Tui Field Development Implementation *(Key Success Factors and Lessons Learned)*

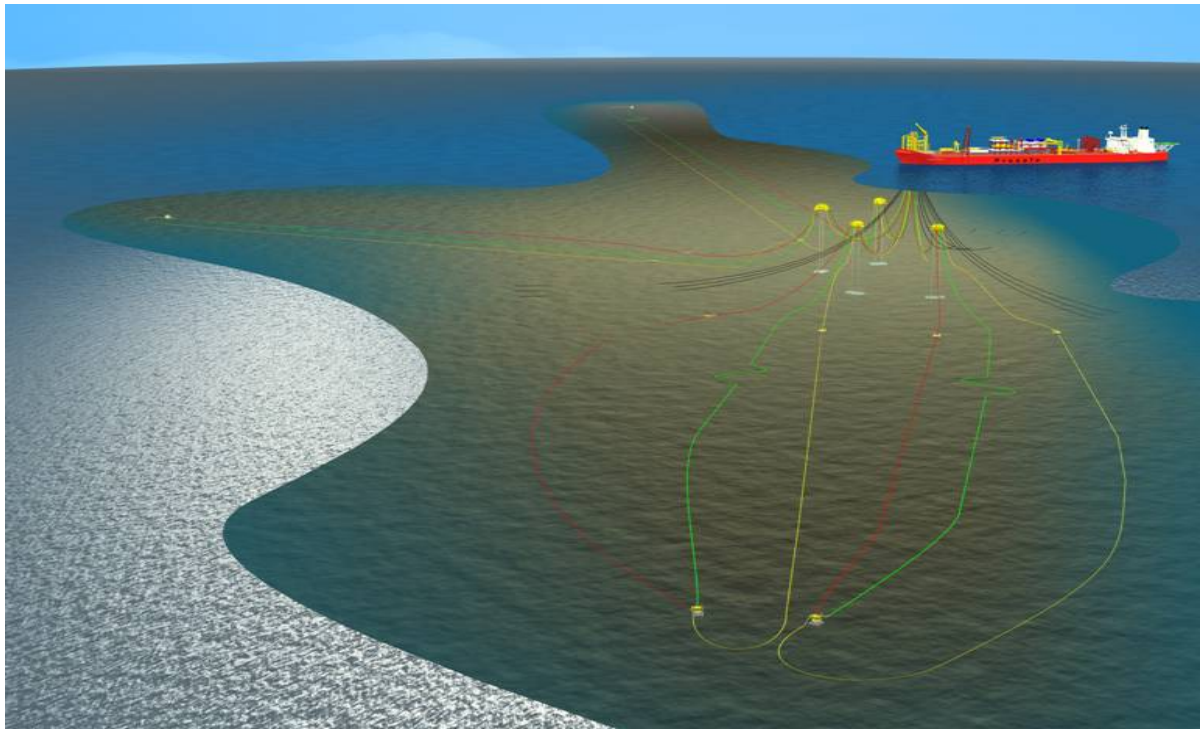
Ian Palmer – New Zealand Development Manager
Australian Worldwide Exploration Ltd

PMP38158 Joint Venture

Australian Worldwide Exploration	Mitsui E&P Australia Pty Ltd	NZ Oil & Gas	Pan Pacific Petroleum NL
42.5%	35%	12.5%	10%

Tui Development Overview

- Three Fields: Tui, Amokura & Pateke;
- Four subsea completed wells;
- One Leased FPSO “Umuroa”.
- 50km offshore southern Taranaki



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Project Time Line

- Development executed in just 20 Months (FID to First Oil)
- But typically long offshore exploration & appraisal period

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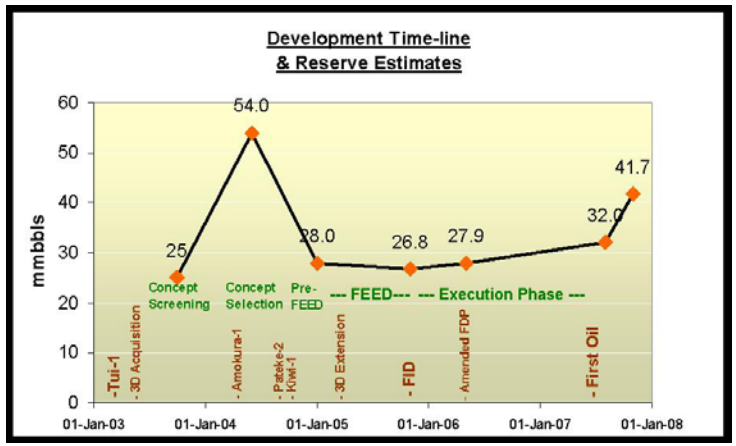
Development Plan Evolution

