



## Mechanical Thruster - Case History

*Scott Craik – Eastern Hemisphere Sales Manager*

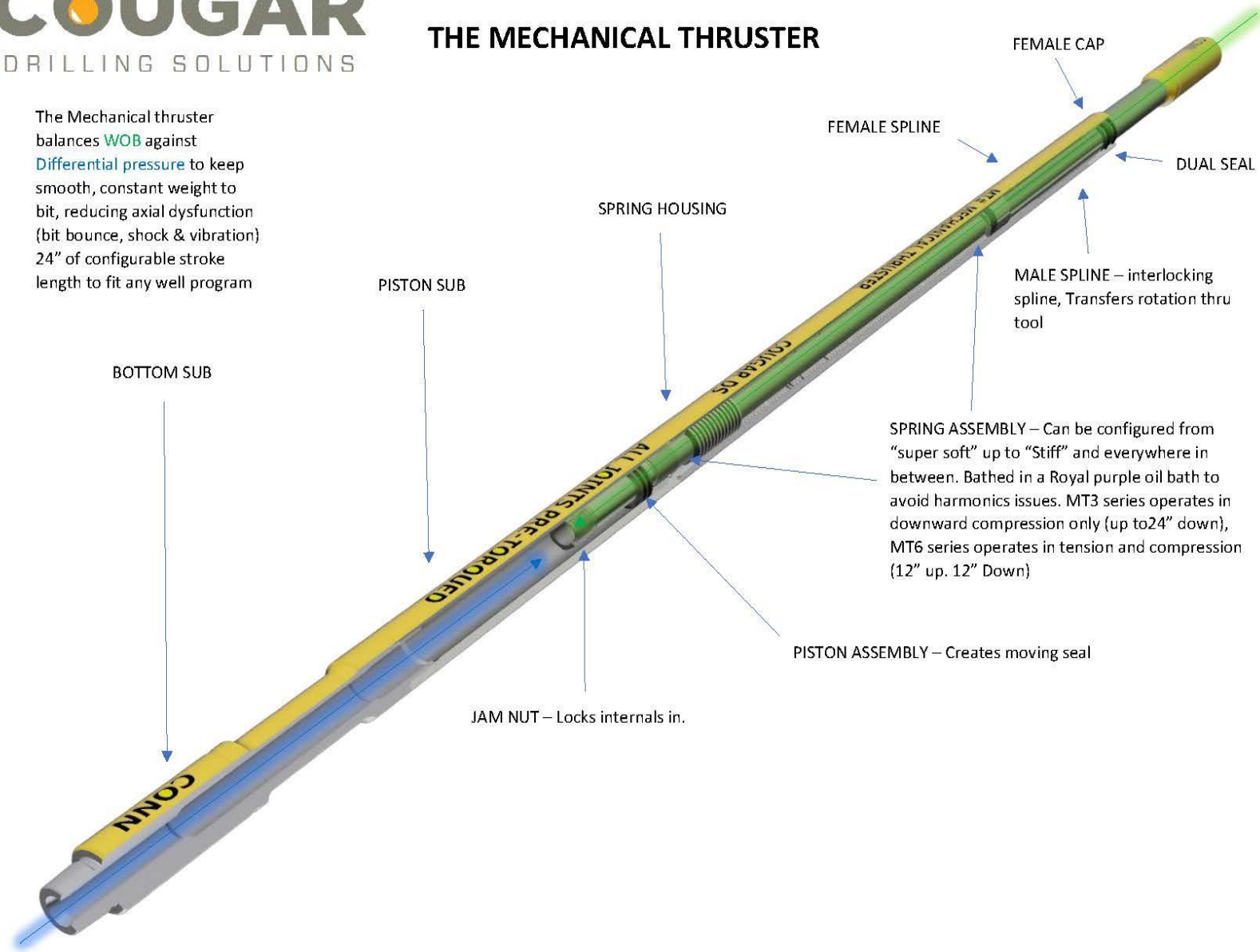


# COUGAR

DRILLING SOLUTIONS

## THE MECHANICAL THRUSTER

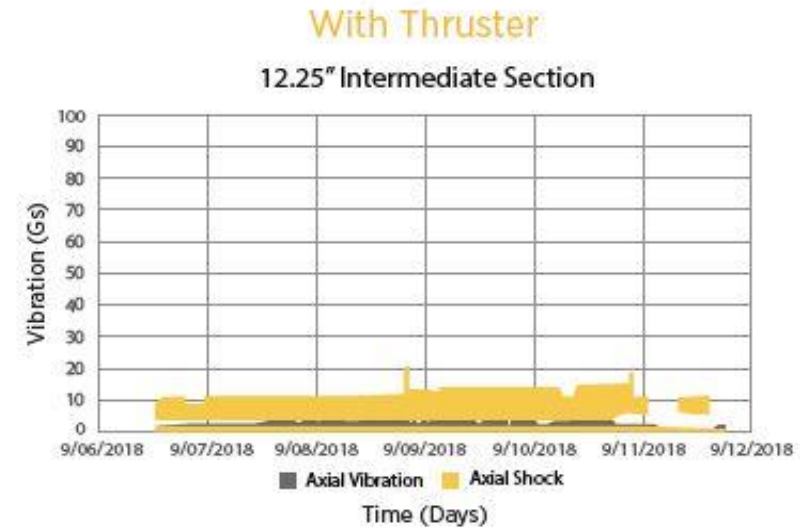
