The Practicalities Of Optimizing The Bottom Line For Mature Fields (Business Performance Improvement)

Gavin Ward, General Manager, UK, RISC Advisory
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1) Murphys Law is Wrong

2) Plan v Practice

3) Challenging mindsets & bias.

4) Morecambe Bay field complex: Facilities designed for plateau period not late life, so the rules change.

5) Insights from Data Room Due Diligence
Practicalities of Prediction (Ravenspurn North Gas Field)

Operator predicts this......

But gets this......

Life of field forecast by operator in 1996, 2006 and 2016

- Historic
- 1996
- 2006
- 2016

Change of operator
Practicalities of Prediction (Ravenspurn North Gas Field)

Operator predicts this…….

Life of field forecast by operator in 1996, 2006 and 2016

Historic

1996

2006

2016

Gross Production (mmscf/d)


Change of operator
### Linear/Traditional Approach

**Problem -> Solution -> Implement -> Expected Outcome**

<table>
<thead>
<tr>
<th>Fields</th>
<th>Reservoir</th>
<th>Wells</th>
<th>Pipeline</th>
<th>Offshore Facility</th>
<th>Export</th>
<th>Onshore Facility</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gas Field Hub #1</strong></td>
<td>Field 1 of 3 reaching end of field life.</td>
<td>Field well GW-2/4 restarted</td>
<td>Lower pressure = integrity and less inspections</td>
<td>None</td>
<td>Reliability of production Hub and LOGGS compression</td>
<td>Improved Project and Cost Management of Freon replacement.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Lower pressure = more sand build up</td>
<td></td>
<td></td>
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</tr>
<tr>
<td><strong>Oil Field #2</strong></td>
<td>Reinstatement of subsea water injection ahead of plan</td>
<td>Increasing H₂S levels</td>
<td>None</td>
<td>Increased water cut in wells from 98% to 99%.</td>
<td>Remove FSU and export via FPS (post-20XX)</td>
<td>None.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Continual infill drilling programme</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Oil &amp; Gas Field Hub #3</strong></td>
<td>Recovery of field #1 oil approx 12%</td>
<td>Potential to use surfactants to dewater field #1 line</td>
<td>Potential to use chemicals to reduce solids in line</td>
<td>None.</td>
<td>None.</td>
<td>None.</td>
</tr>
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<tr>
<td><strong>Oil Field Hub #4</strong></td>
<td>None</td>
<td>Field #3 infill, Prospect AA &amp; BB prospect</td>
<td>Pigging of hub pipeline: Last pig got stuck in line</td>
<td>None.</td>
<td>None.</td>
<td>None.</td>
</tr>
<tr>
<td></td>
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</tr>
<tr>
<td><strong>Oil Field Hub #5</strong></td>
<td>Field X production constrained by Test Separator capacity</td>
<td>Infill drilling in field #1 and field #2reservoirs</td>
<td>Potential new users, including field #A &amp; Quadrant 99</td>
<td>Failure of platform #1 dehydration system before replacement complete (no lift gas)</td>
<td>None.</td>
<td>None.</td>
</tr>
<tr>
<td><strong>Others</strong></td>
<td>No further potential. Cessation of production initiated.</td>
<td>None.</td>
<td>None.</td>
<td>None.</td>
<td>None.</td>
<td>None.</td>
</tr>
</tbody>
</table>

"....But you can’t always get what you want...."
Project Overruns: Positive Bias

- Over the decades the industry has used a decision driven framework for planning, developing & operating.
- On the whole, the process is a good one:
  - From a project management perspective it drives increased confidence in cost and schedule estimates as the development progresses to FID, allowing decision makers confidence in the commercial outcomes of a project.
  - But for some reason, the cost and schedule expectations we use for decision making are often too far from reality.

- Analysis* shows on average, the 8 Australian LNG projects have overrun cost and slipped schedule by about 30%.
- Internal rates of return have been reduced by around 3% to 4% by cost and schedule overruns alone.
- At US$60/bbl this reduces average IRR from 10% to around 7%.
- This analysis doesn’t only apply to our sample of LNG projects, but to all complex projects.

