Driving Efficiency in Idle Wells Restoration/Production Enhancement through Risk Sharing Integrated Operations and CORAL 2.0

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Resource Management
Malaysia Petroleum Management, Upstream
Malaysia Petroleum Management (MPM)

- Custodian of petroleum resources
- Regulator, enabler and shaper of the local O&G industry
- Responsible to manage and steer the overall E&P activities in Malaysia
  - Promote exploration investments
  - Facilitate the development and production activities
  - Protecting national interest
- Optimization of Malaysia E&P assets including wells performance
- Management of all E&P companies operating in Malaysia
  - Over 100 PSCs
  - 6 RSCs
  - 25 international operating companies (OC)
Agenda

• Background

• Strategy Enhancement

• Cost Reduction Alliance 2.0 (CORAL 2.0)

• What Is Integrated Idle Wells Restoration (IIWR)?

• Capabilities Assessment

• How IIWR Drives Efficiency?

• What Are The Controls In Place?

• Case Histories

• Conclusion
Background - Drilling Is Not The Same Anymore

- As drilling activities was declining by end 2015, well intervention needed to sustain certain level of activities to arrest production decline
- Well intervention projects are also subjected to economics viability, hence the need to reduce cost
Background - Why Well Intervention?

- Arresting the Decline (10% of annual production)
  - Production Enhancement
  - Idle Wells Reactivation
  - Wells decommissioning
  - P&A for infill drilling
  - Restoration of Well Integrity
  - Reservoir Surveillance
**Background - How Efficient Is Well Intervention?**

- Between 2013 to 2015, an average 35% of well intervention expenditure did not yield any returns due to job failure, inefficiency and value leakages.
- Furthermore, these jobs suffer from post execution over budget cost.
- Well Intervention is an USD ZZZ mil/year investment!
Strategy Enhancement

- Strategy in 2013
  - #OTC-26555-MS

- Enhanced in 2015
Strategy Enhancement

- Improve the success rate to at least 85%
- Improve the operational efficiency to at least 85%
- Deliver a production gain factor of 12 i.e. total of 12 + YY KBD
- Deliver more production while maintaining the cost factor similar to 2014 which was 1.6X.
- An industry based integration model that promotes clear collaboration via risk sharing mechanism to deliver the above results
Cost Reduction Alliance (CORAL 2.0) - LEAN WIn

What is Cost Reduction (CORAL) Lean Well Intervention (WIn) Initiative?

• The initiative aims to optimize well intervention cost and performance
• Improve Efficiency
• Drive Innovation

What value does it bring?

• We expect this initiative to deliver approximately 3% of cost reduction in 2016, and 10% of reduction of overall Well Intervention cost in Malaysia by year of 2020

10 % of Cost Reduction by 2020

USD 92 mil savings in 1 year (25%)
Cost Reduction Alliance (CORAL 2.0) - LEAN WIn

**WI Operating Model (Planning)**
- Optimising WI jobs by doing sharing resources
- Selecting equipment, e.g. slickline vs. e-line, CT for P&A vs. complicated straddle
- Minimising NBVA steps in operations, e.g. drift run for slickline, meeting time, waiting time

**WI Fit-for-Purpose Cost & Performance (Execution)**
- Standardize equipment and tools requirement
- Removing standby costs when tools are offshore and only when it is in-hole
- Removing 3rd party surcharges, e.g. pumping

**WI Contract and WPB/ACV Management**
- Finding the most competitive rates, e.g. farm-in, duration, discounts
- Negotiating better vessel rates, e.g. via bundling components, zero-rate mob/demob
- Capping the cost of equipment

74 % Contribution
14 % Contribution
12 % Contribution
What Is IIWR Contract?

An integrated provision that leverages on risk sharing mechanism to drive operational efficiency and improve success rate in order to aid operators in improving PE/IWR economics viability.
Capability Assessment

- Umbrella concept
- Since about 95% of the operational and success rate control is now under the service provider, the final cost submitted reflects as the Original Commercial Ceiling (OCC).
- OCC is the maximum cost that the service providers can charge the operators to deliver the set KPI.
- Mini bid is done to determine Project Commercial Ceiling (PCC).
- Check and confirm that PCC is lower than the OCC.
- Select the submission with the lowest PCC.
- Check and confirm that the PCC is also lower than any incumbent contracts.
- \( \text{PCC} < \text{OCC and incumbent contracts} \)
How IIWR Model Drives Efficiency?