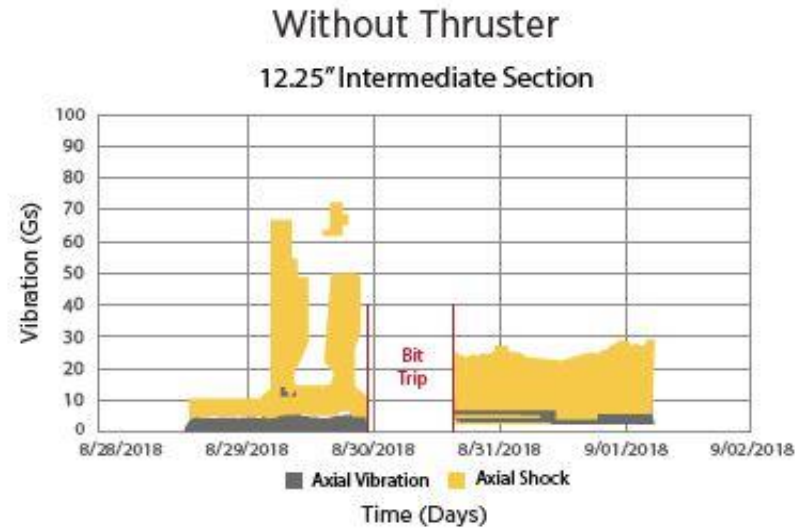
The Mechanical thruster balances **WOB** against **Differential pressure** to keep smooth, constant weight to bit, reducing axial dysfunction (bit bounce, shock & vibration) 24" of configurable stroke length to fit any well program



