Overview of Shell Deepwater Developments in Malaysia

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Malaysia Deepwater Area
Sabah Deepwater Development Opportunities

- Gumusut
- Kikeh (Murphy)
- Malikai
- Lebanon
- Ubah
- KBB
- KME
- SOGT @ Kimanis
- Kinabalu (PCSB)
Development Options...*all options considered for the Malaysian Deepwater*
Malaysia Deepwater - Unique Challenges
Complicated Seabed Relief (Slope, Stability) and Shallow Hazards / Hydrates

- Shelf today is circa 100-120 km wide
- Fold belt (i.e. the slope) is circa 60-80 km wide

Need ability to install flowlines and facilities on steep slopes - allowing for more direct routes

Need ability to quantify threat of producing wells through zones with hydrates
Malaysia Deepwater - Unique Challenges

Long Thin Fields

- Most fields require 2 - 4 drill centers with a high well count to develop
- Need to reduce number of drill centers through ERD capability, or low cost wells

Long Distance Tiebacks

- 25 - 50 km tieback distances
- Flow assurance with waxy crudes
- Need for subsea separation and boosting technologies
Gumusut-Kakap Development

- **Unit Parties:** Shell (Operator) 33%, CoP 33%, Petronas Carigali 20%, Murphy 14%

- **First deepwater Semi FPS in the region**
  - 1200 m WD (offshore Sabah)
  - Hub for future developments in the area

- **World class process facility**
  - 150 kbo/d process capacity
  - 300 mmscf/d gas injection
  - 225 kbw/d water injection
  - Over 100 MW installed power

- **Host**
  - Semi-submersible hull shape
  - Project Engineering – KL, Construction - MMHE’s yard (JB)
  - 16,000 bbls dead oil storage in hull for flowline circulation
  - 4,000 bbls methanol / LDHI storage in hull
Oil evacuated via Pipeline to SOGT

Produced Gas Re-injected

Gumusut-Kakap Subsea Layout

- 19 subsea wells
- 7 subsea manifolds (3 Prod, 3 WI, 1 GI)
- Flowlines: 9 SCR's;
  - 8" (prd – 31mi),
  - 10" (ginj – 11 mi)
  - 12" (winj – 7 mi)

- Sea floor topography (“the bulge” and canyons)
- Shallow hazards
- Constraints Extended Reach Drilling
Gumusut–Kakap Export Route

Oil Export Pipeline to SOGT - Kimanis (125 miles, 18’’), 150,000 BBLS/Day 180,000 (peak)

Gas Re-injection
Malikai:  
- 120 km offshore Sabah in Block G  
- Up to 470 m water depth  
- A number of options considered: Wet tree (subsea) & dry tree (DTU) concepts  
- Wellhead DTU - 8 dry tree wells  
- Additional wells likely for future phases, some of which may be subsea wells  
- Multiphase tie-back to planned Kebabangan Integrated Oil and Gas facility (operated by Kebabangan Petroleum Operating Company)

Floating Systems:  
- TLP vs. SPAR  
- Anchoring and foundation  
- ….
The Deepwater game is challenging

- Development Opportunities are more challenging...low hanging fruit have been largely picked...water is deeper and/or reservoirs are more complex...small and/or sub-economic accumulations...Ultra-deep water and remote locations...viscous oil, low energy drive and lift.

- Capex/Risk exposures are large...cost exposure in the billions $$$...high cost drilling & infrastructure...risks are not completely mitigated.

- Pressure to shorten schedule and reduce cost continues...longer cycle times...standardization/simplicity, technology development vs rapid deployment.

- Lack of local logistics/service industry...project Delivery is affected.

- Competent/skilled staffing shortages exist across the industry...demand still exceeds supply and building local capability can be difficult.
Thank You