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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 ⅞ to 14 ¼ ins

MFT – Specification

- 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

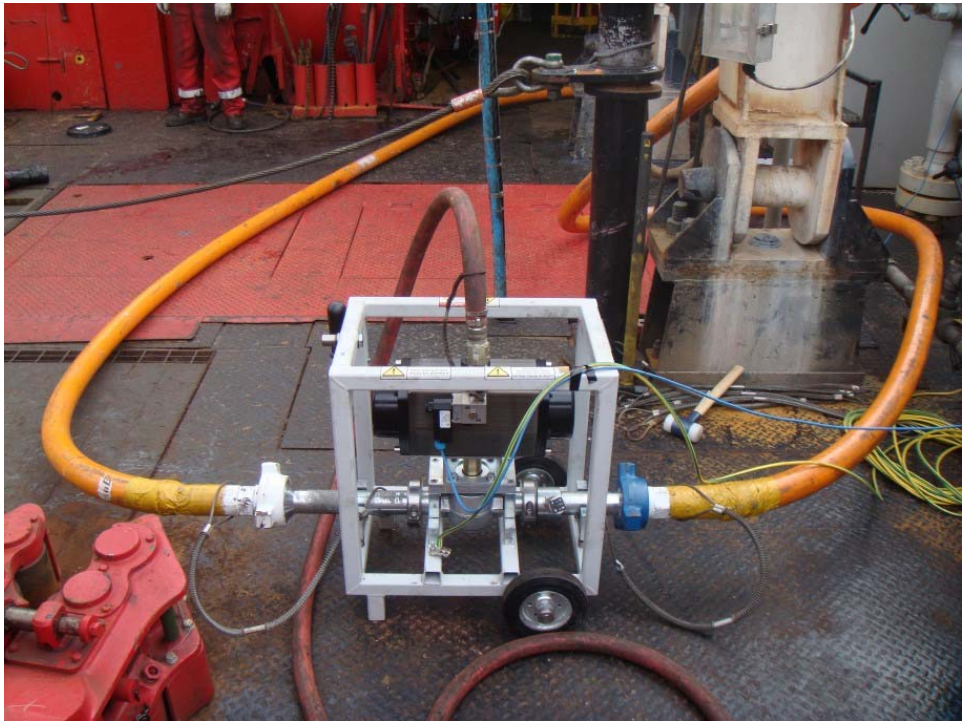
- Test initiated via surface pressure pulse
- Single surface command instructs tool to perform complete test sequence
- Sequence is: tool diagnosis – signal success/fail – Set pad – take double pretest – retract tool – signal tool closed
- Move to next test point

Wireless MFT - Signalling from Surface

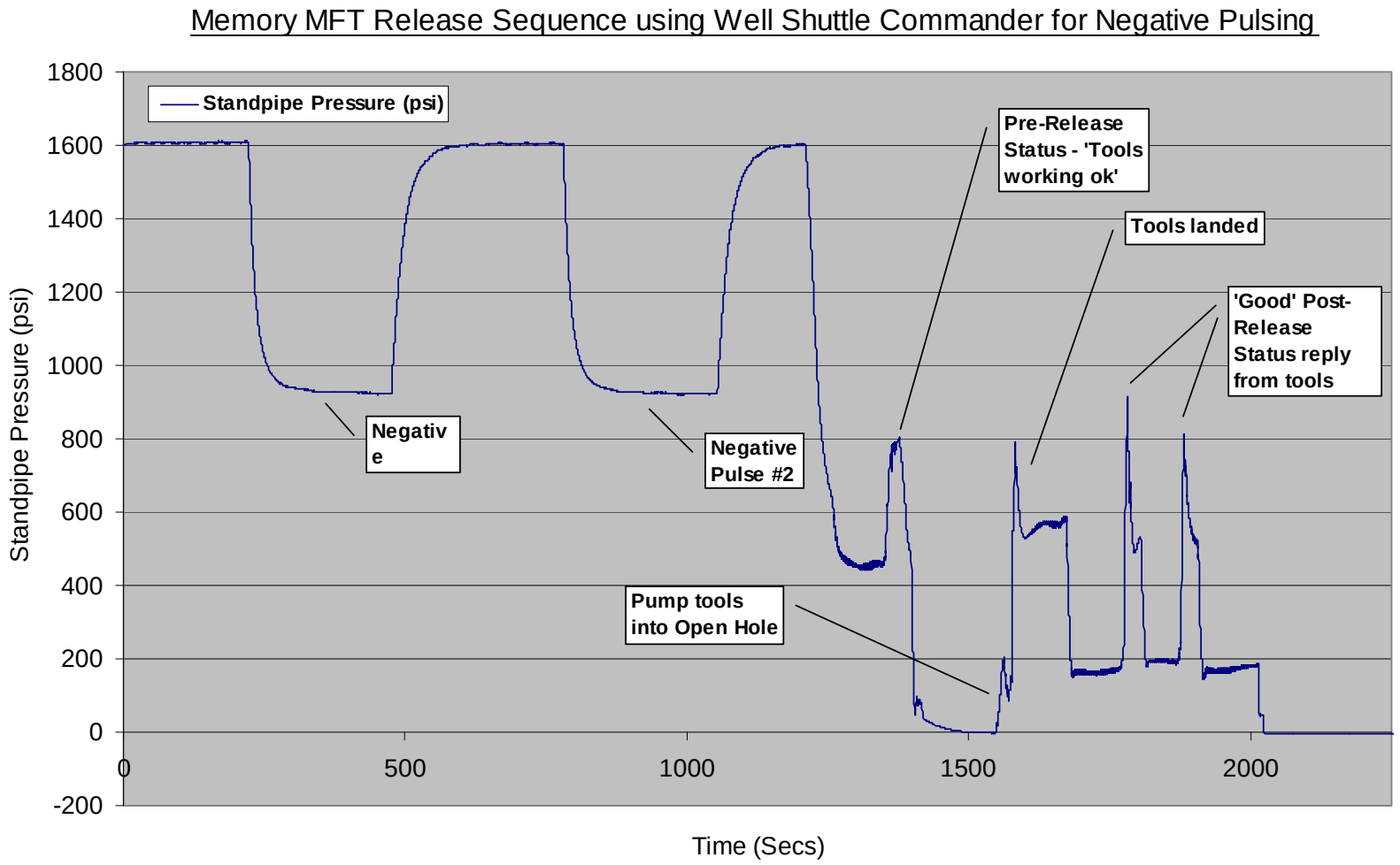
- Signals are sent from surface using the mud pumps
- The pulses can be positive or negative
- Pulses can be generated manually or with the Shuttle Commander
- The Shuttle Commander is plumbed into the mud system between the flowline and return line
- Pulse characteristics are programmed into and recognised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