- Concept Screening studies started soon after 1st discovery
- Concept Selection finalised after follow-up drilling
- Extensive appraisal and subsurface studies to evolve development plan
  - Long horizontal wells, high fluid rates, chartered FPSO
- Extended FEED included tender preparation and FPSO Charter negotiation



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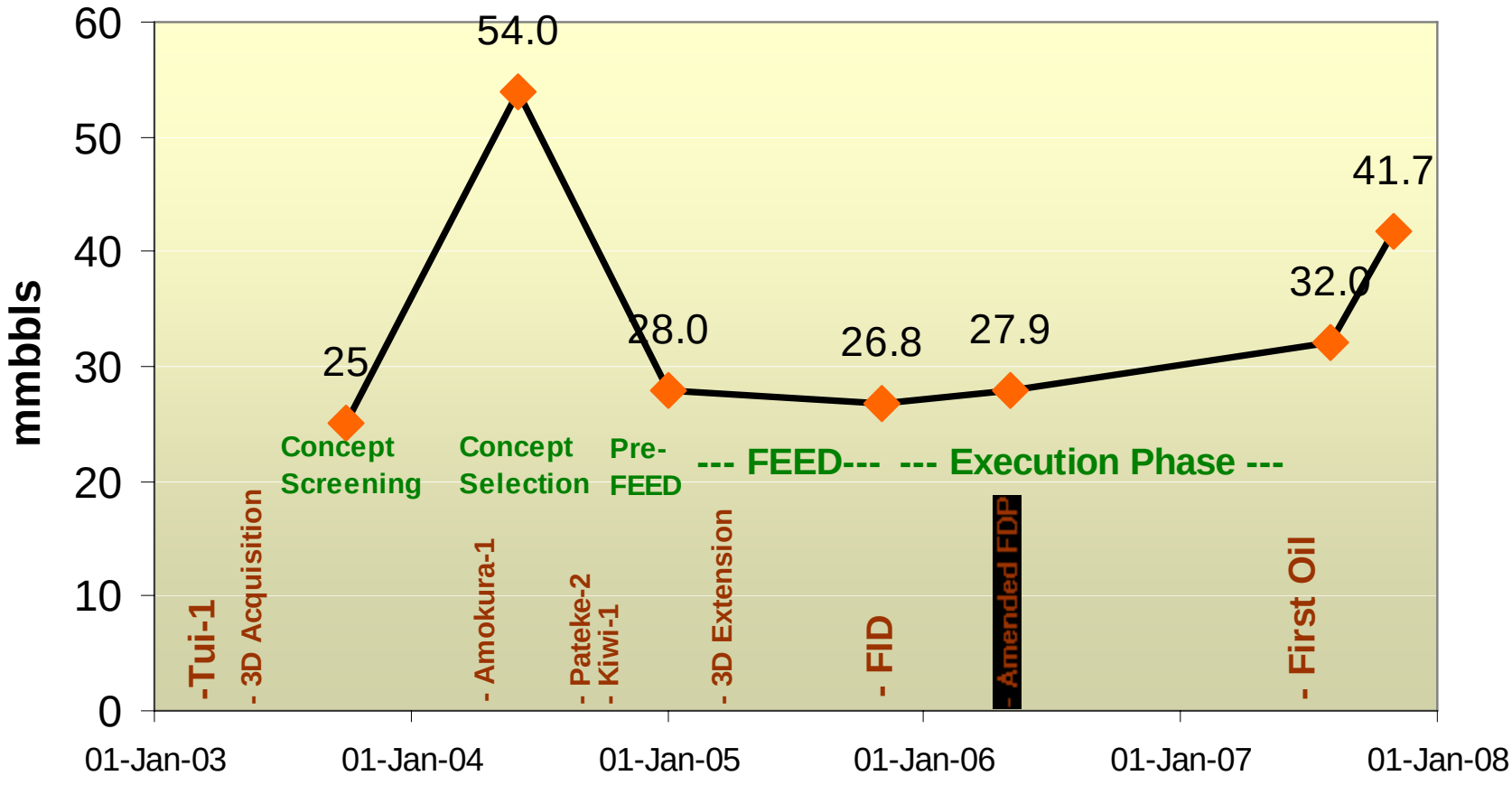
Development Time-line & Reserve Estimates



