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

Gavin Ward, General Manager, UK,
RISC Advisory

RISC

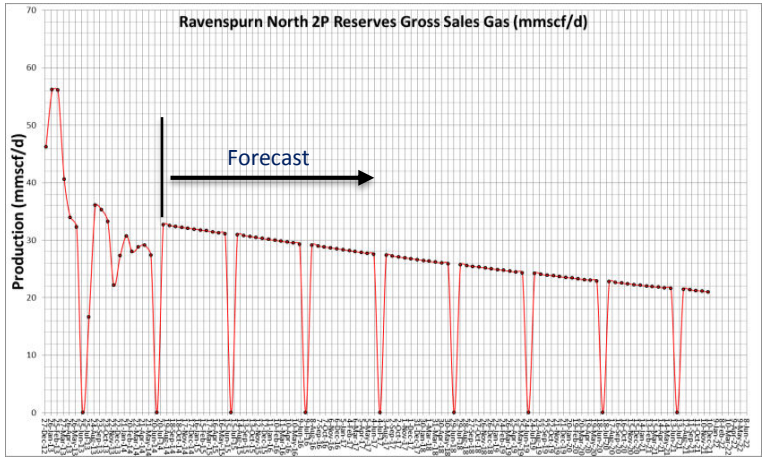
Contents

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

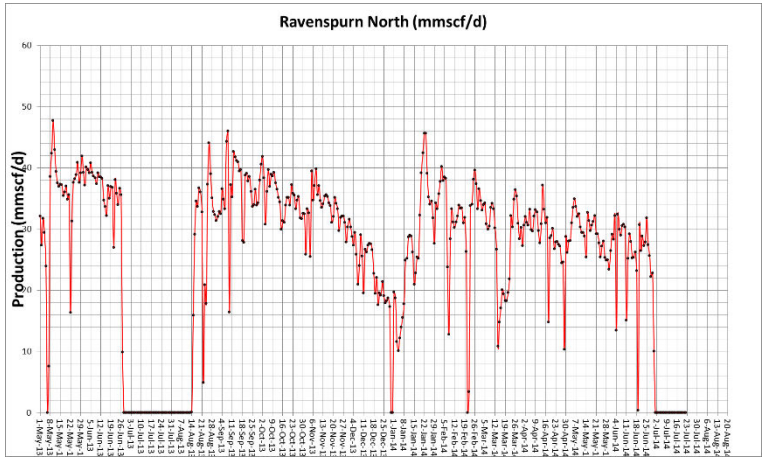
Material shown in this presentation is either given with the permission of the operator or originates from public sources.