*Ref: Project Overrun, G.Lee & S.Whitaker, RISC Advisory, APPEA May 2017
A case study in combating bias*


• Following several poor investments, RWE overhauled its decision-making processes.

• Post mortem analysis after Supervisory board asked “Where has the shareholders’ money gone (more than €10 billion on big capital-expenditure)?”.

• RWE had fallen victim to a number of cognitive biases in combination.

• New cultural-change programme & Devils Advocate required.

• RWE Conclusion: ‘Constructive tension brings us further than universal consent’.

*Ref: McKinsey, May 2017
## Project Funding Decisions: pitfalls of linear thinking

<table>
<thead>
<tr>
<th>Decision Makers</th>
<th>Project Teams</th>
</tr>
</thead>
<tbody>
<tr>
<td>Balancing the required “optimism” with reality</td>
<td>Gaming the system in order to get projects funded</td>
</tr>
<tr>
<td>Setting expectations too early in the development cycle, in absence of any real project definition</td>
<td>Assuming that detailed probabilistic cost modelling is a true representative of uncertainty</td>
</tr>
<tr>
<td>Asking project teams to “sharpen up” estimates when economics look marginal</td>
<td>Removing events from uncertainty analysis that skew results</td>
</tr>
</tbody>
</table>

**Assuming** that uncertainty can be completely transferred via a contracting strategy........:

“If the owner were then to negotiate, for example, a fixed price, EPC contract for the entire project, the uncertainty (from the Owner’s perspective) would immediately drop to zero”

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Ref: Project Overrun, G.Lee & S.Whitaker, RISC Advisory, APPEA May 2017
Example = Morecambe Bay Field Complex

- 10 offshore platforms
- 3 gas terminals
- 59 wells
- 1 Tank farm
- 1 Support base
- 400 staff & contractors
Setting the Scene

- Cash Cow up to 2010: ‘high volumes and significant profits’ disguised a wide-range of long-term problems and some very significant threats.
- Lots of issues, many disguised or ignored that offered the potential to cause major harm to a very profitable, high-profile operation.

**Daunting set of challenges**

- Old plant & Outdated culture
- Limited management & production information
- Safety culture
- Demographics
- Resourcing
- Weak production performance
- Competency
- Integrity
- Controls
- Poor recruitment decisions
- Absence of performance management
- Reservoir management

**Financials**

Mix of short term activities to improve ROCE & longer term options were considered..... but with consequences
Reposition the business: Lag between Action & Results

Unit Opex was forecast to reduce cash flow contribution & become uneconomic

- Not transformational BUT adds value with high IRR (asset fully depreciated).
- Lifting cost competitive at £10/Boe compared to industry average at the time of between £1/Boe and £11/Boe
Some of the Linear Impacts (Year 3)

- Performance stabilised & Threats reduced
- Satellite developments & largest discovery in East Irish Sea in last 30 years
- 1st seismic survey inside offshore wind farm in UK history
- Health support to offshore with Nottingham University NHS Trust
Complex Systems & Feedback Loops

• £10 million saved for Statoil on mature Statfjord field, Norway

• Helping another business unit with HSE KP4 audit

• Production Loss Reporting, Continuous Improvement picked up by Corporate

• Shutdown improvements applied in another business unit

• Sharing of support vessels with other fields & operators

“Having people with operational hands-on experience come in and present their ideas has really made Statoil think carefully about the project and what savings can be made”

Gunner Kjaerland, operations advisor
Six Insights from Due Diligence & Conclusions

Value can be added by optimizing mature fields, but ........

1) Reconfigure operations to optimize between plateau and late life with option to capture upside. Business improvement initiatives are not typically focussed on underlying issues.

2) Change in Mindset required – this is not field development or operating for plateau production, it is “use it or lose it”.


4) Theoretical value is not achieved in practice due to unrealistic assumptions ignoring external factors, or poor execution.

5) Performance relies on Ability, Consistency, Honesty & Mindfulness.

6) Remember ‘Drift into Failure’, : Faster/Better/Cheaper is Okay in early life but you only get two out of three in late life.
Thank you to my colleagues for their contributions:

Gareth Lee & Simon Whitaker

Graham Sheedy