Implementation of Real-time Gas-lift Optimization in Dubai Offshore Field
Authors

• Fathi Shnaib, SPE, Production Engineering Team Leader, Dubai Petroleum
• Manickam S. Nadar, SPE, Production Engineering Consultant, Smart Zone Solutions
• Nick McAlonan, SPE, i-DO Team Leader, Weatherford Production Optimization

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Outline

- Background
- Objectives
- Workflows
- Benefits Realized
- Conclusions
Background

• 4 fields Offshore
• Mature Complex Gas Lifted Field
• Challenges of maintaining production
• Current Optimization is a highly manual effort with long cycle time
<table>
<thead>
<tr>
<th>Current Limitations</th>
<th>Expected Results</th>
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<tbody>
<tr>
<td>• Long optimization cycle time</td>
<td>• Automatic model update workflows leads to short optimization cycle time</td>
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<td>• Slow identification of underperforming wells</td>
<td>• Manage by Exception Well Monitoring with Alerts on sub optimal performance</td>
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<td>• Hard to accurately allocate well production / identify loss</td>
<td>• Automatic back allocation system &amp; target comparison</td>
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<tr>
<td>• Disparate data making comparisons / sharing of data across company harder</td>
<td>• Unified data set across company accessible to all – linking real time, models</td>
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<td>and corporate KPI’s</td>
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Sustainable Production Optimization

Gains – Offline Modelling

Sustained Gains - RTO

Optimisation gains revert to norm as system changes: automation of process is key to sustain the gains

Gains – competition

nb: sporadic processes

Slide builds itself...

Increased Value Over ‘Do Nothing’

Time

Simple Manual Optimisation
Complex Manual Optimisation (Offline)
Complex Automated Optimisation (i-DO)
Automation reduces cycle time

- System automatically gathers and QC’s data (real time and well test) based on inbuilt algorithms customisable by the user
- Well models tuned to the latest well test data (if well test data validation is successful)
- Latest data passed to asset model automatically to allow full field optimization at any point in time
- Run optimization frequently producing new optimal set points
- Analyse problems identified by monitoring
Providing Continually Up to Date Models

Well Testing / Model Updates

• Validation controlled by user defined constraints

• Managed by exception so user can concentrate on issues

• Well models tuned to the latest well test data

• Multiple calibrations available including PI, Pres and L factor

• Latest IPR and Surface Performance Curves automatically generated and made available to rest of system and users

• Optimal performance envelope identified
Diligent tracking of well test results

Well test validation

- Trends of well parameters (input values as well as calculated values) can be viewed
- The passed and failed well tests will be indicated on plots
- System does not tolerate inaccurate test data
Reduce Downtime

Well Monitoring

- Monitor all wells in the system on a manage by exception basis
- Calculate flowing status/times based on user set formula and estimate rates automatically
- Automatically compare current performance against expected model predictions and ‘alarm’ on deviations
- Identify anomalies using trends for comparison
- Outlier detection and fall back mechanism built in
Track Full Field Production At A Glance

Allocation, KPI’s Overview

- Production Loss Management & reconciliation with Back Allocation with comparison to theoretical
- Identify underperforming wells / upside opportunities by comparing to KPI’s
- One screen overview of performance of the asset with full drill down for further analysis
Reservoir Monitoring

VRR, Offtake Management

- Automatic calculation of Voidage Replacement Ratio on a zone and compartment basis
- Identification of under or over injecting areas allowing better injection strategy
- Comparison of reservoir pressures
- Trending including cumulative net offtake

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Benefits Realised

• Multiple new optimization opportunities identified
• Focused engineering and management time on solving issues rather than data gathering
• System has highlighted the need for more accurate and reliable well tests
• Several wells identified as unstable
• Wells analysed deeper and quicker due to combination of measured and calculated results available in one system
• Prioritization done earlier in the day as system identifies suspect candidates ready for morning meeting
• Instrumentation and data errors identified earlier
• Early days – many more opportunities
Conclusions

Previous Limitations

- Long optimization cycle time
- Slow identification of underperforming wells
- Hard to accurately allocate well production / identify loss
- Disparate data making comparisons / sharing of data across company harder

Results Achieved

- Short optimization cycle time – up to date model available on demand
- Reduced Downtime
- Tracking Of Full Field Production At A Glance
- Improved workflows enabling faster and better decision making and unity of data available to all
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