

SPE Flow Assurance Technical Section

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Thrive In Deepwater Gulf of Mexico

April 26, 2018

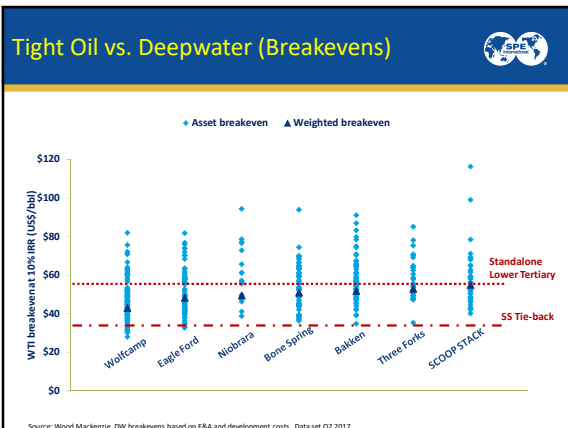


Poll Question 

Is Deepwater GoM Under Threat from Shale Oil?

Poll Question 

As a Deepwater Engineer, Are You Willing to Experience Controlled Failure?

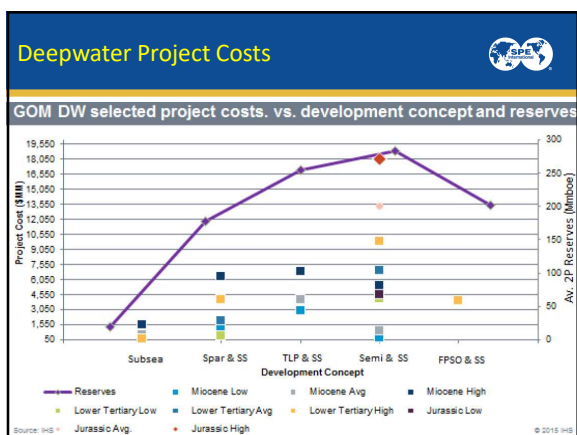


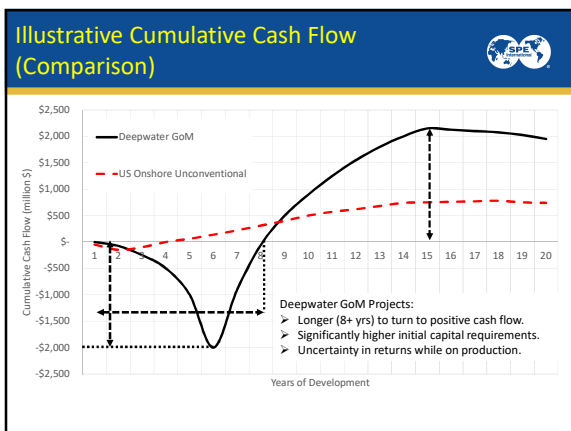
Tight Oil vs. Deepwater

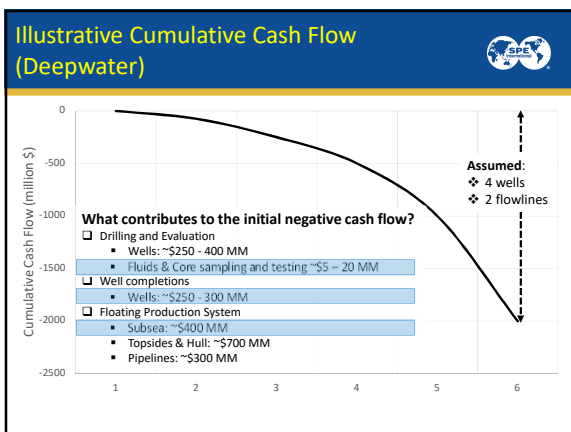
Tight oil		vs	Deepwater	
Low	Reserves per well	A	High	
Low	Current cash flow	A	High	
Quick	Project cycle time		Long	
Medium	Capex flexibility		Low	
High	Rapid data capture		Low	
High	Investor support		Medium	
Low to high	Breakeven	D	Low to high	

