Bakken Three-Mile Lateral Design and Execution

February 26, 2020

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WPXENERGY®

Agenda

- WPX Overview
- Three-Mile Design Considerations
- Execution
- Q&A

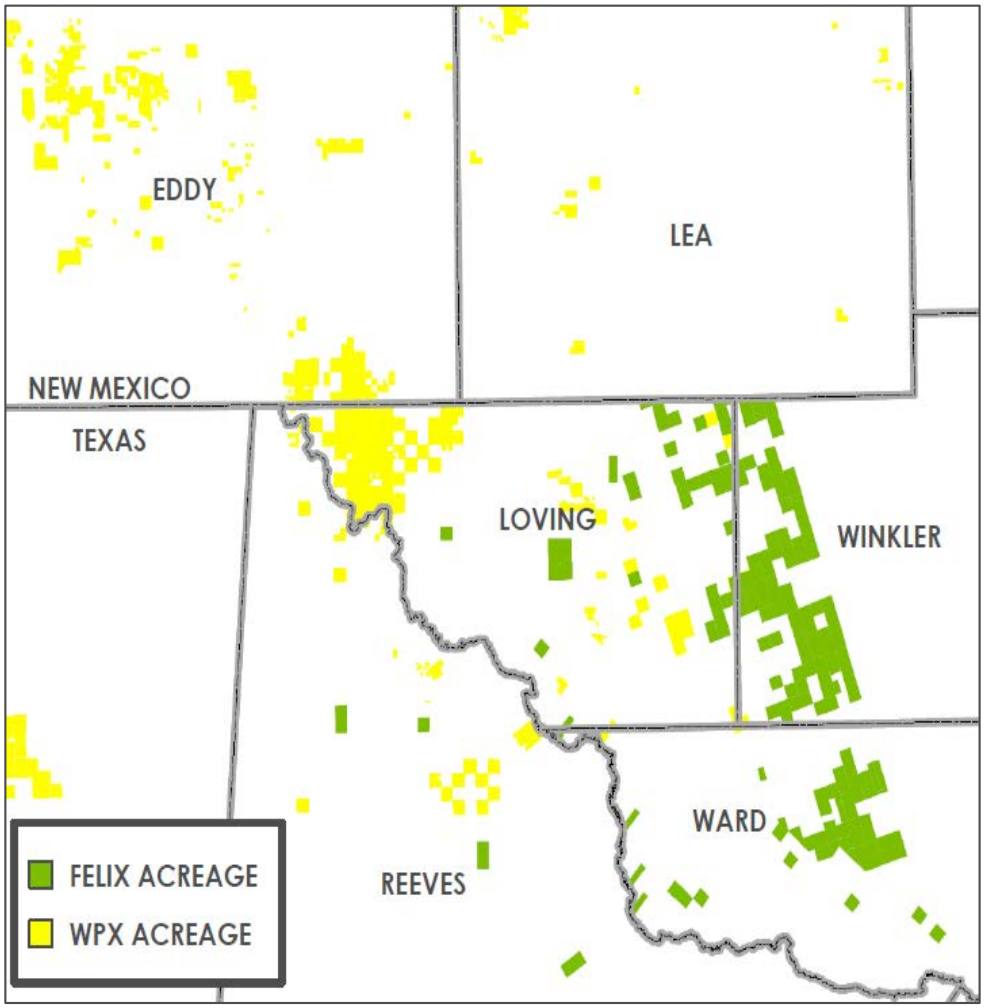
WPX Asset Overview

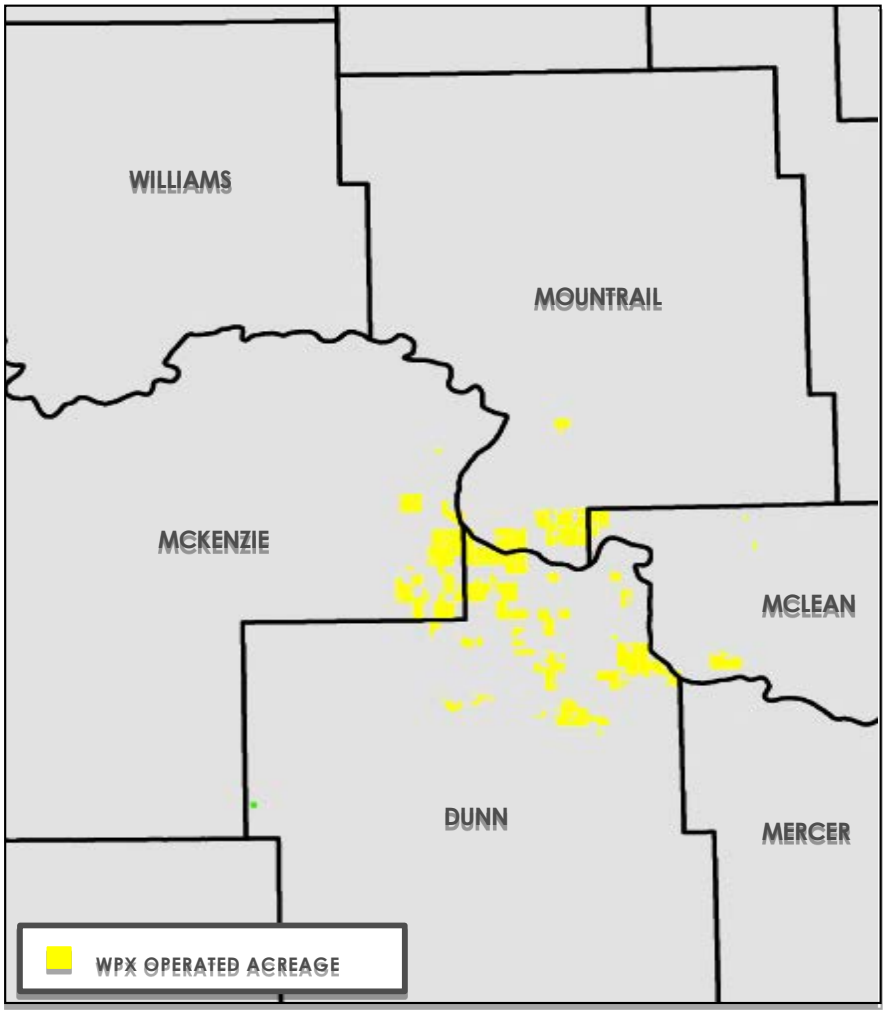
Delaware Basin

- ~185,000 Net Acres

Williston Basin

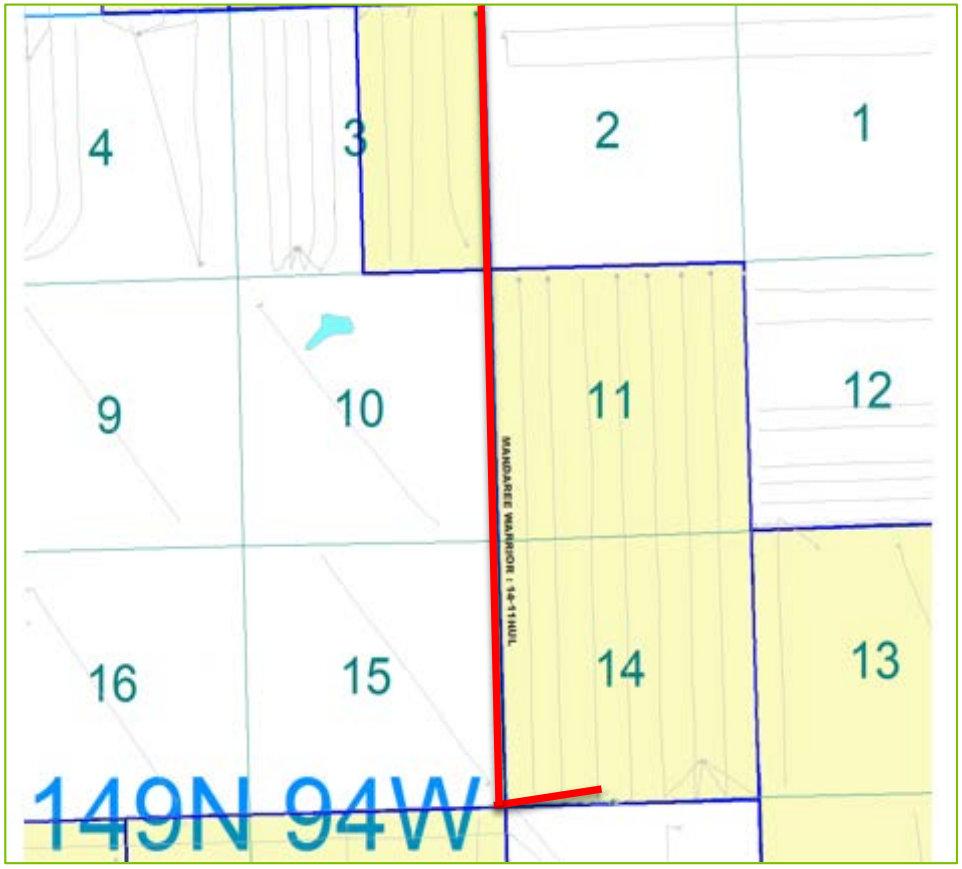
