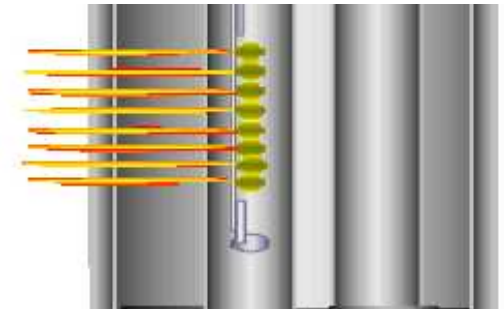


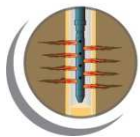
Stand-alone Wireline Oriented Perforating System Delivers New Production in Multi-Casing Well

Mohamed Saber Bou Said, Salman Farhan,
ADMA OPCO

Alan Salsman, Sherif Abdel-Shakour,
Mohammad Assagaf, Schlumberger



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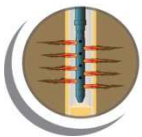
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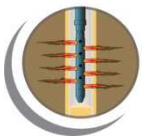
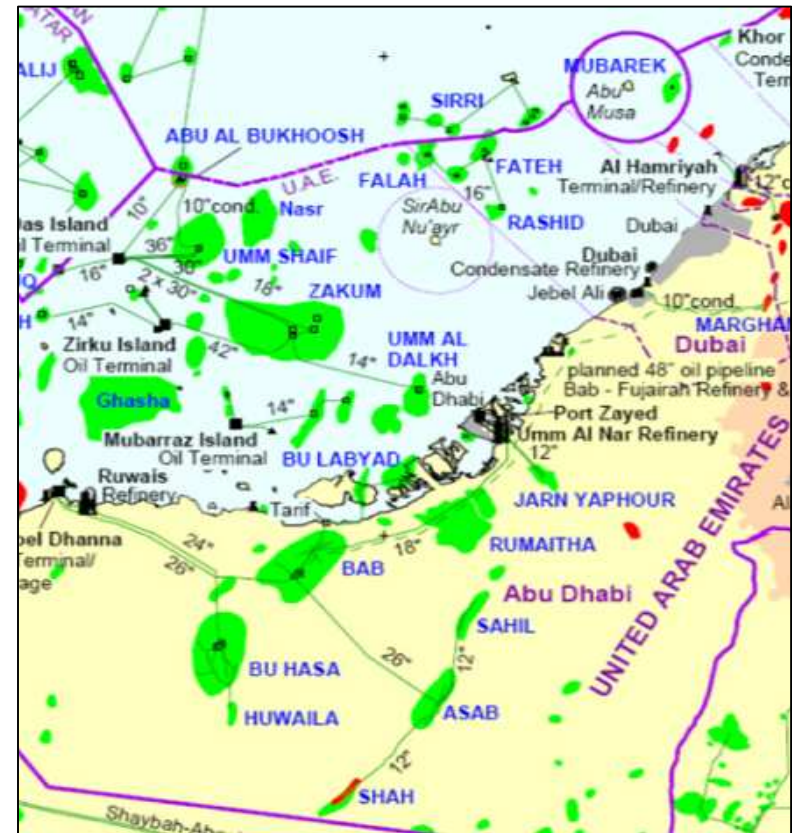
Agenda

- Well description and workover objective
- Program summary
- Job Execution
- Results