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Project Resourcing Model

- No big Operator engineering / project management department
- Contract engineering industry has evolved to offer PM capability
- Subsurface disciplines kept in-house
- Management deep industry experience – risk judgments
- Small operational management team close to operation

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Successful Contractor PMT

- Experience & professionalism and ability to access specialist resources;
- Generous delegation of authority and short Operator/JV ‘decision chain’
- Function as extension of AWE organisation
- Good communication
  - regular and adhoc
  - leveraging Web based IT
- Project Leads assigned work packages with continuity of responsibility
- PMT management concentrated on contingencies and interface issues

ALPHA PETROLEUM SERVICES

◆ *Experience* ◆ *Innovation* ◆ *Integrity*

Contracting Strategy

- EPC within bounds of contractor expertise
  - –FPSO Charter – contractor build, own & operate
  - –Subsea construction & procurement
  - –Subsea trees and controls
  - –Drilling conventional approach
  - –Other contracts to bridge interfaces and provide support services

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Project Philosophy

- No Serial #1s
- Maximise use of contractor expertise
  - Functional specifications and industry standards
- Close engagement with major contractors
- Flexibility to accommodate contingencies
- Aggressive post FID Schedule and Budget

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Schedule Sequencing Challenge

- Three sub-projects & procurement on independent time lines
  - Drilling, FPSO conversion & subsea installation
- Delay risk not uniform
  - Drilling and major yard fabrication prone to delays
  - Equipment suppliers' delivery dates not to be relied on
  - Marine construction vessels more punctual

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Schedule Challenge Responses

- Apply float to according to where delays more likely
- Contingency planning, flexibility & responsiveness
  - Subsea hardware pre-installation
  - Drill through spool trees
- Close engagement with contractors and suppliers
- Careful attention to contract terms related to mob and demob
- LDs have a place
- Understanding & cooperative contractors

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Interface Issues

- Contractual and Physical Interfaces – likely sources of trouble
  - –Minimise
  - –Concentrate attention
- Example: Bend Stiffener Connector (BSC)

Female BSC Receptacle

Riser pull-in assembly

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Six of 15 BSC receptacles attached to turret (with protection covers installed)

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Production flow-line riser pull-in assembly

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FPSO Mooring – Pre-install phase

- Chose to handle FPSO mooring independently
  - –Apparent synergy with availability of rig AHSVs
- Time and safety issues due hardware size

- Difficult to include in subsea installation contract
- Opportunity to utilise large state of the art construction vessel

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FPSO Mooring Chain & Anchors

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Normand Installer

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FPSO Mooring – Connection phase

- Pre-installed subsea hardware required precision mooring of FPSO
  - –Temporary anchors and three vessels required
  - –Lucky with late season weather
- Detailed planning with specialist expertise critical to safe & efficient execution