- ~85,000 Net Acres



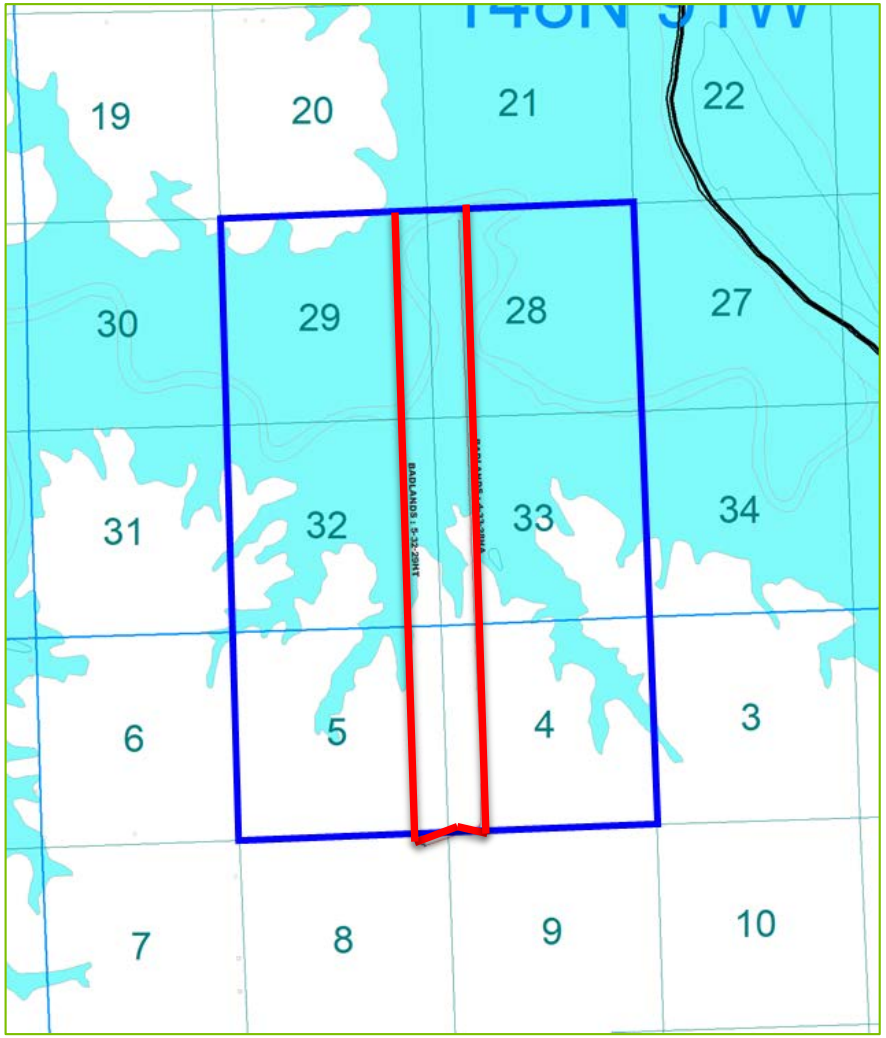


Why 3-Mile Laterals

- **Surface location mitigation**
  - **Leases underneath lake**
  - **Terrain limitations**
  - **Lease line wells**