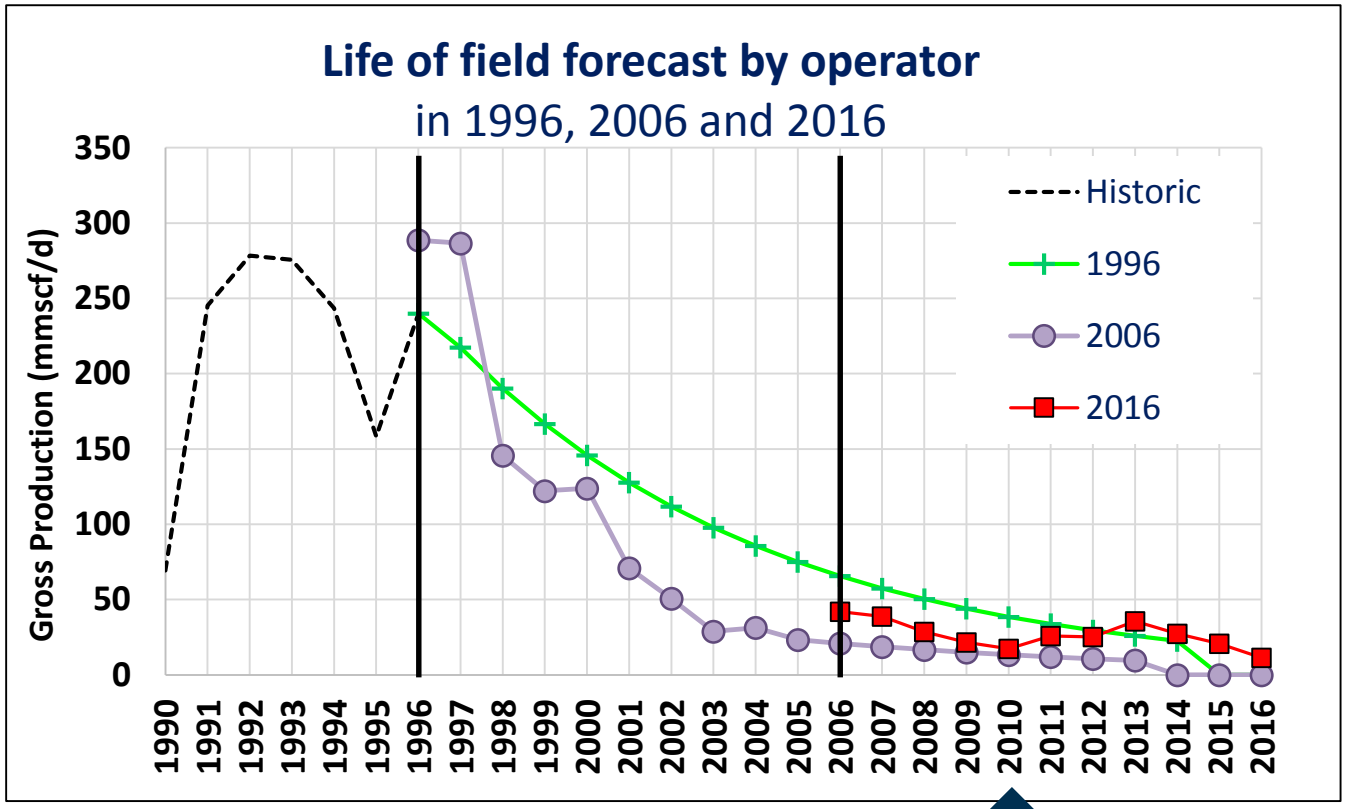
Practicalities of Prediction (Ravenspurn North Gas Field)

Operator predicts this…….



But gets this…….