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FPSO Mooring Operations

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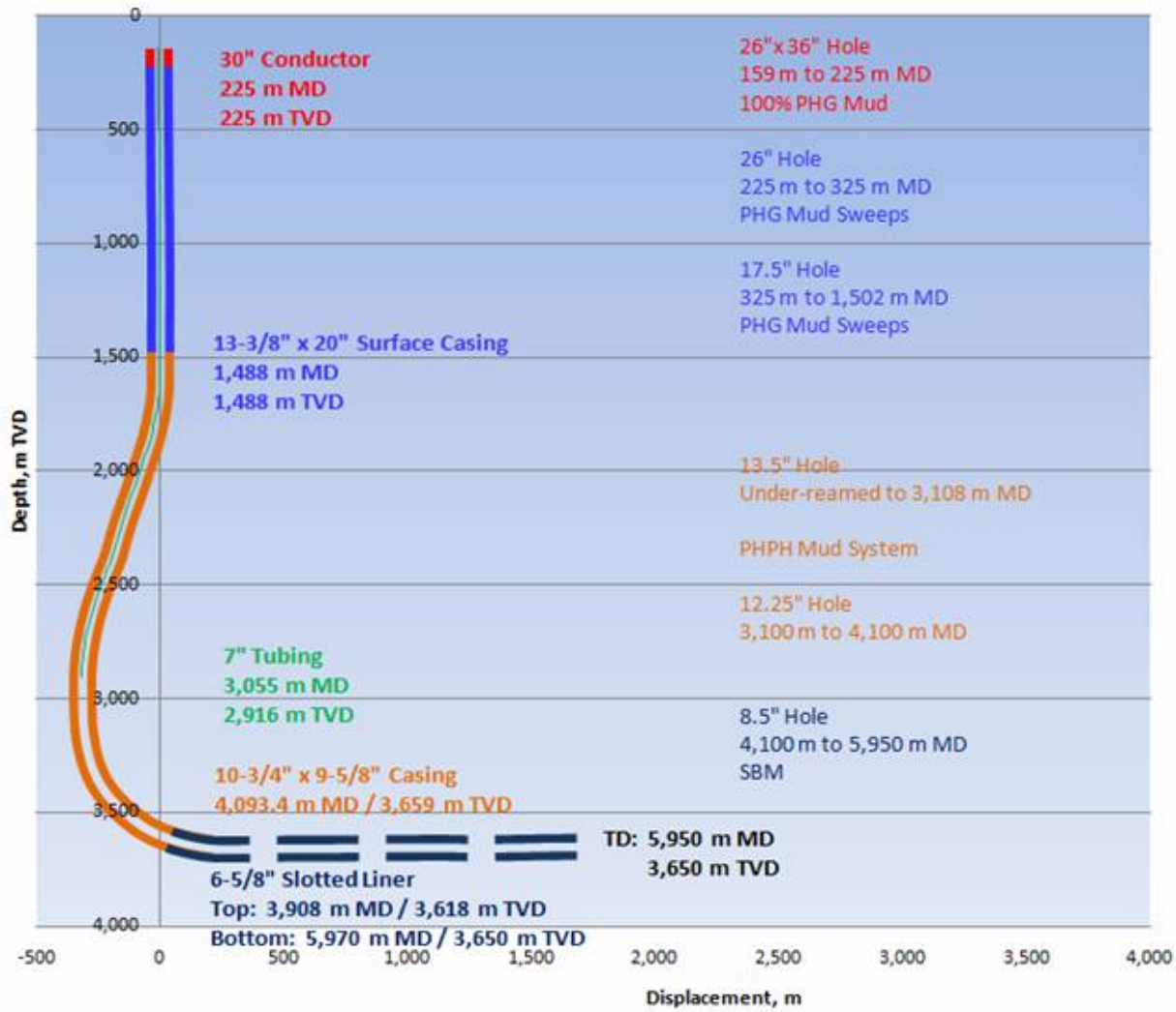
Well Design



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TUI WELL CONSTRUCTION ACHIEVEMENTS

- Success of the ‘lean’ well design
- Torque and drag modelling drove confidence
- Applied extended reach drilling best practices
- Resulting good hole condition
- Achieved solid well foundations in soft seabed
  - welded 30” top joint to housing
  - light weight cement
  - grouted mud mats

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TUI DEVELOPMENT WELL CONSTRUCTION