# 12.25" Intermediate - Midland basin, USA



## Axial Shock and Vibration Comparison



### Vibration Decrease with Thruster

Axial Vibration -80.38%

Lateral Vibration -29.86%

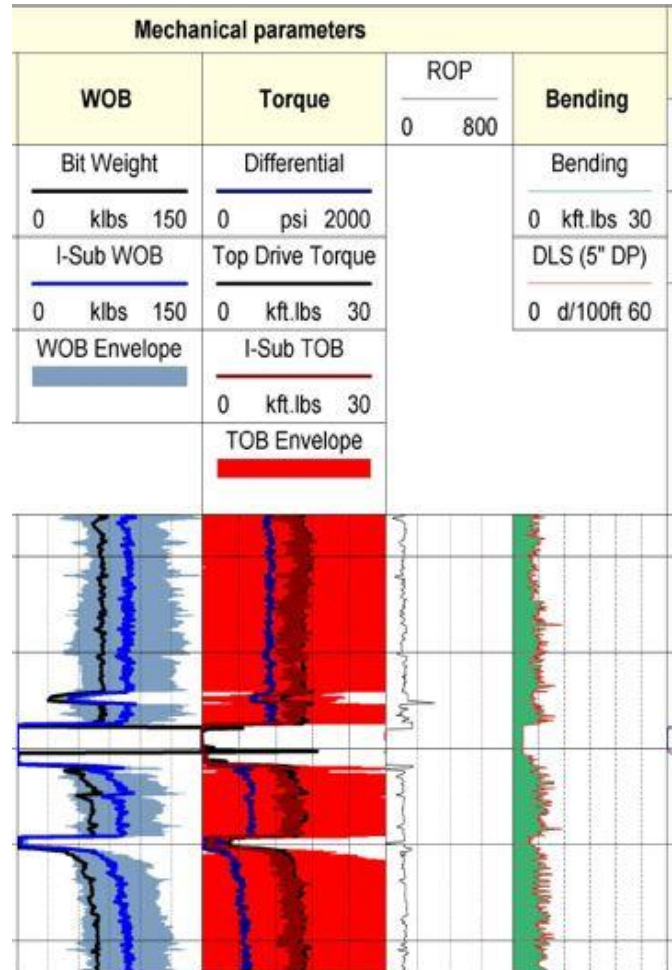
Axial Shock -62.18%

Lateral Shock -41.59%

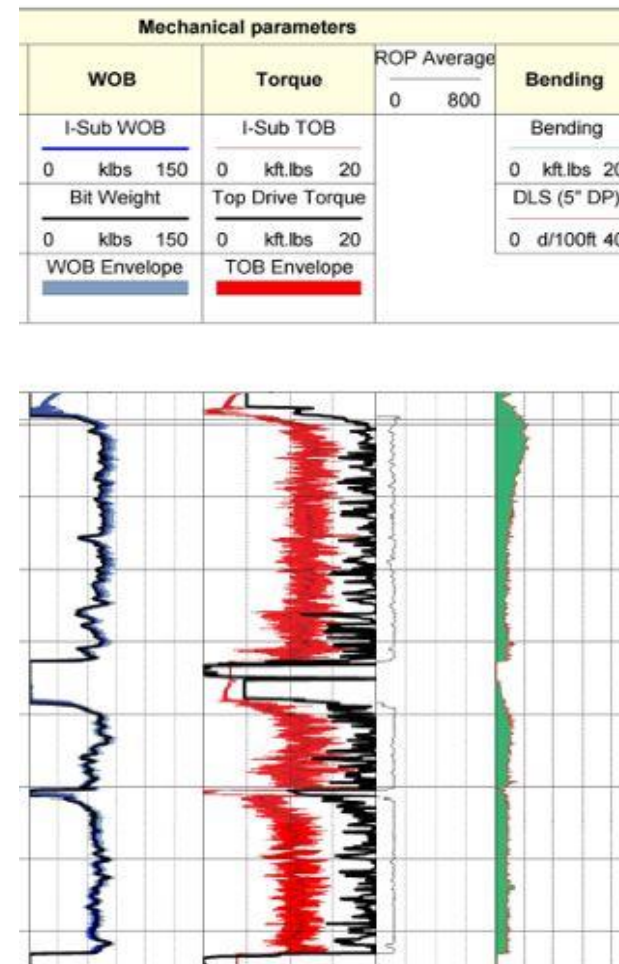
# 12.25" Downhole comparison – Delaware basin (data capture subs)