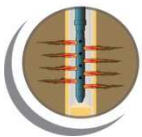
Back Ground

- 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



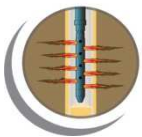
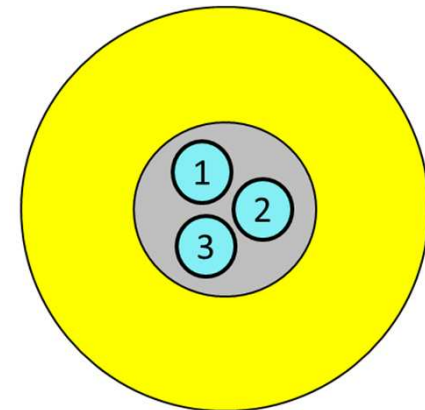
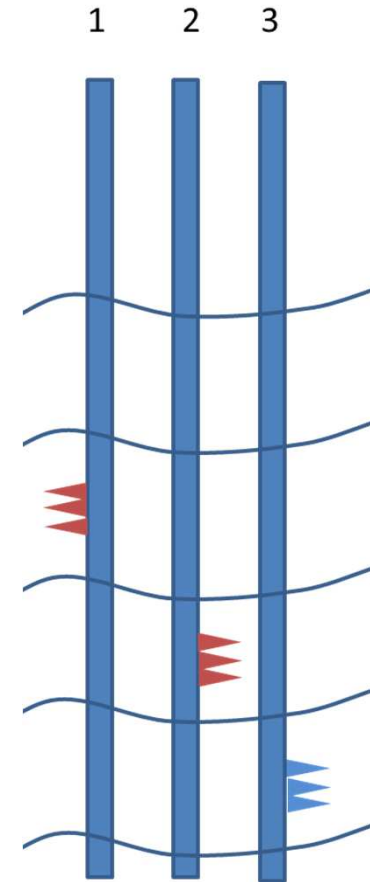
2014 Production Increase Target of 25,000 bbl/d

- 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



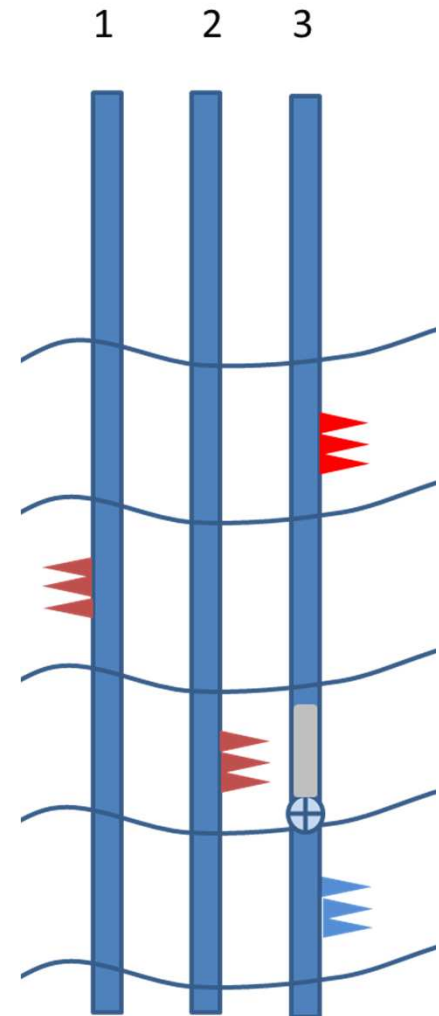
Well Summary

- 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

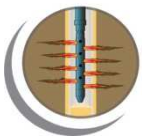


Workover Plan

- 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

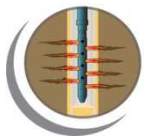
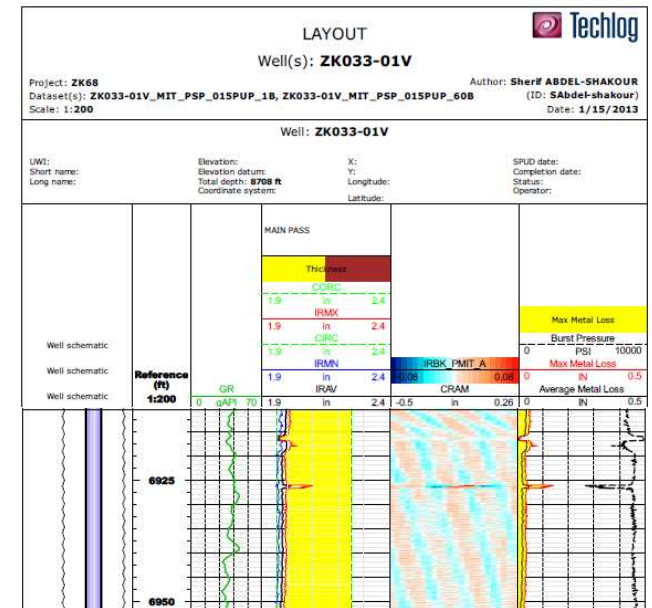