FID Budget

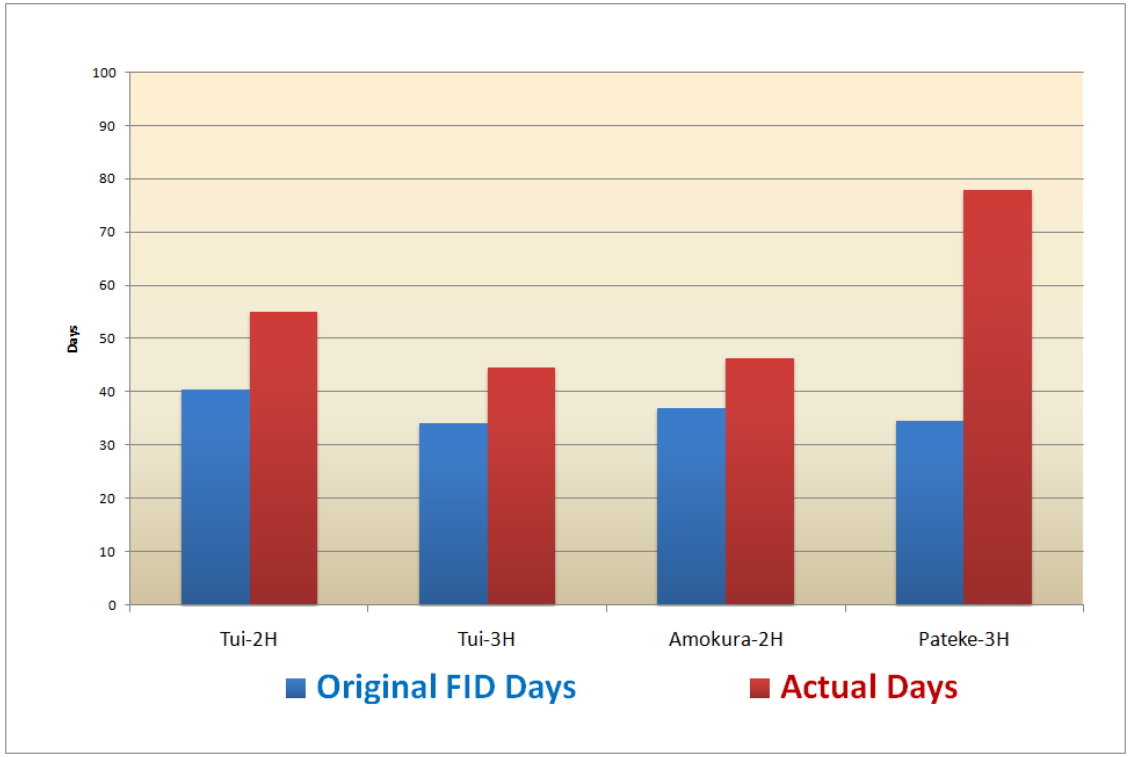
Average Well: 37 days

Average Cost / Well: US$21 million

Actual

Average Well: 47 days

Average Cost / Well: US$27 million



Excludes Pateke-3H fishing cost of US$13.6 million and 36.3 days due to the shear ram event (see Diamond's Drillsafe presentation)

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Next Well – (Tui-4H Follow-on project)

- No pilot holes.
- Eliminate 10-3/4” casing and its required under-reaming.
- More realistic time estimates to account for
  - rig specific productivity
  - more realistic directional penetration rates
  - more robust contingency allowance.
- Improve clean-up approach
- Pre-mobilise worst case fishing & sidetracking contingency package.
- Potential for multi-lateral well design
  - excellent well bore conditions achievable above and within reservoir.
- Detailed design and procedural refinements
  - Comprehensive look-back study completed

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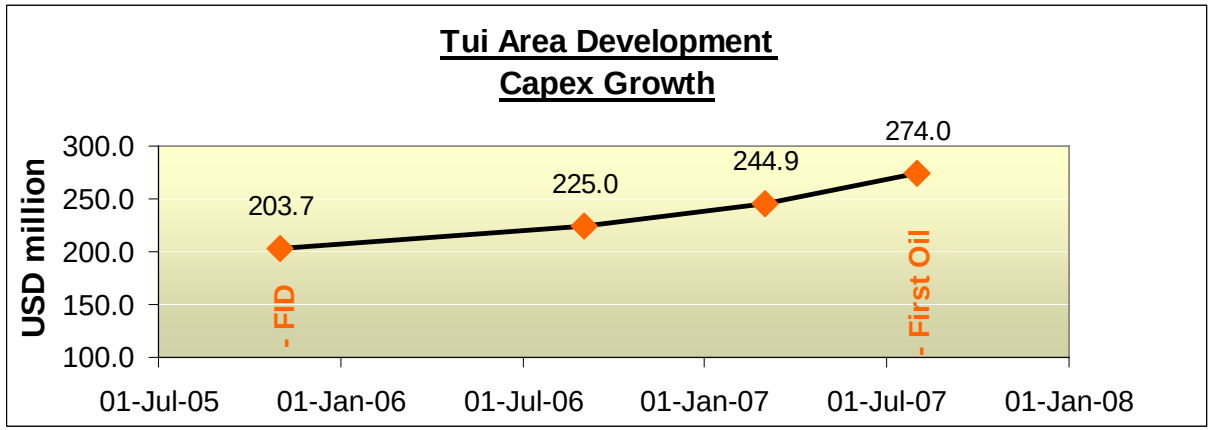
Cost Performance



- Ship yard and weather delays
- Equipment suppliers late delivery (extra HLV from Europe)
- Drilling overly optimistic schedule assumptions
- Peteke-3H severed pipe incident
- Underestimated FPSO mooring job (extra construction vessel)
- Drill rig AHSV dry-docking (mob in replacement vessel)
- Weakening USD
- Inadequate ‘growth’ allowance in budget
- Executed project in a period of hyper industry cost inflation

