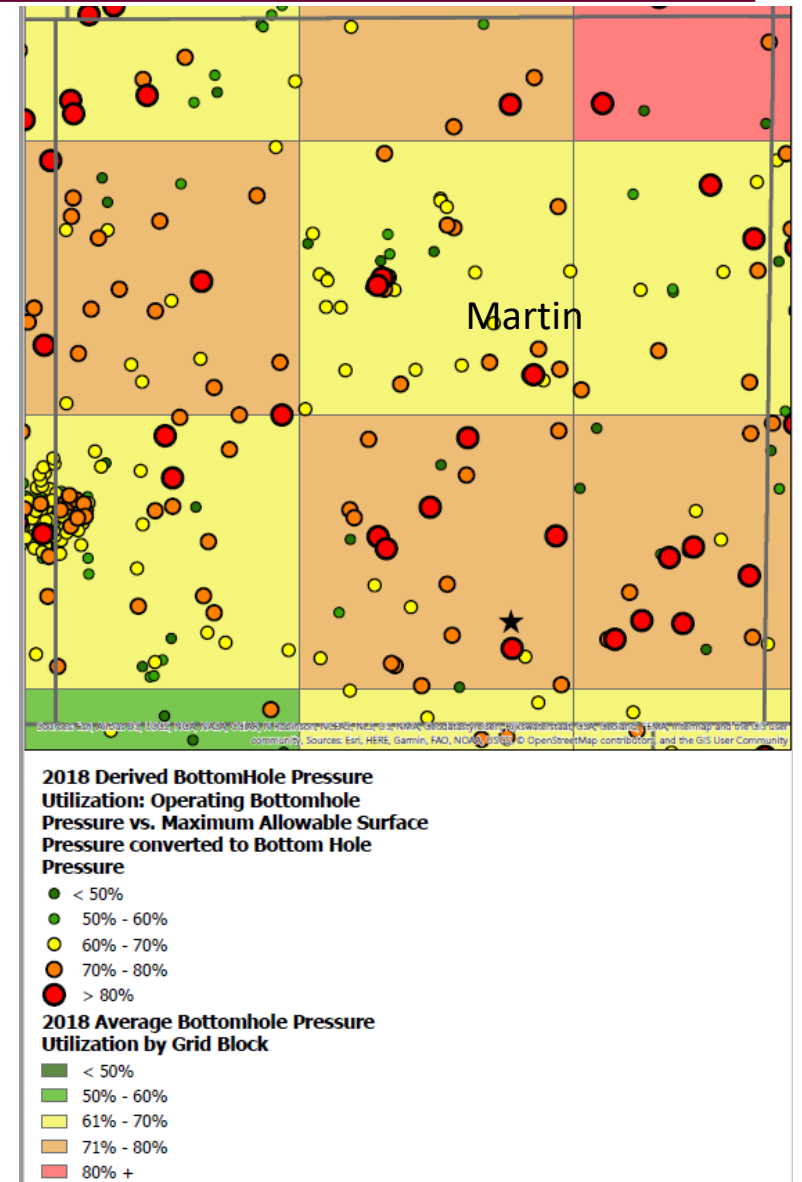
- All Guidon Spraberry targets to date have utilized this 3-string design (64% of all Hz wells to date)
- 1800' of 13-3/8" STC Surface
  - 17-1/2" hole
  - 400' of 54.5# on bottom for collapse
  - 1400' of 48# on top
  - XO joint from STC to BTC on top for cement head
- 6300 to 6850' of 9-5/8" 40# HCL80 BTC
  - 12-1/4" hole
  - Special drift to 8.75" to preserve liner contingency
  - Not using bond coat or rite-wrap
  - Set 250-300' into Clear Fork Lime but above first CF Shale
  - Stage tool 100 ft into Grayburg (top of gauge hole)
  - Stage 1: TOC at DV Tool with 20% excess
  - Stage 2: TOC at surface with 150% excess
- 18000' of 5-1/2" 20# P-110 GBCD
  - 8-3/4" hole to KOP and 8-1/2" Curve/Lateral
  - 6.3 Coupling OD
  - Max Operating Torque 29,620 ft-lbs (insurance policy)
  - Have only had to rotate 3 out of 60 Hz wells to date with OBM but significantly higher with WBM
  - Utilizing disappearing glass float sub with WBM
  - TOC to 1000' inside previous casing, single 13.2 ppg slurry
  - 30 min time delay toe sleeve (full bore ID, 7.38" OD)



# The San Andres Problem



- Currently injecting 120 million barrels per year in the San Andres in Martin County
- 18% increase in average bottom hole pressure (BHP) since 2010
- 27% of San Andres disposal wells in Martin Co. have BHP utilization of over 80% of permit
- The problem is clearly getting worse with time
- Either you drill with flow/losses or you add a 4<sup>th</sup> string to your well design



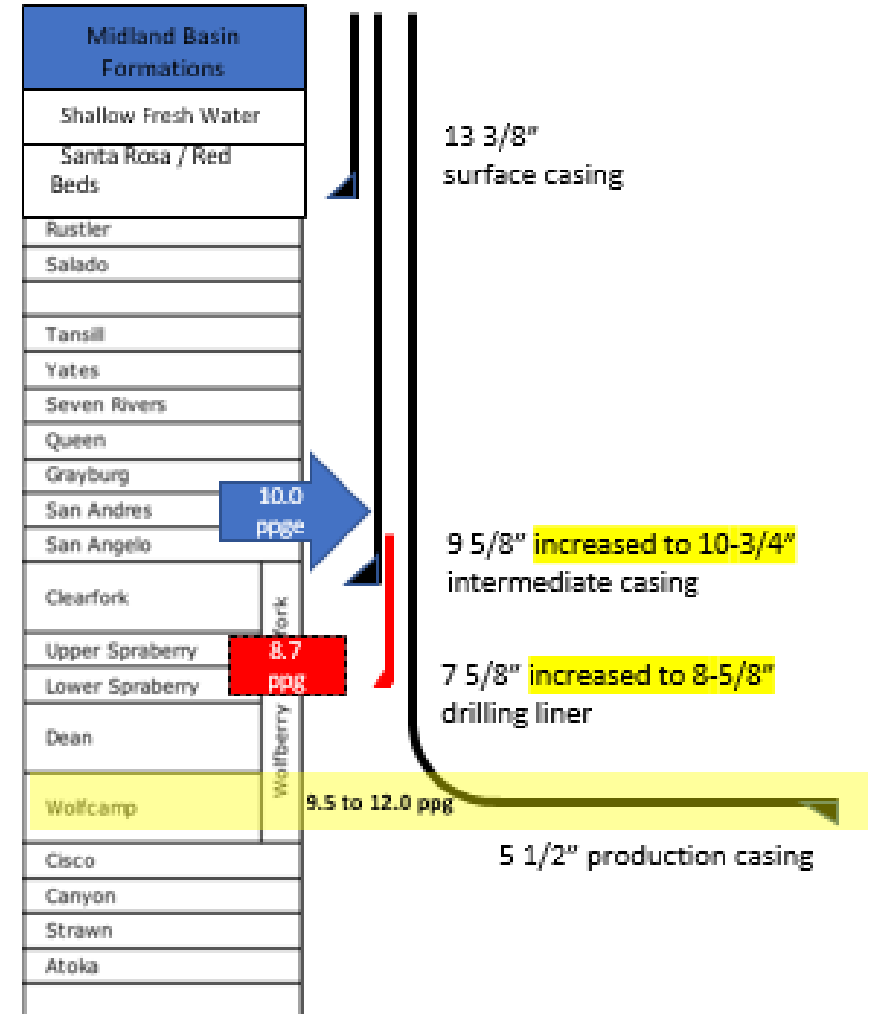
# NextGen 4-String Well Design

## Summary

- The 4-string design mitigates over-pressure in the San Andres disposal zone for wells targeting the Wolfcamp
- New design results in a 7-7/8" production hole size vs. 6-3/4" with original design
- Larger annular clearance allows for the use of water based mud
- Larger hole size enables use of more powerful directional drilling tools
- Eliminates the need for slim hole drill pipe
- Allows use of more reliable 5.5" toe sleeve
- NextGen 4-string well design has potential to save > \$300,000 per well
- As the San Andres pressure continues to increase over time, an optimized 4-string design will be critical to an operators ability to execute

## Potential Cost Savings

Large Bore 4-String Savings	Item
Enables use of WBM	\$ 190,000
More efficient curve/lateral drilling	\$ 100,000
Eliminate slim hole drillpipe rental	\$ 60,000
Improved toe prep efficiency	\$ 18,000
Eliminate semi-flush casing	\$ 17,520
Additional cost for 10-3/4" casing	\$ (20,000)
<b>Total</b>	<b>\$ 365,520</b>

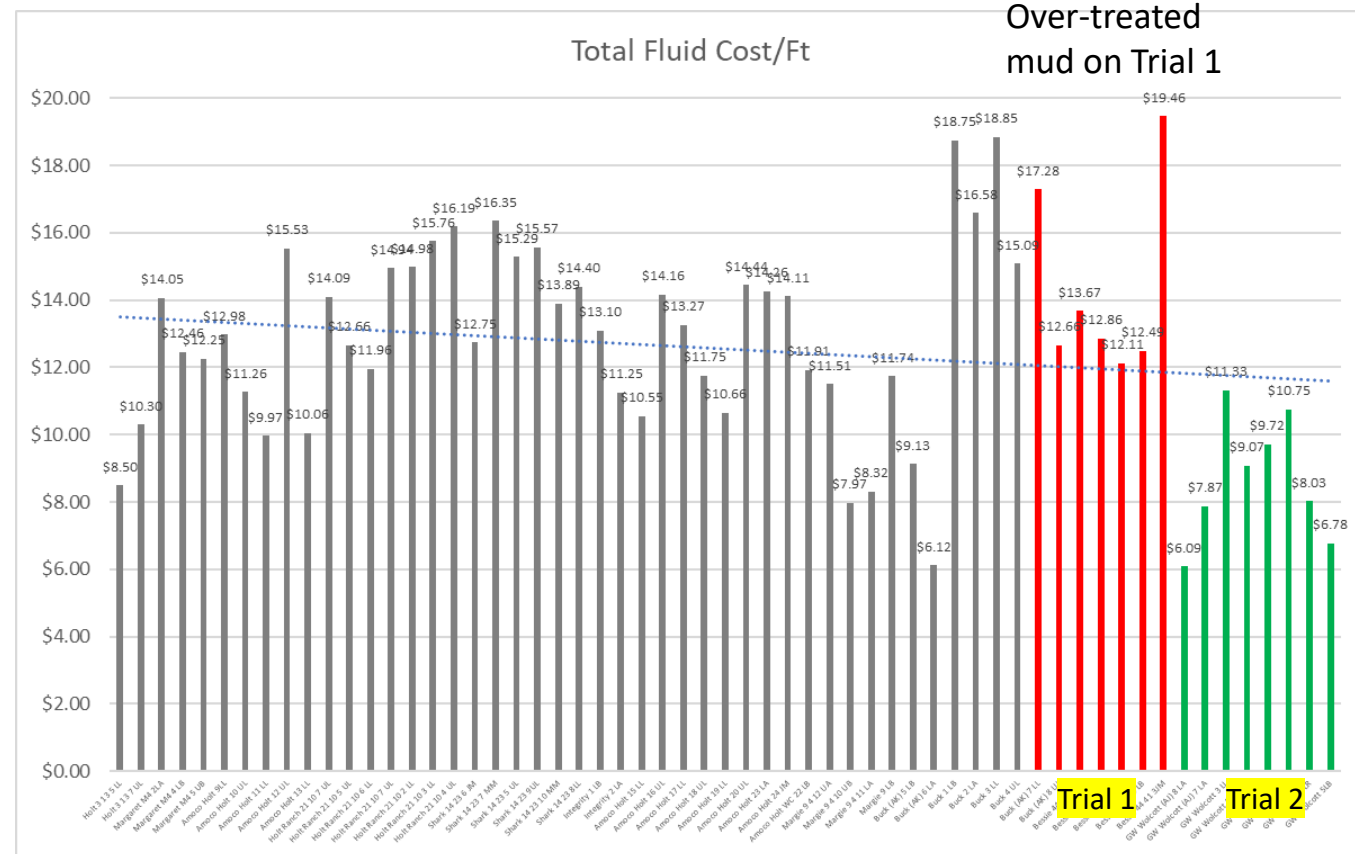


# Water Based Mud in the Lateral

## Summary

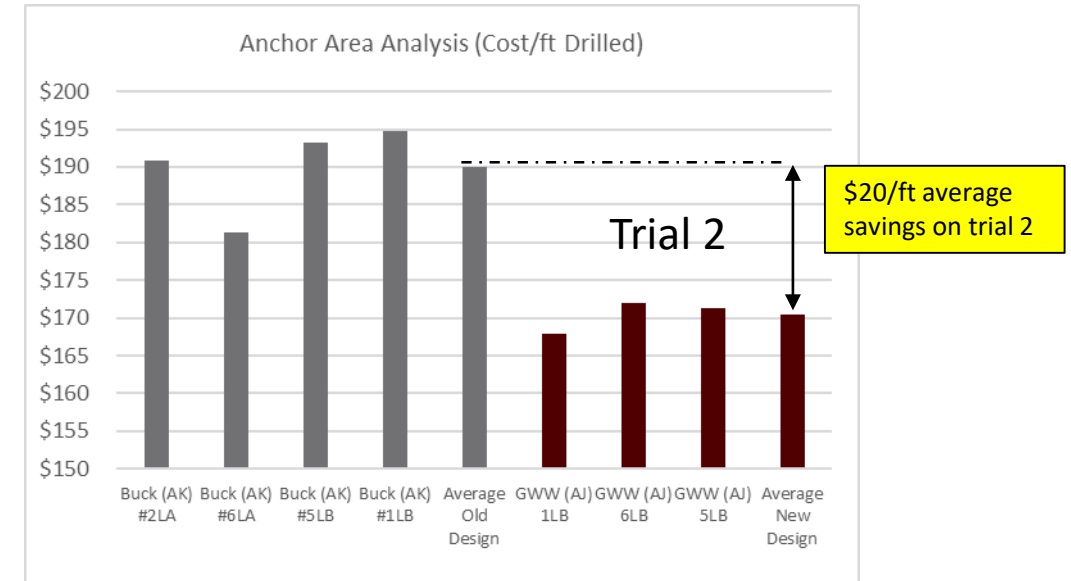
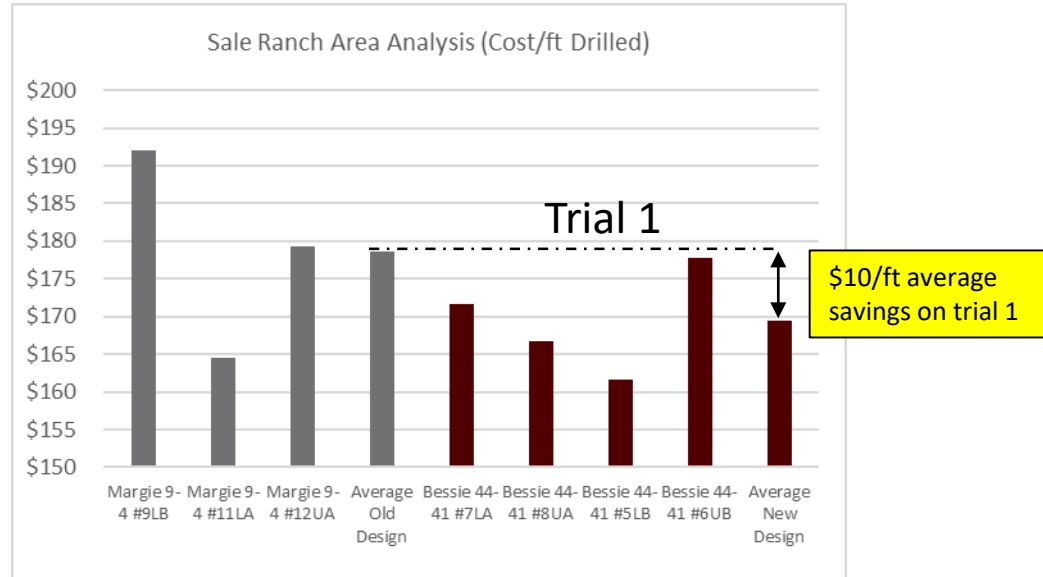
- Reserve pit water management is important
- Must use max MUT on 5" 4-1/2 IF drillstring
- Robust corrosion inhibition program
- 5 ppb of Bentonite for body substance, Xanthum Gum (0.5ppb), PHPA Dry (0.5-2.0 ppb), and maintain pH of 8.5 - 9.5
- 2-3% lube
- Co-polymer bead sweeps and bead recovery on long laterals
- Spot 5ppb co-polymer beads in lateral prior to POOH for casing
- Mix beads properly
- Trial and error with MWD transmitter to prevent jamming with beads
- Spot biocide ahead of cement to protect casing above TOC
- Float sub is a best practice with WBM
- Not uncommon to dry-ream last thousand feet of casing
- WBM doesn't work as well on Spraberry 3-string wells in some areas where the fracture gradient of the Upper Spraberry is < 8.7 ppge (where you need to drill with 8.0 ppge OBM)
- **Reduced average fluid cost 33% from \$12.95 to \$8.70 per ft drilled (\$75,000 savings per well)**