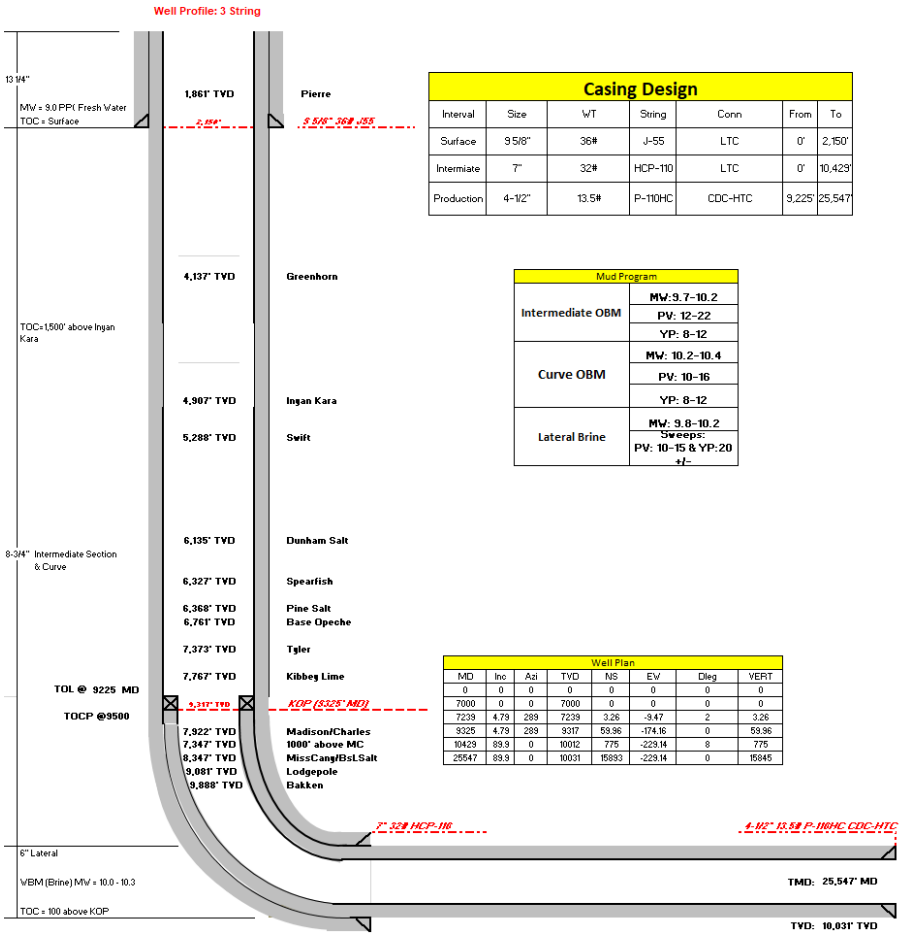
Lease Line Well



Two Well Pad under Lake Sakakawea

3-Mile Design Considerations

3 Mile WBD



Casing Design

Interval	Size	WT	String	Conn	From	To
Surface	9 5/8"	36#	J-55	LTC	0'	2,150'
Intermiate	7"	32#	HCP-110	LTC	0'	10,429'
Production	4-1/2"	13.5#	P-110HC	CDC-HTC	9,225'	25,547'

Mud Program

Intermediate OBM	MW: 9.7-10.2
	PV: 12-22
	YP: 8-12
Curve OBM	MW: 10.2-10.4
	PV: 10-16
	YP: 8-12
Lateral Brine	MW: 9.8-10.2
	Sweeps: PV: 10-15 & YP: 20 +/-