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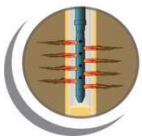
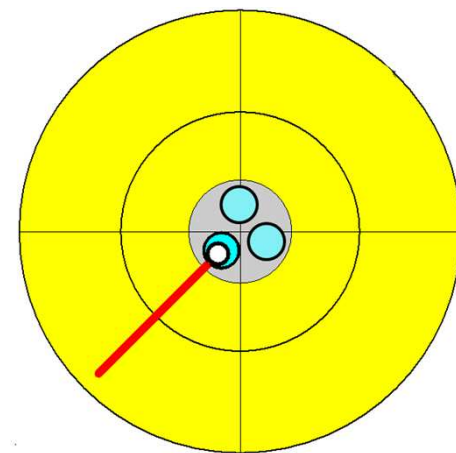
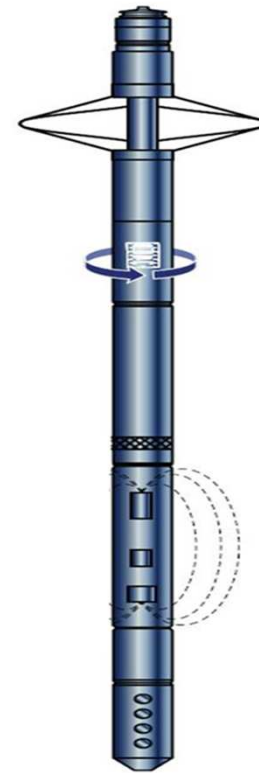
Evaluation and Preparation

- 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



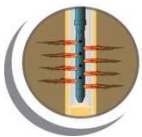
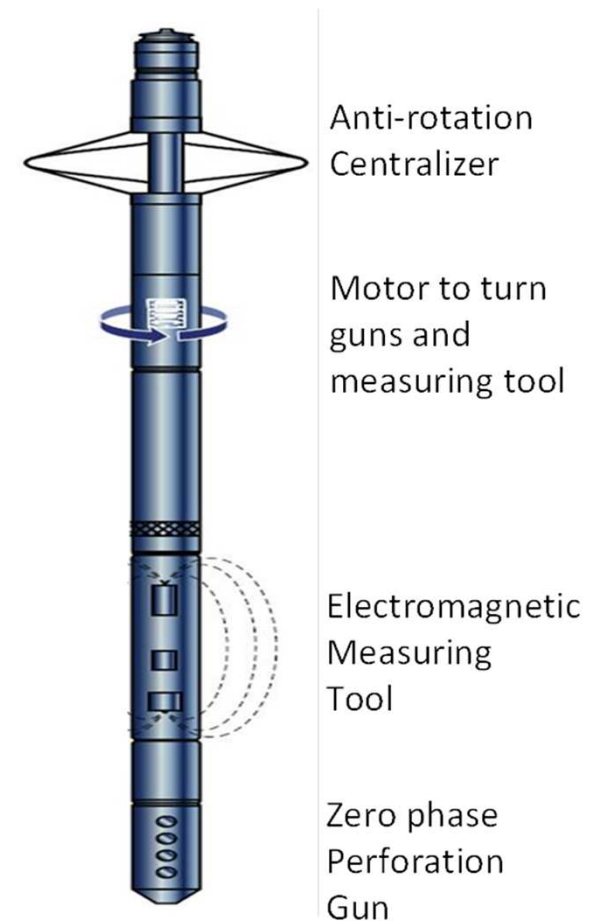
Tool Selection

