Doing More With Lightweight Well Intervention

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A MARINE SUBSEA COMPANY
Lightweight Subsea Well Intervention (LSWI)

- Re-entering existing subsea wells using small, lightweight pressure control equipment deployed from a low cost reasonably small vessel.
- Intervention can be for maintenance, repair, production enhancement or abandonment.
- Usually riserless (RLSWI), can be with riser to surface for coil tubing (LSWI).
Brief History of LSWI

- Riserless Lightweight Subsea Well Intervention (RLSWI) originally patented by BP early 1980s (patent allowed to lapse)
- First operation in 1987 in North Sea
- Camco / Schlumberger / Well Ops systems / history include over 400 RLSWIs to date
- FMC history includes approx 50 RLSWIs to date
- TSMarine / Well Ops history includes 7 to date
- Oceaneering history includes 1 to date
What Can You Do With It?

• RLSWI enables:
  - Running and pulling plugs
  - Static and dynamic logging
  - Re-perforating
  - Manipulation of downhole completion components
  - Installation / lock out of safety valves / storm chokes
  - Gas lift reconfiguration
  - Subsea tree deployment / changeout (vertical only)
  - Bull heading of stimulation fluids into well
Limitations of LSWI

- RLSWI is generally accepted in the North Sea and is gaining acceptance globally
- RLSWI limited to wireline and electric line services and pumping jobs
- Recovery of dropped wireline toolstrings a concern to many operators in tight rig market
- Demands for coil tubing services from smaller, lower cost vessels are increasing which is much more complex and requires new technologies
- No one has been deeper than 430m subsea yet
So What’s New?

• Early systems limited to shallow water (<100m) wireline with diver assist
• Later systems enabled electric line and operated deeper and diverless (<600m)
• Operators now understanding potential of RLSWI and demanding deeper water ops
• Well conditions now demanding coil tubing ops
• Large number of purpose built intervention vessels coming to market 2008 to 2011
Subsea Intervention Vessels
Short Term Challenges

- Umbilical strength, length and deck space limitations
- Control system development
- Deployment and recovery technologies
- Lightweight riser / alternatives to riser – to enable deepwater coil tubing
- Development of key enabling technologies purpose designed for lightweight intervention
- Commitment from operators to support, trial and use new technologies
Where Does Lewis Fit In?

• A subsea engineering company with specialist expertise in LWSI technology
• Developed some of the first purpose designed enabling technologies for LWSI
• Designed and currently building the first fully engineered LWSI coil tubing riser system for new Well Ops intervention vessel, Well Enhancer
• Riser system incorporates first application of Lewis ‘Very High Angle Emergency Disconnect’ technology.
Where Does Lewis Fit In?

Lightweight Subsea Well Intervention

Lightweight Subsea Well Intervention is fast becoming a specialist discipline, independent of drilling, completions and abandonments.
Lewis Technology Developments
Emergency Disconnect Package

First delivery Q1 2009
Very High Angle EDP
The LEWIS SLIC

Purpose Designed Multi-Function RSWI Connector

- Enables riserless fishing ops
- Enables low cost coil tubing ops
- Designed for guidelineless ops
- Designed to be robust
- Designed to be lightweight
- Designed for longevity
- Designed for ease of maintenance
- Designed with inherent redundancy
The LEWIS SLIC

Modular for ease of maintenance

Stackable
And The Longer Term Future?

• Doing More Within Five Years
  – Coil tubing intervention from a monohull becomes routine and accepted in North Sea and is trialled elsewhere
  – Riserless LSWI accepted and becomes routine in Gulf of Mexico, West Africa and Asia Pac
  – Deepwater RLSWI is proven and becomes available
And The Longer Term Future?

• Doing More Within Ten Years

  – Deepwater RLSWI becomes routine for field management and maintenance of deepwater wells

  – Coil tubing intervention in deep water is developed using lightweight intervention riser

  – Riserless exploration drilling (slim hole) is trialled for low cost proving of small hydrocarbon accumulations
And The Longer Term Future?

• Doing More Within Fifteen Years
  
  – Deepwater RLSWI becomes routine for field management and maintenance of deepwater wells
  
  – Deepwater coil tubing intervention becomes accepted and routine
  
  – Riserless sidetracking of production wells is trialled in low pressure wells