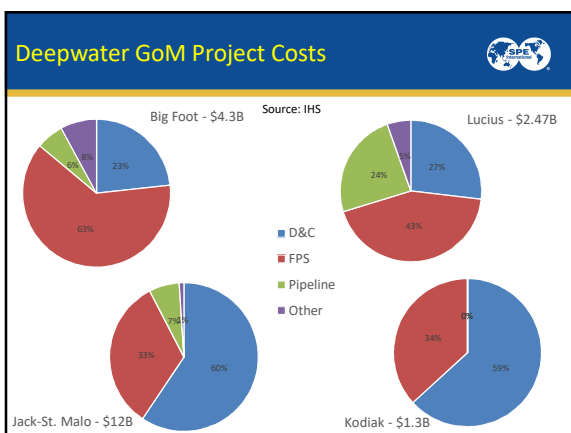
Source: Wood Mackenzie (Imran Khan)

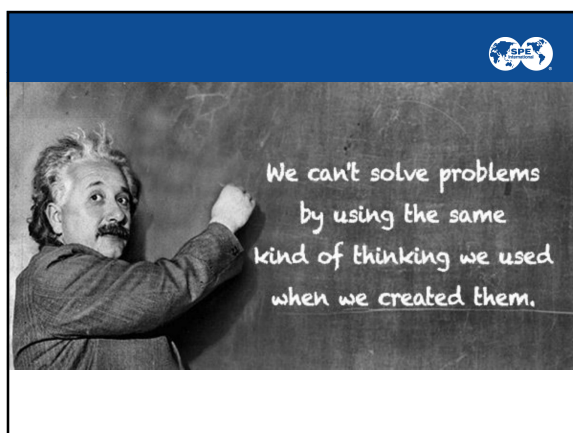
Legend: A Advantage D Depends

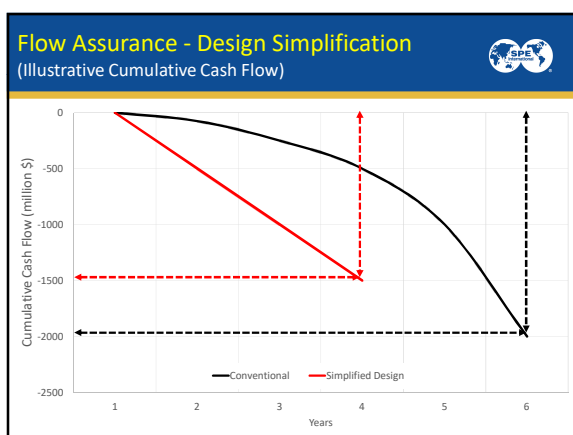






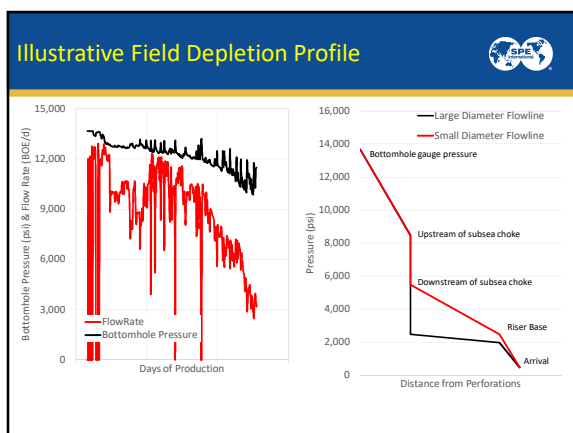


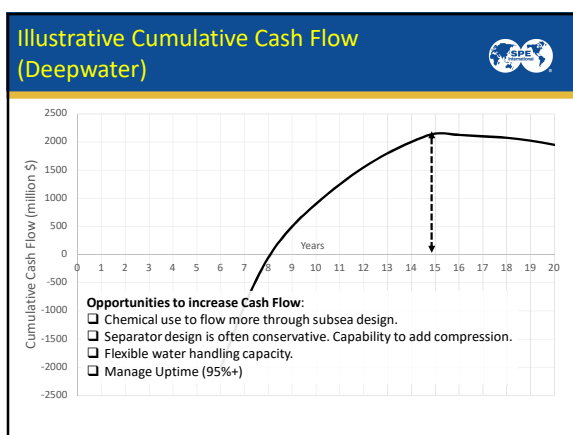


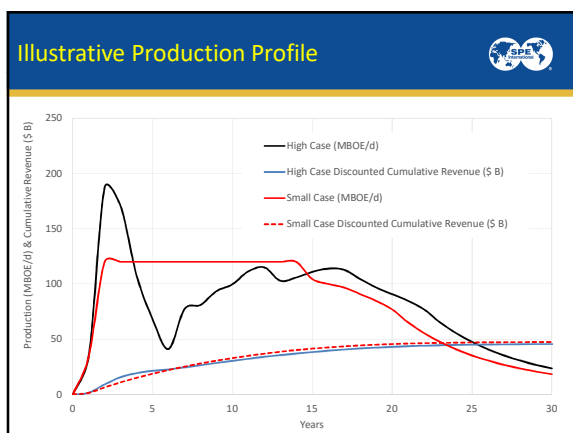


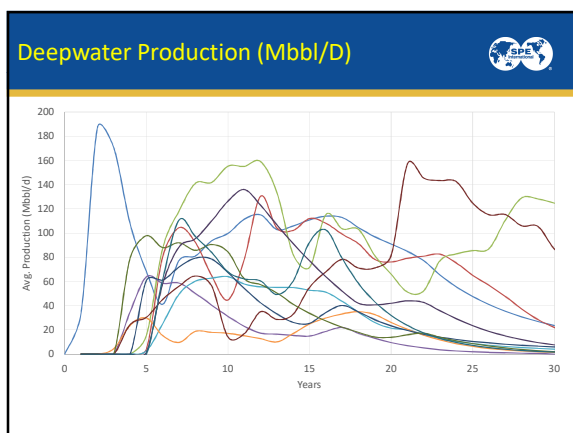
Design Simplification

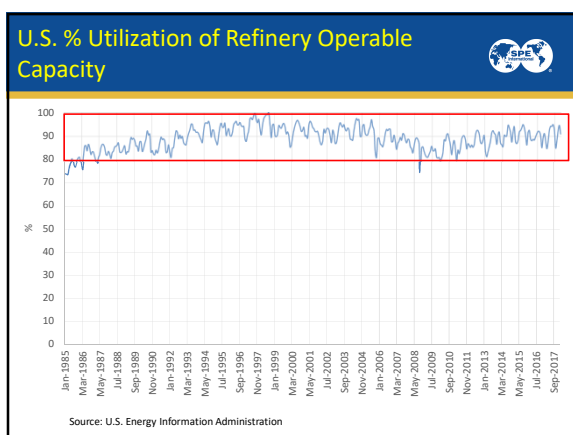
- Subsea
 - 3.5" Tubing
 - 5" Tree (Horizontal / Vertical)
 - 6" Flowline (single / loop?)
 - Dual header manifold
 - Standard umbilical
 - Insulation?
- Topsides
 - Modularized 20,000 bopd processing increments
 - Add-on / subtract capacity
- Advantages
 - Promote competition
 - Shorter lead times
 - Lower costs
 - manufacturing
 - installation
 - Possible re-use
- Challenges
 - One size fits all inherently brings inefficiency
 - May not work for all cases