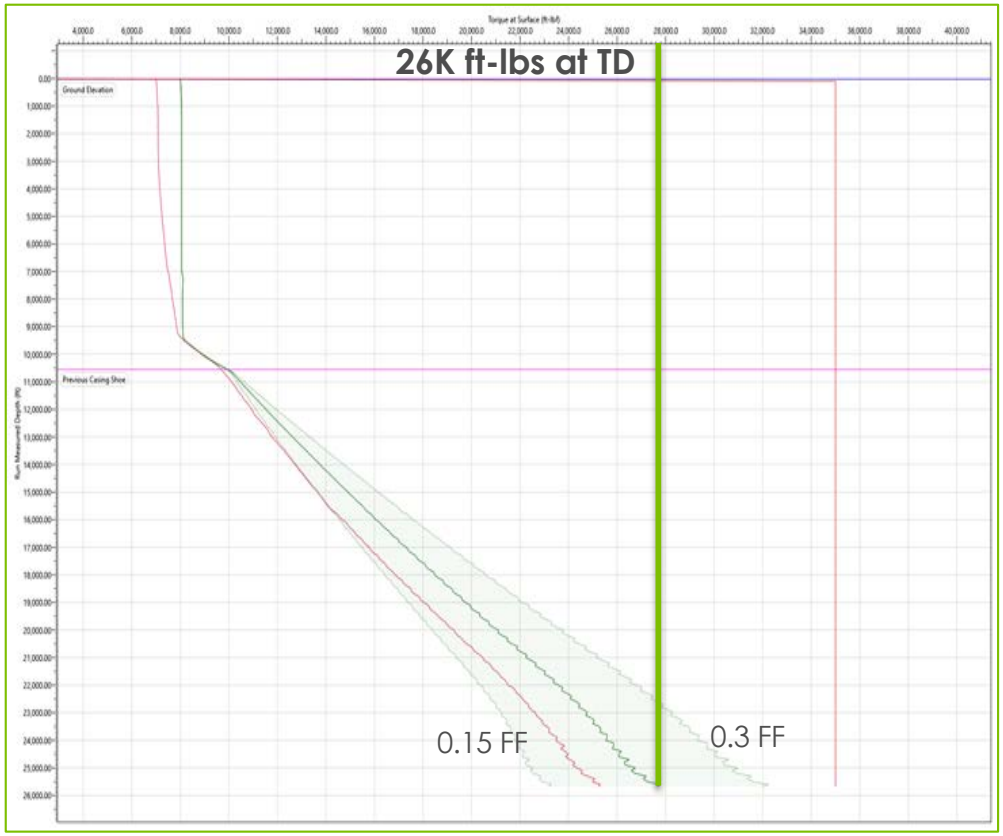
Well Plan

MD	Inc	Azi	TVD	NS	EW	Dleg	VERT
0	0	0	0	0	0	0	0
7000	0	0	7000	0	0	0	0
7239	4.79	289	7239	3.26	-9.47	2	3.26
9325	4.79	289	9317	59.96	-174.16	0	59.96
10429	89.9	0	10012	775	-229.14	8	775
25547	89.9	0	10031	15893	-229.14	0	15845

Design Considerations

- **Well plan**
  - T&D
    - Wellbore profile
    - Buckling
- **Fluid design**
  - Lube/Hole Cleaning
  - Hydraulics
    - ECD's throughout the lateral
- **BHA Design**
  - 1.25* Bend selection in tangent
  - Stabilization
  - Reamers
  - DP Selection
- **Liner Design**
  - Shoe track
  - Liner Hanger
- **Rig Specifications**
  - Pump liners
  - Rack back capacity
- **Batch Drill vs Whole Drill**

Design Considerations – T&D



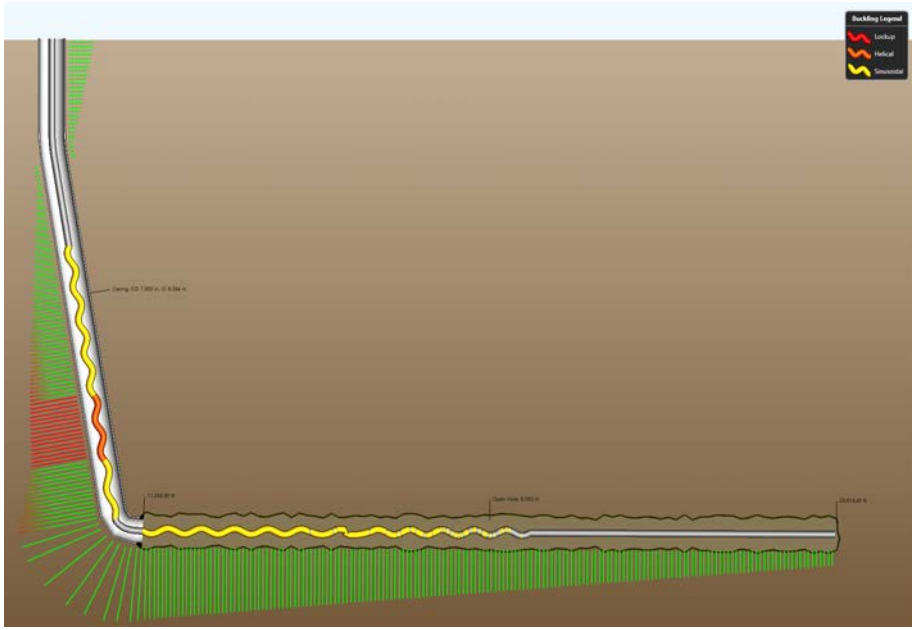
Predicted Surface Torque during Drilling