VISCOSITY	Fluid Loss	6 SPEED	PV	YP	LGS
(Sec/qt)	(mL/30m)	(Rpm's)	(cP)	(lb/100ft <sup>3</sup> )	(% v/v)
34 - 38	<12	2-5	5-10	4-15	<6





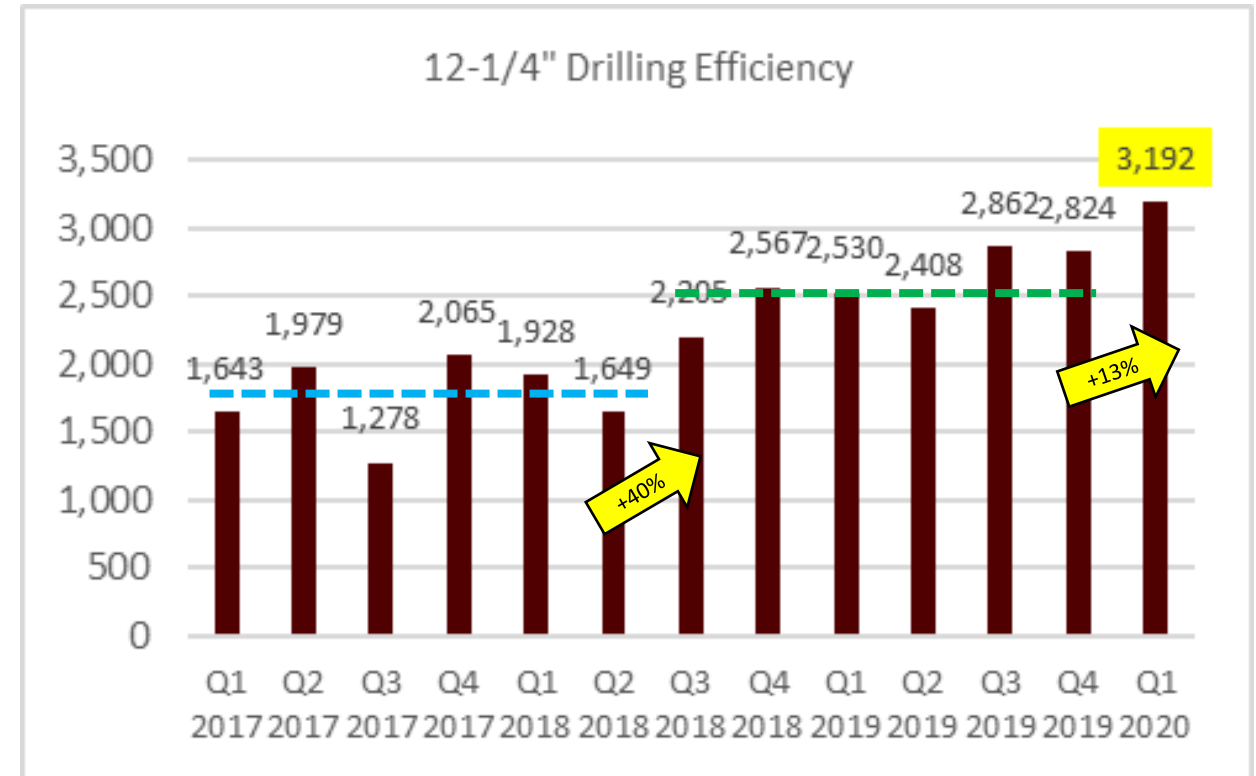
# Results of New 4-String with WBM



- 2 significant design changes implemented in Q3 2019:
  - ✓ NextGen 4-string well design results in a 7-7/8" production hole size vs. 6-3/4" with original design
  - ✓ Water based mud in the curve/lateral
- Realized \$200,000/well savings on first 4 well trial and \$400,000/well savings on second 3 well trial

# 12-1/4" BHA Optimization

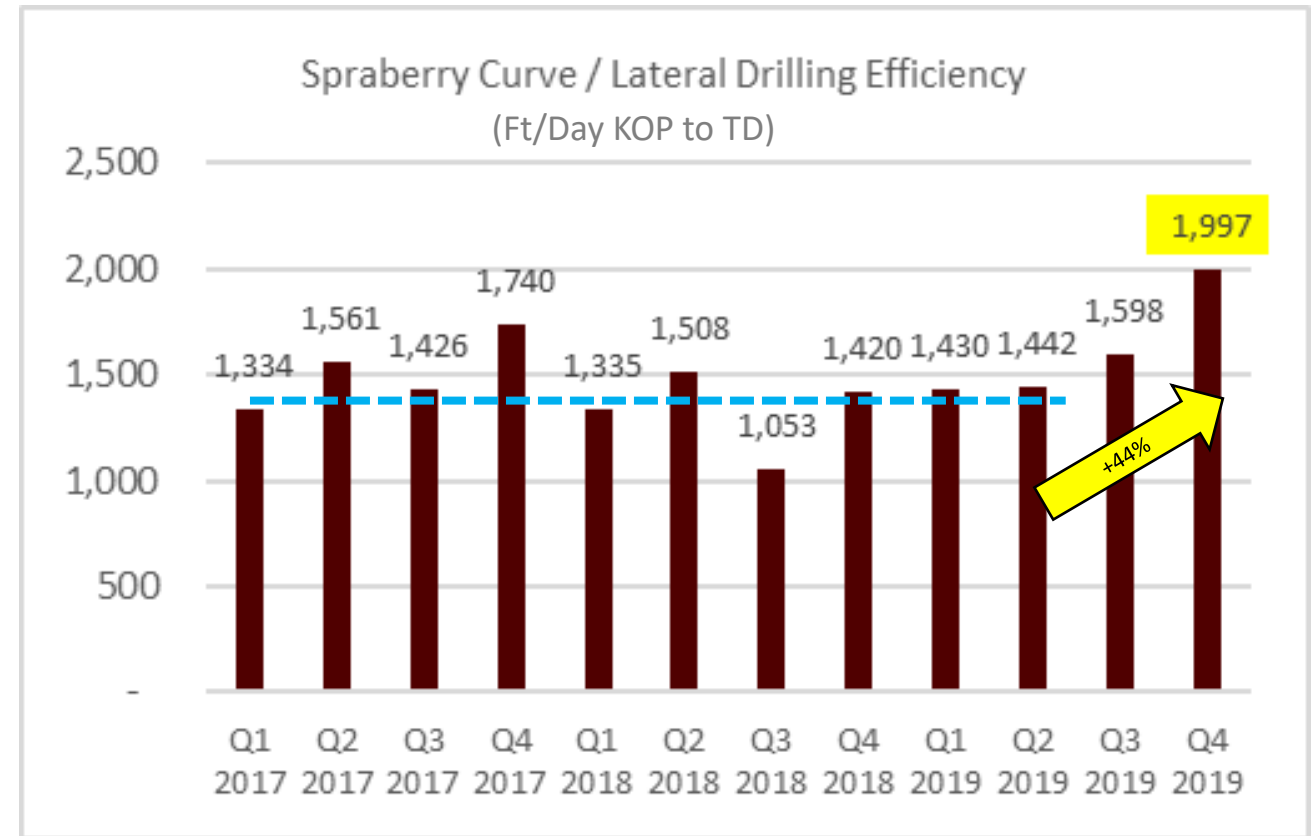
- 40% improvement with new 8-3/4" power section in Q3 2018
  - 8-3/4" 7/8 lobe, 7 stage, 0.17 rev/gal
  - Previously running 8" 6/7 lobe, 4 stage, 0.15 rev/gal
- Additional 13% improvement by increasing flowrate from 800 gpm to 900 gpm
- Hold 80 rpms until top of Clear Fork, then slow to 60
- Targeting 700-900 psi diff when rotating
- 716 bit
- 11-3/4" stabs above and below motor
- Shock sub above motor
- 4 stands of NC56 DC and 3 stands of 5" HWDP
- Average improved from 1757 ft/day to 2,507 ft/day
- Recent record performance 4,067 ft/day from drill out to TD (4,829' in 28.5 hours)



# 8-1/2" Lateral BHA Optimization

## Spraberry Curve/Lateral Strategy (3-string Design)

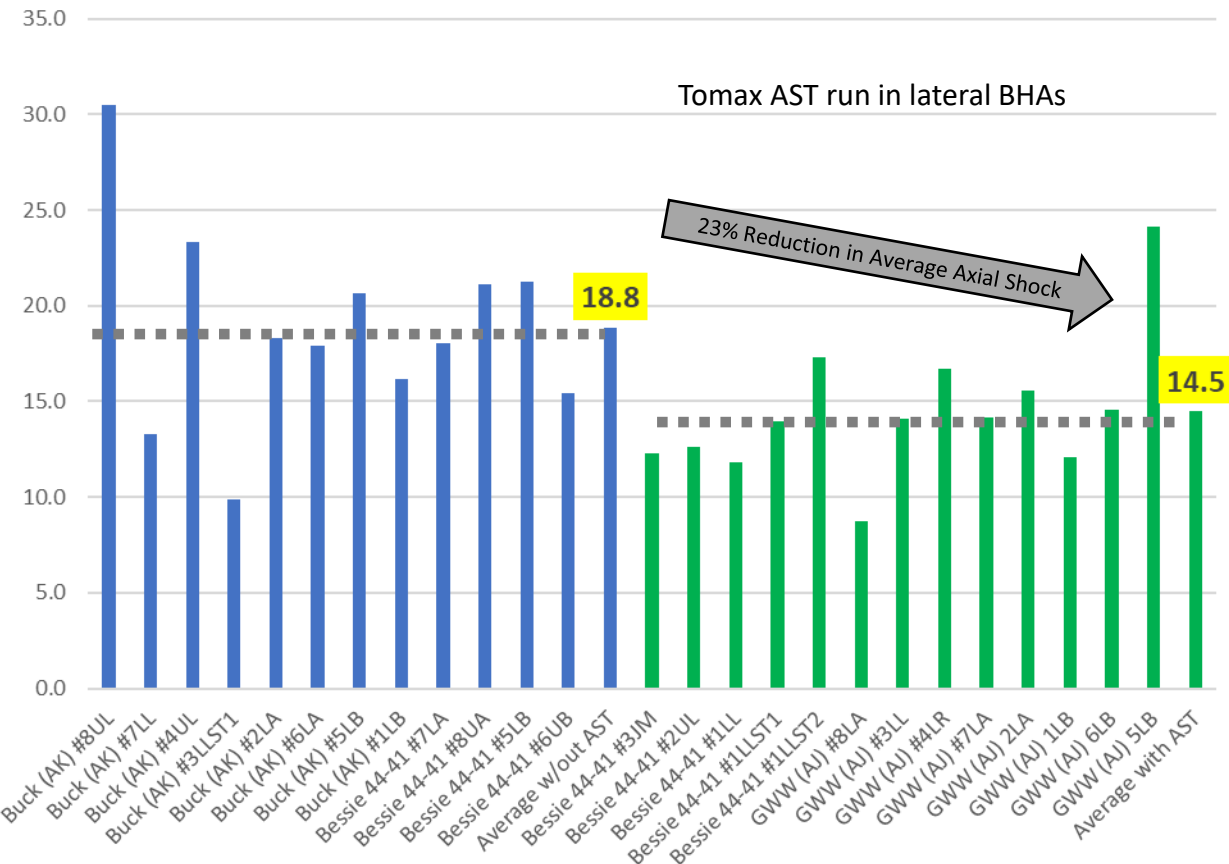
- Historically landed curve with 6-3/4" slick 2.0 deg motor and drilled ahead until bit failure, then pick up 7" 1.5 deg lateral BHA with CF716 bit (unable to keep 6 blade bit in the hole due to bit wear)
- Began new strategy at end of Q3 2019: land curve and TOOH for 7" lateral BHA with Tomax Anti-Stick-Slip Tool (AST) placed above MWD
- "Tomax AST tool is a best practice for the top RSS providers in the basin... if it doesn't effect slide drilling it should help us in rotation mode"
- After 2 successful lateral test runs with Tomax AST and CF716, swapped to 6 blade bit (SPL 616)
- Curve/Lateral drilling efficiency increased 44% from 1,407 ft/day to 2,021 ft/day with new strategy: trip at base of curve and pick up 7" lateral BHA with Tomax AST + SPL616