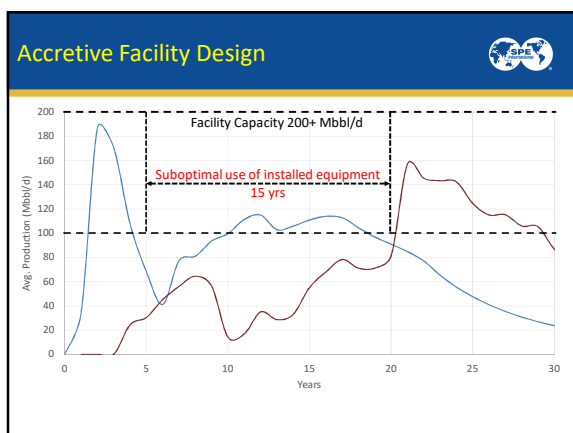








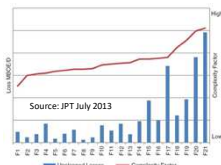
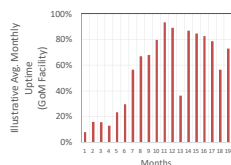




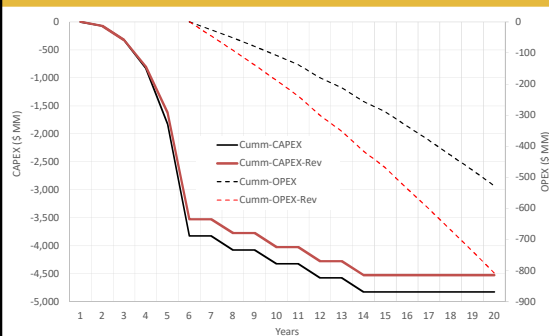
Improve Production Uptime



- Collect accurate data (as much as possible), generate data models to assess downtime causes.
- Identify physical phenomenon causing downtime, take corrective actions.
- Proactive models tied to control system to proactively prevent downtime causes.
- ~1% improvement in uptime can be equivalent to 30 % of OPEX.



CAPEX vs. OPEX



CAPEX vs. OPEX



- | CAPEX | OPEX |
|---|--|
| • Steel | • Chemicals; Workover |
| • Prevention | • Remediation / Mitigation |
| • Proactive | • Reactive |
| • Forecast challenges | • Challenges known |
| • Relatively large budget | • Relatively small budget |
| • Relatively easier to justify projects | • With point forward economics, projects are harder to justify |

CAPEX vs. OPEX Example



CAPEX

- Large produced water (60,000 bwpd) treatment capacity
 - Low Turndown (initial processing of low volume water is a challenge)
- Gas compression for late life

OPEX

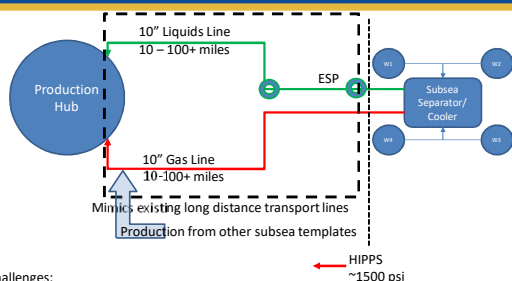
- Relative small design (20,000 bwpd) Add-on filtration equipment as needed after initial breakthrough, design fit-for purpose
- Add-on capacity as needed with reservoir depletion

Challenge Status Quo



- SPE 187129: Challenge processing capacity norms
 - Achieved 15 – 30% increase from nameplate capacity in the field
 - Additional processing capacity couldn't be proven because of limited production from wells
- Facilities reported to exceed nameplate (Lucius and Delta House)
- Consider drag reducing chemicals to achieve 25+% flow capacity improvement in subsea flowlines.

Concept Discussion



Challenges:

- Inadequate separation (gas needs to be liquids free?)
- Hydrates / wax in the liquids flowline or in the separator?!
- Accurate subsea flow measurements.

Poll Question



What is Your Willingness to Experiment with
Subsea / Subsurface Equipment / Procedures?

DISCUSSION

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