Integrated Field Management

Increased production and lowered lifting costs in mature fields

The Waddell Ranch project comprises more than 1,000 active producing wells and 300 water-injection wells in an area of approximately 323,750 ha [80,000 acres]. The project includes 47 fields producing from 14 horizons, with six major fields accounting for more than 90% of production. The fields have produced more than $6.7 \times 10^7 \text{ m}^3$ [420 million bbl] of oil and $18 \times 10^9 \text{ m}^3$ of gas [$638 \times 10^9 \text{ ft}^3$]. Most of the wells are produced by artificial lift. In 1991, as part of an aggressive exploitation scheme, the operator initiated a program to evaluate long-term reservoir performance, improve well maintenance, and apply appropriate recovery strategies.

Since 1998, Schlumberger Integrated Project Management (IPM) has been responsible for general management of the Waddell Ranch project, on a performance-based contract. IPM’s responsibilities include exploitation and operations engineering, field operations, revenue accounting, joint interest billing, accounts payable, and materials management. On average, the IPM project management team has included 35 technical professionals.

**IPM field-management expertise**

With extensive experience in the Permian Basin, IPM has contributed extensive, best-in-class field operations expertise to the Waddell Ranch project, including diagnostic dynamometer/fluid-level analysis, daily production monitoring and well testing, systems-failure management, and artificial lift optimization.

At the onset of the project, the Waddell Ranch fields were experiencing an equipment failure rate of 2.5 per well per year, far above the average in the region. A major goal of the project team was to reduce the rod, tubing, and pump failures to less than one failure per well per year. To that end, the IPM team restructured the field organization around the well-maintenance process. A number of artificial lift problems were identified, including hydrogen sulfide corrosion, significant paraffin and asphaltene levels, scale buildup, and mechanical wear caused by high lift volumes. The IPM team initiated a maintenance program to address these problems.

Under IPM’s integrated approach, the project teams reduced well failures to 0.25 per well per year, far below the average in the region, and saved more than USD 1 million in operating expense. Subsequently, the teams developed optimization techniques that significantly increased production through lift analysis and lift efficiency improvements. In 2005, lifting costs were USD 0.85 per m$^3$ [USD 5.35 per bbl] and USD 0.025 per m$^3$ [USD 0.89 per Mcf], lower than had been predicted, and the operator’s rate of return on capital invested had exceeded 100%.

**Case study:**

**Waddell Ranch, Permian Basin, Texas**

**Objectives**

- Evaluate long-term reservoir performance
- Reduce lift system failures
- Increase production

**Solution**

- Implement a total field management program directed by Schlumberger IPM

**Benefits**

- Reduced well lift system failures to 0.25 per year
- Increased production by 40%
- Reduced direct lifting costs by 26%