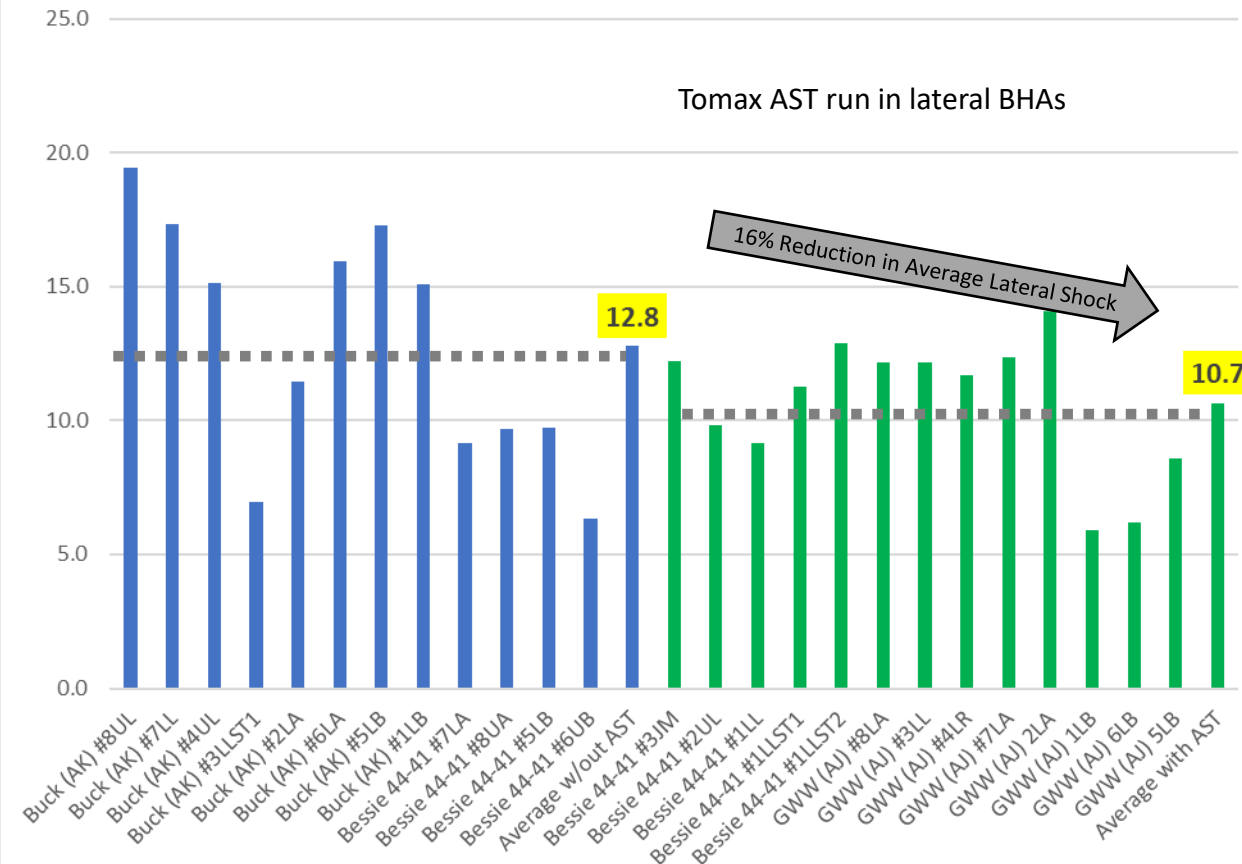


# Reduction in Shock with Tomax AST

Average **Axial** Shock in Lateral



Average **Lateral** Shock in Lateral

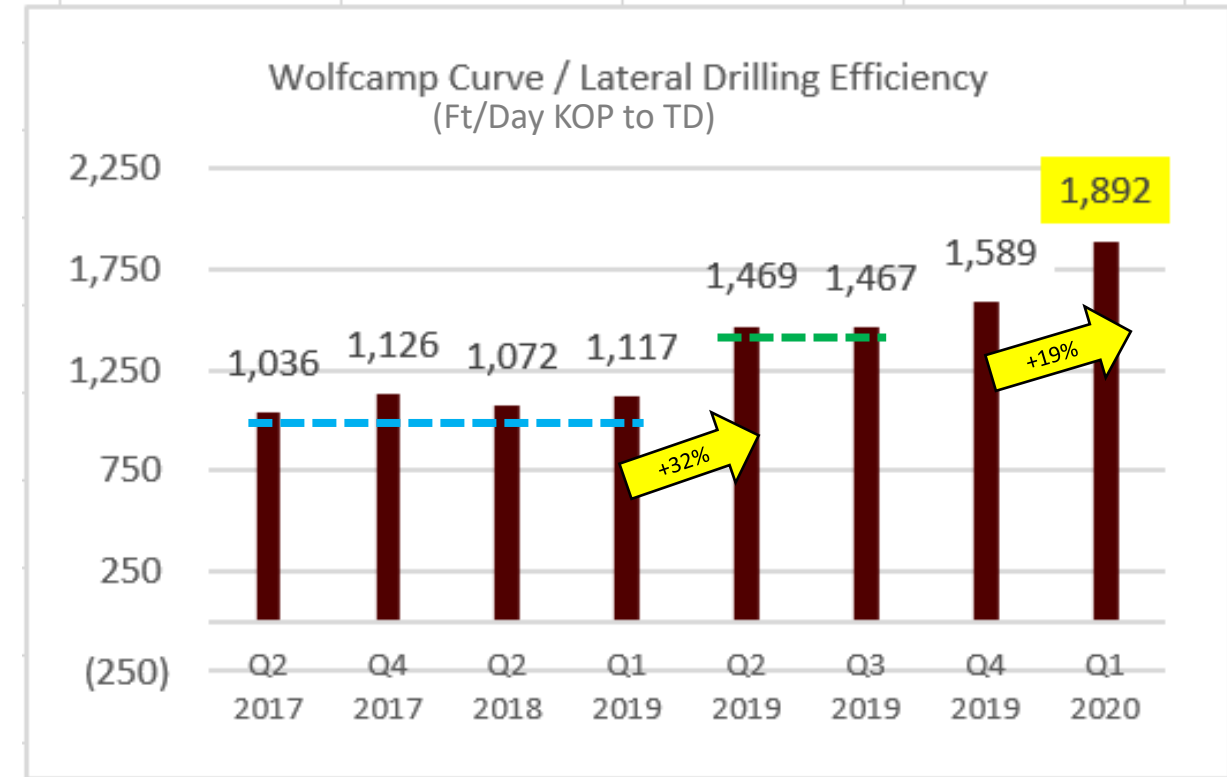


- 23% reduction in average Axial Shock with use of Tomax AST
- 16% reduction in average Lateral Shock with use of Tomax AST
- Shock data supports results seen with improved ROP and bit wear

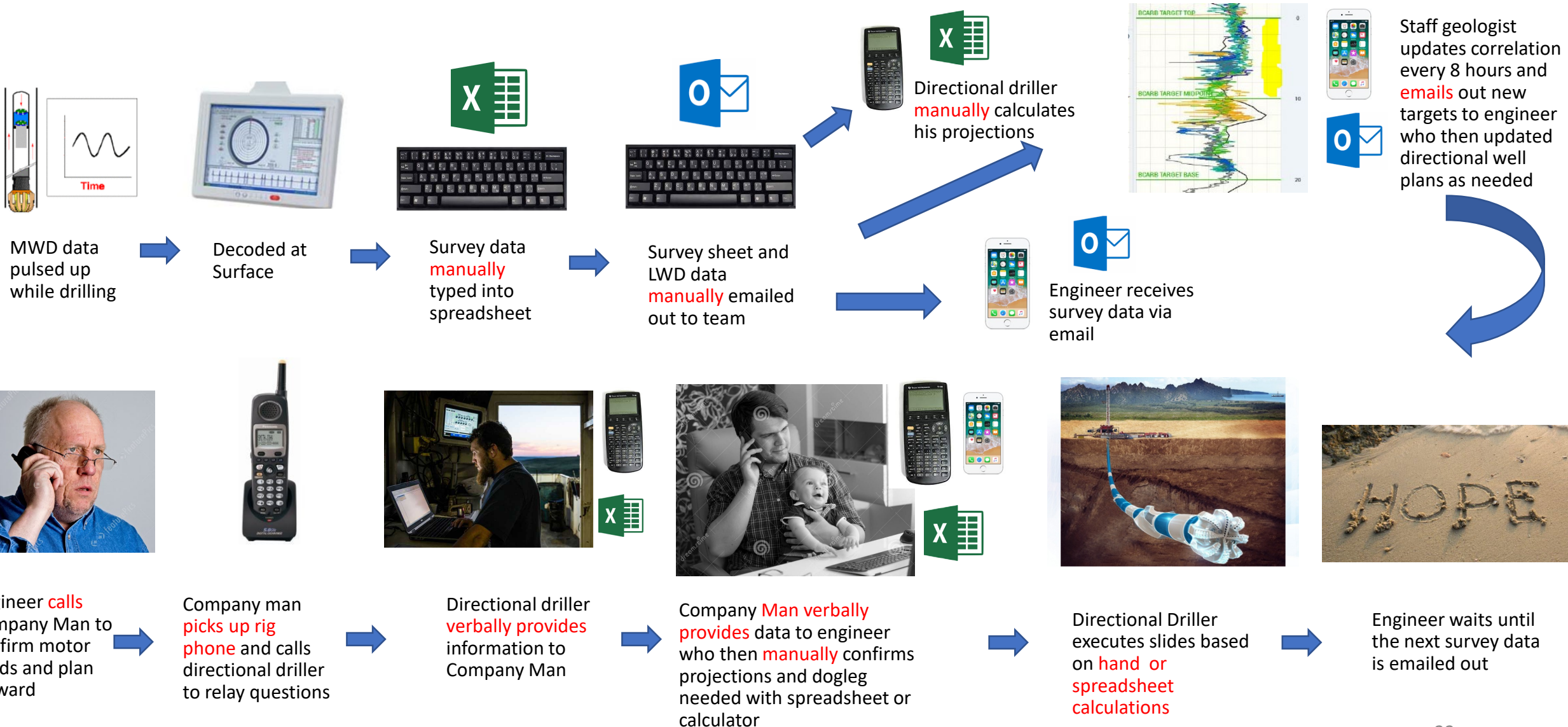
# 6-3/4" & 7-7/8" Lateral Optimization

## Wolfcamp Curve/Lateral Strategy (4-string)

- Historically landed 6-3/4" curve with 5" stabilized 2.0 deg motor and drilled ahead until failure
- In Q2 2019, 6-3/4" Curve/Lateral efficiency increased 32% with new 5-3/4" Lateral BHA: Intrepid 5-3/4" 6/7 lobe, 11.5 stage, 0.7 rev/gal (1.5° slick) with CF611 bit
  - Record performance with 5-3/4" motor in 6-3/4" hole is 2,128 ft/day from KOP to TD
- Began NextGen 4-string well design in Q3 2019 and saw continued improvement with 6-3/4" tools in 7-7/8" hole vs. 6-3/4" hole
- Began using the 6-3/4" Tomax AST tool in 7-7/8" hole in Q1 2020 and increased efficiency by an additional 19%
  - 29% total improvement with new 7-7/8" BHA vs. optimized 6-3/4" hole size
  - Record performance with 6-3/4" motor in 7-7/8" hole is 2,156 ft/day from KOP to TD

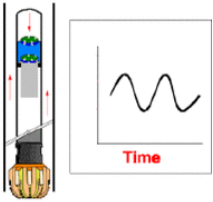


# Old School Geosteering





# Optimized Geosteering Process



Staff geoscience picks target from advanced logs and core data and provides to 3<sup>rd</sup> party geosteering firm

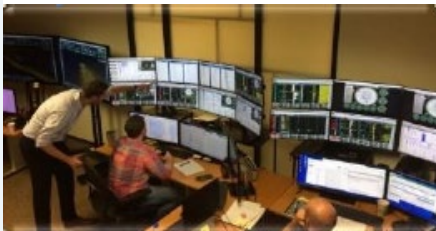
MWD data pulsed up while drilling

Decoded at Surface

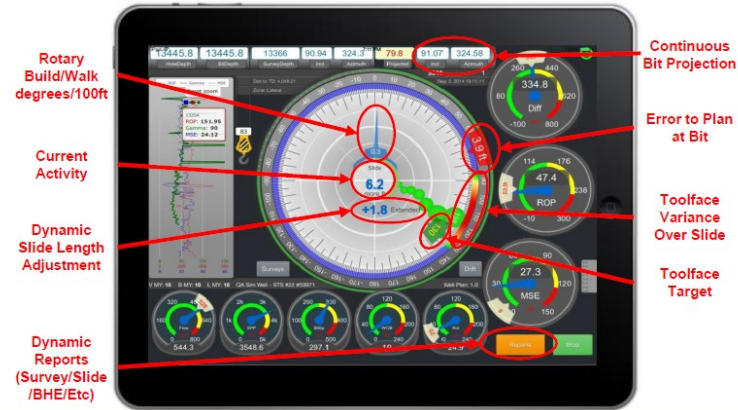
Data **Automatically** WITS to Motive Bit Guidance System (BGS)

Survey data and projections are calculated **automatically** by BGS and automatically emailed out to team via Welldrive FTP

Drilling Engineer has **real-time** access to all projections and Toolface efficiency



## Rig Floor Display



Directional driller is given realtime slide/rotate guidance based on **automatically** calculated projections and Toolface efficiency. Engineer has **realtime** access to same dashboard and can observe remotely at their convenience.



Process makes it much easier to **target fast-drilling shale** within the given geologic target window. Ex. Drilling Engineer tells the BGS to target the 10' shale interval directly above the center line. Cost of these services represents < 1% of the drilling AFE.

3<sup>rd</sup> party geosteering provides new correlations every 4 hours and uploads to Welldrive which **automatically** distributes to team. Motive command center updates target line in the Bit Guidance System.

# Improved Survey Data with Motive

Margie 9-4 (Alloc-1NH) 9LB Survey MD:9349.0 / TVD:9234.08 / Inc:60.88 / Azm:341.69 / VS:-55.15 / DLS:10.24 -PTB MD:9406.12 / TVD:9260.21 / Inc:64.04 / Azm:341.21 / VS:-4.46 / SVY-HLLR: Low:19.1 / Left:0.3 / PTB-HLLR: Low:11.1 / Left:1.6

Survey Accepted at 2019-04-05 11:37 (Rig Time)

## Last Survey

MD 9349.0ft  
INC 60.88°  
AZM 341.69°  
TVD 9234.08ft  
NS -159.81ft  
EW -372.76ft  
VS -55.15ft  
**DLS 10.24°/100'**  
CL 48.0ft

## Projected Borehole Position

MD 9406.12ft  
INC 64.04°  
AZM 341.21°  
TVD 9260.21ft  
NS -111.69ft  
EW -388.97ft  
VS -4.46ft

23.5ft of slide ahead @ -9.1° GTF, **TF Precision 88.2%**

**Survey Point**-HLLR Low: 19.1' / Left: 0.3'

**Bit Projection**-HLLR Low: 11.1' / Left: 1.6'

**Recent Gamma:** 101.0 API

Recent ROP: 0.0 ft/h

**7.1°/100' minimal build rate required** to go from projected inclination of 64.0°@9260.2' TVD

to planned inclination of 90.3°@**9342.0' TVD** (313.9' VS)

**AntiCollision:** 193.5' from Margie 9-4 (Alloc-1NH) 11LA well (Partial)

**AntiCollision:** 336.7' from Margie 9-4 (Alloc-1NH) 10UB well (Partial)

**AntiCollision:** 421.9' from Margie 9-4 (Alloc-1NH) 12UA well (as drilled)

**AntiCollision:** 766.8' from Margie 9-4 (Alloc-1NH) 1LL well (Active)

Most Recent Motor Yield (BHA 3): **13.35°/100'**

**Average of Last 3 Motor Yields** (BHA 3): 14.51°/100'

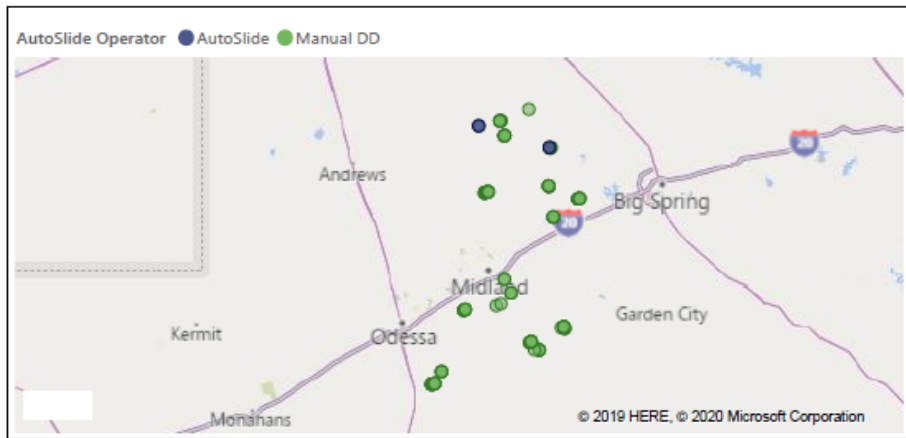
## Motive Survey Features:

- Dogleg severity, motor yield, build-rate needed are calculated automatically by computer
- Anti-collision distances calculated automatically
- Toolface precision reported for each slide
- Target center line and positioning calculated automatically by computer
- No longer required to trust hand or spreadsheet calculations from directional drillers
- Eliminates fat-fingers by MWD hands

# AutoSlide – Martin & Midland Counties

Overall Average Toolface Precision		% in Lateral Target		Manual DD Wells	AutoSlide Wells	Depth	Spud Date
AutoSlide Operator	Toolface Precision (%)	AutoSlide Operator	Percent in 10 ft Zone	117	15	0.00 26,020.00	9/3/2018 2/7/2020
Manual DD	83.01 %	AutoSlide	78.73				
AutoSlide	80.53 %	Manual DD	80.02				

