



A Systems Approach to Production Management: Beryl Field Case Study

M. C. Arnordin, SPE, Mobil North Sea Limited and M. A. Jackson, SPE, Petroleum Experts Limited

Beryl field gas sales started in 1992 and a sales gas production management system was to be set up to ensure that the gas sales target was met without negatively impacting on the oil rates. There are two platforms on this field and for both of them the gas compression capacity is the limiting constraint.

A production system had already been designed and set up in previous years but was found to be inadequate in achieving the objectives. So the approach to creating an optimisation system was altered from previous attempts and could split into two sections:

1. Technical requirements

- Accurate description of produced fluid PVT properties for all reservoirs
- Reliable well test and pressure database
- Matched analytical and outflow models for each well
- Gathering system model with optimisation capability

2. Organisational Requirements

- Well surveillance procedures which ensure that each well is performing correctly on a daily basis
- Monthly review of well and system performance
- Strategic studies to assess the impact of commercial, reservoir and production equipment changes



Before any optimisation can be carried out, an accurate and reliable model which has been matched to field data has to be the starting point (carried out in PROSPER). A production optimisation model can then be designed to account for well interactions and backpressure effects as well as the following field management options:

- Determine the optimum GLR targets for each well
- Gaslift design modifications and problem diagnostics
- Well workover opportunities
- Calculation of matched VLP curves
- Estimation of current reservoir pressure

Benefits

Estimates suggest that optimisation efforts have reduced the gaslift requirements by 30% while achieving 15% uplift in daily oil production. The following were also improved: reaction time, diagnosis of well performance problems, production forecasts, efficiency in performing 'What-if' scenarios and modelling for changing constraints and operating conditions.