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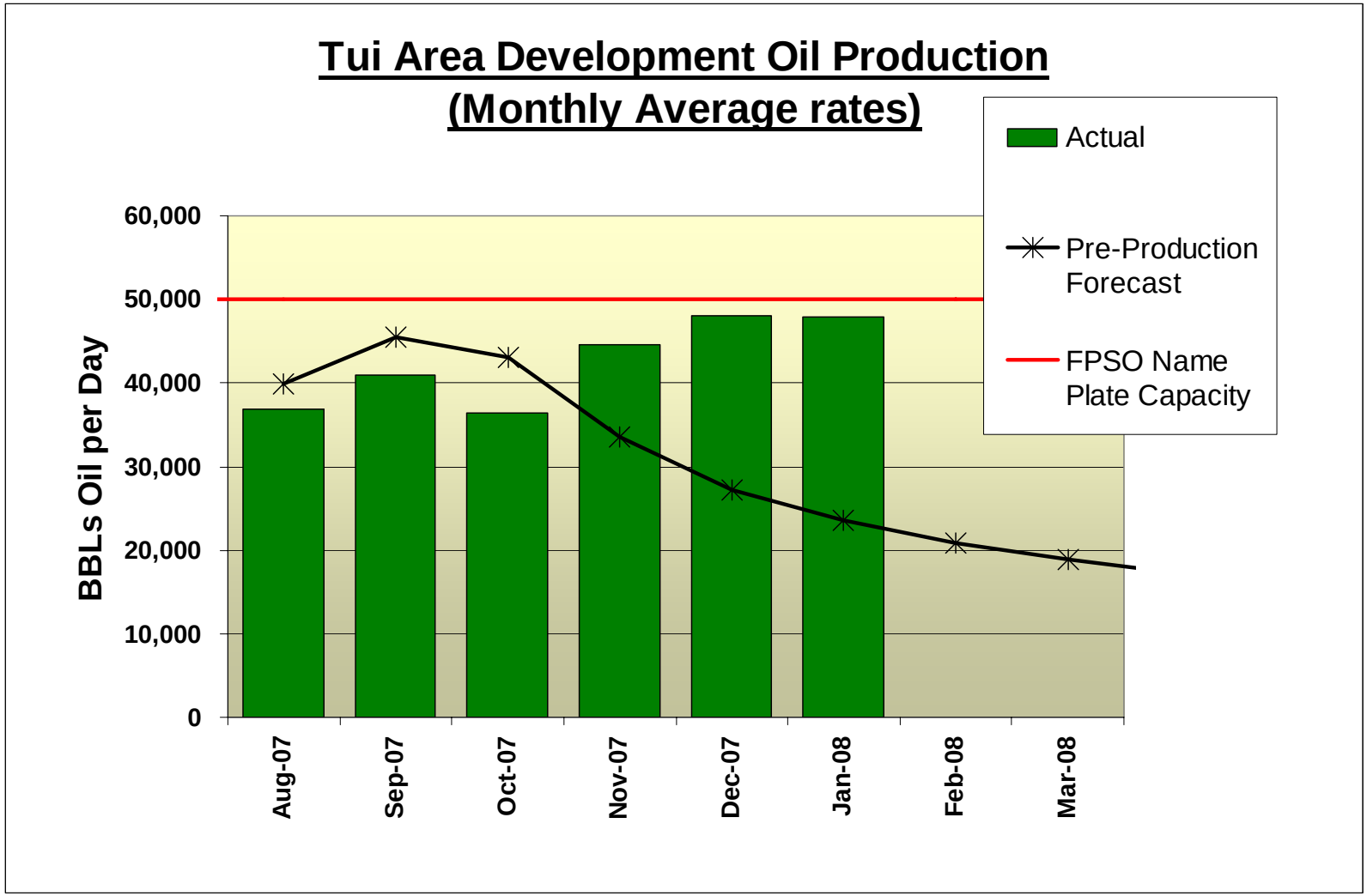
Production Performance to Date