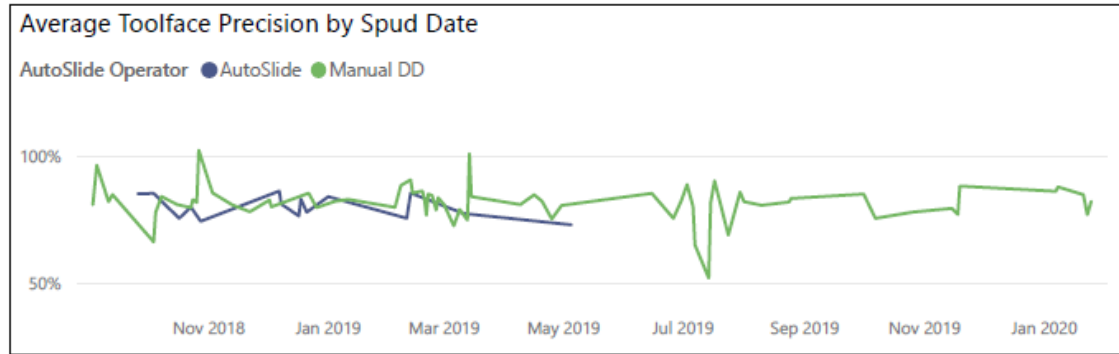
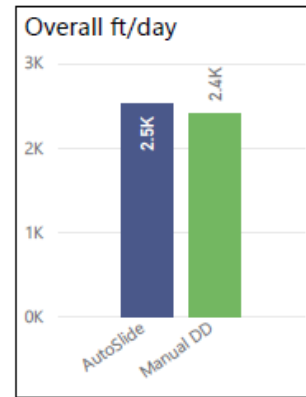
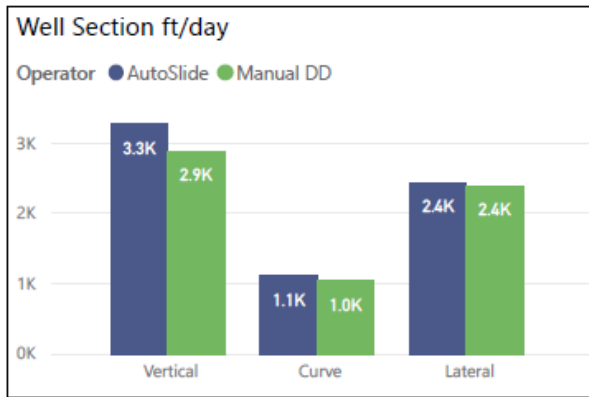
Drill Bit Diameter	District	County
All	West Texas	Multiple selections



Operator	Slide % by Distance	Slide ROP (ft/hr)	Rotating ROP (ft/hr)	Overall ROP (ft/hr)	Toolface Precision (%)	Average DLS
AutoSlide	6.27 %	41.12	161.38	136.38	79.05 %	0.58
Manual DD	6.30 %	37.05	141.57	120.20	77.90 %	0.63

Operator	Slide % by Distance	Slide ROP (ft/hr)	Rotating ROP (ft/hr)	Overall ROP (ft/hr)	Toolface Precision (%)	Avg. DLS	Avg. Plan DLS
AutoSlide	65.11 %	36.18	94.13	46.07	80.83 %	8.35	8.72
Manual DD	68.69 %	39.48	55.25	43.36	82.15 %	9.11	9.90

Operator	Slide % by Distance	Slide ROP (ft/hr)	Rotating ROP (ft/hr)	Overall ROP (ft/hr)	Toolface Precision (%)	Average DLS
AutoSlide	8.58 %	27.69	135.05	101.34	80.82 %	1.72
Manual DD	8.36 %	26.76	132.15	99.42	85.92 %	1.89

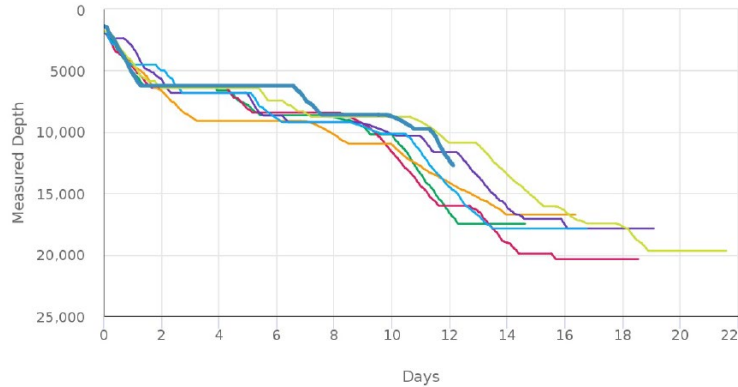


## H&P AutoSlide

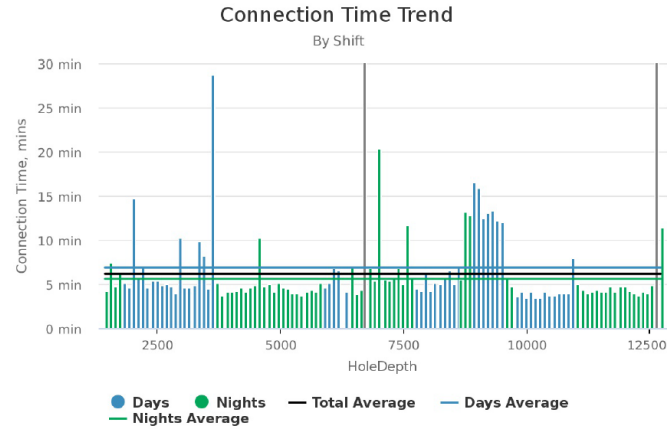
- Topdrive spindle is automatically controlled by Motive Bit Guidance System. Driller presses a single button to execute slide.
- Performance is on par with traditional directional drilling and improving over time
- Guidon did a 6 well trial in Q4 2018 with similar results
- Technology and performance should get better over time
- AutoStand is the next step where the full stand is executed with a single press of a button

# The New Morning Report

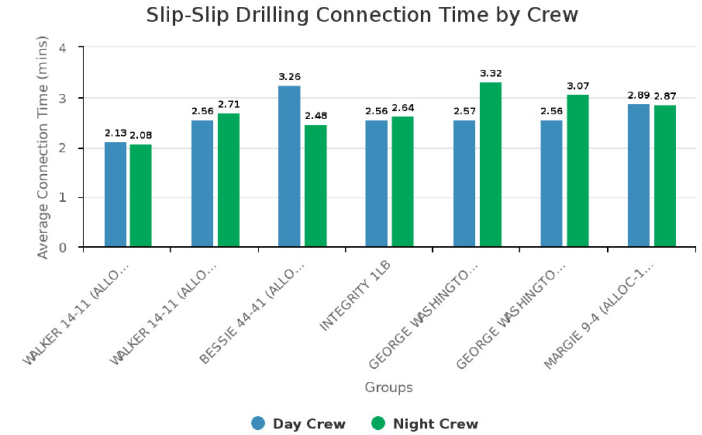
**Days vs Depth (Full Well)**



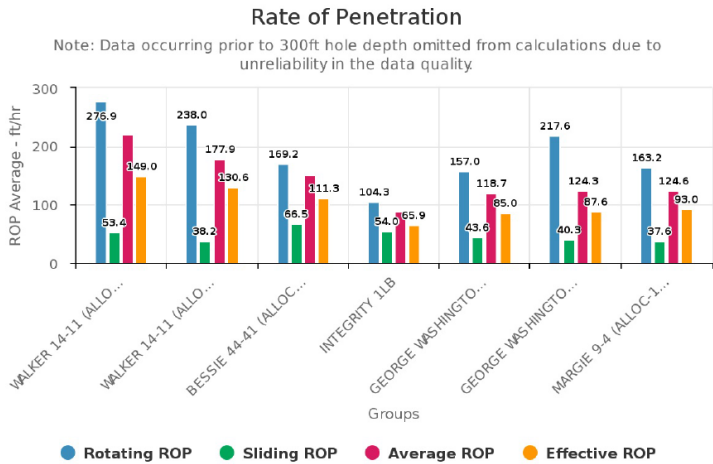
**Drilling Connections (Full Well)**



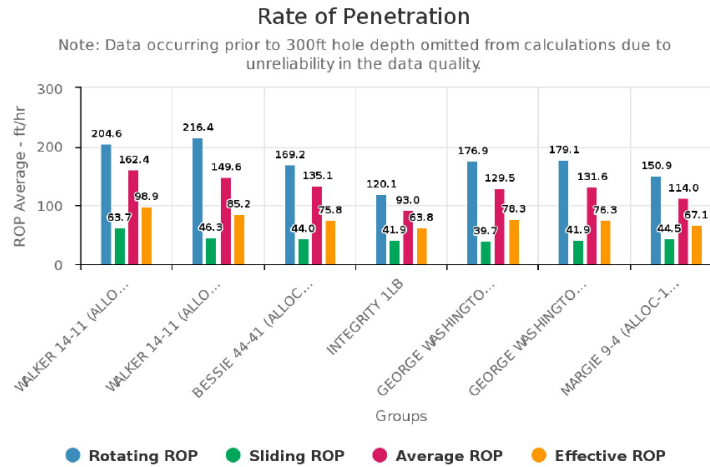
**Connection by Crew (Last 24 hours)**



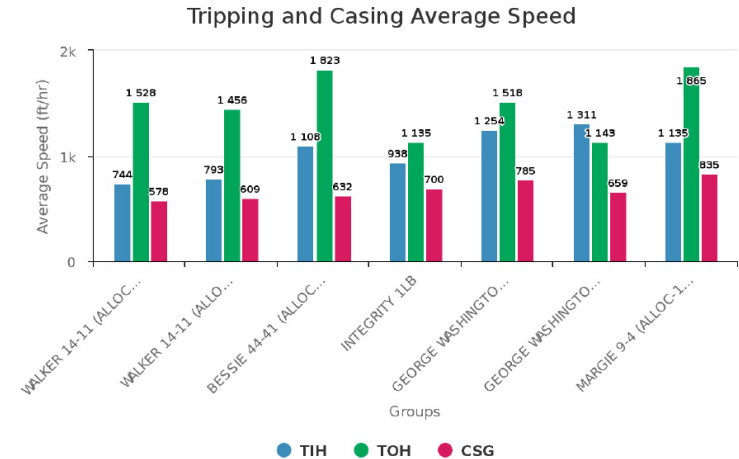
**ROP - Last 24 Hours (Last 24 hours)**



**ROP (Full Well)**



**Tripping Speed (Full Well)**



- Automated morning reports generated from EDR data and Mobilize service. Drilling engineer selects relevant offset wells for comparison.

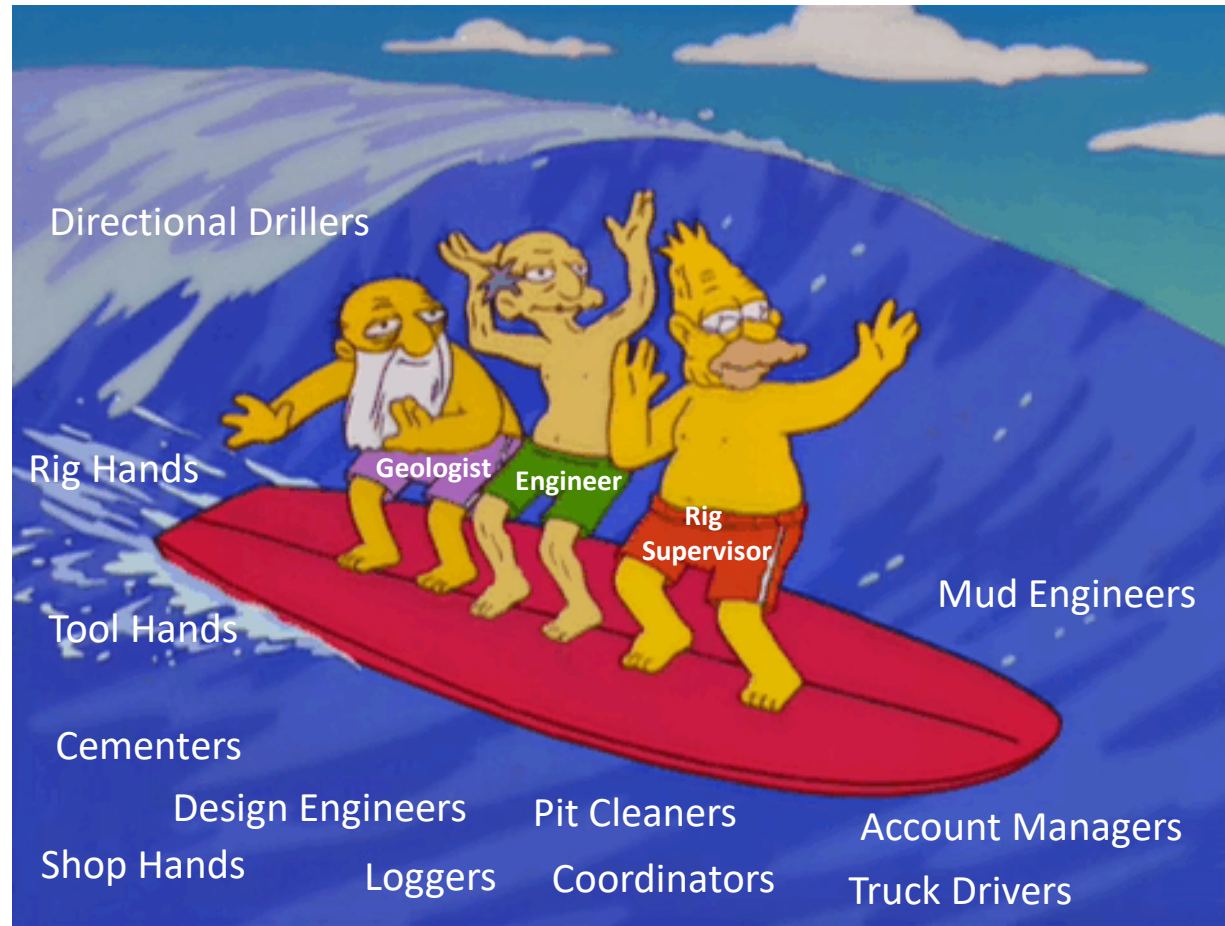


# Other Wins I'm Hearing About

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- NextGen 3-string: 13-3/8" surface x 11" x 8-5/8" intermediate, 7-7/8" x 5-1/2" production
- Offline cementing of all strings saving 1 day per well
- 9-5/8" motor with 1100 gpm in 12-1/4" hole
- 7-1/2" motor with 725 gpm in 8-1/2" hole
- 5-1/2" drill string leads to improved weight transfer and drilling performance in 8-1/2" hole
- Upgraded topdrive with 50k usable torque (with 5-1/2" DP or high torque 5" DP)
- Bit wear algorithm and real time DBR prevention alert
- De-manning one MWD hand with the use of remote ops center to approve MWD survey qualifiers

# PSA for Drilling Engineers: You're Not The Wave



If you're surfing you don't confuse yourself with the wave. That's a real mistake... You might be on top of the wave... but you're not the wave.



