

FIELD DEVELOPMENT CASE STUDY

PETRONAS Carigali Sdn Bhd (PCSB) – Siwa
Offshore Sarawak

AWT DISCIPLINES

Reservoir Engineering
Production Technology
Completions Engineering
Drilling Engineering
Facilities Engineering
Project Economics

PROJECT BACKGROUND

The Siwa field is located in Block SK307, West Baram Delta, about 30km offshore Lutong. Discovered in 1973, first oil was produced in September 1985 initially from the SI-103 well, followed by SI-101, SI-105 and SI-106. All wells were completed as slanted dual string producers. Gas lift was initially installed as an artificial lift method in Siwa wells, but later Subsurface Hydraulic Jet Pumps (SHJP) were introduced as an alternative due to insufficient lift gas supply. The reservoirs exhibit strong aquifer support with an almost constant reservoir pressure, resulting in early water breakthrough. The high water cut wells, thin oil columns, unoptimised artificial lift system (SHJP) coupled with declining reserves have led to the deterioration of field production rates.

Because of this AWT was commissioned to rejuvenate the Siwa field through maximisation of recoverable reserves, identifying infill locations and creating the associated drilling programs, and productivity enhancement opportunities where new technology applications may provide benefit.

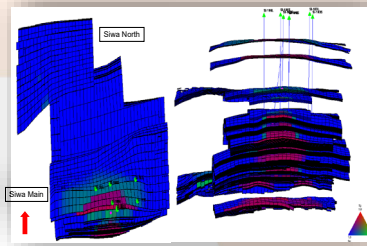
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AWT WORKSCOPE

The scope of work was split into a Full Field Review (FFR) and a Field Development Plan (FDP) to formulate an optimal development plan for the field, maximising the ultimate recovery from the field, while minimising the capital investment required.

FFR scope

- Geophysics
- Geology
- Petrophysics
- 3D Geostatic Modelling
- Classical Reservoir Engineering
- Reservoir Simulation
- Hydrocarbon-In-Place and Reserves
- Reservoir Management Plan (RMP)



Top and cross section view of the dynamic model

FDP Scope

- Development Plan
- Production Technology
- Production Forecast
- Drilling
- Facilities Engineering
- Operations and Maintenance Philosophy
- Projects Economics
- Project Schedule

AWT ADDED VALUE

The project was scheduled over an 18 month period and was completed on schedule, on budget and with all PCSB reviews completed.

The proposed Siwa field re-development improved Siwa simulated field recovery factors by 15% to 19%. This was achieved through:

- Drilling 2 new infill wells as the best way forward to enhance the Siwa oil recovery
- Completing the wells horizontally to boost performance and to minimise the occurrence of premature water coning to exploit Siwa's thin pay zones
- Optimising Subsurface Hydraulic Jet Pump (SHJP)
- Optimising drilling program
- Outlining a good Reservoir Management Plan (RMP)