Torque Along the Drillstring at TD

- **Modeled torque shows 26,000 ft-lbs at TD**
  - **.15 - .3 OH-FF modeled**
  - **Real-time showed ~.21**
- **Modeled torque used to understand rotation of liner to bottom (if needed)**

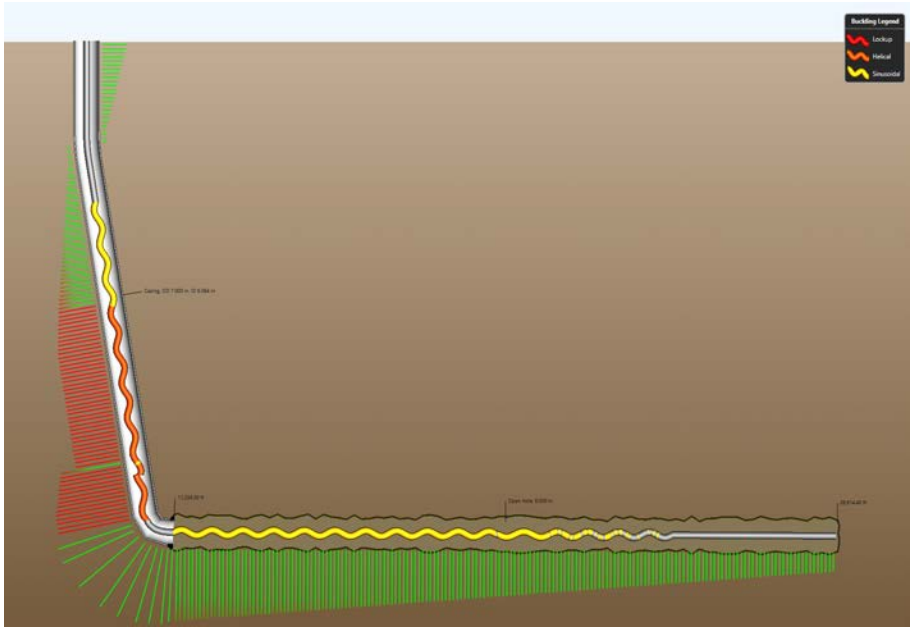
Design Considerations – Buckling

4 ½” Drillpipe



Operation	Stress Failure			Buckling Limits			Torque Failure	Measured Weight (kip)	Stretch (ft)				Rotary Table Torque (ft-lbf)	Windup With Torque (revs)	Windup Without Torque (revs)	Axial Stress = 0 [From TD] (ft)	Surface Neutral Point [From TD] (ft)
	Fatigue	90% Yield	100% Yield	Sinusoidal	Helical	Lockup			Mechanical	Ballooning	Thermal	Total					
Tripping In				✕	✕			106.0	-7.89	0.65	33.84	26.60	0.0	0.0	0.0	21,553.72	0.00
Rotating On Bottom				✕	✕		✕	191.1	-0.42	0.65	33.84	34.07	24,993.9	48.1	27.4	17,386.70	17,316.86
Slide Drilling				✕	✕			55.1	13.67	0.65	33.84	20.82	4,000.0	10.3	0.0	24,263.00	26,391.15

4” Drillpipe



Operation	Stress Failure			Buckling Limits			Torque Failure	Measured Weight (kip)	Stretch (ft)				Rotary Table Torque (ft-lbf)	Windup With Torque (revs)	Windup Without Torque (revs)	Axial Stress = 0 [From TD] (ft)	Surface Neutral Point [From TD] (ft)
	Fatigue	90% Yield	100% Yield	Sinusoidal	Helical	Lockup			Mechanical	Ballooning	Thermal	Total					
Tripping In				✕	✕			118.3	-6.05	0.87	33.68	28.50	0.0	0.0	0.0	20,842.71	0.00
Rotating On Bottom				✕	✕		✕	183.7	0.51	0.87	33.68	35.05	20,933.1	62.6	31.8	17,386.70	17,044.26
Slide Drilling				✕	✕			46.3	-14.17	0.87	33.68	20.37	4,000.0	15.4	0.0	25,221.02	26,735.00

