FROM FIELD TO DESK:
AUTOMATED FIELD SURVEILLANCE FOR RESERVOIR MANAGEMENT

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Daily Field surveillance is of great importance because it allows users to tackle production issues, improve reservoir knowledge and maximize recovery. However, some practical challenges of data handling increase time requirements and reduce the efficiency and the appeal of routine reservoir surveillance. In addition, high frequency information opens the possibility to control and optimize field production in real-time but the data cannot be effectively managed by ad-hoc spreadsheet solutions and requires a more integrated approach.

This paper is focused on the lessons learnt from the ENI experience in developing and applying an intelligent automated surveillance system in several fields worldwide, reviewing the main challenges to address for a successful initiative. In essence, the ENI automated surveillance system consists in a technology framework to orchestrate five key components: data, processes, workflow automation, smart surveillance and people. It is highly focused on saving time and effort in routine standardized analysis of well and field behavior by transforming crude data into valuable information in an automated fashion.

ENGINEERING WORKFLOWS PROVIDE INTEGRATED OPERATIONS
AND STREAMLINE REAL-TIME PRODUCTION OPTIMIZATION

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This paper explores the results of Pemex’s successful implementation of One Virtual Source for real-time Production Surveillance and Optimization of a large on-shore field in Mexico. It further examines the fundamental aspects of large-scale workflow delivery in a real-world environment—in this case, involving over 200 wells producing over 200,000 STBD, 50+ users, multiple and often conflicting sources of data (ex: Field vs. SCADA), and integration of production modeling applications from multiple vendors. The solution combines automation of production modeling workflows, real-time monitoring, Surveillance-by-Exception, and virtual integration of 8 data sources— including real-time, operational, well test, field data, and others—into a single and user-friendly environment. It has been designed with the asset in mind, and has delivered their on their goals to:

• Maximize total oil production
• Minimize downtime
• Enable virtual well flowrate metering
• Establish a well performance overview, providing a single point-of-access to all available information
• Standardize engineering processes across the asset, with a heavy emphasis on automation and analytics

The “intangible” benefits of standardizing processes and providing readily-available access to information are seen as key enablers of the more directly measurable economic benefits.
VIRTUAL INTEGRATION AND DATA MANAGEMENT IN GOODRICH PETROLEUM

It is not unusual for oil and gas companies to have somewhat eclectic data infrastructures that are very different from one organization to another within the same company (Financial, Production, Drilling, Lease Management, etc.). This infrastructure usually includes various vintages of data, and a host of information sources from various vendors leveraging different architectures, a wide range of data frequencies, data standards, and customized database structures.

In most cases, it is prohibitively costly to change the architecture and create a single database warehouse that comprises all of the data. A viable alternative is to use the current technology in place to create a “Virtual Data Layer” that is not invasive, uses the current data architecture and provides a virtual data warehouse. Using this approach, projects can generate quick wins and focus on creating value through the automation of operational and engineering processes using the virtual integrated data.

This paper describes a real case of virtual-database integration of multiple databases in Goodrich Petroleum Corporation. The virtual data integration incorporates a broad range of data types including: Drilling, Financial, Lease and Production data, and shows the information to the end users on very intuitive dashboards. In addition to the quick integration, the solution delivers a notification system that makes the operation surveillance and daily analysis much easier in a controllable environment for thousands of Leases and hundreds of wells.

NEW TECHNOLOGY MAKES IMPACT ON OLD EAST TEXAS WATER FLOOD

This paper explores the results of Zone Energy, LLC’s successful implementation of a new surveillance and automation framework technology called One Virtual Source (OVS). Zone Energy LLC is a small, investor-backed, start-up operator focused on acquisition, improvement, and divestiture of US brown fields. The company acquired producing assets in the giant East Texas field in Greg and Rusk counties in 2011. The company implemented a water flood on the field and pursued an “automate and optimize” strategy to improve production and drive down costs. To achieve their goals, the company felt it was crucial to migrate away from the “Excel-heavy” workflows and into technology that could support data quality improvement processes, automated surveillance and reporting, and much improved capture of downtime, allocation and operational processes.

The Zone implementation supports several views making the system practical for field entry, engineering analysis and surveillance, and C-level reporting. Zone plans a number of system extensions in the next phase to tune their water flood design with a focus on increased production.