- 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



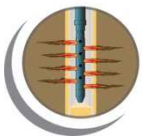
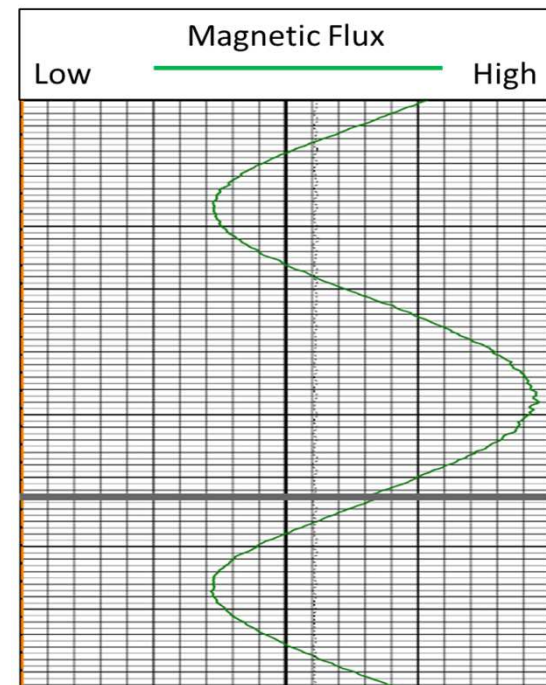
Surface Controlled Sensor Tool for Perforating

- 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



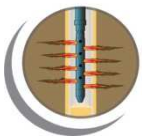
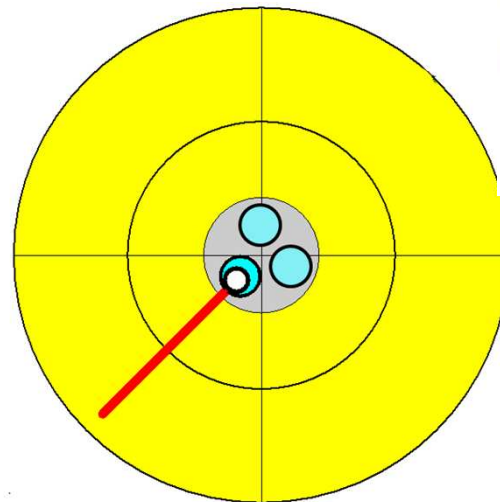
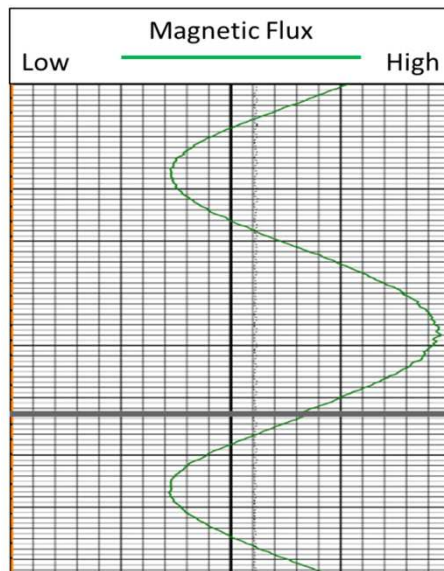
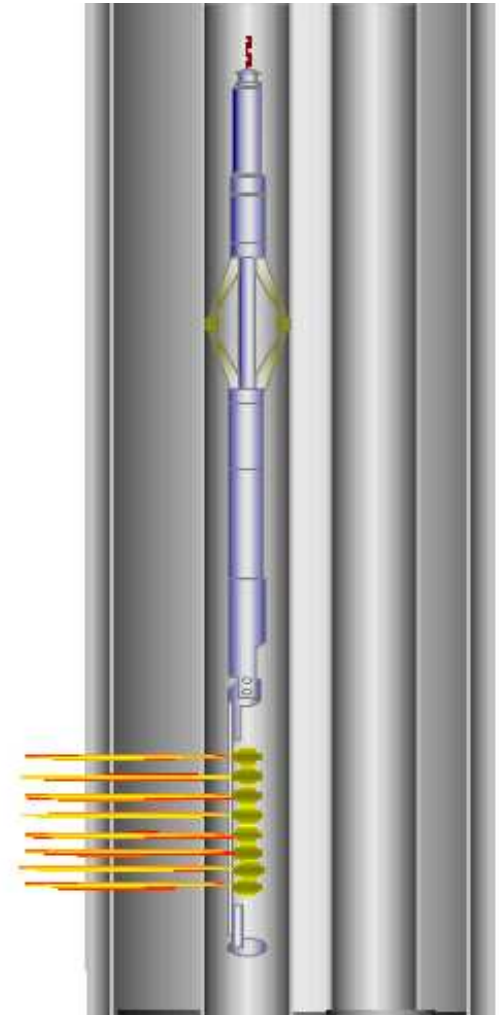
Pre Job Planning