Efficiency is defined as below:

\[
\frac{\text{Total hours worked on well}}{\text{Total hours offshore}} \times 100\%
\]

- Total hours worked on well - hours the resources are run to restore or enhance the well
- Total hours offshore - hours from mobilization to demobilization

Success rate definition is based on either one of the following after work has been executed:
- The idle well is restored and put on production or;
- The production rate increases on an existing flowing well

This success rate definition is also going through an evolution stage where the ultimate definition will be purely based on:

\[
\text{Success} = \frac{\text{Post UEC}}{\text{Pre UEC}} \times 100\% < 1
\]
# What Are The Control In Place?

<table>
<thead>
<tr>
<th>Element</th>
<th>Mechanism</th>
<th>Control</th>
</tr>
</thead>
<tbody>
<tr>
<td>KPI tied invoicing</td>
<td>Invoice based on KPI met</td>
<td>To ensure they provide the best fit for purpose solution and achieve the success rate</td>
</tr>
<tr>
<td>Project Commercial Ceiling (PCC)</td>
<td>• Total cost estimates is proposed by the service provider&lt;br&gt;• No additional budget allowed</td>
<td>To ensure that their initial cost estimate is accurate and all the required resources have been included</td>
</tr>
<tr>
<td>Zero rate during NPT</td>
<td>On the complete package of intervention and marine support</td>
<td>To have better project preparation and ensure all resources are maintained accordingly</td>
</tr>
<tr>
<td>Single line package rates</td>
<td>To provide all the required resources to execute the operation as per industry practice</td>
<td>Much simpler cost tracking exercise</td>
</tr>
<tr>
<td>Solution unit rates for consumables</td>
<td>One rate to suit any well parameters</td>
<td>Avoid any sell ups due to non standardize well parameters</td>
</tr>
</tbody>
</table>
Case History A

<table>
<thead>
<tr>
<th><strong>End State Target</strong></th>
<th><strong>Solution Proposed by Service Provider</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>To test 80 zones and restore a minimum of instantaneous 1500 barrels of oil per day within the agreed budget of MYR 15.0 million (USD 3.6 Mil)</td>
<td>Concurrent well test and restoration works between 2 platforms using a package of 1 accommodation vessel, 4 multiphase flow meter packages and 1 slick line with a PCC of RM 11.5 million (USD 2.7 mil)</td>
</tr>
</tbody>
</table>

| HSE | = Zero incidents |
| Cost savings/avoidance | = MYR 3.3 million (41%) ~ USD700K |
| Work scope completion | = 56% (45/80 zones tested) |
| Idle strings restored | = 8 |
| Total production gain | = Between 2200 to 3200 BOPD |
| Work efficiency | = **85% (87 work days/102 day campaign time)** |
| Success rate | = **100% (8 out of 8 wells restored)** |
## Case History B

### End State Target

<table>
<thead>
<tr>
<th>To restore a minimum of 1.7 KBD oil production within a budget of MYR 40.0 million (USD9.5 mil)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solution Proposed by Service Provider</td>
</tr>
<tr>
<td>Concurrent restoration works between 2 platforms using a package of 1 accommodation vessel, 1 coiled tubing and pumping package, 1 electrical line package, 1 flowback package and 1 slick line with a PCC of MYR 29.0 million (USD 6.9 mil).</td>
</tr>
</tbody>
</table>

### HSE

- = Zero incidents

### Cost savings/avoidance

- = MYR 7 million (36%) ~ USD 1.6 million

### Work scope completion

- = 100% (9 out of 9 months)

### Idle strings restored

- = 33 vs 11 strings

### Total production gain

- = 2.0 KBD

### Work efficiency

- = 94% *(110 work days/118 day campaign time)*

### Success rate

- = 83% *(5 out of 6 wells restored)*
## Case History 3

### End State Target

<table>
<thead>
<tr>
<th>Solution Proposed by Service Provider</th>
</tr>
</thead>
<tbody>
<tr>
<td>To perforate, clean up and well test 11 new wells and achieve more than 250 MMSCFD gas production within a budget of MYR 48 million (USD11.4 mil).</td>
</tr>
</tbody>
</table>

