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Solve the right data-people-time problem

Data management plays an increasingly critical role in upstream operations.

AUTHORS

Jaime Gonzalez Alanis, *Pemex; and* ***Barry Irani,*** *iStore*

The single most difficult and frustrating challenge upstream companies face is getting the right people access to the right data at the right time so they can make well-informed business decisions.

Upstream companies collect and store massive quantities of valuable data each day. Technology advances today enable data that used to be captured once a day to now be monitored and collected by the second or even less, which accentuates the challenge by increasing the data volume to more than 86,000 times each day.

Pemex Exploration and Production (PEP), Mexico's national upstream oil company, directly addressed one of its data management challenges in its Southern Region where it operates 60 to 70 onshore and offshore rigs, when it streamlined its method for scheduling and tracking rig activities.

Improving rig activity tracking

Like many upstream companies, the company used spreadsheets to manage rig activities. The company's planning group, business units and drilling services organization jointly maintained a complex 50- to 60-column spreadsheet containing drilling, financial and technical information, and the various geological, engineering and other information needed to plan and coordinate activities for each rig. Each business unit (asset) used the spreadsheet to add its prospects and compete for scarce and valuable resources. The drilling services organization used the spreadsheet to schedule, deploy and organize rig activities. It served as the planning group's source for allocating funds to create the right balance between internal supply and demand. As the company continued to add activities, the spreadsheet grew in size and complexity.

A group of about six engineers and planners from the three groups re-created the spreadsheet approximately every 6 weeks to reflect ongoing activities, maintenance, new requirements, changing budgets and schedules and various other parametric fluctuations. Re-creating each new spreadsheet took up to 6 days and required tedious attention to detail to capture the cascading effect each change had on other activities. Printed reports were so large that they filled an entire wall. Teams could make critical decisions based on this snapshot report, but by the next day it was obsolete.

Connecting the systems

The three-fold solution included a scalable, secure way to manage and track the company's valuable rig data, connecting systems to the data and to each other and evaluating work processes so people could use data as needed in their daily work. In late 2005, the company implemented a new Web-based software application based on iStore's PetroTrekAsset Management Solution for Drilling to schedule and manage all of its drilling rig activities. Pemex has now completed a full year of drilling activity using the new system.

Through the new system, users check rig availability and request rigs for specific wells and tasks creating user-generated scenarios. Planners and

