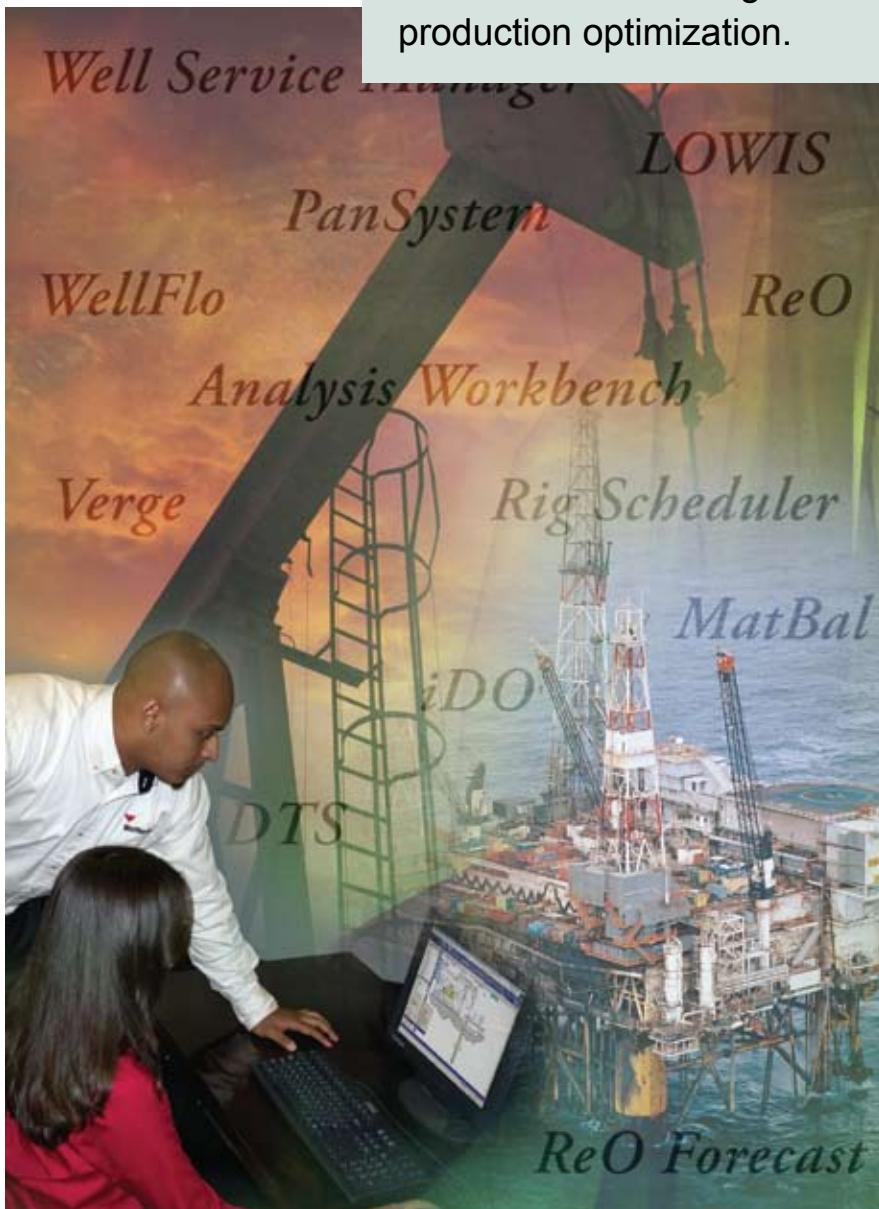


# Field Office™

## Real-time Production Optimization Software

A software suite designed for comprehensive production optimization.