# Appendix



Guidon Energy: The Meaning of the Name

*Frank McCarthy: "Buffalo Soldiers Advance as Skirmishes, Charge"*



# 2025 Projections

	1952	2015	2020	2025 Projection
# Producing Wells	2,000	82,000	180,000	220,000
Rig Count	200	500	405	
Well MD (ft)	7,000	18,000	25,000	30,000
Lateral Length	n/a	10,000	15,000	20,000
Well Design	10-3/4" x 5-1/2"	3-string	4-string	5-string?
Drilling Days Per Well	33	20	10	8
Ft/Day Drilling	212	720	1,600	1,800
Bits per Well	35	3	5	5
Foot per Bit	200	6,000	10,000	20,000
Drill Tools	Cable and rotary	Bent Motors and RSS	Bent Motors, AutoSlide, Bit Guidance, RSS	AutoStand with AI Guidance
Completion Type	Open hole	Plug & Perf	Plug & Perf	?
Frac Design	Single Stage 1,500 gals	30 stages, 4.2 million gals	100 stages,	133 stages
Well IP Oil	300 bopd	1500 bopd	2000 bopd	2500 bopd



# Advice from the Rig Supervisor

Concentrate on team building by creating a safety culture, listening to all input, and relaying data gathered to the office support. Learn to how to talk to people with different personalities and cultures to get them on board towards your goals. *-Jack Chamberlain*

The most important task is to keep the people working under your direction safe. With every informed decision you make, you must prioritize the safety of your rig personnel and service personnel. They depend on your competence while on the job. Safety is paramount and productivity is required. Both must be accomplished. *-Elliot Leavell*

Stay humble, treat people with respect, ask questions, be honest about your knowledge of the area, and learn from others failures so to not repeat them yourself. *-Jud McCleod*

You must always maintain focus and be attuned to the wellbore and what it is revealing to you, such as mud weights, flow out, cuttings, gas, torque, drag, pressures. *-Elliot Leavell*

When you question yourself about something, stop, and call for help. Two heads are better than one. *-Bobby Powell*

Always plan for multiple scenarios. Keep in mind that things don't always go to plan, think of "what if". *-Jud McCleod*

As a drilling supervisor one can set the work atmosphere of the drill site. A tight nit "family" type atmosphere creates high morale and ultimately creates an efficient operation. The day-to-day challenges and responsibilities help to keep me humble. *-Jud McCleod*

Carry yourself well and conduct yourself in a manner that is befitting of your job and company. In turn, you will find that your good work ethic will cause your coworkers to not only want to help you, but they will want to follow your lead as well. Developing good leadership skills is essential, and it starts with listening to those around you. Speak to people the way you want to be spoken to. Lastly, be prepared to train and teach people in a manner that meets your expectations. *-Elliot Leavell*

To be successful as a drilling supervisor you need to be able to think well on your feet in multiple types of situations and handle stressful situations calmly, because calmer situations are safer and more proactive. *-Chris Robinson*

Drilling is a competitive business. Personally, I like the challenge of new adventures in the drilling of oil and gas wells, in addition to the challenges of working for a new operator, encountering different people, and drilling in newly explored areas. Drilling is like a new frontier, and every well brings its own set of challenges that make it an exciting place to work. The caveat is for the team to strive to be better than what it was on the last job, and to be better than the competition, the next lease over. *-Elliot Leavell*

Workplace environment and management makes all the difference in the world to you being happy in the position. *-David Whitfield*

There is nothing better than working for some very good people. *-Bobby Powell*

Always speak your mind. Don't be afraid to take advice from others. Keep a positive attitude and open mind, the cup is always half full not half empty. *- Josh McCall*

# Rig Supervisor Bios



**Luke Beekman** has been in the Oil & Gas industry for 11 years. He worked his way up through the ranks from Floorhand up to Rig Superintendent, as well as having some Directional Driller Experience. Luke recently transitioned to the role of Wellsite Supervisor. He's worked in several different areas including Pennsylvania, Ohio, Oklahoma, East Tx, South Tx, West Tx, and Louisiana. Luke resides in Troup TX, where he owns and operates a cattle ranch with his family. When he's not on the rig he enjoys spending time with family, horseback riding and being outdoors.

**Jack Chamberlain** has 37 years in the oilfield. He started as a roughneck, and worked up to driller in the deep South Texas oil field drilling gas wells. He also drilled and worked his way up to OIM in the offshore side of the industry while drilling and completing wells in the GOM, Argentina, Chile, Trinidad Tobago, Cameroon, Gabon, Equatorial Guinea, Congo, and Nigeria. Jack started consulting as a drilling supervisor for Chesapeake energy drilling Haynesville wells, and Eagle Ford wells. He was a drilling supervisor for Energy XXI drilling and doing P&A work in the GOM. He was also a lone drilling supervisor for EQT drilling Marcellus wells in PA. Jack lives in McAllen Texas with his better half, and spends as much time as possible at their in Port Isabel, Texas.

**Elliot Leavell** has worked in the oil and gas industry for 40 years. He first began with Exxon Co. USA. While working with Exxon, he was offered a position as a Drilling Supervisor and was sent to a company drilling supervisory school in 1979, that later followed with his first rig assignment in 1980. Elliot worked as a Drilling Superintendent throughout Texas and Oklahoma for fourteen years. He left Exxon in 1992 and became an independent Drilling Consultant. Elliot's previous work areas have included inland barges in Texas costal waters, South Texas, jack-up rigs in the Gulf of Mexico, Austin Chalk Central and South Tx., Oklahoma, Eagle Ford Shale, and the Permian Basin for the last twenty-six years.

**Josh McCall** has 19 years of oilfield experience. He broke out in the oilfield working as a roustabout on a jack-up rig for Diamond Offshore in the GOM. He has also drilled wells in the Deepwater GOM, Colorado, Pennsylvania, California and Abu Dhabi. Josh recently spent 1 year working as a Rig Manager in the Midland Basin and then transitioned into the roles of Drilling Supervisor for Guidon Energy. Josh is from Monterey, LA and currently resides in Monterey, LA with his wife and 2 daughters.

**Jud McLeod** has 14 years of oilfield experience. He broke out as a roustabout for Diamond offshore drilling in GOM where he quickly worked his way up through hard work and dedication. He has also drilled wells in multiple shale plays throughout US land as well as Malaysia and offshore Qatar in the Persian Gulf, including HPHT and PMCD. Jud is currently a drilling supervisor for Guidon Energy in the Permian Basin. Jud is from and currently resides in Richton, MS with his wife and 2 kids. When he is not on the well site, he enjoys hunting, fishing, camping and spending time outdoors with his family.

**Bobby Powell** is from Lafayette, LA. He has 37 years of experience in the oilfield, with 28 years of supervisory experience, 12 years of rig superintendent and 7 years as a drilling superintendent/rig manager. He and his wife of 41 years have 3 kids and 5 grandkids.

**Chris Robinson** grew up in Collinsville, MS and now resides in Enterprise, MS. He started in the oilfield 17 years ago after an 8 years in the Navy Seabees (Construction Battalion). He started out with Rowan Drilling as a roustabout on the Gorilla III. He worked offshore for 9months before transferring to their Land Division. Chris spent a majority of his career on Rig-33 working Floors, Derricks, Motors, Assistant Driller and Driller (East Texas Austin Chalk, Bossier Shale, Barnett Shale and Haynesville natural gas wells). Ensign Energy bought out the Rowan Land Division in 2011. This is where he took a Rig Managers position on Rig-151 where he worked the rig in the Permian Basin area until 2018. In March of 2018 he went to work as a drilling supervisor for Guidon Energy.

**David Whitfield** has 39 years of experience in the oil and gas industry. He started out as a drilling fluids engineer in the Gulf of Mexico after graduation from college. He has also worked wells in deep water G.O.M., California, India, Colorado, Utah, Oklahoma, Texas, Louisiana, and New Mexico. The last 14 years have been spent as a drilling supervisor in the Haynesville, Eagle Ford, Woodford, Delaware, and Permian plays, with 1 year as a drilling superintendent in Oklahoma. David is from Hattiesburg, MS and recently moved from Destin, FL to Ft. Worth, TX where he lives with his wife and enjoys his grandchildren who live nearby.

# If Wooden Was A Driller



THE ART OF  
SUCCESS

## PYRAMID OF SUCCESS

### COMPETITIVE GREATNESS

"Perform at your best when your best is required. Your best is required each day."

### POISE

"Be yourself. Don't be thrown off by events whether good or bad."

### CONFIDENCE

"The strongest steel is well-founded self-belief. It is earned, not given."

### CONDITION

"Ability may get you to the top, but character keeps you there – mental, moral, and physical."

### SKILL

"What a leader learns after you've learned it all counts most of all."

### TEAM SPIRIT

"The star of the team is the team. 'We' supercedes 'me'."

### SELF-CONTROL

"Control of your organization begins with control of yourself. Be disciplined."

### ALERTNESS

"Constantly be aware and observing. Always seek to improve yourself and the team."

### INITIATIVE

"Make a decision! Failure to act is often the biggest failure of all."

### INTENTNESS

"Stay the course. When thwarted try again; harder; smarter. Persevere relentlessly."

### INDUSTRIOUSNESS

"Success travels in the company of very hard work. There is no trick, no easy way."

### FRIENDSHIP

"Strive to build a team filled with camaraderie and respect: comrades-in-arms."

### LOYALTY

"Be true to yourself. Be true to those you lead."

### COOPERATION

"Have utmost concern for what's right rather than who's right."

### ENTHUSIASM

"Your energy and enjoyment, drive and dedication will stimulate and greatly inspire others."

*"Success is peace of mind which is a direct result of self-satisfaction in knowing you made the effort to become the best of which you are capable."*

John Wooden, Head Coach

### SUCCESS

*Success is not a destination, it is a journey.*

ACHIEVEMENT

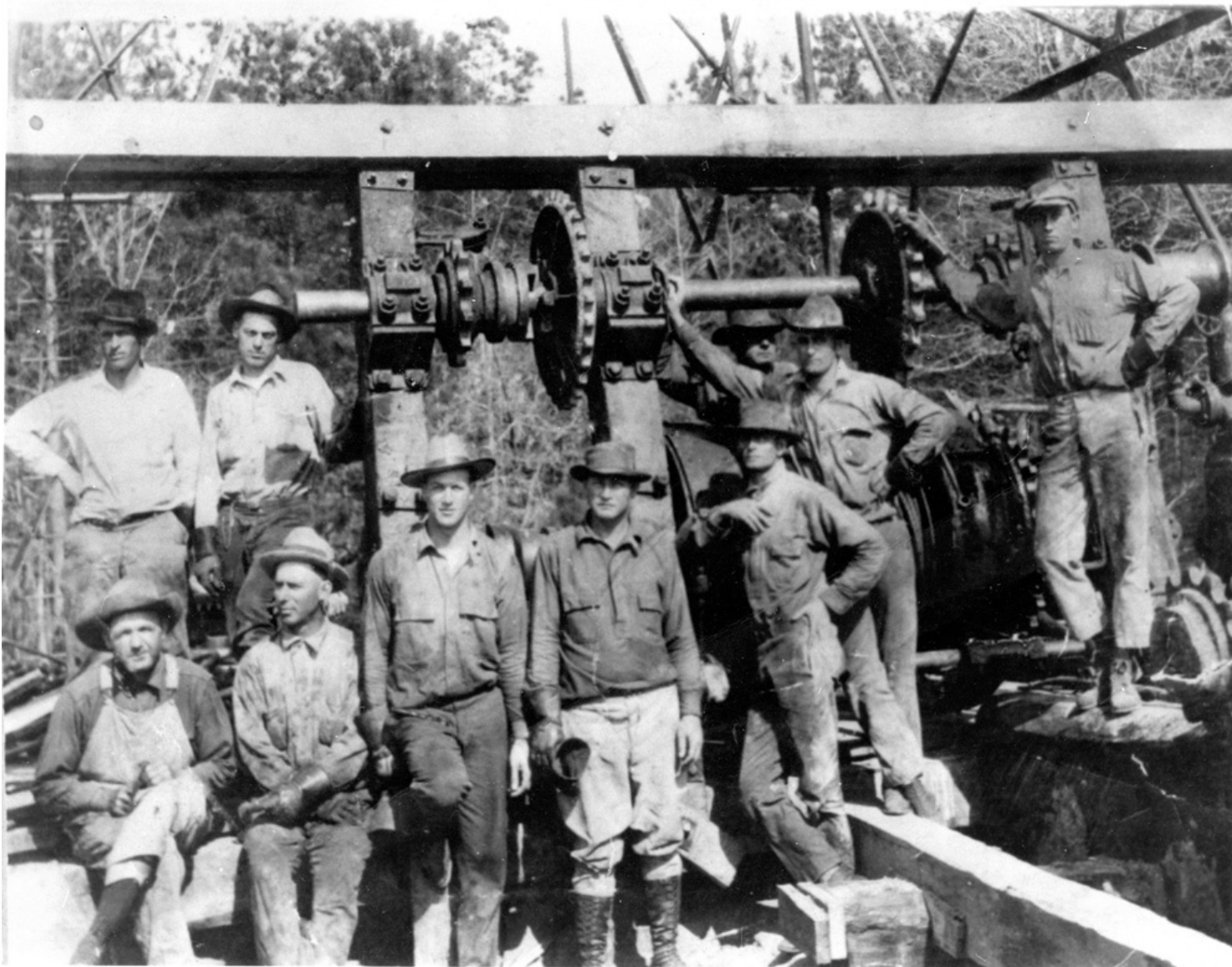
*Failure to prepare is preparing to fail.*

## 12 Lessons in Drilling

1. Surround Yourself With Good People
2. "Stop Work Authority" Is The Most Important Policy
3. Find A Good Mentor
4. Learn From Your Mistakes And Don't Repeat Them
5. Every Job On The Rig Is Important
6. The Devil Is In The Details
7. Use The Right Tool For The Job
8. Resiliency Is Required
9. Make Greatness Attainable By All
10. Peer Review All Significant Changes To Your Plan
11. Make Data-Driven Decisions
12. Proper Planning Prevents Poor Performance



# A Texas Family Tradition



Great-Grandpa Bill (1920)



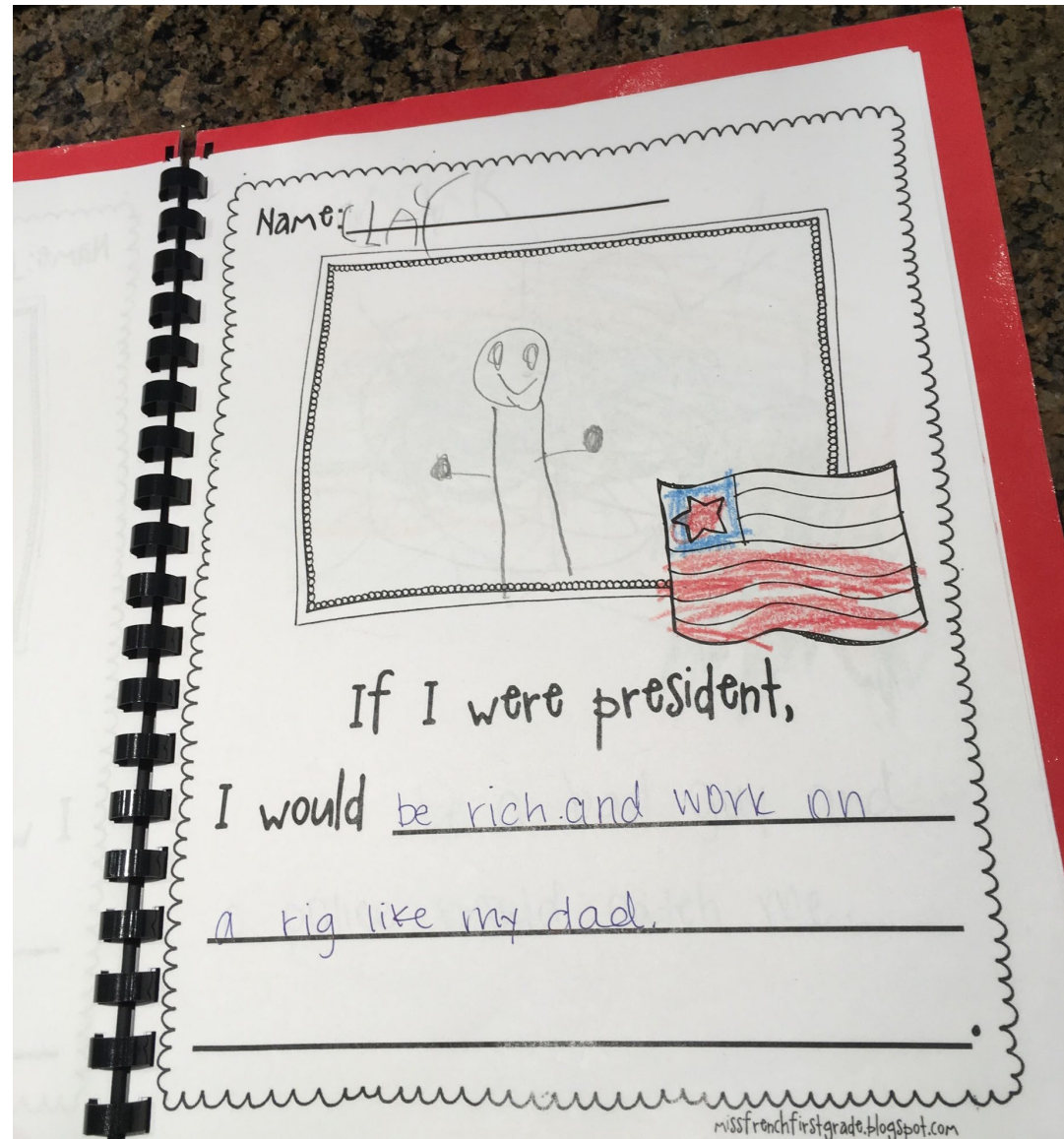
Grandpa Bilbo (Petroleum Engineer), Uncle John, and Stepdad Bill (1950s)



