

Advanced Lifting Services Extended Well Testing

Diagnostics used to identify production enhancement opportunities

Reservoir diagnostics are performed to estimate the reservoir and near-wellbore properties that are used in defining exploitation strategy and in understanding production enhancement opportunities. These diagnoses primarily involve transient analysis of the pressure data captured during a well startup or shutdown operation. In a routine production operation, pressure transient data usable for analysis are drawdown or buildup data. Drawdown data is acquired when a well is started after a shut-in of sufficient duration. Buildup data, on the other hand, is acquired when a well is shut in and the pressure builds up in the wellbore. Analyses of these tests can yield important information, such as the extent of the reservoir, effectiveness of the completion, and need for stimulation.

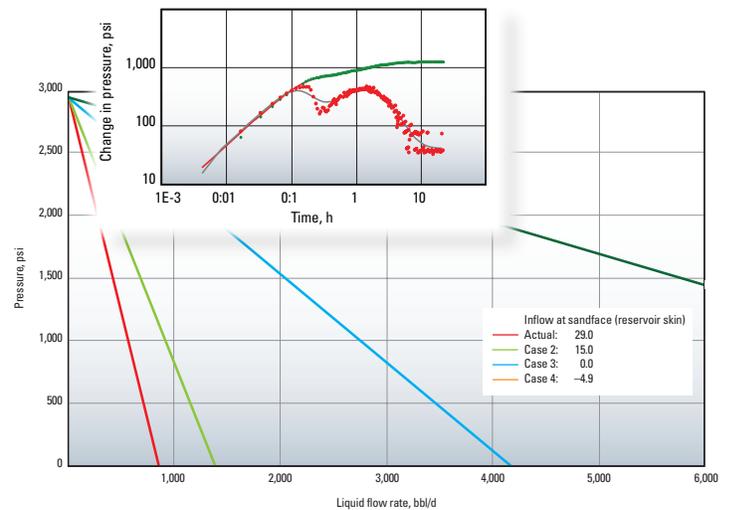
Conventional well testing is performed by placing sensors in the borehole using wireline or electric line. Wells under Advanced Lifting Services can be tested similarly using downhole sensors installed on a pump or gas lift system.

After the initial analysis, experts at the Production Center of Excellence assume the lead in directing the diagnostic process. During the well test, an experienced surveillance engineer will monitor the key parameters of the well's behavior in real time to evaluate the lifting system efficiency. A knowledgeable reservoir engineer will design and recommend the appropriate diagnostic procedure. The team will make recommendations to improve the efficiency of the lifting system (outflow) as well as the productivity of the reservoir (inflow).

SURVEILLANCE SERVICE

Typically scheduled to last 30 days, surveillance during a well test is designed with the following features:

- fully automated raw data acquisition with historical data storage and Web-based presentation with the ability to download to the desktop
- user-configurable alarms and callouts based on user requirements, with notification to most communication devices
- access to all parameters in real time
- access to control of wellsite hardware including variable speed drive, switchboard, controller set points, etc.
- summary reports available on demand on the Web site
- trend analysis of well parameters to evaluate alarm events.



The reservoir quality gauge provides crucial data to enable transient analysis, boundary identification, and permeability analysis. Schlumberger Advanced Lifting Services combines reservoir and artificial lift expertise to help the operator analyze and remediate inflow problems.

The frequency of data accessed on the Web is set according to the well condition. A stabilized well is polled once every day and at every alarm event.

DIAGNOSTIC SERVICE

One of the features of the extended well testing service is a system health check, which includes a diagnostic analysis of the reservoir and the lift system. This health check examines the entire lifting system efficiency as well as the deliverability of the reservoir. When appropriate, the system health check includes a recommendation for production enhancement.

Other diagnostic services may be performed, as needed, based on the following scenarios.

- Alarm-based diagnostics. Diagnostics are performed when an alarm indicates inefficiency in the system.
- Event-based diagnostics. Diagnostics with defined objectives are performed when requested by the operator.