**Weatherford®**

# Real-time Production Optimization

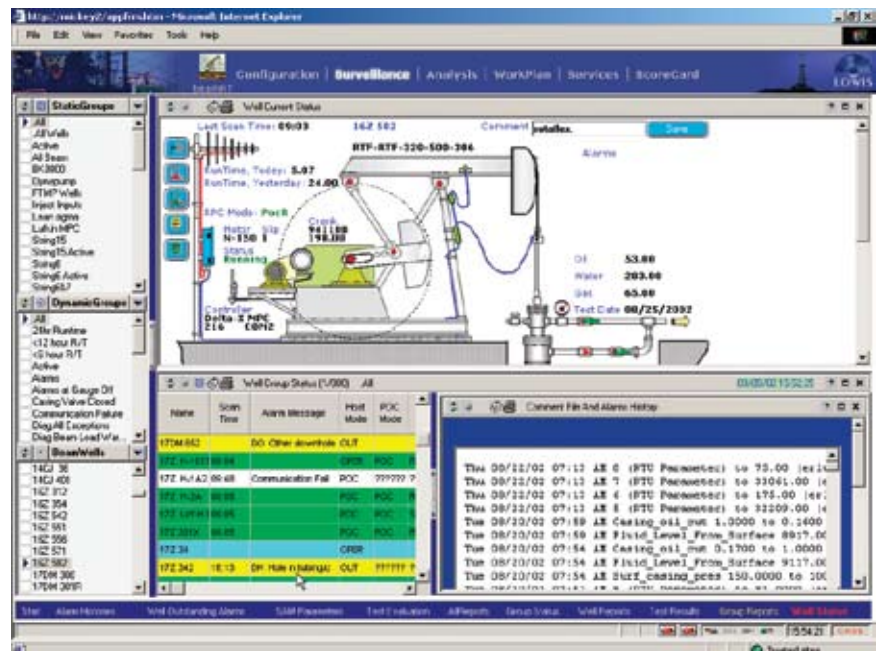


Weatherford recognizes that different types of wells and reservoirs require different methods of optimization. Therefore, we provide the *Field Office* suite of specialized production optimization software tools. These tools help operators achieve real-time results for operational efficiencies, namely increased production, decreased lifting costs and minimized downtime. The package includes industry-leading applications providing optimization for all forms of artificial lift, well design, reservoir monitoring, well testing and workflow management. It is a full-field package for surface to subsurface modeling, analysis and optimization.

Weatherford's real-time surveillance and analysis tools grant significant time savings and a more attractive bottom line by providing notification of those wells that are underperforming, replacing rote field surveillance with automated event detection and consolidating disparate field data. This enables workers and managers to make better decisions faster with around-the-clock surveillance of key field performance indicators.

Production, real-time well surveillance, analysis and servicing data are integrated into a shared database where the user can easily compare information historically through trends, comparatively across wells and effectively through modeling how changes affect performance of assets and the entire field operations.

*Over 90,000 wells worldwide are optimized with Field Office components.*



LOWIS™ software.



## An Open Solution

The *Field Office* suite standardizes workflows by communally tracking tasks with a common interface. Enabling worldwide access to data, the software provides unifying tools across geographical and domain obstacles, and a shared interface reduces training and new technology adoption downtime. The standard platform can be used across multiple asset types, and there is a seamless integration between the tools and legacy supervisory control and data acquisition (SCADA) systems. That means prior investments can be incorporated in the new systems.

The application follows open standards to assure that existing hardware and software tools can be incorporated into a comprehensive production optimization solution. The program uses web services/production markup language (ProdML™) for data integration, object-linking and embedding (OLE) for process controls (OPC) to access real-time systems and it has the ability to connect to reservoir modeling tools and other engineering applications.

*Field Office* solutions are customizable to your specific needs and asset types.

### Financial Benefits for Customers

- Early detection of downtime
- Incremental production increases
  - Lift optimization
  - System optimization
- Reduced failures
- Efficient rig scheduling
- Workover planning and forecasting
- Identification of system bottlenecks
  - Compressors, separators
- Knowledge development tool
  - Scorecards to enable personnel development
  - Establish key performance indicators (KPIs) for asset management
- Eliminate errors
  - Integrated toolset helps with earlier detection of problems
- Asset optimization



## *Real-time Decisions*



# Real-time Production Optimization

## Why choose *Field Office* suite over mixing solutions from multiple providers?

- Integrated solutions provide significant value
- Closes the loop between real-time operations and engineering
- Field-proven software
- Single source
- One support group
- Reduces vendor/supplier finger-pointing or blame game
- Field optimization is realized in real-time

