

2016 INTERNATIONAL PERFORATING SYMPOSIUM GALVESTON



Wireless – Electronic Firing Head for Selective Reservoir Connection

IPS 16-16

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Objective:

- Provide a safe, efficient, and economical method to perforate
- Enable DSTs design for Multi-zone Testing
- Ability to survive Gun Shock
- Combines two proven highly reliable technologies:
 - Digital electronic firing head
 - Acoustic wireless communication system

Introduction to the Technology:

- Intelligent Remote Instrumentation System Combines sensors, battery power, microprocessors, and control switches
- Acoustic Technology Wireless System Provides bidirectional real-time digital communication
- As a result, provides:
 - Real time updates
 - Direct firing commands, any order
 - Confirmation of fire command receipt



Technology Flexibility & Value:

- Allows Multi-Zone Perforating either independently or combined
- Activate perforating guns without the need of any mechanical or pressure activation
- Explosive safety features that includes a safety dongle key
- Bidirectional Communication
- Initial SUB, SOB or balance control.
- Legacy acceptance of Mud Pressure Firing Command signals
- Fully compatible with redundant FH configurations & broad range of gun sizes



Technology Flexibility & Value:

No primary explosivesNo applied pressure

Improve **RELIABILITY**

Enhance **SAFETY**

No moving parts
Survival in gun shock
Redundant firing head

Increase EFFICIENCY Acoustic signal with direct firing commands Real time updates Confirmation of fire commands

Promote FLEXIBLE Operation Selective perforating

Multizone perforating

Partial cushion or with little margin for applied pressure

Well Integrity

Rig Time Saving

Technology successfully Demonstrated!

- North Sea Offshore
- Water Depth 1,300ft; TD 12,000ft
- BHP 9,400psi & BHT 280degF
- TCP String:
 - 2 Sets of Acoustic Firing Heads (Upper/Lower)
 - Upper Acoustic Firing Head ran in redundancy with 2 more electronic FHs
 - 4.72" gun with DPs shaped charges.



Technology Success!

- 10/29/15 RIH
- Stablish Network Discovery (Tool status)
- Set Packer
- Displace Cushion
- Request Pressure Tool reading
- 11/06/15 Firing Sequence for the Upper Wireless Acoustic Firing Head
- Test the Well
- End of Build Up
- 11/08/15 Firing Sequence for the Lower Wireless Acoustic Firing Head
- POOH End the job

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Questions?