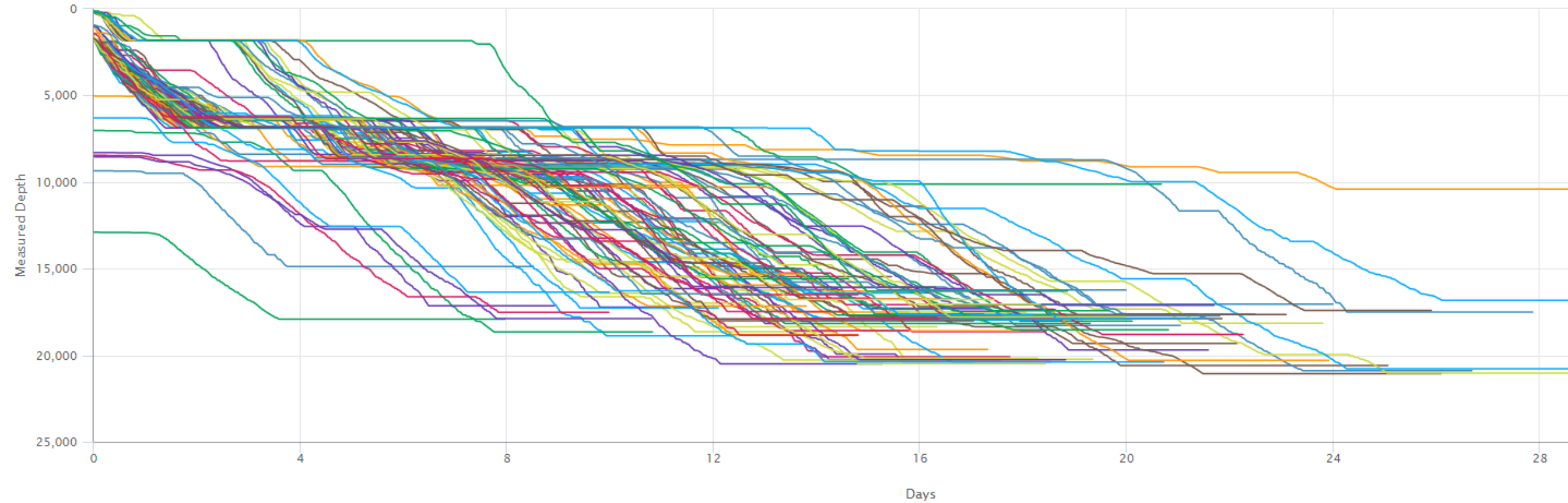
Ensign 151 crew including author and Guidon Supervisor and former Toolpusher Chris Robinson (2<sup>nd</sup> from Right)



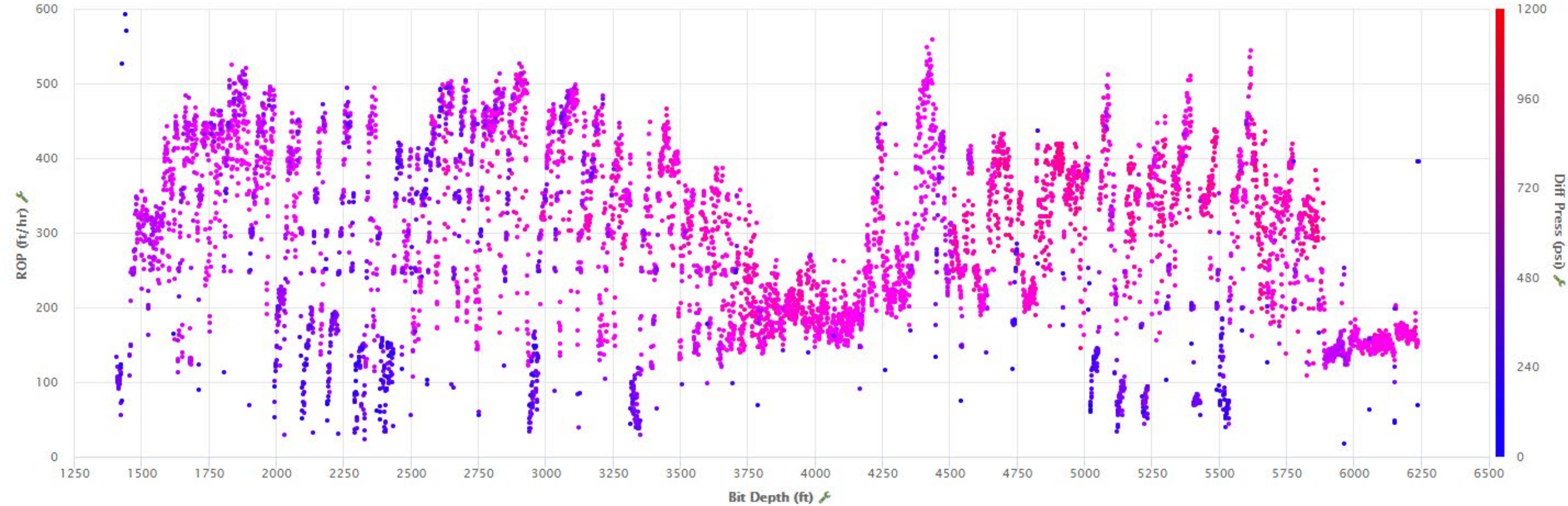
# The Next Generation



# Days vs. Depth – Q2 2017 to Present



# Top Performing 12-1/4" Interval

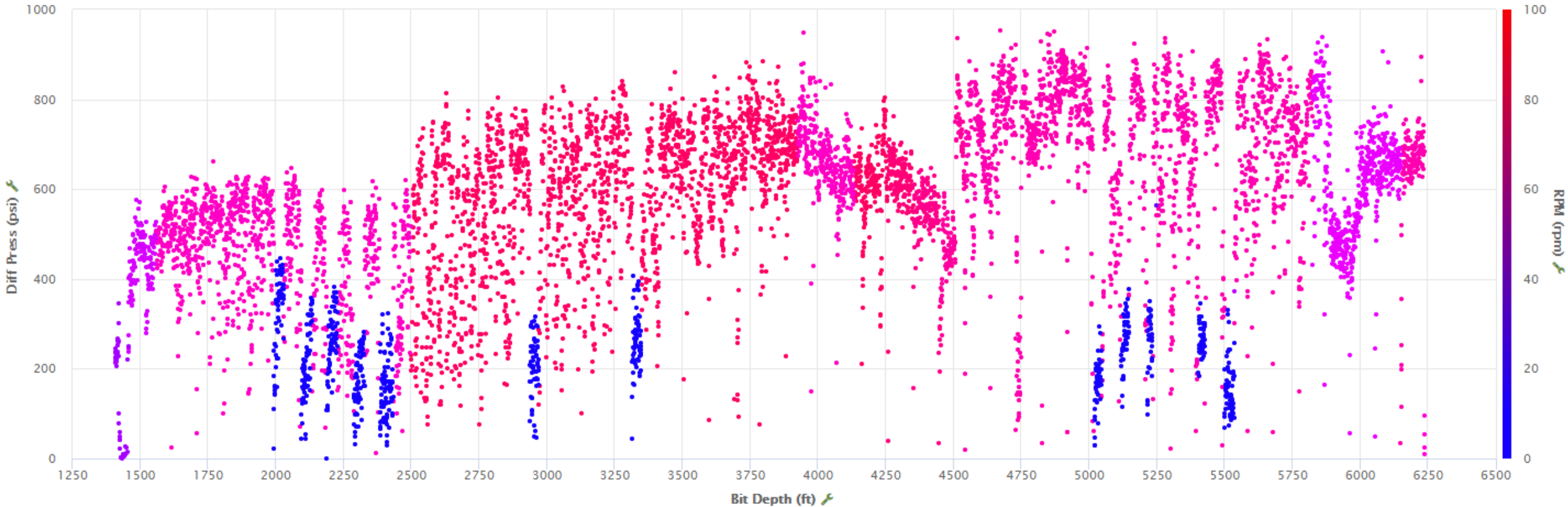


## Walker 9LB

- 4,067 ft/day from drill out to TD
- 4,829' in 28.5 hours
- CF716 bit graded 1-2



# Top Performing 12-1/4" Interval

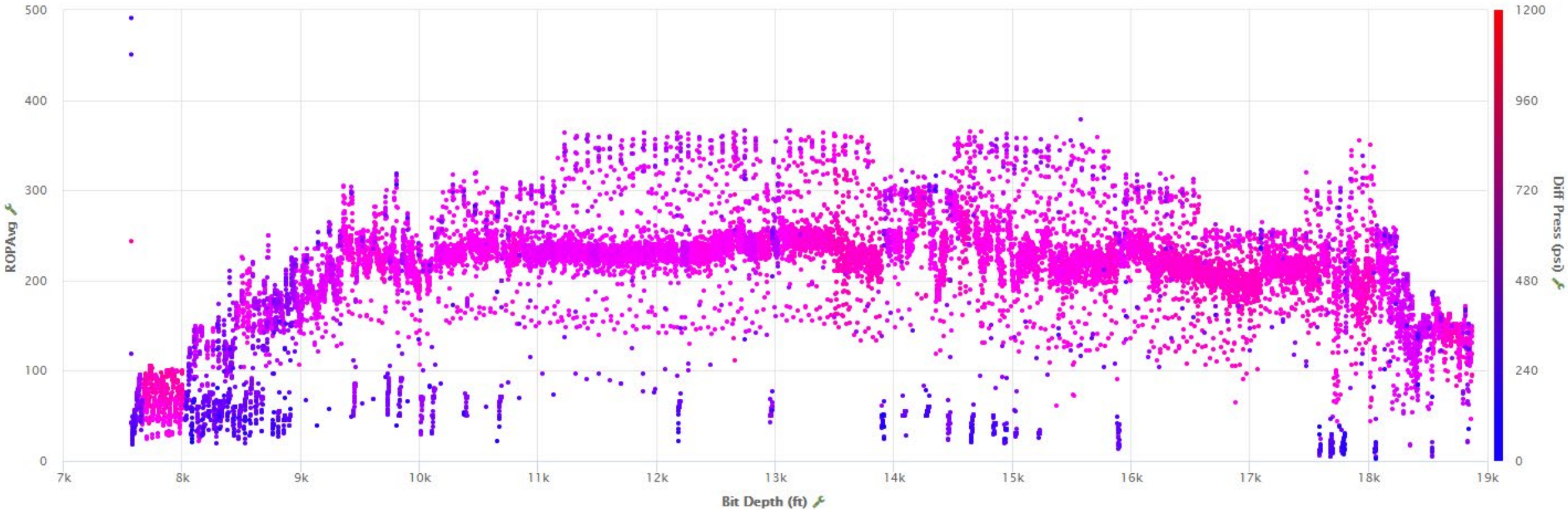


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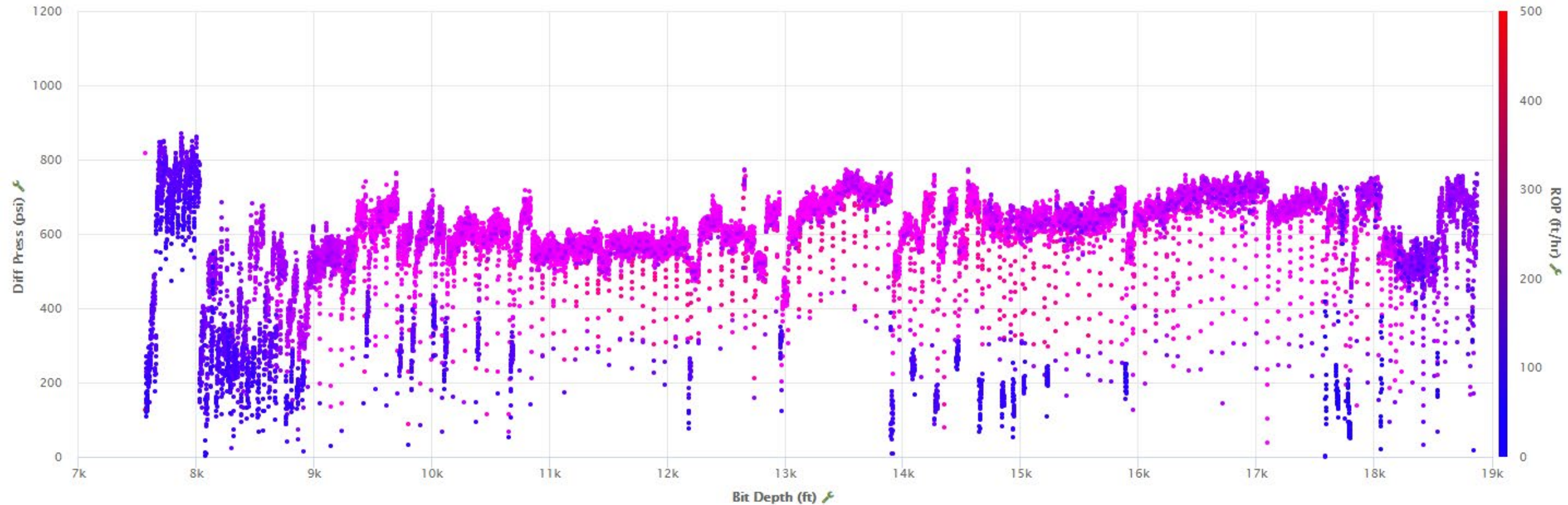


# Top Performing Curve/Lateral Interval



- Bessie 2UL- 2,111 ft/day from KOP to TD
- 75 RPMS
- 600-800 psi diff

# Top Performing Curve/Lateral Interval



- Bessie 2UL- 2,111 ft/day from KOP to TD
- 75 RPMS
- 600-800 psi diff

# Building the Team

- **Drilling Engineers & Management should have previous experience working as a rig supervisor**
  - At Guidon we are fortunate to have former supervisors working at CEO, COO, VP, Manager, and Engineer positions
- **Balance “grey hair” and youth with a preference for former toolpushers working as night company men**
  - Experience is critical for tight hole, well control, and all other drilling hazards
  - Youth, enthusiasm, and new ideas keep everyone moving forward
  - Toolpusher usually sleeps at night; its beneficial to have a former pusher supervising operations
- **Set clear expectations with entire rig team**
  - Commitment to HSE
  - Honesty and respect
  - Focus on pre-planning
  - Top tier performance
- **The Importance of good rig team morale cannot be understated**
  - Team mentality: “strive to build a team with comradery and respect... “we” supersedes “me”
  - Delivery is important when communicating with Rig Supervisors “What do you think about \_\_\_\_?” vs. giving orders
  - Avoid micro-managing
  - Bad news must be able to travel upwards; do not punish hands for speaking up about mistakes