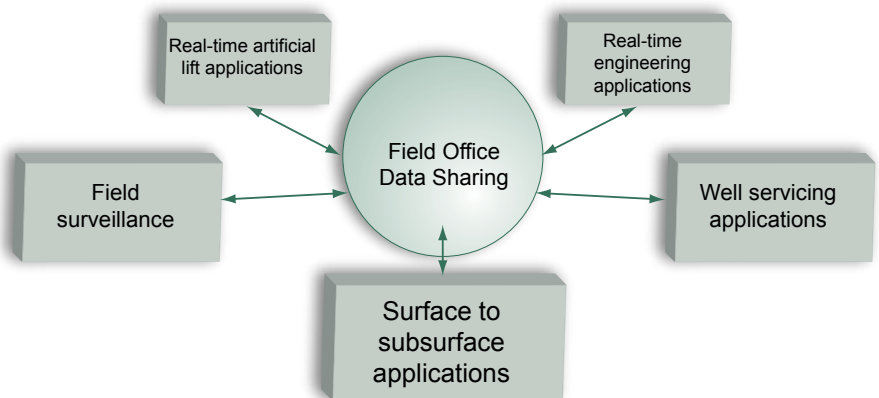
## Integrated Capabilities

The suite components are chosen based on the needs of the users. By choosing only the modules needed, producers are able to address their current needs while keeping a plan to expand the system in the future. When designing their specific suite, operators can use information from real-time and relational data sources so that advanced analysis previously based on last week's or last month's information is now based on today's.

More importantly, the applications data is interchangeable. The programs combine data from real-time artificial lift systems, real-time engineering applications, surface to subsurface modeling programs and well servicing programs. Data collected by one person can be used by someone else in a different domain to better do their job. Examples are using production well test data for reservoir modeling evaluation, evaluating well workovers based on the input from the field workers and evaluating the entire field network using real-time data from the artificial lift and SCADA systems.

Weatherford's solution set is the result of extensive new development coupled with proven software applications from eProduction Solutions (eP), Edinburgh Petroleum Services (EPS) and Case Services. The acquisition of these companies by Weatherford created the opportunity to bundle advanced oilfield applications including **WellFlo™**, **DynaLift™**, **PanSystem™**, **PanMesh™**, **MatBal™**, **ReO™**, **ReO Forecast™** and **LOWIS** software.

## Integrated Workflow



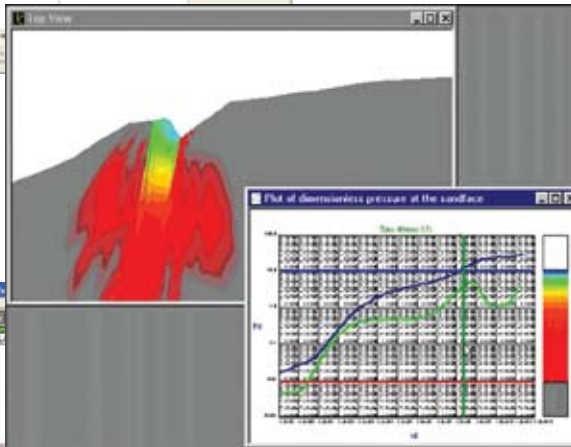
Data collected from one domain can be used for analysis in another.



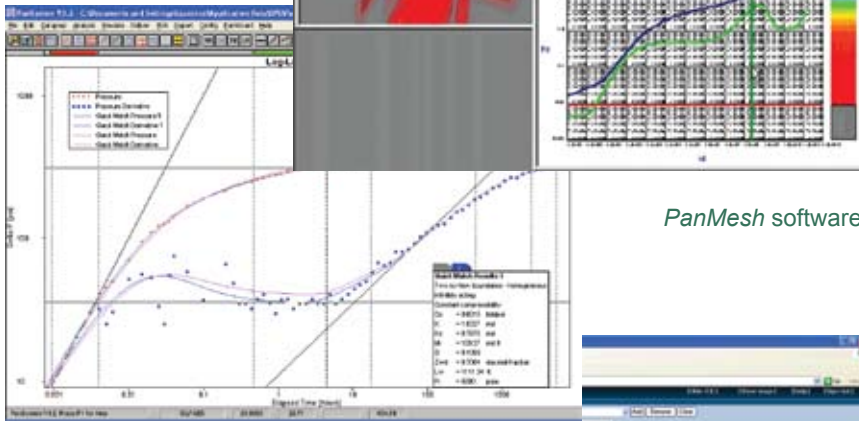
# Real-time Production Optimization



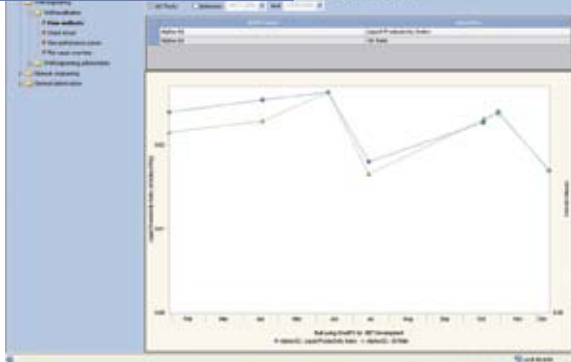
WellFlo software.