Well Shuttle Commander

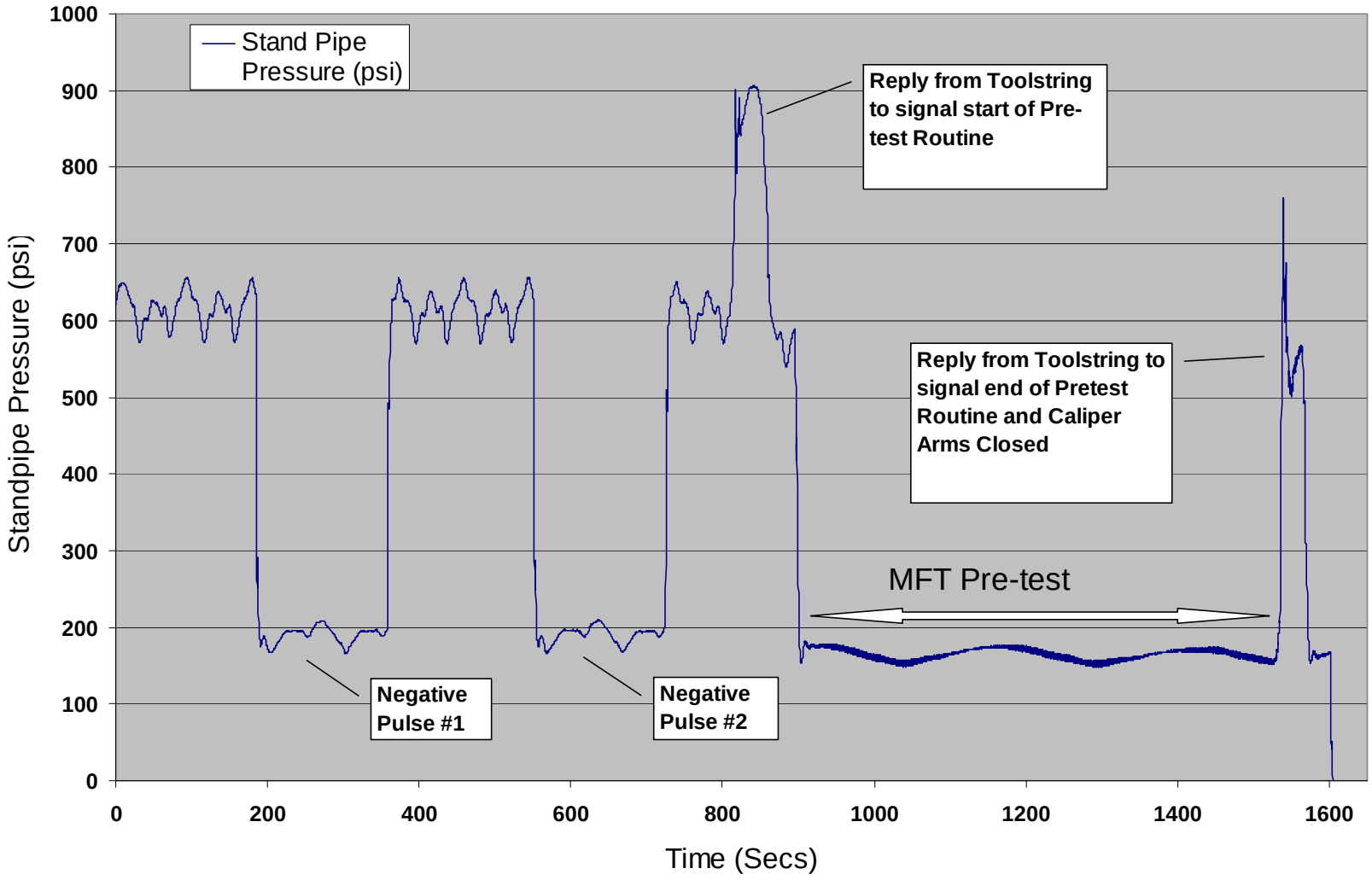
- Makes signalling to the downhole tools faster and easier
- Can be fixed into rig mud system ahead of time
- Electro pneumatic control for safety
- Small footprint
- Easy to operate



Memory MFT – Release sequence



Surface Pressure data



Job History

Date	Country	Well	Depth (feet)	Deviation	Bit Size (inch)	Tests	
6th April 2009	UK	ELK 1	900	0	8.5	10	
20th May 2009	Austria	N1	6600	87	8.5	7	First run caliper. Second run MFT
17th July 2009	Austria	N2	6600	88	8.5	14	First run MFT
22nd October 2009	New Zealand	M3	11877	89	6.125	12	First run quad combo. Second run MFT

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