

# Production Optimization in Shale Operations with Real-time Analytics



OIL & GAS

We are in the midst of an oil industry revolution. Well, maybe not a revolution, but certainly an evolution. The way we produce oil is changing, and major players in the game are updating their thinking right along with their field technologies.

The Peak Oil argument of a few years ago may have been disproved, but today it's normal to go further, explore deeper waters, or work harder to extract available reserves. In the case of shale reservoirs, "working harder" means developing and applying technology advancements to produce oil from previously uneconomic assets.

The challenge, of course, is that shale reservoirs do not display the same flow characteristics as conventional reservoirs. In this uncertain world, how are companies working to create a better, more informed environment so that shale operations can be more predictable?

## Data Delivers More Oil

In the Eagle Ford play in South Texas, one major operator sought to do just that: evolve their understanding of shale production to improve predictability and maximize returns. The plan was to move data from these operations into an automated system so that functions could be aggregated and calculated, in real-time, as well as available to all users enabling better informed decisions and increase production.

## High-Level System Architecture

The solution was to apply proven data warehousing principles to data from multiple sources, generating useful information that engineers can use to optimize reservoir production. In addition, accuracy, manageability and transparency enables quick identification of and response to issues in the field—all while reducing the amount of time spent managing data.

The Integrated Data Environment combines and improves the quality of disjointed data from several sources, including production monitoring (SCADA),

equipment records, and well master data, plus a host of "spreadsmarts"—an uncontrolled set of spreadsheets. These spreadsheets served as a complex chain of custom code and siloed data, and the advent of the IDE has enabled most to be retired, thereby eliminating much of the decision risk from poor quality and inconsistent data.

For the first time, it is possible for all Reservoir Engineers, Production Engineers, and Geoscientists to access the same data using their preferred applications without having to rely on cumbersome and error-prone manual processes.

IDE comprises several components and interfaces between multiple applications. Sources of data and tools within the IDE are utilized to both analyze and display results.

The core of the environment is the integration of data within the data warehouse, providing all systems and all users with a consistent base of data of known quality, origin, and timeframe.

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## Production Surveillance

The surveillance of individual wells, as well as the field at large, enables operations personnel to monitor production rates and related parameters and to analyze well and reservoir performance in relevant time. Users continue to operate on the data using established engineering, analysis, and visualization tools.

Key objectives of integrated production surveillance:

- Monitor well behavior and response to changes in operating parameters

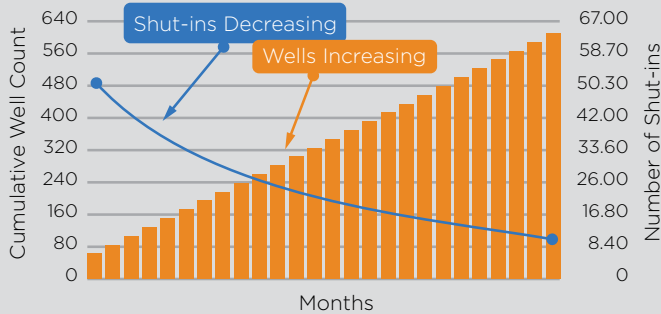
- Continuously gather and aggregate data in pre-defined hierarchical groups (e.g. area, asset, route and reservoir) for real-time monitoring and analysis
- Present key performance indicators for wells and facilities

Primary benefits of an effective production surveillance strategy:

- Reduce production deferment by minimizing curtailment
- Maximize reliability through faster and more accurate decision making
- Capture other commercial opportunities across the asset
- Reduce non-productive time through automation of manual processes

Well, facility, and reservoir surveillance allows early detection of potential issues, and the IDE provides consistent, high-quality data to the diagnostic tools that help the production engineers identify root cause(s).

### Decreased Shut-ins Despite Increased Wells



### Wellsite Tank Management

A secondary benefit of the increase in data visibility and production efficiency was the ability to better manage oil hauling operations. With minimal pipeline infrastructure in the field, this process (including Tank Management, Logistics and Optimization) has minimized well curtailment (shut-in and choke-back) due to tank capacity limitations.

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Because of the data collected, engineers were able to create a tank fill prediction algorithm including temperature corrections, reducing shut-ins by 90 percent. This allowed the customer to improve their produced oil trucking procedures. The modified process maximized oil production, generated more sales of oil and condensates, and led to improved communications between key stakeholders in the process.

This lucrative byproduct of the work already being implemented illustrates a fine example of one Teradata philosophy: If you manage data once and manage it well, you can reuse it elsewhere and often.

### Delivering on a Data Promise

At many oil and gas companies, process-related information lives in one application, while asset-related information lives in another. Moreover, additional critical data resides in other databases scattered across the organization. The smartest organizations are recognizing that this flood of data isn't simply a technology challenge, but one that reaches into all aspects of their business. Teradata solutions for the oil and gas industry can put all of that data to work for you.

Not only has this customer been able to better manage their data holistically, they have rapidly increased their understanding of the reservoir. As a result, they have consistently and repeatedly raised their Estimated Ultimate Recovery (EUR) for the asset.

The Integrated Data Environment is credited with a 1-2 percent increase in production, and improved HSE reporting and control—benefits which are now being extended to all other business units within the United States.

The overall solution has shown much better optimization in production. Formerly, standard recovery hovered around 5-7 percent. With these operations in place, the value has significantly increased.

Teradata can implement these same solutions for you. Arm yourself with the best possible information, and you enable the best business decisions for your subsurface assets. When you know more, you can do more.