PanMesh software.



PanSystem software.



i-DO™ software.



# Real-time Production Optimization

**PanSystem™** software is the industry leading well testing program. A pressure transient well test has the unique ability to obtain information from within the reservoir surrounding the well. With appropriate testing techniques well testing can provide a wealth of information including permeability, completion efficiency, well performance, production forecasts and reservoir structure and pressure.

**LOWIS™** software provides a unique combination of real-time surveillance, analysis and well service management tools, empowering producers to better organize and standardize their production workflow processes. Using the software, operators can quickly identify, prioritize, plan and service poor performing wells, thereby reducing downtime and the associated production losses.

**PanMesh™** software makes numerical simulation accessible to the well test analyst without requiring simulation expertise. It can be used to simulate bottomhole flowing pressures for history matching to a well test data set, or to design a well test. It uses numerical simulation which envelopes all existing analytical solutions and has potentially unlimited flexibility including three-dimensional models. Almost any geometry can be represented, encompassing multiple layers, irregular boundaries and multiple completions.

**WellFlo™** systems analysis software is a powerful and simple-to-use stand-alone application to design, model, optimize and troubleshoot naturally flowing or artificially lifted oil and gas wells. Using a guided step-by-step well configuration interface, the engineer builds accurate and rigorous well models. They display the behavior of reservoir inflow, well tubing and surface pipeline flow, for any reservoir fluid. Using *WellFlo* software results in more effective capital expenditure by enhancing the design of wells and completions, reducing operating expenditure by finding and curing production problems and enhancing revenues by improving well performance.

**MatBal™** software is designed for reservoir analysis and reservoir-centered production forecasting based on a material balance approach. For engineering applications, it provides a quick and easy alternative to a full reservoir simulation study. Additionally, the program provides a way of understanding the size of reserves and subsurface connectivity between reservoirs and aquifer to assess the commercial viability of a new development.

**DTSPPlus™** software is an application for reviewing and managing distributed temperature sensor (DTS) data. It provides temperature profiling data viewing, analysis and management. The data can be exported to SQL databases, LAS, POSC (PRODML) and ASCII format files. The displays include animations relative to baseline DTS data and user-specified data interval density (in time).

## Integrated C

### Well Optimization

*PanSystem*

*PanMesh*

*WellFlo*

*LOWIS*



*MatBal*

*DTSPPlus*

### Reservoir Optimization



# Real-time Production Optimization

**Analysis Workbench™** software promotes faster diagnosis and remediation of production problems for artificially lifted and flowing wells. With this program, you can analyze and optimize your wells using real-time information enabling you to zero in on probable performance problems before well intervention.

**ReO Forecast™** software is a production forecasting and field planning tool that supports engineers and managers making business planning decisions for oil and gas fields. It seamlessly links together models of the reservoir, wellbore and surface equipment to predict their combined performance and detailed interactions. This allows integrated production forecasting and optimization from reservoir to delivery point.

## Components

### Asset Optimization

*Analysis Workbench*

*LOWIS*

*Verge*

*WSM*

*ReO*



**ReO™** software is a simulation solution for surface networks incorporating everything from individual wellhead performance to the macro-details of the processing plant. It provides essential information on current operating conditions and asset performance. Concurrently, the program optimizes the user defined economic model and generates alternative production system management strategies, which typically result in substantial production increases and simultaneous reductions in operating costs.

**Verge™** software provides a view of current field data in an easy-to-use interface that displays simplistic views of complex analysis. This data provides the answers to real-life issues that occur in producing oil and gas fields such as visualizing data trends, evaluating operations and making important workover well profiles and predictions. The user can analyze pattern flood analysis, enhanced recovery projects, recovery and depletion monitoring, validating effectiveness of remedial work, early detection of performance problems and decline curve analysis. The powerful calculation engine's functions can be linked to create complex expressions to accurately describe well behaviors and provide statistical analysis.

