A ‘Wireless’ Compact Repeat Formation Pressure Tester Tool (MFT)

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Presentation Outline

• What Is Wireless Formation Testing?

• Wireless MFT Applications and Advantages

• MFT Tool Overview

• Wireless MFT Impulse Compact Well Shuttle Conveyance

• Summary
What Is Wireless Formation Testing?

- A method of measuring formation pressures into memory in challenging borehole environments
- It is done by adding a memory sub, battery pack and mud pulse control system to the proven wireline MFT tool
- It is conveyed in the Impulse Compact Well Shuttle
- Tool set/retract controlled via surface pressure pulses
Wireless MFT Applications

- Horizontal / deviated wells
- Problem hole conditions
- Smaller hole sizes (3 1/2” minimum)
- Identify compartmentalised reservoirs
- Identify oil water gas contacts
Wireless MFT Advantages

- Access to pressure data previously inaccessible
- Reliable operation
- Low sticking risk
- Dual draw down
- Tool attached to drill pipe (Already fished!)
- Small rig footprint
MFT – Overview

- 2.4 inches OD (minimum trim)
- Pressures only
- Fishing rate = 2% of operations
  (probably wireline sticking, not tool sticking)
- Seal success rate = 89%
  (averaged over all hole sizes, conditions and mud weights)
- Accessed 90+ degrees under memory
- Operated in hole sizes 3 7/8 to 14 ¼ ins
• Sidewall force = Variable to 3,307 lb
• Drawdown = 8,000 psi max.
• Max. Pretest Volume = 40 cc
• Pretest can be repeated without retracting tool
• Pretest Drawdown Rate - Programmable (Max.1cc/sec)
• Quartz gauge with Strain gauge back up
• Combinable
• Class Leading 9cc Flowline Storage
Wireless MFT Shuttle Conveyance Method

- Tools are conveyed via Impulse Shuttle
- Run to TD protected inside the BHA
- Tools released from BHA via pressure pulses
- Tools pumped into openhole, retained by landing ring
- Landing confirmation by pressure signature
- Pipe is pulled to test depth
Wireless MFT Shuttle Conveyance Method

- Test initiated via surface pressure pulse
- Single surface command instructs tool to perform complete test sequence
- Sequence is: tool diagnosis – signal success/fail – Set pad – take double pretest – retract tool – signal tool closed
- Move to next test point
Wireless MFT - Signalling from Surface

- Signals are sent from surface using the mud pumps
- The pulses can be positive or negative
- Pulses can be generated manually or with the Shuttle Commander
- The Shuttle Commander is plumbed into the mud system between the flowline and return line
- Pulse characteristics are programmed into and recognised by the Memory sub
Well Shuttle Commander

- Makes signalling to the downhole tools faster and easier
- Can be fixed into rig mud system ahead of time
- Electro pneumatic control for safety
- Small footprint
- Easy to operate
Memory MFT – Release sequence

Memory MFT Release Sequence using Well Shuttle Commander for Negative Pulsing

- Pre-Release Status - 'Tools working ok'
- Tools landed
- 'Good' Post-Release Status reply from tools
- Pump tools into Open Hole
- Negative Pulse #2
- Standpipe Pressure (psi)
- Time (Secs)
Surface Pressure data

Standpipe Pressure During MFT Pre-Test Routine

- Stand Pipe Pressure (psi)
- Negative Pulse #1
- Negative Pulse #2
- Reply from Toolstring to signal start of Pre-test Routine
- Reply from Toolstring to signal end of Pretest Routine and Caliper Arms Closed
- MFT Pre-test
## Job History

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Summary

- The Wireless MFT has unique well access advantages
- The Wireless MFT Shuttle conveyance has demonstrated significant rig time savings and improved safety compared to wireline pipe conveyed logging
- The Wireless MFT has demonstrated a low differential pressure sticking risk
- The Wireless MFT has produced significant data value to clients