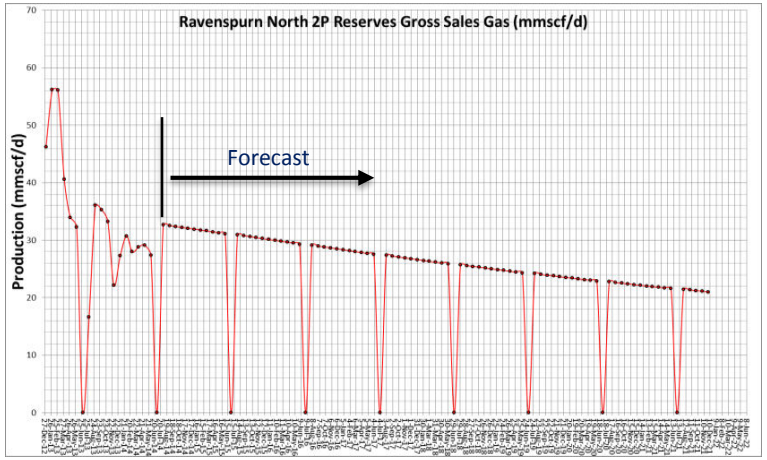


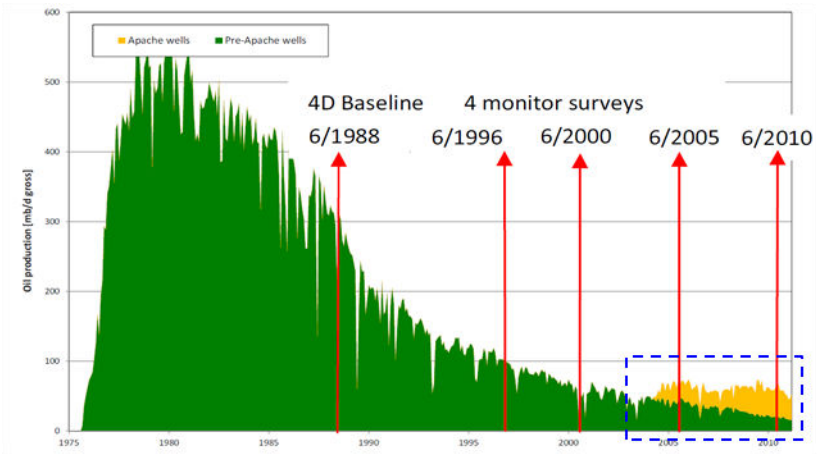
Change of operator

3

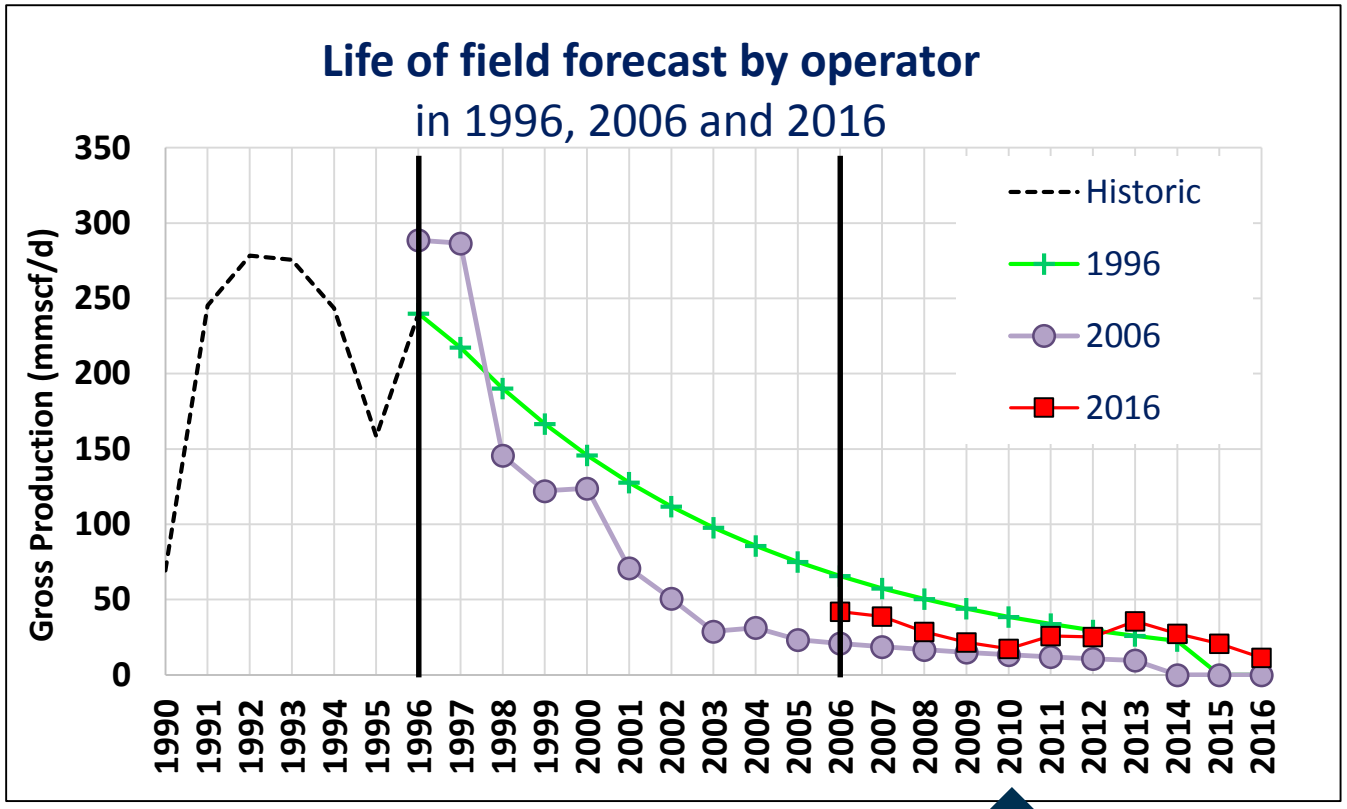
Practicalities of Prediction (Ravenspurn North Gas Field)

Operator predicts this…….