### Field Optimization

*i-DO*

*ReO*

*ReO Forecast*

**Well Service Manager™** (WSM) software is used to prioritize and plan well service events. It presents histories in comparative graphs and reports to help determine best operating practices. Web reporting tools facilitate enhanced information exchange across the enterprise to help you understand your operational issues and cost drivers. Specific service events are included in the package for tubing and rod failures, pump failure workovers and workovers costs trended over time.

**i-DO™** software links real-time downhole, surface and corporate data sources to ensure that reservoir, well and facility models are constantly monitored and updated to reflect actual operating conditions. The system integrates production data management and reservoir modeling with transient pressure analysis, well modeling and surface network modeling and optimization. The system can be applied without modification to a wide range of production optimization problems, including downhole controls in smart wells and intelligent completions.



# Real-time Production Optimization



## Field-proven Results

A large multinational E&P company operates an offshore gas-lifted field in the North Sea. This complex asset presents the operator with numerous operational challenges due to the dynamic nature of the operation and the need to operate within the constraints of available lift gas. With the ultimate goal of increasing total production and ensuring optimum asset utilization, components of Weatherford's *Field Office* software suite are used to enable the operator to optimize the operation within this demanding environment.

The impact of daily operational decisions on production is highly complex, especially in this dynamic offshore environment where conditions can change radically from one day to the next. Therefore, a real-time solution was installed that not only gave operators key information on well conditions so they were not making engineering decisions in the dark, but also could be used offline as a "what if" tool for allocating lift gas, debottlenecking, adding new wells, validating production well tests, identifying which wells to test and other production management tasks.

The combination of *WellFlo* systems analysis software and *ReO* network optimization software provides a complete reservoir inflow to sales point optimization model that considers the entire production system and uncovers opportunities not identified by traditional techniques. Weatherford's Intelligent Daily Operations (*i-DO*) solution connects the *ReO* and *WellFlo* models to real-time data and allows the models to be updated automatically, reducing the optimization cycle time which, in turn, enables sustainable production gains.

Other key benefits include improved asset understanding and problem detection achieved through early and automated well surveillance and increased production through improved asset operating modes and workflows.

*"Software solutions from Weatherford are making the promise of the digital oilfield a reality today."*



# Real-time Production Optimization

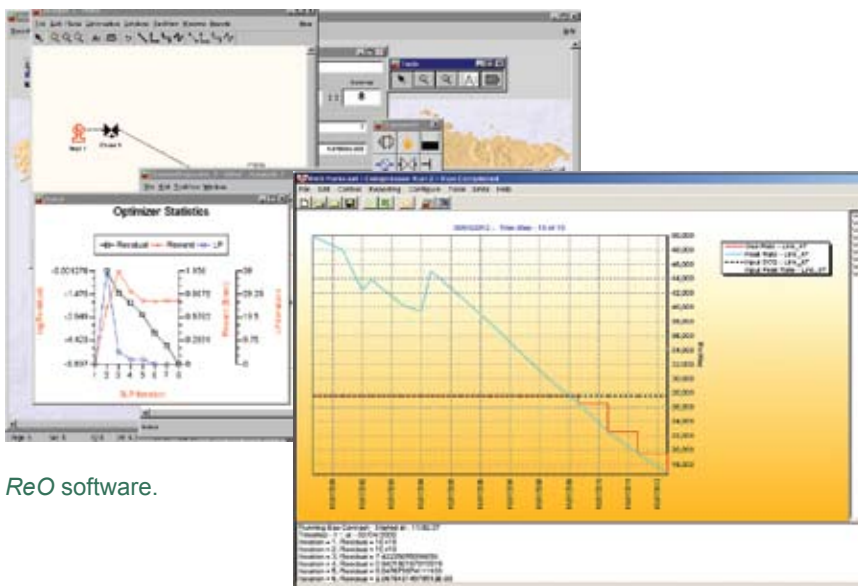
A major producer in Nigeria operates 3000 wells in the Niger Delta with a total daily production of approximately 1,000,000 bbl/day of oil and 1,700 MMScf/day of gas.

Software solutions from Weatherford provide an integrated subsurface-surface production optimization model for this operation to enhance the performance of the assets and improve total field management.

