

SONAR flow meters for Gas lift optimization

Gas lift surveillance & production optimization

Summary

Expro's non-intrusive SONAR meters measure production and gas lift rates simultaneously in order to gain a full surveillance picture and help optimize gas lift rates for maximum production.



PassiveSONAR™ meter on production pipework (foreground) and ActiveSONAR™ meter on injection side (background)

Background

This massive field in the Middle East has been producing oil since the 1930s and remains one of the region's highest producing fields. Production from the field has declined significantly over the last 15 years; however, an initiative to revive the field has been undertaken a national oil company, together with a major international operator. The field produces oil from a combination of naturally flowing and gas lifted wells.

Field challenge

The first step in the revival of this field was an appraisal of the asset and its subsurface condition. The initial appraisal will then be used to create a field development plan. The operator also had a desire to improve field operations near-term, before implementation of the field development plan.

To appraise the current production situation, the operator required surveillance data to provide a baseline survey of well injection and production rates. Utilizing conventional trailer mounted test packages was not feasible due to the existing wellhead infrastructure, timing, logistics, HSE exposure and cost. For the gas lifted wells, the

Key deliverables

- Non-intrusive design
- Real time measurement
- No process shut down
- Multiphase surveillance
- Cost effective
- Accurate

Technology Used

- PassiveSONAR™ flow meter
- ActiveSONAR™ flow meter
- TPS Multiphase Software

Contact Information

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gas injection and production rates must be measured concurrently in order to properly account for the injected and produced gas.

Expro's solution

Expro was contracted to measure the production rates from the 10 highest priority wells in the field and, for gas lifted wells, also measure the rate of injection gas. Expro mobilized its *SonarTest*™ service, which utilized a *PassiveSONAR*™ flow meter, which was clamped onto the existing wellhead pipework upstream of the production choke to measure the velocity of the production from the well. For gas lifted wells, the *ActiveSONAR*™ flow meter was clamped onto the lift gas flow line. Production and gas lift rates were collected over several hours for each well, and each well was tested in one daytime shift. The SONAR data, along with wellhead pressure and temperature and watercut (by sampling), was collected and then post processed by Expro utilizing its *Total Production Surveillance Software*™ (TPS1000). TPS1000 is a multiphase interpretation model which leverages client provided wellbore compositional data, SONAR and other surface readings to infer oil, gas and water production rates at standard conditions.

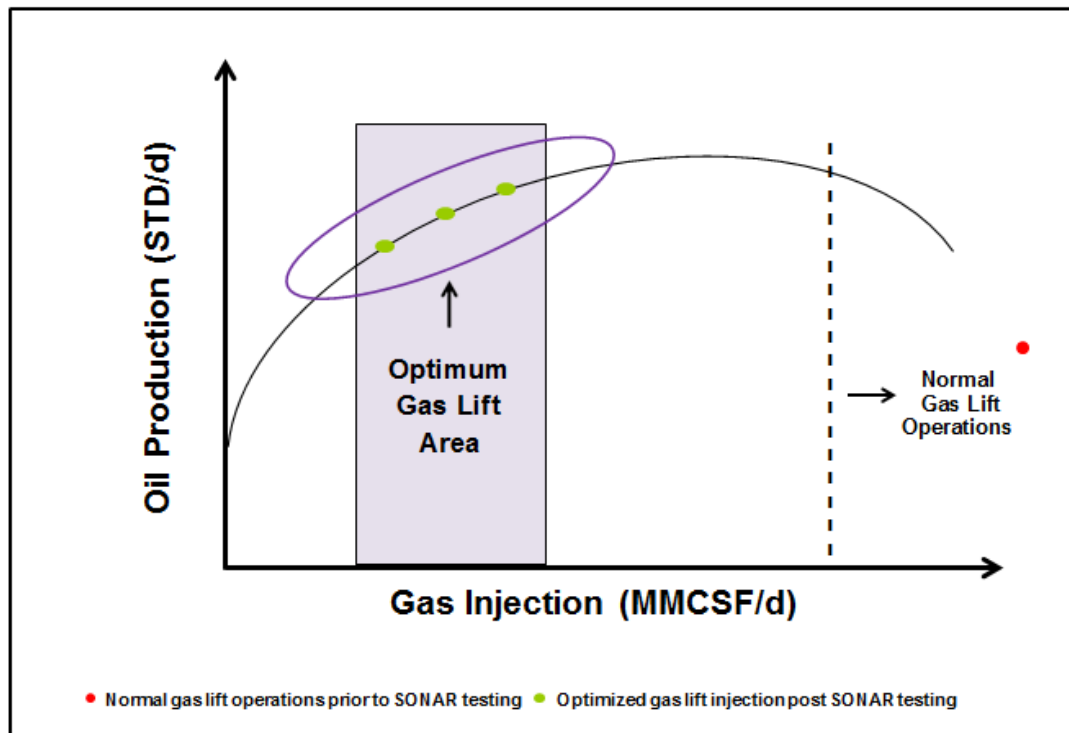


Figure 1: Gas Lift Optimization Curve

Result

Expro deployed its *SonarTest*™ package for approximately 10 operational days in the first campaign and another 10 days in the second campaign. The production rates and injection rates, as measured in each campaign, were analyzed and compared. The data showed, in some cases, the actual injection rates were in excess of five times the optimized rate, consequently, limiting the production from these wells. In the second campaign, the operator varied the gas injection rates for some wells and analyzed the resulting production rates, optimizing gas lift efficiency and increasing near-term production. All Expro field operations were conducted with national staff without HSE incident. The data was evaluated and compiled in *SonarTest*™ reports by the Expro Meters product center. The data provided the client's reservoir engineers with valuable surveillance information which will influence their appraisal of the subsurface infrastructure of the field and their field development plan. In the near-term, the surveillance results were used to develop actions to increase well production rates.