Elliot Leavell and Josh McCall



Jud McCleod and Bobby Powell

If you get this wrong it doesn't matter how good your equipment or practices are



# Construction Superintendent / Drone Pilot



Buy your Construction Superintendent a nice drone camera



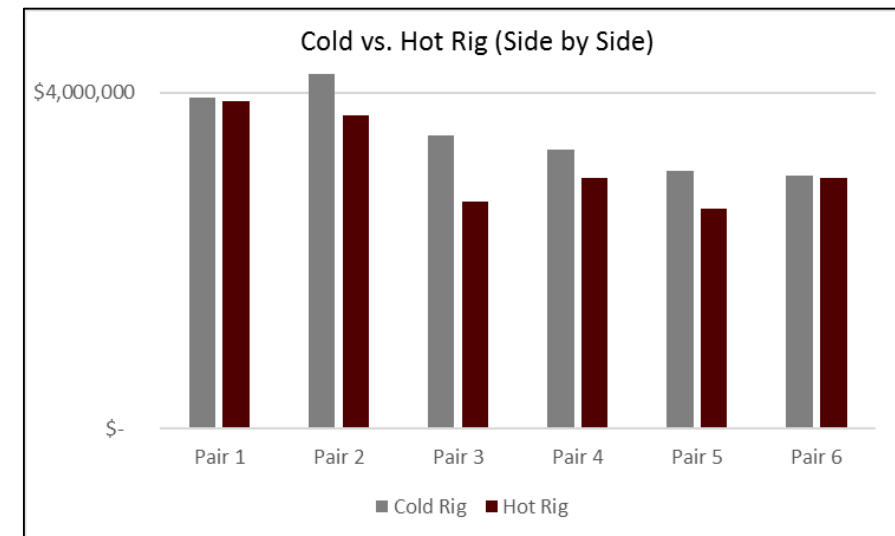
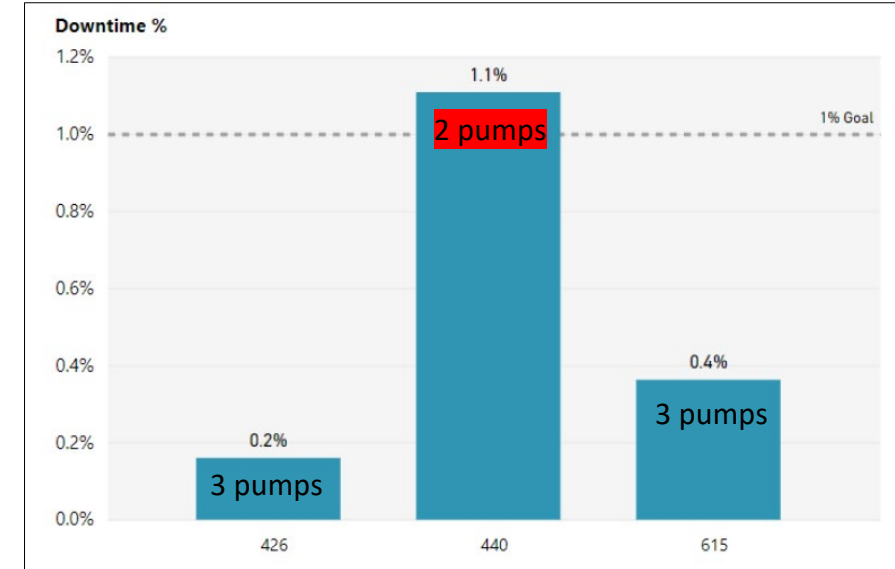
# Surface Land Management

- **Although not a very populated area, the Midland Basin presents its own set of challenges for selecting drilling locations**
  - Tens of thousands of existing vertical wells and gathering lines
  - Power lines
  - Farm land
  - Ranch houses
  - Playa lakes
- **Partnership and fair treatment of land owners is mission critical**
  - Single point of contact
  - Minimize footprint by having a full development plan that maximizes well count per pad
  - Take care of their land
  - Do what you say you will do
- **At small companies like Guidon, the Drilling Department is also the Development Planning and Permitting Department**
  1. Work with technical team to select targets
  2. Select ideal well row position
  3. Initial review using Google Earth with KMZ files for your acreage position
  4. Boots on the ground to stake location
  5. Landowner approval of damages and surface use agreement
  6. Subsurface easements for off-lease locations



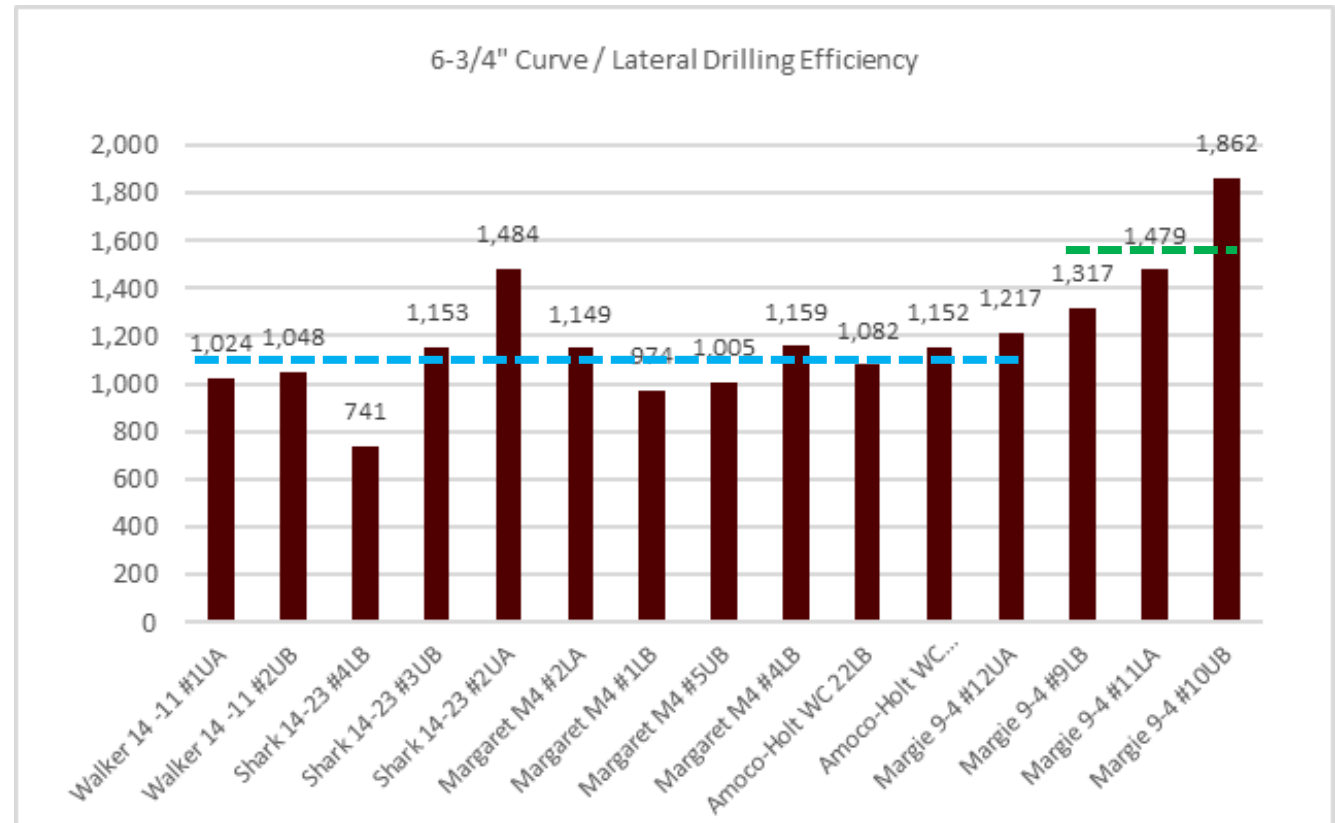
# Vendor/Rig Selection for a Startup Company

- **Go with who you know; loyal to long term performance and integrity**
  - Same directional well planner, and directional coordinator for 5+ years
  - Same cementing service company for 8+ years
  - Same mud service advisor for 5+ years
  - Same casing provider for 5+ years
- **Drilling rig selection: you get what you pay for**
  - Currently contracting 2 high-spec walking rigs, each with 3 mud pumps
  - Remember... spread rate is 3x the rig dayrate; you can save significant money by drilling more efficiently with a higher spec rig (example below)
    - Average rig w/ \$5k lower dayrate: 20 days x \$80k spread rate = \$1.60 MM
    - High spec rig w/ \$5k (± 20%) higher dayrate: 19 days x \$85k spread rate = \$1.61 MM
    - Implies a break-even of 1 day savings (5% reduction in drilling days)
    - A high spec rig must drill 5% more efficiently to pay out the higher dayrate
- **A cold-stacked rig will cost you ± 10-15% more in the first quarter of ops after startup**
  - Represents ± \$400,000 of extra drilling cost per well
  - You'll pay this "fee" every time you laydown a hot, optimized rig and replace with a cold rig at a later date
  - It pays to go with a hot rig when possible



# 6-3/4" Slimhole Lateral BHA Optimization

- **41% improvement** with new 5-3/4" lateral motor on recent 3 well test
  - 5-3/4" 6/7 lobe, 11.5 stage, 0.7 rev/gal, slick
  - Previously running 5" 6/7 lobe, 8.0 stage, 0.84 rev/gal
- 300 gpm
- 60-70 rpms (sufficient hole cleaning with 4.5" DP x 6.75" hole)
- Targeting 800-1000 psi diff when rotating
- 611 bit
- Average improved from 1,099 ft/day to 1,553 ft/day
- Small sample size but trial showed promising results







# Optimized Data Analysis



## Step 2

Start: 12/31/1969 6:00:00 End: 05/21/2018 1:23:17

Section: Lateral

(UOM)	ROP				Footage				Time			
	Rotating ROP (ft/hr)	Sliding ROP (ft/hr)	Average ROP (ft/hr)	True ROP (ft/hr)	Rotary (ft)	Sliding (ft)	Rotary % (%)	Sliding % (%)	Rotary (hrs)	Sliding (hrs)	Rotary % (%)	Sliding % (%)
SHARK 14-23 (ALLOC-1SH) 4LB	94.0	38.7	78.9	51.6	6773.4	1046.4	86.6	13.4	72.0	27.1	72.7	27.3
SHARK 14-23 (ALLOC-1SH) 2UA	125.8	48.3	109.1	73.9	6947.1	734.6	90.4	9.6	55.2	15.2	78.4	21.6
WALKER 14-11 (ALLOC-1NH) 1UA	100.7	35.5	80.1	56.6	6327.1	1027.2	86	14	62.8	28.9	68.5	31.5
SHARK 14-23 (ALLOC-1SH) 3UB	117.3	51.5	106.0	61.9	6917.0	633.9	91.6	8.4	58.9	12.3	82.7	17.3
WALKER 14-11 (ALLOC-2NH) 2UB	128.2	45.0	92.4	45.3	5843.7	1549.3	79	21	45.6	34.5	56.9	43.1
MARGARET M4 (ALLOC-1SH) 1LB:BHA 8 6.75" 9941 ft - 15733 ft	114.4	48.0	96.9	75.6	4729.8	711.0	86.9	13.1	41.3	14.8	73.6	26.4
MARGARET M4 (ALLOC-1SH) 1LB:BHA 9 6.75" 15733 ft - 19963 ft	108.2	26.4	85.2	63.9	3859.9	368.0	91.3	8.7	35.7	13.9	71.9	28.1

Group: Content

Export as CSV Close



## Step 3

Well Name	ROP				Footage				Time			
	Rotating ROP (ft/hr)	Sliding ROP (ft/hr)	Average ROP (ft/hr)	True ROP (ft/hr)	Rotary (ft)	Sliding (ft)	Rotary % (%)	Sliding % (%)	Rotary (hrs)	Sliding (hrs)	Rotary % (%)	Sliding % (%)
SHARK 14-23 (ALLOC-1SH) 4LB	94	38.7	78.9	51.6	6773.4	1046.4	86.6	13.4	72	27.1	72.7	27.3
SHARK 14-23 (ALLOC-1SH) 2UA	125.8	48.3	109.1	73.9	6947.1	734.6	90.4	9.6	55.2	15.2	78.4	21.6
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WALKER 14-11 (ALLOC-2NH) 2UB	128.2	45	92.4	45.3	5843.7	1549.3	79	21	45.6	34.5	56.9	43.1
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- 3 minute workflow for same analysis

# 2,000+ Shallow SWD Wells in the Midland Basin

## Midland Basin SWD Data Estimates

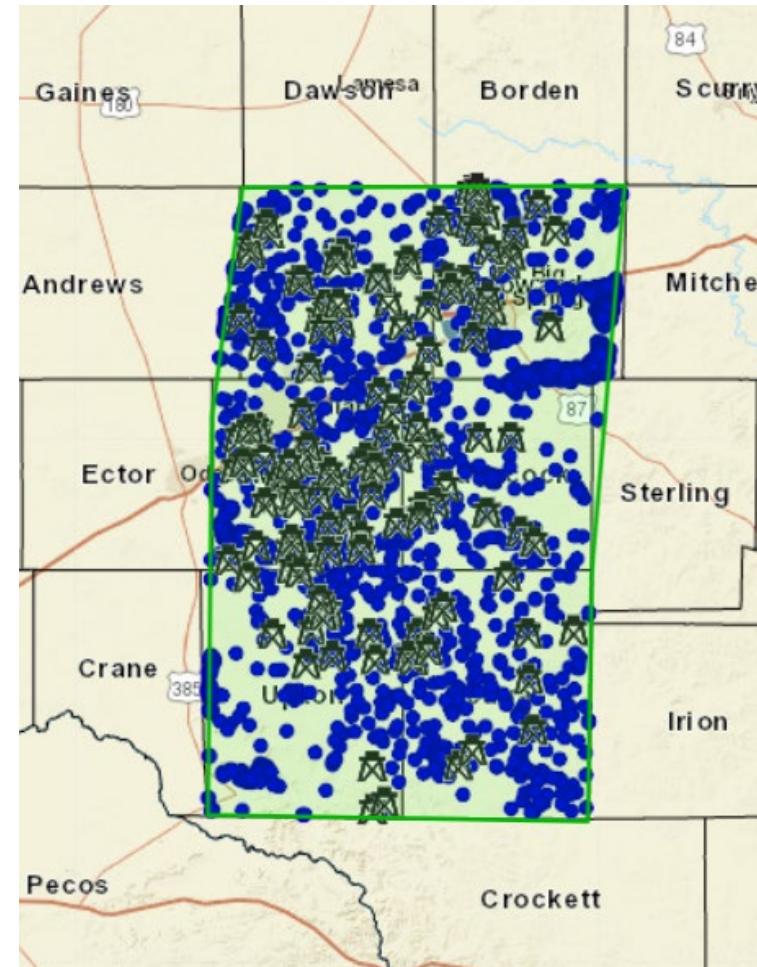
- Very rough estimates intended to show trend
  - 6-county data set = 4,250 square miles
  - Estimated daily oil production =  $\pm 1,750,000$  BOPD
  - Estimated water cut = 2 bbl water produced for each bbl of oil (IHS)
  - 2,281 active SWD wells
    - 89% or  $\pm 2,000$  are shallow disposal (upper perf < 6000')
    - 1 active shallow SWD every 2 square miles
    - Shallow disposal rate average = 1,250 bbl/day per well
  - Current estimate of 2,700,000 bbl/day\* shallow disposal basin wide
    - **7x** the pre-Hz daily annual disposal volume in 2010
  - Projected Midland Basin production in 2025 = 3,600,000 BOPD\*\*
  - Projected shallow disposal in 2025 = 5,400,000 bbl/day
    - Equates to **15x** the pre-Hz annual disposal volume in 2010
- **The current shallow disposal rate growth is not sustainable**