*WellFlo* and *ReO* software model the entire surface infrastructure of the operation including the integrated pressure and volume behavior of the surface flow lines. This *ReO* model allows the customer to evaluate different operating scenarios to meet a number of specific business objectives including the following:

- Maximization of oil production for a specified flare limit
- Optimization of produced oil quality including blending of different fluids
- Identification of under-performing wells and facilities
- Surveillance and monitoring to achieve daily performance improvement of wells

Weatherford's *ReO Forecast* software provides time-dependent integrated surface and subsurface production forecasts, accounting for reservoir decline over the life of the asset. This integrated surface-subsurface production system model will include both oil and gas reservoirs with associated wells and model both the oil production and gas gathering networks. This demonstrates that *ReO* and *ReO Forecast* software can be effectively used to model the impact of changing reservoir conditions. As a result, these *Field Office* components will predict optimal production performance over time and also minimize lost production due to planned/unplanned production network downtime.



ReO software.

ReO Forecast software.



# Real-time Production Optimization

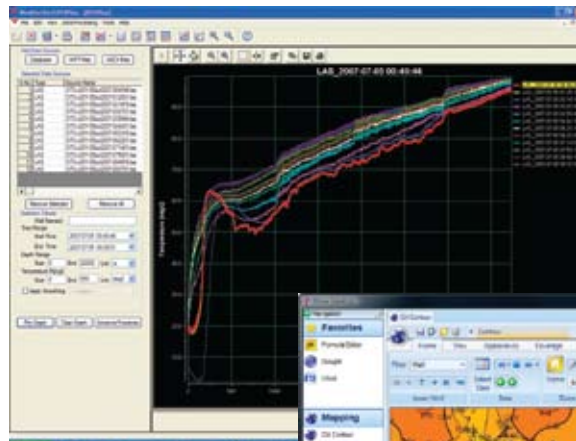


## Training

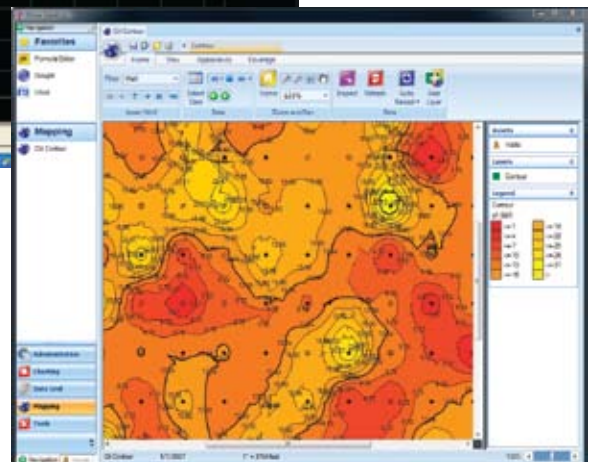
Weatherford instructors draw from wide international experience and expertise in applying industry best practices to reach each student's development goals and technical requirements. Many of the techniques taught are applied through our advanced EPS Products engineering software. Delivered by internationally-respected practicing engineers and teachers, course attendees leave with a full understanding of the intricacies and issues of the subject matter, including both theoretical and practical application of engineering techniques.

Three levels of course training, general, engineer and advanced, ensure that content and subject matter are pertinent to the intended audience. The background of the attendees often provides a major enhancement to the total class experience as they bring their own unique experience to the training courses and learn much from each other, as well as the instructor.

**Your facility or ours.** The courses can be delivered at the client's facility or can be attended at one of Weatherford's multiple training facilities worldwide, including our premier facility located on the campus at Heriot-Watt University in Edinburgh, Scotland. Some examples of open course titles are Well Test Analysis, Advanced Gas Reservoir Engineering, Production Logging and courses such as *PanSystem* and *WellFlo* Software User Training.



DTSP software.



Verge software.