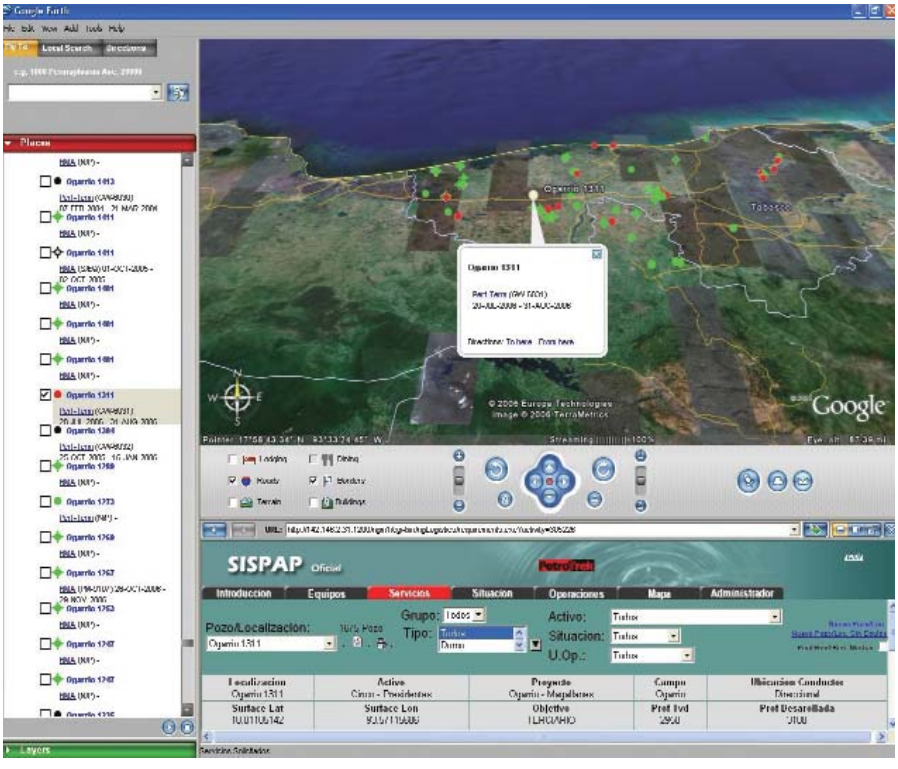

Figure 1. *iStore's PetroTrek provides interfacing of SISPAP (Pemex's planning system for drilling activities) to geospatial systems like Google Earth to make it easy to find and track information about the terrain, wells and rig activities. This is key for site location, management of permits, and general logistics operations. (Image courtesy of iStore)*

managers can now easily rank and evaluate a variety of scenarios using important performance indicators such as incremental production, reserves and well profitability. The system is updated in real time, capturing and reflecting prevailing conditions. It also assists with planning, service requirements and equipment provisioning for drilling rigs, trucks or other heavy equipment. For instance, if a drilling permit is delayed or funds are reallocated, teams can quickly adjust planning scenarios.

Asset teams input demand, drilling teams update the supply side and planners add budget information to give an accurate, synchronized and complete snapshot of the entire drilling program — whether activities are on, behind or ahead of targeted budgets and schedules. An interactive Gantt chart further provides the capability to easily enter and update activities schedules. Information is shared on daily reports, and management can track activity status almost to the hour through the online Gantt chart, map and other displays.

While reworking the spreadsheet, the team realized that valuable data could not remain isolated. For the last several years, the company has also focused on integrating more than a dozen separate technical and administrative systems to create a network that connects its drilling supply chain. Systems that track budget, production forecasting, daily drilling activities, permits and other aspects related with the maintenance, scheduling and operations of more than 70 rigs are now connected and synchronized, facilitating timely online access to all of this vital data for the people who need it.

Three of the company's most critical systems are those that handle production forecasting, drilling operations and budgeting. For example, if a rig is on a well longer because of unforeseen drilling problems or reaches its targeted depth earlier, the forecast and budget are impacted. With these systems now connected, people have access to updates as they occur.

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Right time hits bottom line

Real-time data and integrated system access has helped the company optimize the way it uses and allocates vital resources — rigs, people, supplies, funds and time — to synchronize its drilling operations, improve productivity and reduce costs. As a result of the new rig scheduling system, productivity increased requiring substantially fewer person days to complete each operational drilling program.

From the forecasting perspective, a real-time view into rig activity has enabled management to review and adjust expectations related to oil and gas production, reserves and the overall profitability of the southern region. It can adjust goals in response to additional funding and drilling rig availability from the company's other regions. Management can also minimize or avoid potential operational problems such as rig, crew and funding shortages and the related costly contracting expenses to cover for unplanned shortages.

The company has also improved decision making related to how it allocates rigs between drilling and workover activities, schedules rigs according to drilling capacity and reprioritizes available funds among activities as priorities change. All of this adds to productivity and cost improvements.

With more reliable data, employees have also adopted a noticeable new workflow that has streamlined and improved their decision-making process and positively impacted their availability for critical activities. A real-time view into rig activity improves engineers' abilities to effectively manage the entire program, enabling them to schedule delays or advances to capitalize on demand, market pricing or business strategy changes.

Impact on the industry

There is enough available information technology to deplete most companies' budgets. The key to optimizing business performance is prioritizing business problems and effectively using existing and new information technology investments to solve those problems. High on most upstream companies' lists is the challenge of having the right technology, systems and processes in place to effectively manage assets and optimize their capacity to meet supply and demand.

Effective data management has a significant role in the industry's move to the digital oil field of the future. While many petroleum companies have put a stake in the ground for enterprise digital oilfield initiatives, others are focusing on improving workflow and streamlining processes to solve specific business challenges. Both involve using information technology to operate more efficiently — integrating systems, data and people — the difference is in the implementation method.

As this case study describes, upstream companies can realize the strongest impact by integrating systems and processes so that people have real-time insight to make the best and most informed technical and business decisions. Companies today have access to technology that can capture data, provide secure and scalable data storage and make the right data accessible to the right people at the right time. When these are focused on solving specific business problems, true optimization occurs. E&P