\*SWD disposal rate assumes 2/1 oil/water ratio from IHS, 15% recycling, 10% goes to deep wells

\*\*2025 Oil projection based on annual growth of 300,000 bopd (approx. 2017-2018 YOY growth)

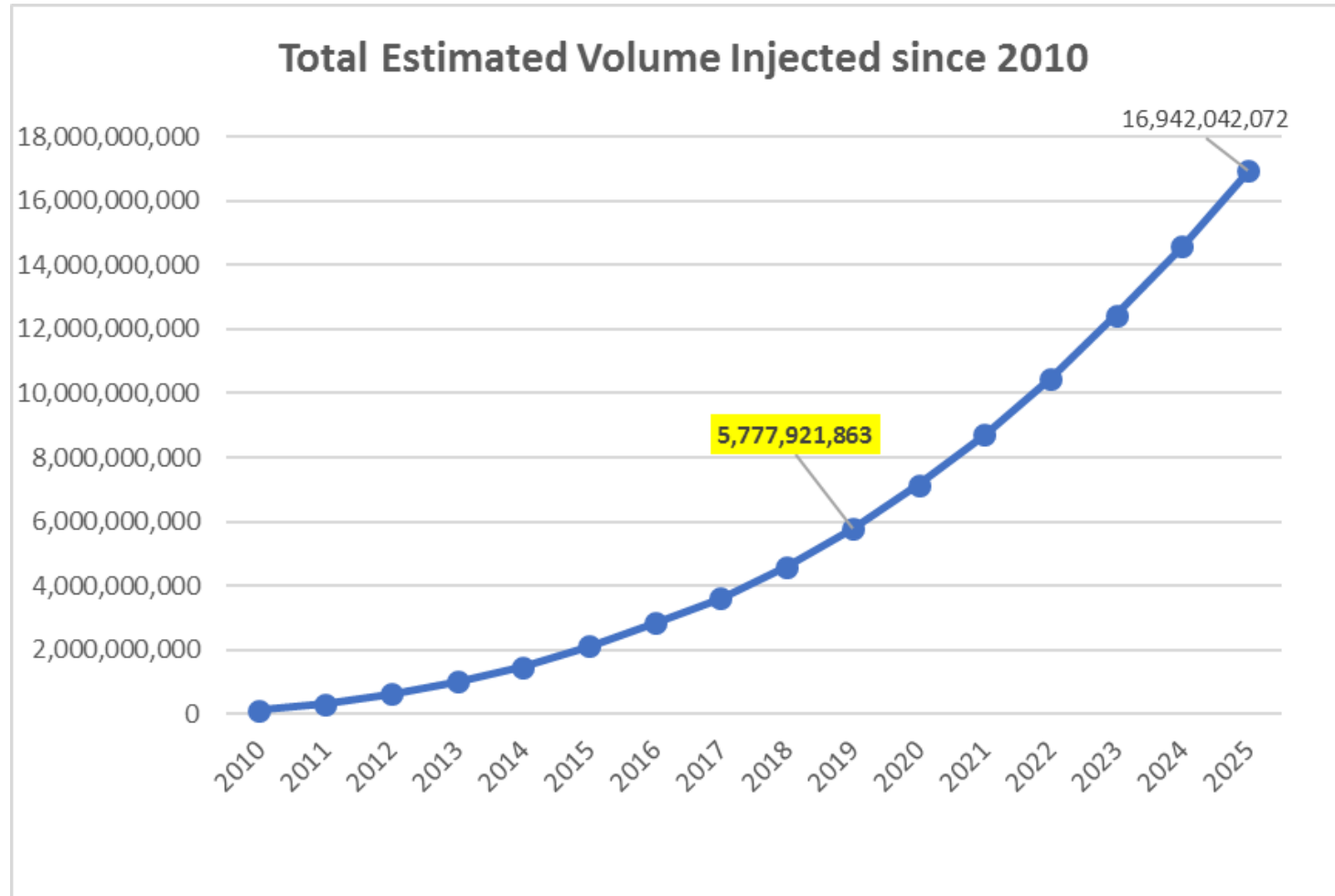
6 counties include Midland, Howard, Martin, Glasscock, Reagan, Upton

## Martin, Howard, Midland, Glasscock, Upton, Reagan



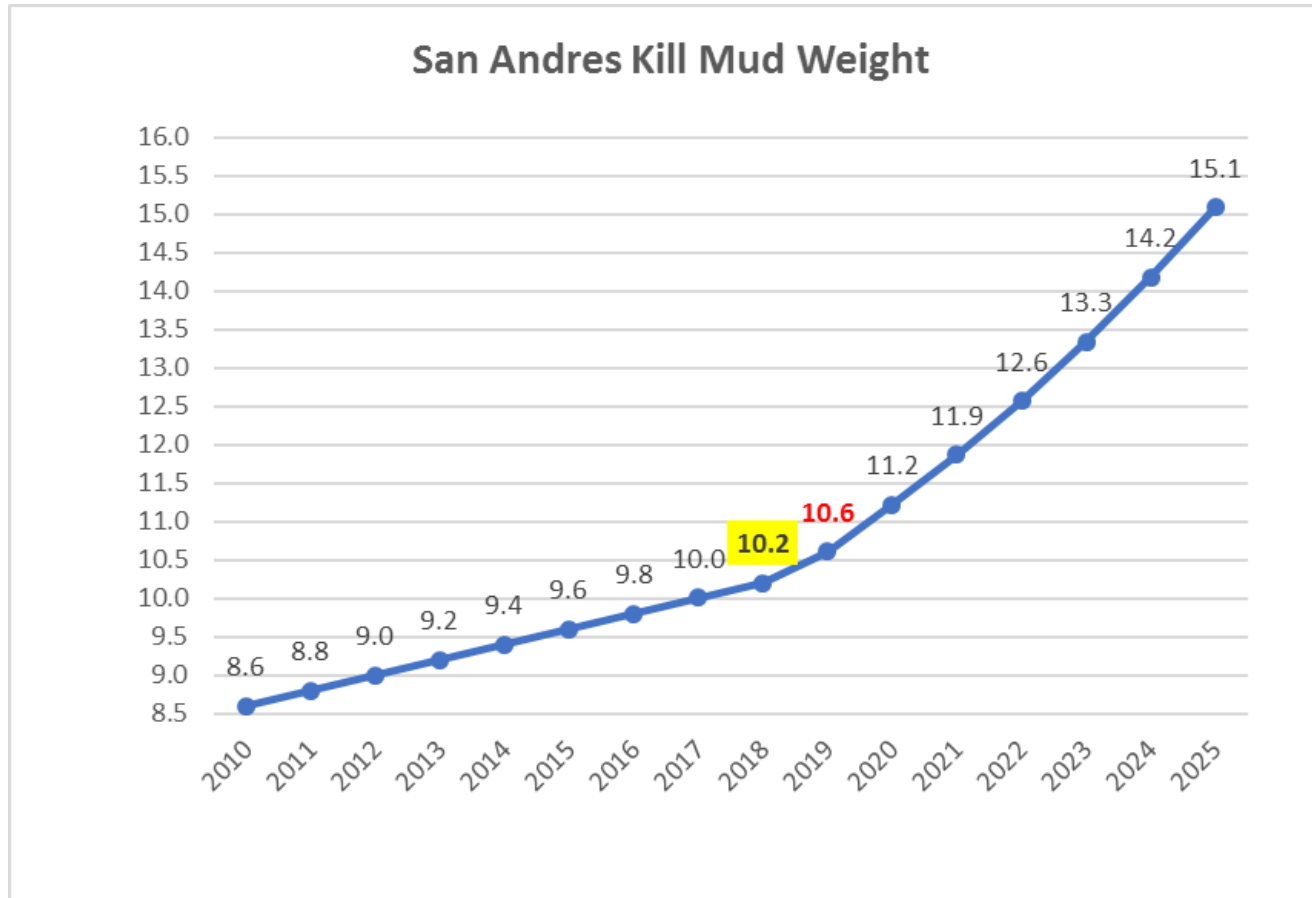


# ± 5 Billion Barrels Disposed Shallow Since 2010



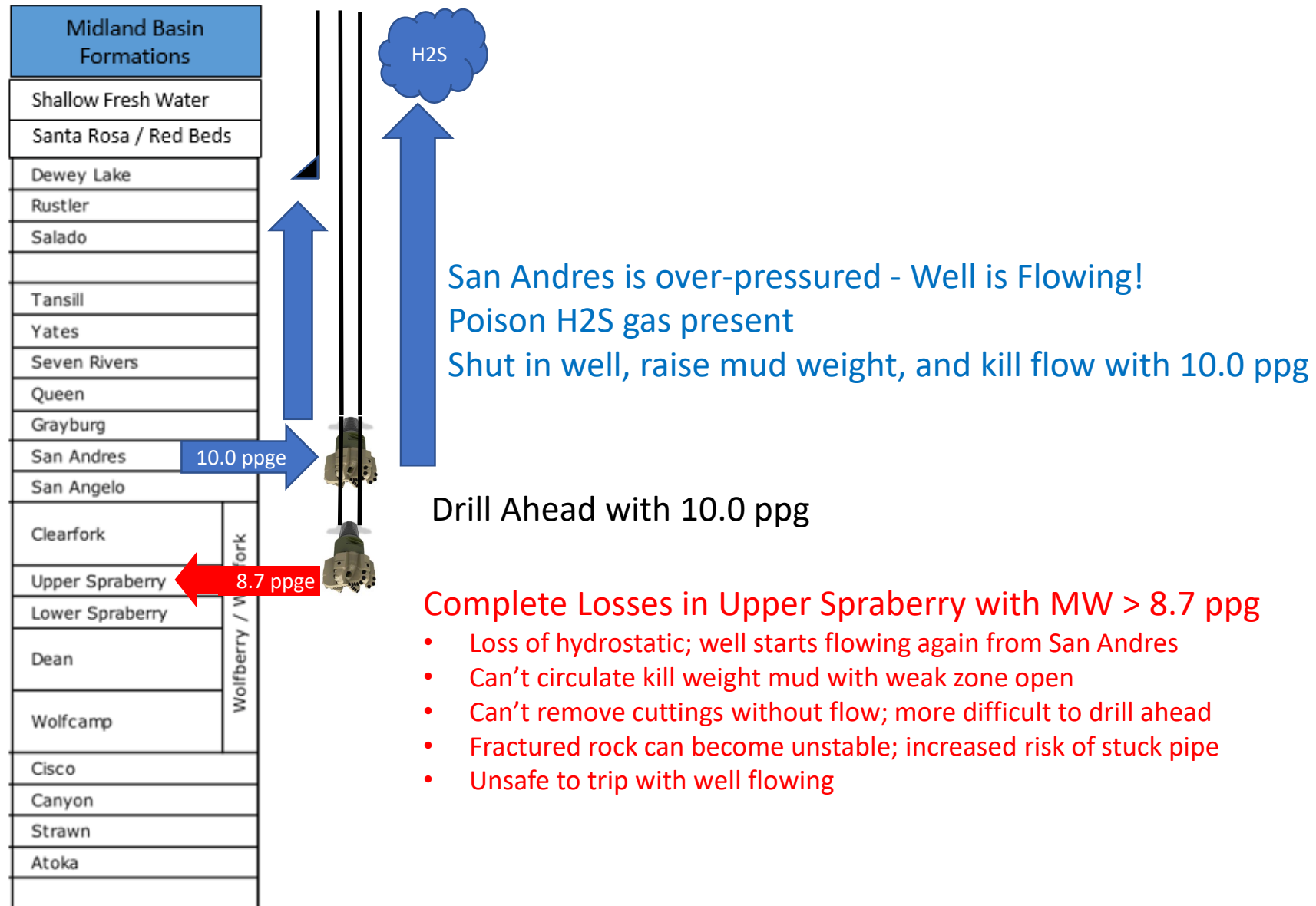
- Based on total oil production volume, 2/1 water/oil ratio, and 10% goes to deep disposal wells

# What Happens When We Add 5 Billion Barrels to a Closed System?



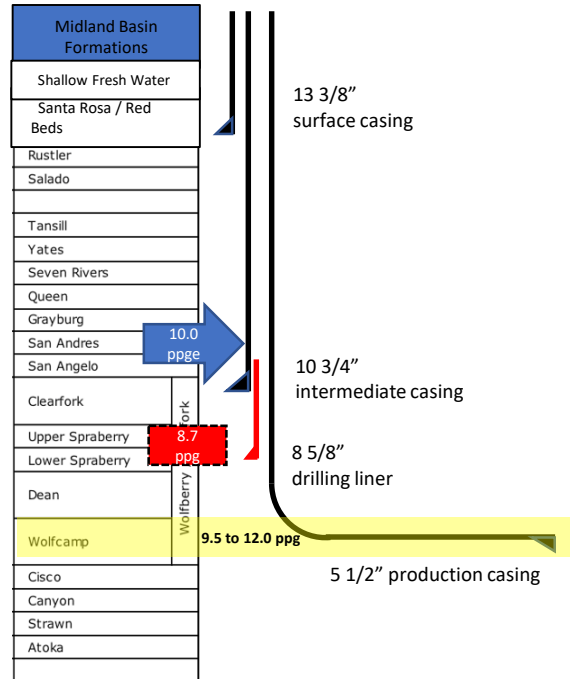
- Projection based on rough estimate of ppg increase per billion bbl injected since 2010 (0.3 ppg per MMMBW)
- At 10.2 ppg kill mud weight, we have already started to exceed the fracture gradient of the San Andres shale at 5900' TVD; lost circulation and differential sticking hazards increasing rapidly
- At 10.6 ppg kill mud weight we approach the fracture gradient of the Clear Fork lime, our primary 9-5/8" casing shoe
- Bottom hole pressure of San Andres does not appear to be regulated properly in the basin

# Why is San Andres Injection Such a Drilling Hazard?





# NextGen 4-string Well Design



- **All Wolfcamp targets to date (28% of all wells) have utilized a 4-string with the exception being the two wells on the very north of our acreage where there is no abnormal pressure in the San Andres**
  - East Central Martin Co. San Andres = 9.3-9.4 ppg with 8.7 ppg Spraberry FG
  - West Central Martin Co. San Andres = 10.1-10.3 ppg with 9.0 ppg Spraberry FG
  - Far North Martin Co. San Andres = normal pressure with 9.0 ppg Spraberry FG
- 1800' of 13-3/8" STC Surface (same as 3-string)
- 6300 to 6850' of 10-3/4" 45.5# HCL80 BTC SC
  - 12-1/4" hole with 12.5" drill-n-ream
  - Special Clearance couplings
- 2,500' of 8-5/8" 32# TLW Liner
  - 9-7/8" hole
- 9000' of 5-1/2" 20# P-110 GBCD above kick off point
  - 7-7/8" hole with 8.0" drill-n-ream
  - 6.3 Coupling OD
  - Max Operating Torque 29,620 ft-lbs (allows for rotation in water based mud)
- 9000' of 5-1/2" 20# P-110 Hunting TLW
  - 7-7/8" hole with 8.0" drill-n-ream
  - 5.92 Coupling OD
  - Max Operating Torque 38,100 ft-lbs (allows for rotation in water based mud)
  - TOC Tail to 1000' inside previous casing, single 13.2 ppg slurry
  - TOC Lead to 4000'
  - 30 min time delay slimhole toe sleeve (6.5" OD)