### HSE
- = Zero incidents

### Cost savings
- = MYR 16 million (38%) ~ USD 3.8 million

### Work scope completion
- = 100% (11 out of 11 wells)

### Wells put on production
- = 11

### Total production
- = >> 250 MMSCFD

### Work efficiency
- = **85% (50 work days/59 days campaign time)**

### Success rate
- = **100% (11 wells put online out of 11 plan)**

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[Graph: Integrated Services Contract ACV Utilization & Job Efficiency]
Impact of Efficiency Improvement

• Deliverability in Idle Wells and Production Enhancement improved via proper implementation of risk sharing mechanism in:
  • Procurement process
  • Operational execution
  • Subsurface management

<table>
<thead>
<tr>
<th>KPI Pre IIWR</th>
<th>KPI Status after 2 years of IIWR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Improve the success rate to at least 80%</td>
<td>Success rate improved to 86%</td>
</tr>
<tr>
<td>Improve the operational efficiency to at least 80%</td>
<td>Operational efficiency improved to 94%</td>
</tr>
<tr>
<td>Deliver a production gain factor of 12 i.e. total of 12 + YY KBD</td>
<td>Deliver a production gain factor of 10 i.e. total of 10 + YY KBD per year</td>
</tr>
<tr>
<td>Deliver more production while maintaining the cost factor similar to 2014 which was 1.6.</td>
<td>Achieved 70% of the production gain factor while improved on cost factor to 0.7</td>
</tr>
</tbody>
</table>
MPM Critical Success Factors (CSF)

- **Contract Management**: Contract that reflecting market rate. Risk sharing mechanism for new concept.
- **Selection of Optimum Conveyance**: Workover vs CT vs E-line vs Slickline.
- **Fit for Purpose Equipment**: Only use intended equipment for job with appropriate performance target.
- **Project Management approach**: Clear organisation, role, responsibility, resource, and standard.
- **Continuous Improvement**: Lesson learnt capture, and sharing process.
- **Risk Management**: Perform risk assessment involving relevant stake holder.

**IIWR** - Improve efficiency and success rate

**CORAL 2.0 LEAN Win** - Optimize cost

**PE/IWR GUIDELINE** - Improve production sustainability
What’s Coming in 2018

• First in Malaysia:
  – Subsea well decommissioning (ongoing)
  – Subsea stimulation campaign

• Application revival:
  – P&A for sidetrack
  – End of Life field decommissioning
  – HWU

• Technology replicator
  – Fiber optic CT
  – Perf-Wash- cement tool
  – Downhole camera
  – CT Catanery
  – Heave compensated gangway

• Inter operator – MPM – Services HSE initiatives

• Maintain intensity of well intervention activities and sustain the current performance for a 3\textsuperscript{rd} year

• IIWR has expanded from production driven activities to well start up and to well decommissioning

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<thead>
<tr>
<th></th>
<th>2016</th>
<th>2017</th>
<th>2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of operators</td>
<td>1</td>
<td>3</td>
<td>8</td>
</tr>
<tr>
<td>No. of Campaigns</td>
<td>1</td>
<td>3</td>
<td>13</td>
</tr>
<tr>
<td>No. of Packages</td>
<td>1</td>
<td>2</td>
<td>13</td>
</tr>
</tbody>
</table>
Conclusion

**INDUSTRY DEMANDS**

- Adapt and sustain!
- NO BOX thinking!
- Risk sharing collaboration!
- Change ways to get different results!

Continuous collaboration between PETRONAS, Operating Companies and Service providers can provide value to the various initiatives and the focus areas of industry intervention activities.
References

- OTC-26555-MS Pushing the Limit of Idle Well Management - A Nationwide Industry Approach
- SPE-186938-MS Driving Efficiency in Idle Wells Restoration through Risk Sharing Integrated Operations
- SPE-186883-MS Sustaining the Barrels - Making Well Intervention More Affordable
Thank you