- 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



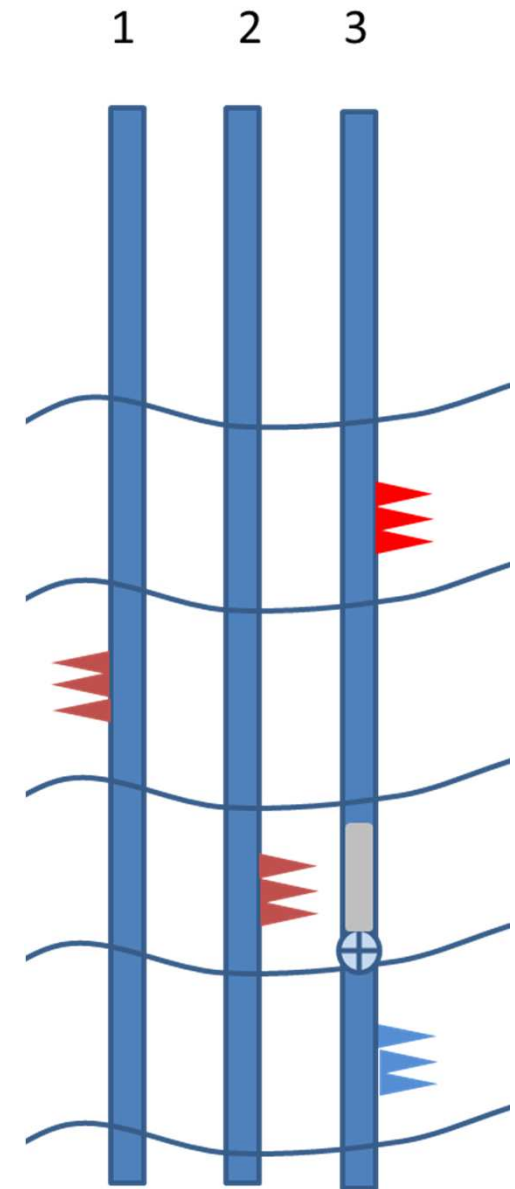
Job Execution

- 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

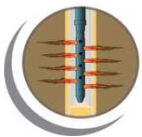


Results

- 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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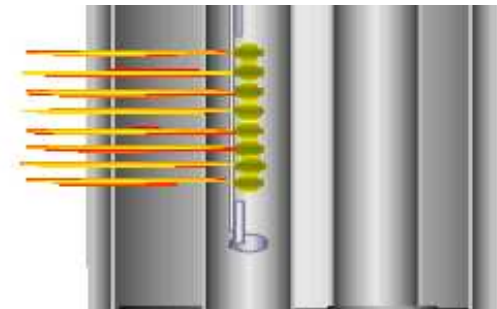


Thank You

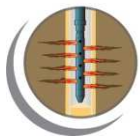
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