Technical Session
Managing Challenging Asset & Marginal Field: Malikai Project - Thriving in a Lower for Longer World

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Malikai Project:
Thriving in a Lower for Longer World
Introduction to Malikai Tension Leg Platform (TLP)

**WHAT IS A TENSION-LEG PLATFORM?**

- **500 METRES DEPTH**
- **Topsides**
- **Hull**
- **Tendons**
- **Top-tension risers**
- **Subsea wellheads**
- **Foundation**

**KEY FACTS**

- **100KM OFFSHORE SABAH, MALAYSIA**
- **TOTAL WEIGHT 27,500 Tonnes**
- Roughly weighs the same as 27,000 average family cars.
- **UP TO 90 CREW MEMBERS WILL LIVE ON THE PLATFORM AND WORK**

It is a vertically floating structure moored by groups of tenders (tendons) at each corner. The groups of tendons are held upright in tension, giving the platform its name.

*Special kind of pipe used for both drilling and production supported by tension from the top.*
Evolution of the Concept

Wet Tree vs Dry Tree

- Full Production TLP + Permanent Drilling Module + Export to shore
- Satellite to KBB (Shared Processing)
- ‘Hybrid’ TLP (Limited Facility + Tender Assisted Drilling)
- Major Maintenance Philosophy (LQ vs Campaign based)
- New Technology: Single Combo Top Tension Riser (SC-TTR)
- Passive Hull & Marine System
- Reduced well count

FASTER  CHEAPER  FIT-FOR-PURPOSE
Overall Design

Passive Hull & Marine System
All traditional TLPs have active hull design; for Malikai, a passive hull design was used to minimize risks associated with hull entry.

Single Casing Top Tensioned Risers
Reduction of 3 steps, Reduce costs

Topsides
- Normal POB capacity 65, max 90
- Production/Test Separator – 2
- Two-Stage Gas Compressor – 2 Trains x 2x50%
- Separate Oil & Water metering
- Crude Oil transfer pumps – 2x100%
- Liquid Pig Launcher
- Gas Pig Launcher/Receiver

Export Pipelines
- 1 Gas & 1 Liquid flowline to KBB Platform
- KPOC, 1 Crossing @ Kinarat

Tender Assisted Drilling
Reduced TLP Topsides weight by relocating drilling package DES to TAD
Front End Design

- Carried out Basic Engineering Studies to develop Functional Specifications and Design Philosophy Documents
- Emphasized optimization/value engineering
- Early engagement with manufacturer/vendors for key equipment selection and weight/footprint
- Development of detailed information for input to tender documents (Scope of Work, Functional Specifications, etc.)
- Development of responsibility matrix for the various contracts to provide clarity of interfaces - led to clear and well defined contractual arrangements
Tendering Strategy

• FEED Design Competition leading to award of TLP EPC Contract

• 1st tender unfortunately aborted; but team used the various learnings from the exercise to improve the second tender (better defined scope of work)

• Second tender was open to international players

• Pricing structure – overall lump sum, with reimbursable elements (12 key packages identified as critical); unit rate for variations and provisional sum elements
Post Award / Execution Phase

- Established 5 focus areas in the pursuit to meet Goal Zero (no harm, no leaks):
  1. Leadership
  2. Communication
  3. Planning
  4. Quality
  5. Care for people

- Integrated Project Leadership Team; effective collaboration

- Maximized standardization and replication, e.g. reuse of installation aids used by Mars-B TLP project, reuse of contractors / vendors (framework agreement)

- Vigorous Management of Change process; every change subjected to 2-tier MoC challenge process

- Disciplined post contract management, minimized variations

- Detailed KPI monitoring for progress measurement

- Cost reimbursable packages – strict adherence to tendering process & change management
PRINCIPLE 1
REALISTIC EARLY PROMISES
• Completed full IPA Benchmarking
• Conducted Cost & Schedule Risk Analysis
• Developed Contingency Action Plans

PRINCIPLE 2
STRONG TEAMS DELIVER!
• Integrated Team - Facilities, Wells, Subsurface, all support functions represented
• Project Team Charter
• Team Effectiveness Program

PRINCIPLE 3
COMPLY WITH ORS
• Application of premium project assurance, with agreed Assurance Plan
• Project risks assessed and managed systematically

PRINCIPLE 4
CLEAR, COMPETITIVE & DEFINED SCOPE
• Major contracts competitively tendered and ready for award prior to sanction

PRINCIPLE 5
FREEZE THE SCOPE
• Robust MoC procedure with 2-tier challenge processes

PRINCIPLE 6
BEST PRACTICAL FRONT-END LOADING
• Completed IPA Benchmarking, no major gaps

PRINCIPLE 7
MAXIMISE REPLICATION & STANDARDISATION
• Strong alignment and support from Deepwater Centre of Excellence
• Strong linkage with Mars-B TLP and GK Projects for learnings
• Use of frame agreements & umbrella contracts

PRINCIPLE 8
COMPLY WITH PROJECT STANDARDS & CONTROLS
• Complied with mandatory project controls
• Compliance to DCAF
• Audit & Review Plans in place
Overall Project Performance

- **SAFETY:** Excellent HSSE performance compared to other global megaprojects
- **COST:** Delivered ~18% below promise (~15% lower than benchmark)
- **SCHEDULE:** Delivered on target
- **QUALITY:** Flawless start-up and high uptime

**AWARDS & RECOGNITIONS**

- 2015 BEST INNOVATIVE PROJECT at 7th ShipTek Maritime Awards
- 2016 TECHNIP CEO HSSE AWARD
- 2016 SHELL CEO HSSE & SP AWARD in HSSE & SP Leadership category
- 2016 GREEN STORY AWARD, REPLICACTION STORY AWARD and INNOVATION STORY AWARD at PETRONAS PAC Success Story Competition 2015/16
- 2017 OUTSTANDING ENGINEERING ACHIEVEMENT AWARD by The Institution of Engineers Malaysia (IEM)
- 2017 ASEAN OUTSTANDING ENGINEERING ACHIEVEMENT AWARD by ASEAN Federation of Engineering Organisations
- 2017 FINALIST for ENGINEERING PROJECT OF THE YEAR for Platts Global Energy Awards
- 2017 RUNNER-UP for EFFICIENT & EFFECTIVE DELIVERY ORGANISATION by P&T Performance Excellence Awards