Without Thruster

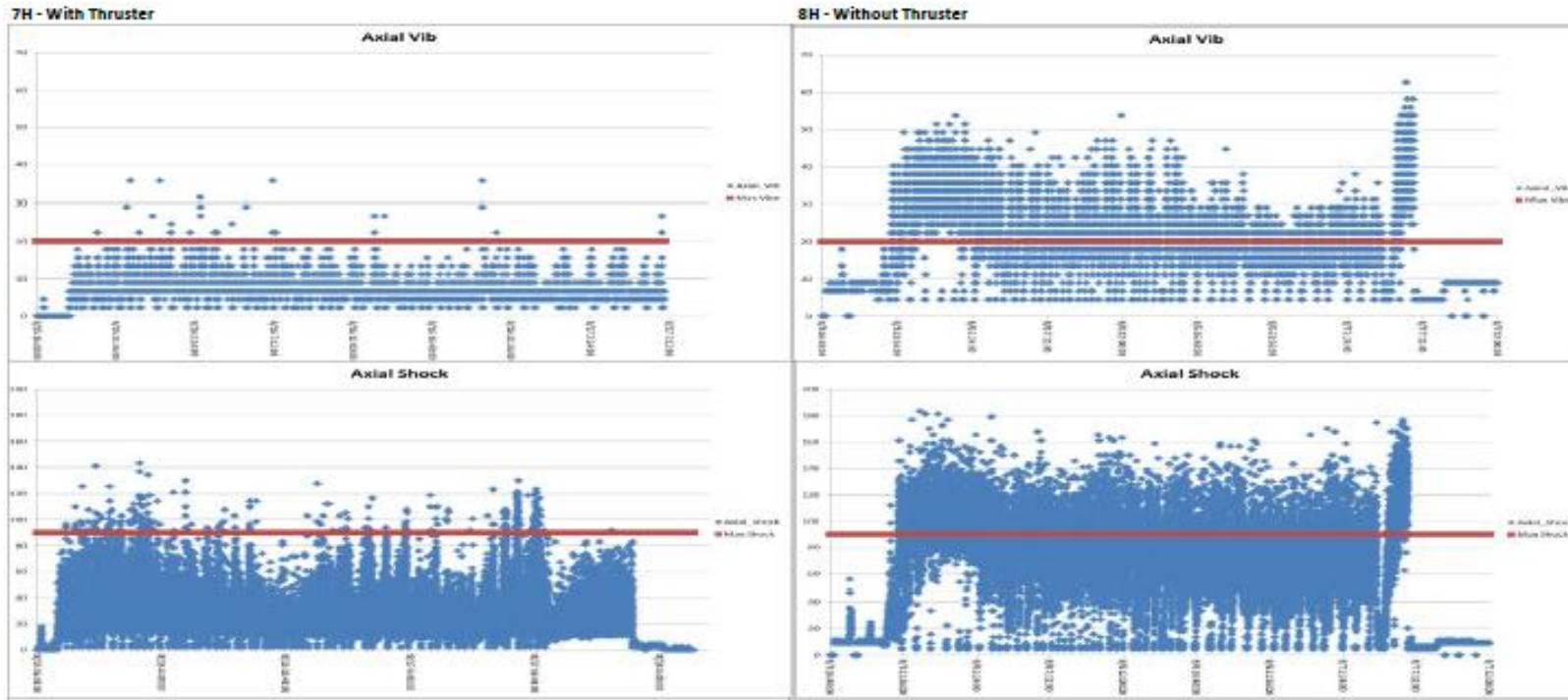


With Thruster

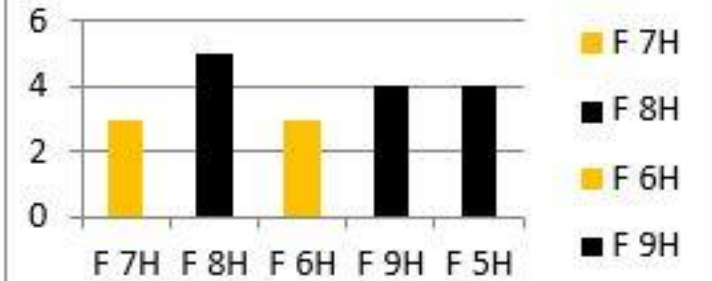




# 8.5" Lateral – Eagle Ford, USA



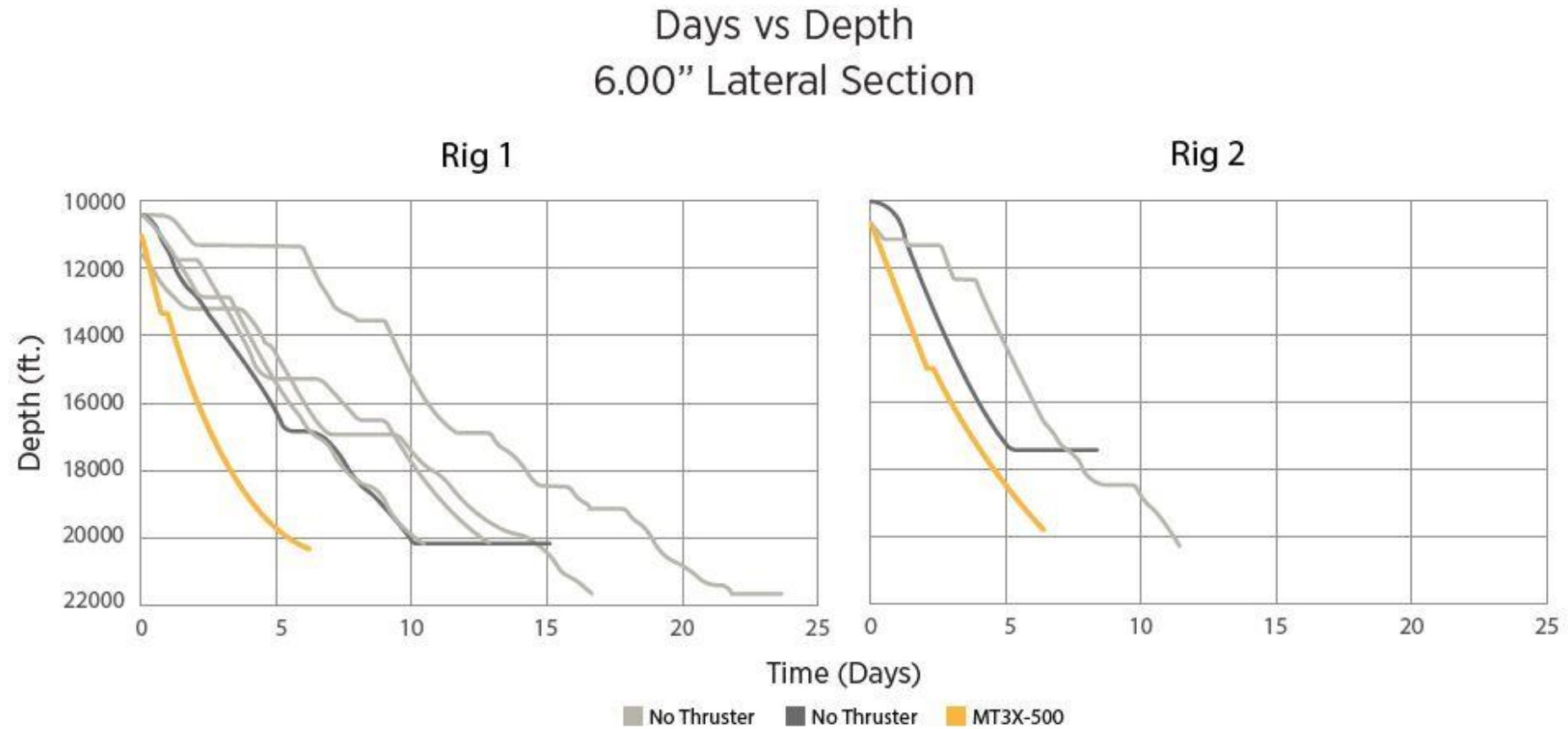
**Total BHAs used  
per well**



**THRUSTER**

**NO THRUSTER**

# 6" Lateral - Delaware basin, USA



# One Run 12 1/4" Intermediate - Delaware basin, USA



## Challenge

Major operator in the Delaware basin experiencing high shock and vibration, resulting in damaged bits and multiple trips per section.