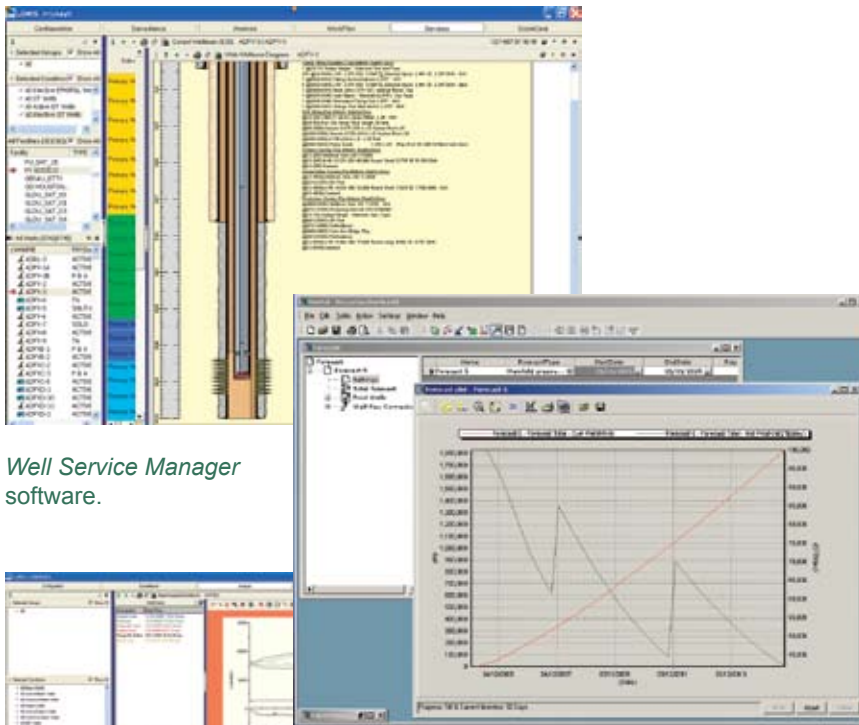


## Consulting Services

Weatherford provides advanced consultant services to clients all over the world. We offer solutions for wells, fields and reservoirs. These services range from a single well test analysis project or production optimization to delivery of full-field integrated development plans and the technical management of offshore fields.

Weatherford employs a host of experienced professional engineers and technicians. The diverse backgrounds of our staff mean that the application of advanced technology is accompanied by a solid understanding of the cultural and business context in which it must succeed. Clients include E&P companies (operating and non-operating), service companies, stockbrokers and banks.

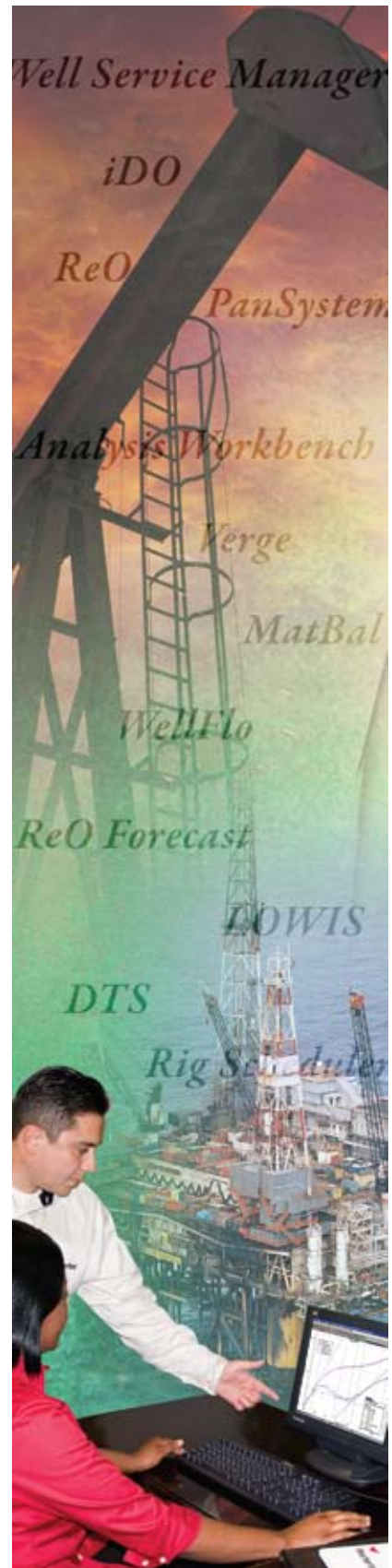
Our range of services include: production optimization, well data integration, reservoir engineering, field development planning and reservoir management. Contact any Weatherford office worldwide for more information about specific consulting services.



*Well Service Manager* software.



*Analysis Workbench* software.



*MatBal* software.





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