- **4 ½” Drillpipe improves:**
  - **Helical/Sinusoidal Buckling**
  - **Rotating on Bottom Weight**
  - **Slide Drilling Weight**
  - **Torque Capacity**

Design Considerations – Drillpipe Selection

4" 14 PPF XT39

Pipe Body:

	Nominal 100% RBW	95% RBW	Ultra Class 90% RBW	Premium 80% RBW
OD (in):	4.000	3.967	3.934	3.868
Wall Thickness (in):	0.330	0.314	0.297	0.264
Nominal ID (in):	3.340	3.340	3.340	3.340
Tensile Strength (lbs):	513,645	485,769	458,124	403,526
Torsional Strength (ft-lbs):	41,918	39,586	37,281	32,752
Burst Capacity (psi):	19,491	21,161	20,048	17,820
Collapse Capacity (psi):	20,141	18,604	17,042	13,836

Notes: Body properties are calculated based on uniform OD and wall thickness.
Burst capacity for Nominal (100% RBW) based on 87.5% RBW per API.

Connection: XT39

TJ OD (in): **4.875**
TJ ID (in): **2.688**
MYS (ksi): 120

Maximum MUT is recommended (unless stated). Lower than maximum MUT should only be used when MUT is limited by rig equipment or connection tensile. Lower than minimum MUT should never be used.

Maximum MUT (ft-lbs):	**21,200**
Tension at Shoulder Separation @ Max MUT (lbs):	Tensile Limited
Tension at Connection Yield @ Max MUT (lbs):	553,300
Minimum MUT (ft-lbs):	**17,700**
Tension at Shoulder Separation @ Min MUT (lbs):	647,200
Tension at Connection Yield @ Min MUT (lbs):	662,200
Tool Joint Torsional Strength (ft-lbs):	35,300
Tool Joint Tensile Strength (lbs):	662,200

XT39 is a trademark of NOV Grant Prideco.
Note: MUT values are based on a friction factor of 1.0. There is no published pressure rating for this connection.

4 ½" 16.6 PPF DELTA 425

Pipe Body:

	Nominal 100% RBW	95% RBW	Ultra Class 90% RBW	Premium 80% RBW
OD (in):	4.500	4.466	4.433	4.365
Wall Thickness (in):	0.337	0.320	0.303	0.270
Nominal ID (in):	3.826	3.826	3.826	3.826
Tensile Strength (lbs):	595,004	562,966	531,168	468,296
Torsional Strength (ft-lbs):	55,453	52,405	49,389	43,450
Burst Capacity (psi):	17,693	19,209	18,198	16,176
Collapse Capacity (psi):	16,773	15,354	13,913	10,964

Notes: Body properties are calculated based on uniform OD and wall thickness.
Burst capacity for Nominal (100% RBW) based on 87.5% RBW per API.