## Application

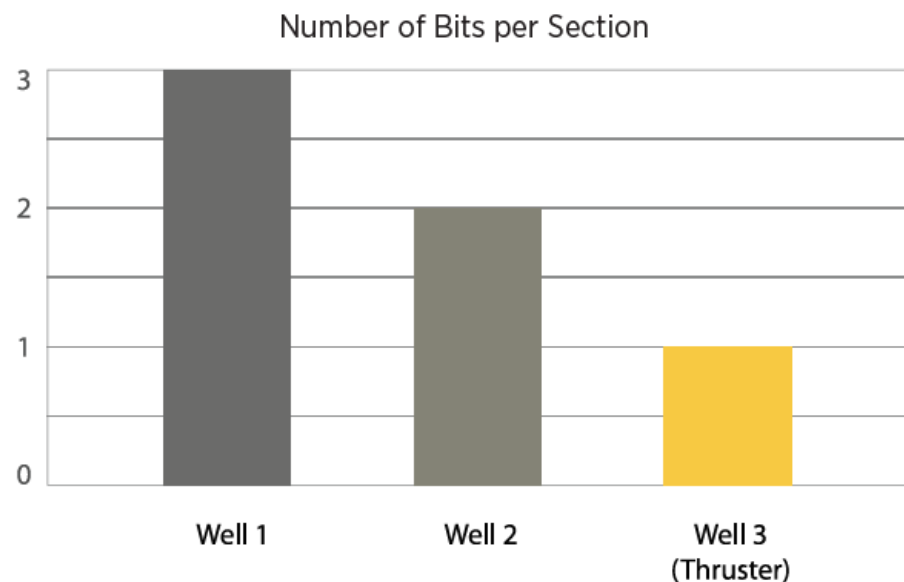
Analyze BHA, well profile, drilling performance requirements and discuss specific objectives with drilling team. Optimize MT6-800 configuration and placement for maximum effectiveness.

## Results

Single bit run to section TD, drilling a total of 8,013 ft at an average ROP of 143 ft/hr

"The main benefit, and the reason why we picked up the thruster, was due to some severe vibrations at around 4500-5000' on the first two runs. In that zone, thruster drilled much better, higher ROP, no vibrations, and eliminated a trip - about 12 hours of savings and one bit rental."

- Drilling Engineer



Single Run  
Footage

**8013**



Average ROP  
(ft/hr)

**143.1**



Runs from  
Shoe to TD

**1**

# 1000'+ Laterals Drilled to TD with single BHA - Delaware basin, USA



## Challenge

Delaware basin operator experiencing multiple trips per lateral section and DBR bits. Seeking to run more aggressive bits to increase ROP without the negative consequences of DBR bits resulting in trips.

## Application

Analyze BHA, well profile, drilling performance requirements and discuss specific objectives with drilling team. Optimize MT3X-500 configuration and placement for maximum effectiveness.

## Results

Drilling engineer chose a bit that typically DBRs quickly but provides higher ROP. Back-to-back record runs on (2) rigs, with >10,000' drilled with a single BHA on each well.