bp Change of operator Apache



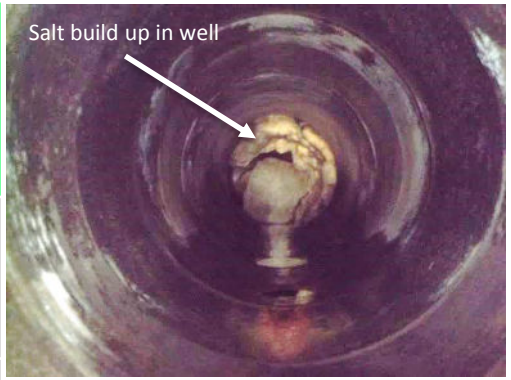
bp Change of operator Perenco

Linear/Traditional Approach

Problem -> Solution -> Implement -> Expected Outcome

Opportunities & Constraints

Fields	Reservoir	Wells	Pipeline	Offshore Facility	Export	Onshore Facility
Gas Field Hub #1	Field 1 of 3 reaching end of field life.	Field well GW-2/4 restarted	Lower pressure = integrity and less inspections Lower pressure = more sand build up	None	Reliability of production Hub and LOGGS compression	Improved Project and Cost Management of Freon replacement.
Oil Field #2	Reinstatement of subsea water injection ahead of plan	Increasing H_2S levels Continual infill drilling programme	None	Increased water cut in wells from 98% to 99%.	Remove FSU and export via FPS (post-20XX)	None.
Oil & Gas Field Hub #3	Recovery of field #1 oil approx 12%	Potential to use surfactants to dewater field #1 line	Potential to use chemicals to reduce solids in line	None.	None.	None.
Oil Field Hub #4	None	Field #3 infill, Prospect AA & BB prospect	Pigging of hub pipeline: Last pig got stuck in line	None.	None.	None
Oil Field Hub #5	Field X production constrained by Test Separator capacity	Infill drilling in field #1 and field #2reservoirs	Potential new users, including field #A & Quadrant 99	Failure of platform #1 dehydration system before replacement complete (no lift gas)	None.	None.
Others	No further potential. Cessation of production initiated.	None.	None.	None.	None.	None.



KEY

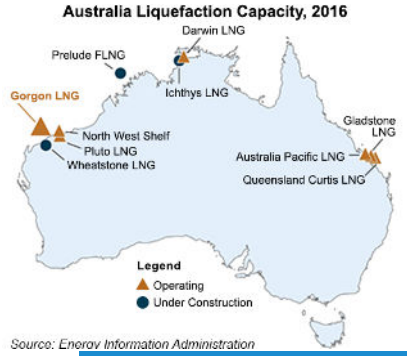
- High Impact: Constraint / Risk
- Medium Impact: Constraint / Risk
- Opportunity

"….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*

Bernhard Günther, RWE, CFO 2013 – 2016.

- 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

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

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"

RISC

Ref: Project Overrun, G.Lee & S.Whitaker, RISC Advisory, APPEA May 2017

SPE International Society of Petroleum Engineers

Example = Morecambe Bay Field Complex

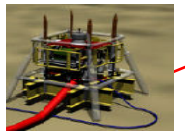
ConocoPhillips

(Operated by Centrica)

