Stand-alone Wireline Oriented Perforating System Delivers New Production in Multi-Casing Well

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Agenda

• Well description and workover objective
• Program summary
• Job Execution
• Results
Back Ground

- Client operates several offshore fields in the UAE
- Platforms serviced by jack-up rigs and barges
- Over the years strings have become inactive for various reasons
- Have started a campaign to rejuvenate inactive strings
2014 Production Increase Target of 25,000 bbl/d

• Inactive Wells Rejuvenation Plan
  – One of the initiatives undertaken by client
  • Main advantages of this initiative
    – Quick return
    – Done offline in a short time
    – Small investment

• Hurdles
  – Relies on technology which may have no track record
  – Risk averse client
  – Jobs require a lot of planning and simulation to assess feasibility before moving to execution
Well Summary

• Well completed in 1968
  – 12 ¼” open hole – several production layers
  – 3 x 4 ½” tubing strings cemented in place
    • Like 3 individual wells
  – Perforated using radioactive source in parallel tubing as a direction reference
• Oil producers
  – ~3000 bbl/d/well
  – 10,000’, ~4000 psi, H2S
  – Well #3 watered out in 1979 and shut in
    • Inactive till 2014
Workover Plan

• Objective
  – Plug well #3 and open up new zone
  – Rigless operation

• Challenge
  – Perforate new interval and not damage wells 1&2
  – No lost production from wells 1&2
  – Introduce new technology to ADMA
    • 1st time this has been tried in the Gulf area
    • High perceived risk
Evaluation and Preparation

- Multifinger caliper and Production log run to evaluate wellbore
  - Data used to determine feasibility
  - 3 well integrity confirmed
  - Nearby wells are oil producers
- Customer/supplier team created
  - Multiple visits to operations facility
  - Test jig design
  - Full hazard analysis completed
Tool Selection

- Deep penetration required
  - 2 7/8” 4 spf zero phase deep penetration gun
    - 35’ interval in one run
- Orient charges away from parallel casing strings
  - Surface controlled perforating sensor tool
Surface Controlled Sensor Tool for Perforating

- 1 11/16” OD tool
  - Pressure and temperature, gamma ray, relative bearing
  - Motor to rotate assembly
  - Focused electromagnetic sensor
    - Sensitive to total metal thickness in the measurement range
- Adapts directly to perforating gun
Pre Job Planning

• Shop jig prepared
  – Simulate downhole conditions
    • 3 x 4 ½" tubing
    • Vary standoff and alignment
      – Horizontal and vertical
  – Used same jig offshore for prejob tool string check
    • Hung vertically
  – Log shows flux (total metal thickness) variation as tool rotates
Job Execution

• Set plug above water zone
  – Dump cement for seal
• Tool check in jig – vertical
• Run 2 7/8 zero phase gun
  – Rotate to minimum flux and shoot
• Gauges recording pressure in 1&2
Results

• Well #3 producing clean oil
• Wells 1&2 unchanged
• Wireline Sensor Tool made this job possible
  – Radioactive source technique long obsolete and inefficient
• Prejob planning and simulation work reduced the risk
• Several more wells can benefit from technique and are being evaluated
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