Average Footage to TD with Single BHA

**>10,000'**



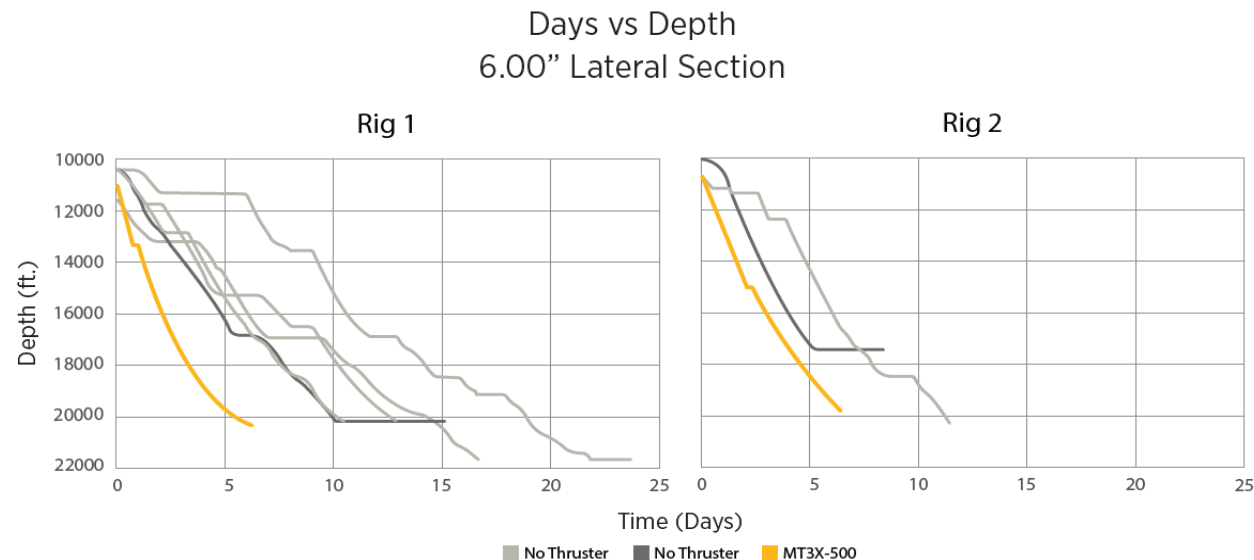
Average Reduction per Section Drilled

**2.5 Bits**



Average Net Savings per Well

**\$142.5K**





# 311mm Section – Kaybob Field, Canada



## Challenge

Major operator experiencing multiple trips per section and associated NPT, while pad drilling the 311mm intermediate hole.

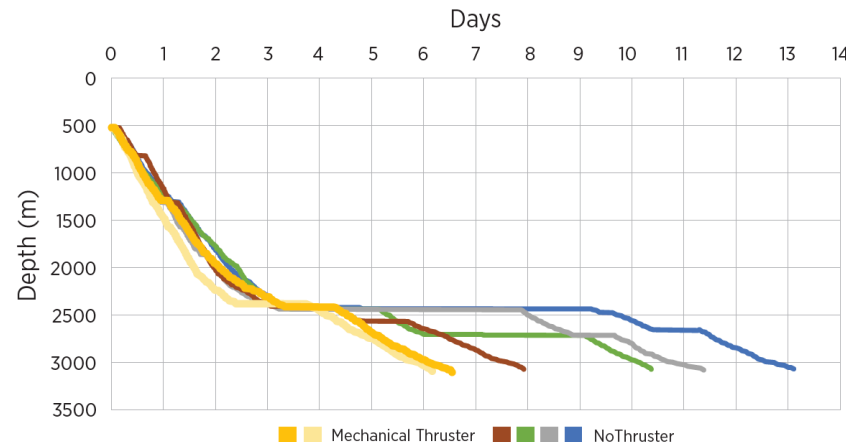
## Application

Analyze BHA, Well profile, and drilling performance requirements. Optimize MT6-800 configuration and placement for maximum effectiveness.

## Results

Consistent elimination of one bit trip per section, contributing to an average reduction of 2 days per section.

“The addition of the thruster tool has turned what is normally a three-bit intermediate into a two-bit intermediate. That saves us about one day for the round trip and about a day gained performance for having a fresher bit through that second run for a total of about two days savings per intermediate. We can legitimately associate that with the thruster.” – Drilling Engineer



Average Per Section

**8.25 DAYS**

Without Thruster

**6.25 DAYS**

With Thruster

Average Reduction

**2 DAYS**



Estimated Burn Rate  
Per Day

**~65K CAD**



Average Cost Savings  
Per Section

**130K CAD**

# Mechanical Thruster with RSS on 8 ½” Laterals – Delaware basin, USA



## Challenge

A Delaware Basin operator experienced constant damage to their RSS and MWD assemblies in the 8.50” lateral sections. Cougar Drilling Solutions was contacted to help them increase BHA reliability and consistency in their lateral sections.

## Solution

We discussed the following goals with the operator’s drilling team:

- Reduce RSS damage and extend BHA life.
- Maintain constant drilling parameters.
- Drill the section in a single BHA run for well quality and cost-effectiveness.

Cougar Drilling Solutions analyzed the operator’s BHA, well profile and drilling performance requirements. We recommended adding the dual-acting Mechanical Thruster, MT6-675, to the BHA to reduce damage by absorbing shock and vibration and to maintain constant drilling parameters by keeping the bit engaged to formation. The Mechanical Thruster was then going to be used in seven wells in the same formation, along with a motor assisted RSS.