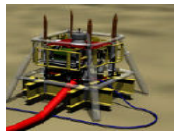
Rivers Terminal

Millom West

Millom East



Dalton



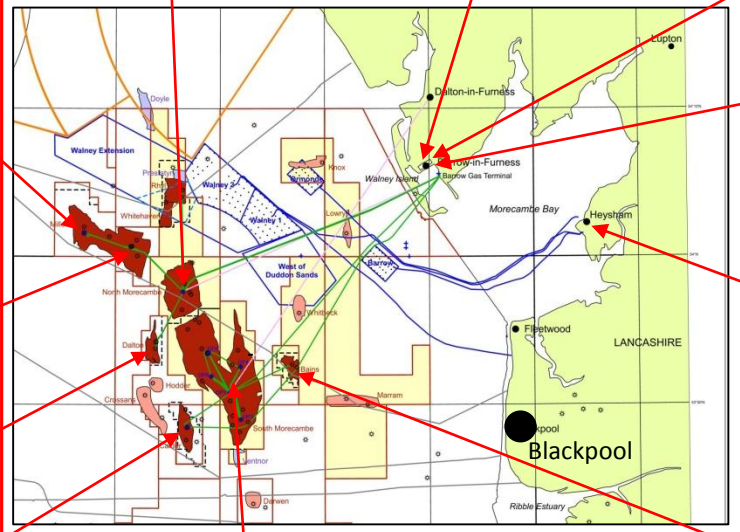
Calder

centrica

North Morecambe Field DPPA

North Morecambe Terminal

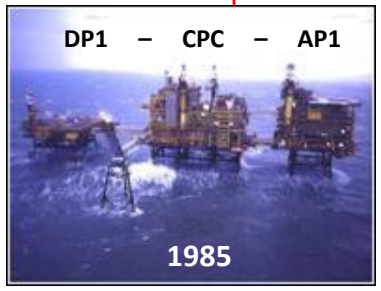
Condensate Tank Farm



South Morecambe Terminal (now decommissioned)

Heysham Support Base

DP1 – CPC – AP1

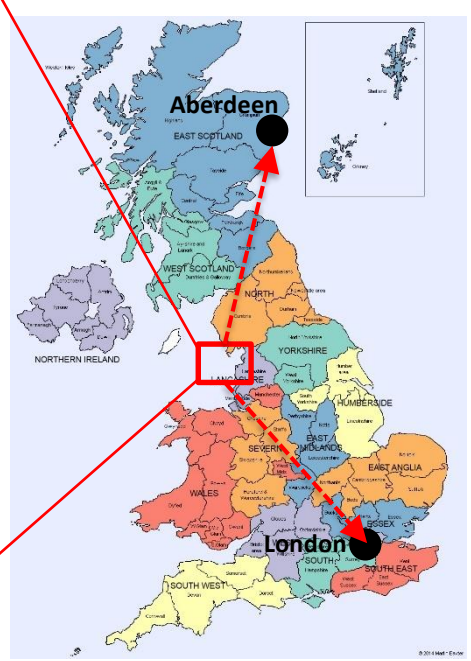


DP3, DP4,

DP6 & DP8

Bains Field

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



RISC

SPE International

Society of Petroleum Engineers

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

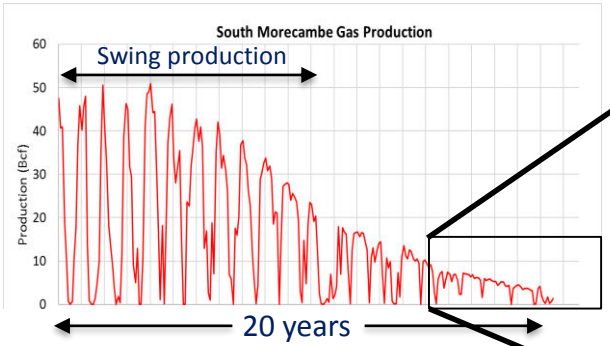
Financials

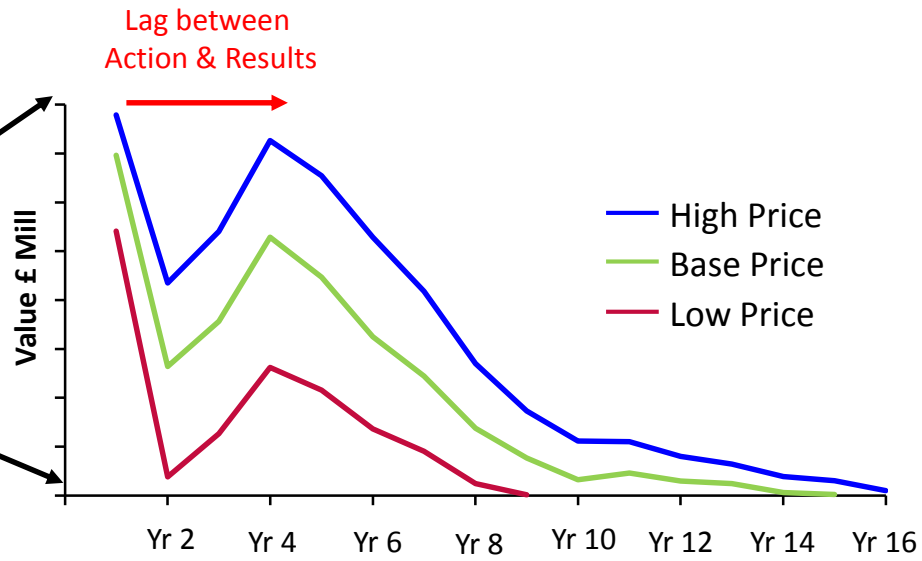
Mix of short term activities to improve ROCE & longer term options were considered….. but with consequences