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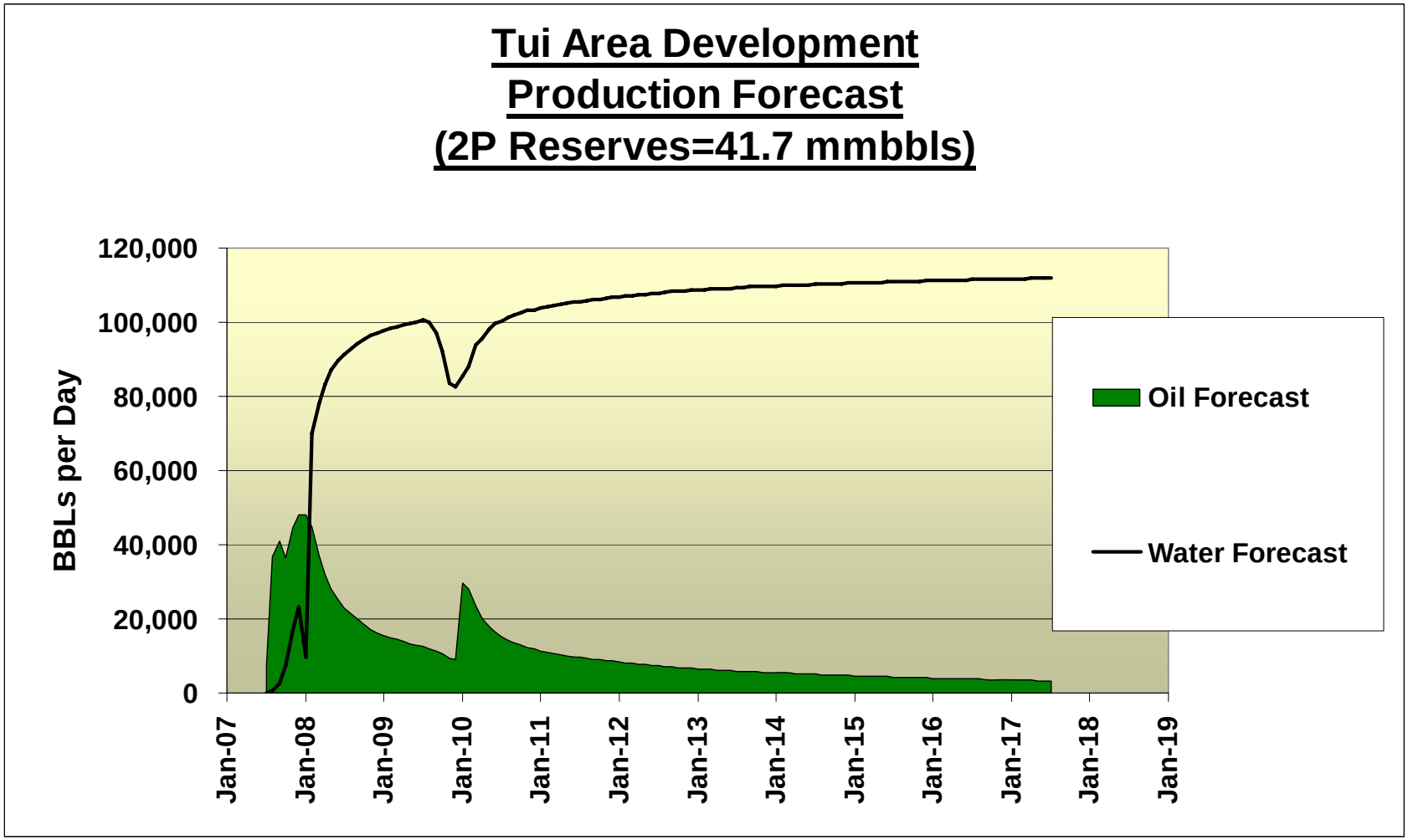
Field Life Forecast



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TUI DEVELOPMENT NZ RECORDS

- First stand alone offshore oil development
- Longest Offshore Well
- Longest Horizontal Well
- First Subsea Completion
- First use of new generation deep induction geosteering
- Most productive oil wells

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Prosafe Production Services PTE Ltd

Prosafe

… in 17 months

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Thank You


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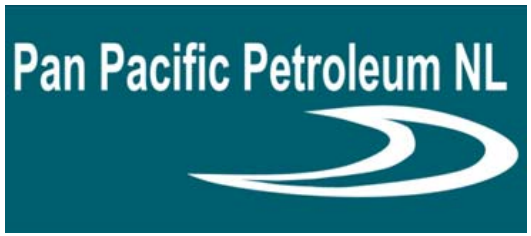
MEP Au
Mitsui E&P
Australia Pty Ltd


APS


NZ OIL & GAS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Prosafe