Connection: Delta 425

TJ OD (in): **5.375**
TJ ID (in): **3.000**
MYS (ksi): 130

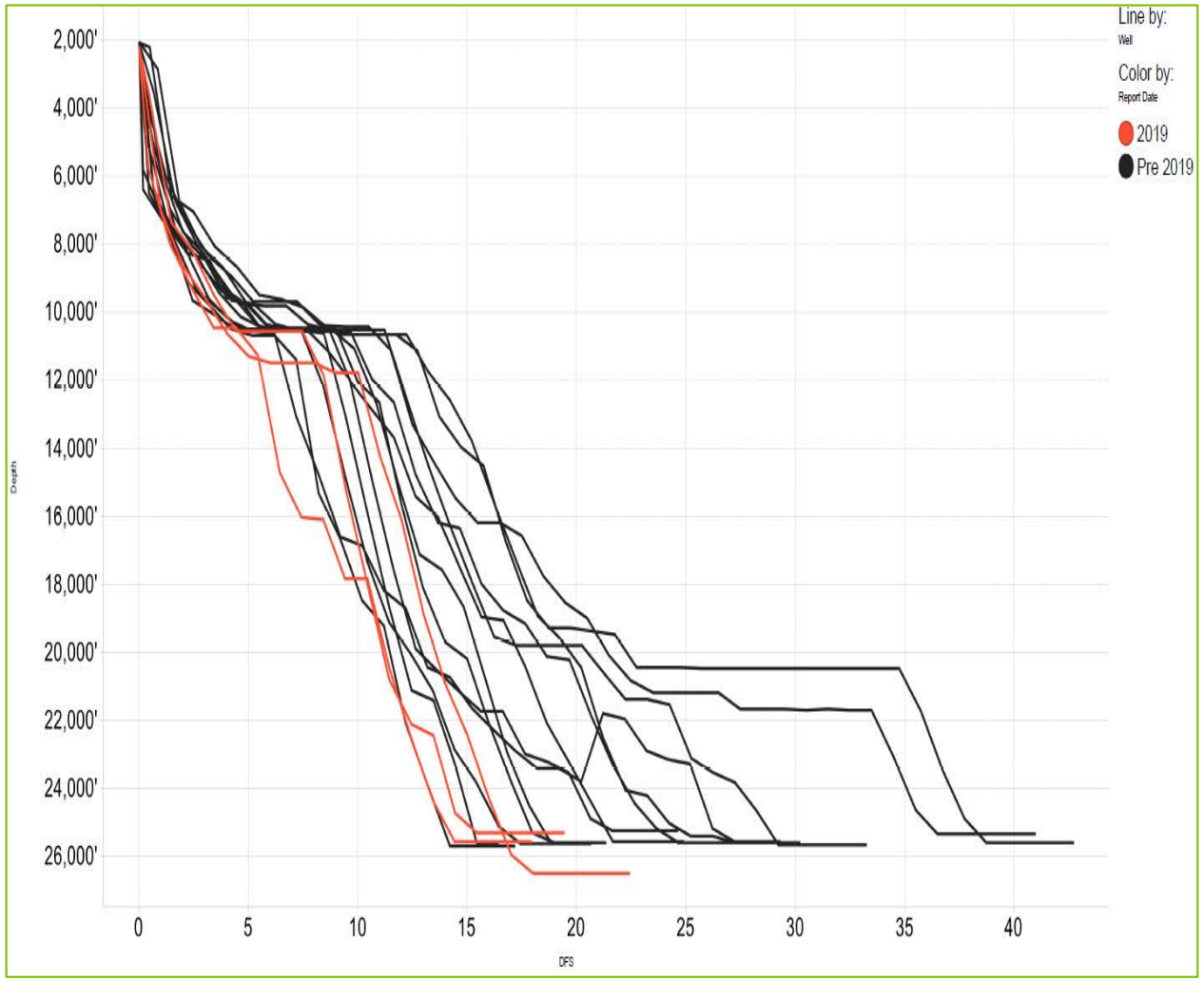
Maximum MUT is recommended (unless stated). Lower than maximum MUT should only be used when MUT is limited by rig equipment or connection tensile. Lower than minimum MUT should never be used.

Maximum MUT (ft-lbs):	**35,000**
Tension at Shoulder Separation @ Max MUT (lbs):	Tensile Limited
Tension at Connection Yield @ Max MUT (lbs):	482,858
Minimum MUT (ft-lbs):	**34,800**
Tension at Shoulder Separation @ Min MUT (lbs):	Tensile Limited
Tension at Connection Yield @ Min MUT (lbs):	482,858
Tool Joint Torsional Strength (ft-lbs):	49,748
Tool Joint Tensile Strength (lbs):	786,353

MUT values are based on a friction factor of 1.15. A copper-based thread compound with a friction factor of 1.15 must be used to achieve the MUT values for this connection.

Delta 425 is a trademark of NOV Grant Prideco.

Execution



- **Days from Spud:**
  - **2015-16:** 26.8
  - **2019:** 19.94
- **Modeling is a necessity**
- **100% success on liner runs**
- **4 ½" Drillpipe**
  - **Less buckling**
  - **Higher torque capacity**
  - **Better hole cleaning (AV's)**
  - **More available WOB**
- **100% conventional assemblies**
- **2020:**
  - **9 wells in the schedule**
  - **Currently batch setting on a 5 well pad**
- **Future Opportunities:**
  - **BHA design evolution**
    - Eccentric reamers
    - Drillpipe configuration
  - **Permian applications?**

Questions?