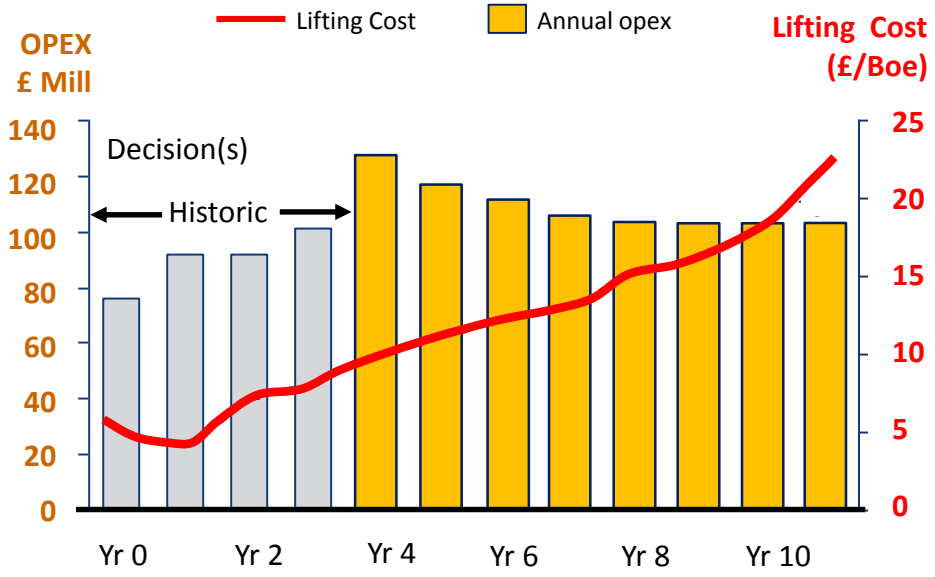
10

Reposition the business: Lag between Action & Results

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





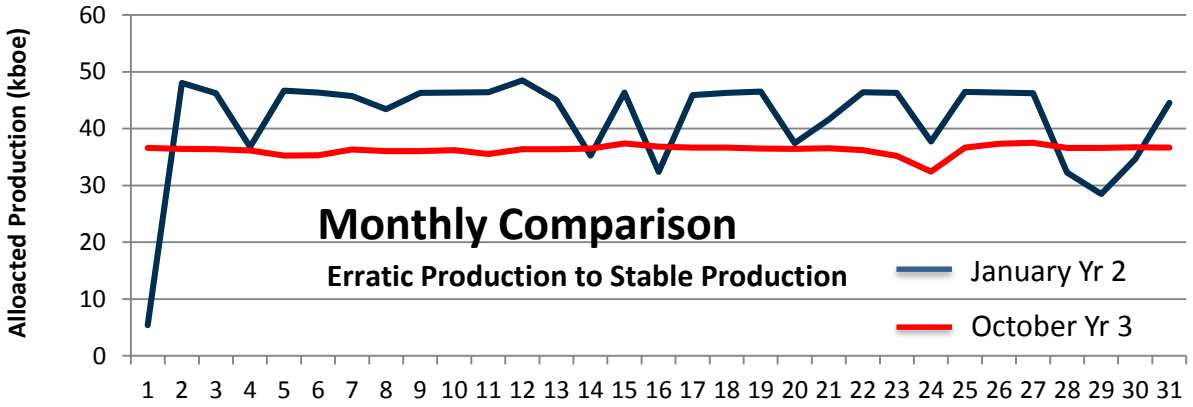


- Not transformational BUT adds value with high IRR (asset fully depreciated).
- Lifting cost competitive at £10/Boe compared to industry average at the time of between £1/Boe and £11/Boe

RISC

Society of Petroleum Engineers

Some of the Linear Impacts (Year 3)



SUCCESS The survey vessel in the windfarm

Seismic event is a UK windfarm first

A UK first has taken place at a windfarm off the Furness coast.

