Retrofit Intelligent Well Technology

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Wireless Communications

The industry requires a reliable range of wireless communication methods downhole to compliment surface capability

- No Cables
- No Control Lines
- Limited Downhole Jewellery.
Downhole Wireless Communications

Credit:
www/webwormcpt.blogspot.com/2008/01/tube-rupture-pressure-relief-valve-psv.html

© CEphoto, Uwe Aranas
Downhole Wireless Communications

Credit: www.ECCV.com

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Downhole Wireless Communications
Downhole Wireless Communications

Traditional methods - Binary outcome

- Tool functions....
- Or it doesn’t
What is PulseEight

Unique pressure pulse telemetry communicating wirelessly between downhole and the wellhead and vice versa

- No Cables
- No Control Lines
- No Signal Boosters or Repeaters
- No Additional Surface Kit*

Retrofit design allows it to be positioned into most completions
Communications

- Communication to surface
- Tool briefly choking well flow
Communications

- Communication from surface
- Brief choking of well flow by surface valve manipulation
## Deployment Configuration

### Technical Specification

<table>
<thead>
<tr>
<th>Specification</th>
<th>PulseEight Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max OD</td>
<td>2.50” – 5.00”</td>
</tr>
<tr>
<td>Max Rate</td>
<td>10,000bpd – 30,000bpd</td>
</tr>
<tr>
<td>Max Length</td>
<td>30.30ft</td>
</tr>
<tr>
<td>Body Pressure Rating</td>
<td>10,000psi</td>
</tr>
<tr>
<td>Static Seal Rating</td>
<td>5,000psi</td>
</tr>
<tr>
<td>Unloading Seal Rating</td>
<td>1,500psi</td>
</tr>
<tr>
<td>Max Design Temperature</td>
<td>150°C/302°F</td>
</tr>
<tr>
<td>Max Operating Temperature</td>
<td>110°C/230°F</td>
</tr>
<tr>
<td>Lifetime</td>
<td>Up to 5 years</td>
</tr>
</tbody>
</table>

*Qualified limit can be reviewed on application basis

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### Diagram

- ≥ 3 ½" Production Tubing
- Hanging Device
- Crossover
- Choke Module
- Actuator and Electronics Module
- Battery
Intelligent Completion Management System

- Interpret telegrams from tool
- Seamless data transfer to operator system
- Generate pulse sequences
- Verify correct pulse generation
- Record device status
- Monitor battery usage
Applications

1. Multilateral Control
2. Gas Lift Optimisation
3. Pressure Temperature Monitoring
Multilateral Control

- Increasing water cut
- Suspend existing bore
- Interventionless reopening based on time or command
- Longer term production at higher oil rates
- Improved recovery factors
Gas Lift Optimisation

- Utilise gas cap to drive production
- Minimise the need for traditional gas lift
- Surface/autonomous control of downhole flow regime
Pressure and Temperature Monitoring

- Long term pressure or temperature trend analysis
- Real Time data
- Ability to easily replace existing failed PDHG’s
- Reduction in interventions required
- Downhole shut in capability
- High speed data recording
Case Study - PT Monitoring

Wireless pressure/temperature monitoring onshore well Austria

Production rate – 4-5MMscf/d
Setting depth – 1000m
Pressure – 100-110Bar
Temperature – 68°C
Well Type - Gas Storage
Case Study - PT Monitoring

Demonstrate Cloud Connected Wireless Communication from Reservoir to Desk
Case Study - PT Monitoring

Results:

- 11 weeks in hole
- Weekly Pressure/temp signals
- Data Access
  - Onsite
  - Remote Desktop
  - iPhone App
- Downhole shut-in

![Pressure Temperature Chart](image)
Future?

Is there value in Big Data?
Questions?