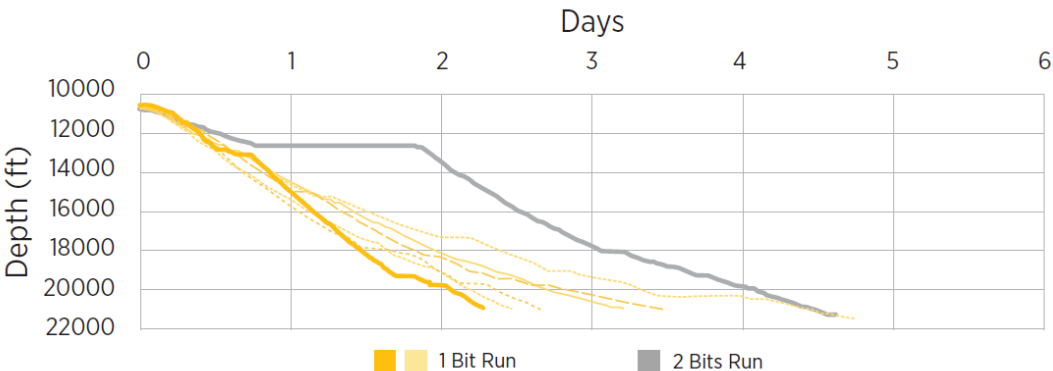
## Results

With the addition of the Mechanical Thruster, the operator was able to drill six out of the seven laterals in a single bit run. The average lateral length was 10,400 feet, and the average first bit footage was 9,500 feet. This was the first time Cougar’s MT6-675 was used in 8.50” lateral sections with a motor assisted RSS BHA, and it significantly increased the operator’s drilling consistency and cost-effectiveness.

### MT6-675 BHA Placement



BHA	Size
Bit	8 ½”
RSS	6 ¾”
MWD	6 ¾”
Cougar Thruster	6 ¾”
Mud Motor	6 ¾”



# 159mm Multi-Leg Lateral - Alberta, Canada



## Challenge

Multiple bit trips required per hole section, often per leg. Through a combination of bit and BHA optimization, reduce and eliminate bit trips while increasing on bottom ROP.

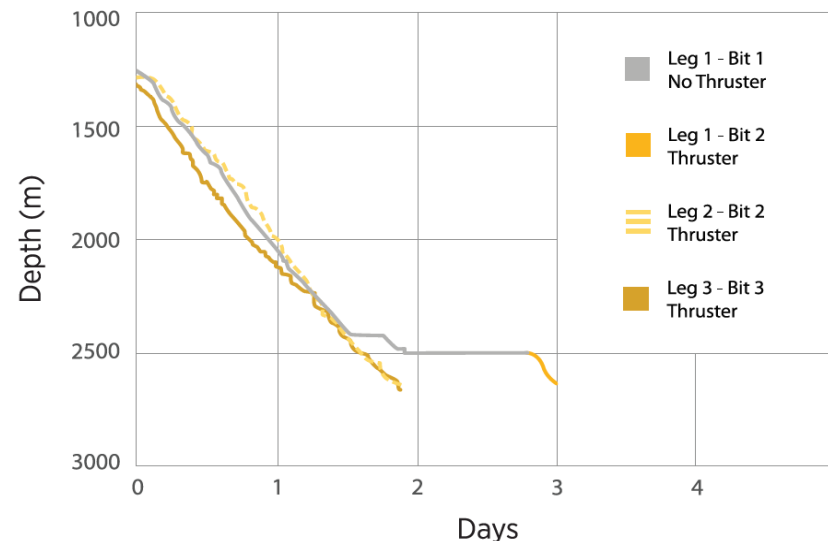
## Application

Analyze BHA and well profile. Evaluate drilling performance requirements and specific objectives with client's drilling team and supporting services. Optimize MT3X-500 configuration and placement for maximum effectiveness.

## Results

Single bit run achieved on the two legs drilled utilizing MT3X-500 from Sidetrack Point to TD, with each leg drilled in ~25 bit hours. First leg picked up MT3X-500 after required bit trip due to poor ROP, leg drilled in ~29 hours not including trip time.

Days vs Depth  
159mm Lateral Sections



Average Section  
Time Reduction  
**15%**



**>30%**  
Reduction in  
Section Times to TD

### Rate of Penetration (m/hr)

Leg 1 - No Thruster	48.11
Leg 1 - Thruster	45.95
Leg 2 - Thruster	53.34
Leg 3 - Thruster	53.67