Centrica Energy carried out a seismic survey at the Ormonde Offshore windfarm in Morecambe Bay.

The firm's East Irish Sea team undertook the mammoth task to ascertain how much gas there is in its Knox Field, which lies beneath the Ormonde windfarm.

- 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

RISC

Society of Petroleum Engineers

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

UPSTREAM teams from either side of the North Sea have come together to save millions on an offshore upgrade project.

TEAMWORK SAVES £10m

When Statoil came to overhaul the emergency systems on its Statfjord field it called on Centrica Energy, which has a 38% stake in the field, for its take on the plans.

Stewart Forrest, lead control and instrument (C&I) project engineer in the East Irish Sea, recognised immediately what the work involved.

He said: "We have been working on a very similar project at Morecambe for the last five years.

"The company wants to replace an obsolete fire and gas detection system on two platforms in the Statfjord field. It was unreliable, unsupportable and for the platforms to continue operating it had to be replaced.

"We've been working on replacing the same systems here, as well as the emergency shutdown system."

Together with principal C & I engineer Ian Wilson and his team, and with help from the Norwegian business, Stewart was able to find ways to save time and more than £10 million on the estimated cost of the project.

Gunner Kjaerland, operation advisor in Norway, said: "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.

"In partnership with Statoil, we were able to look again at the length of the project, and suggest ways to get the most from the project scope.

"Although there are differences between the Morecambe and Statfjord fields, it was useful to learn about the companies' different approaches to engineering, challenging contractors estimates and management costs."

PARTNERSHIP

The East Irish Sea team also suggested a new simpler way of designing the gas detection systems, using fewer detectors in strategic positions.

Stewart added: "Managing and designing this safety critical project in-house gave our engineering team, led by Greg Hewson, the chance to look at new innovative solutions.

"Instead of replacing individual systems on a like-for-like basis we've integrated our emergency shut down and fire and gas detection systems, giving us shorter shutdown periods and substantial cost savings at the system build stage.

"Although Statoil is only replacing the fire and gas detection systems we were able to take our technical knowledge from this process and pass it on."

Centrica Energy also offered advice on how Statoil could reduce their equipment costs, and suggested ways in which the number of people working on the project could be reduced.

Ian said: "We've been able to focus on providing protection for our people offshore, so it was good to be able to pass on what we've learnt to others doing a similar job.

"We were also able to learn from the team in Norway, it was a very valuable partnership."

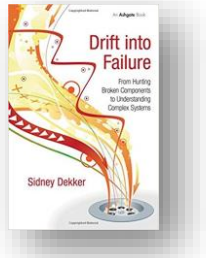
RISC

SPE International Society of Petroleum Engineers

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*".
3) Process safety & safety critical maintenance: Balance Time/Cost/Quality .
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.



RISC

14

SPE International
Society of Petroleum Engineers

Thank you to my colleagues for their contributions:

Gareth Lee & Simon Whitaker — RISC — **Technical & Economic Advisers in Oil & Gas**

Graham Sheedy — GS Management Consultants Ltd.

RISC

Perth
Level 2
1138 Hay Street
WEST PERTH WA 6005
P. +61 8 9420 6660
F. +61 8 9420 6690
E. admin@riscadvisory.com

Brisbane
Level 10
239 George Street
BRISBANE QLD 4000
P. +61 7 3025 3397
F. +61 7 3188 5777
E. admin@riscadvisory.com

London
4th floor Rex House
4-12 Regent Street
LONDON UK SW1Y 4RG
P. +44 203 356 2960
F. +44 203 356 2701
E. admin@riscadvisory.com

Dubai
Suite 503, Shangri La Offices
Sheikh Zayed Road
DUBAI UAE
P. +971 4 401 9875
F. +61 8 9420 6690
E. admin@riscadvisory.com

Jakarta
Alamanda Tower, 25th Floor
Jl. T.B. Simatupang, Kav. 23-24
JAKARTA 12430 INDONESIA
P. +62 21 2965 7987
F. +62 21 2965 7888
E. admin@riscadvisory.com