

JPT

**DEEPWATER PROJECTS
INTELLIGENT FIELDS TECHNOLOGY
MULTILATERAL/EXTENDED-REACH WELLS
CEMENTING/ZONAL ISOLATION**



FEATURES

**Underbalanced Drilling in
Unconventionals**

What Do Fractures Look Like?

Making Data Pay

Are Well Construction Practices Safe?

Making Data Pay

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Inside the protective white box is a pump monitoring and control system called the Smart Pumper, installed in the Eagle Ford Shale. It uses fluid level data in a well to maximize production, and limit the risk of pump damage. *Photo courtesy of Direct DriveHead.*

There is talk about digital oil fields and big data and some striking examples of their power. But in real oil fields, a lot of operators are still running fields with systems relying on big paper.

Since retiring from Chevron where he worked on introducing digital oilfield technology, Jim Crompton has advised smaller operators and learned that “80% are operating on paper” and many control systems using established computerized control systems such as SCADA are “the next generation.”

To describe the state of the oilfield technology during a presentation at the recent SPE Digital Energy Conference and Exhibition in The Woodlands,

Texas, Crompton, an adviser with Noah Consulting, quoted a well-known science fiction writer, William Gibson, who said, “The future is here, it is just not evenly distributed.”

The speakers at the conference pointed out a widely shared problem for those working in this field: while much data is gathered, little of it is used. For example, about 5% of the real-time data from a drillship are sent to shore to help monitor and control drilling, he said.

At the corporate level, the industry has been a leading user of computer power and advanced analysis methods for engineering and managing the enterprise. Exploration and production (E&P) com-

panies own some of the world’s most powerful supercomputers, which are used to do the seismic studies that are the foundation of reservoir models. But frequently, they are unable to update those models with results from producing fields.

“Analytics is used on an enterprise level, but no one is looking at how to use it on an operational basis so we can run data on models of wells or reservoirs as we gather the data,” said Moray Laing, executive lead consultant for oil and gas at the SAS Institute, during a panel discussion at the conference.

On the conference show floor, exhibitors were selling digital tools ranging from a software services system integra-

tor, Entrance, whose offerings include systems used by companies to move from paper-based invoices to digital ones, to a small company selling a pump monitoring and control device called the Smart Pumper. What looks like a boxy laptop uses data from a fluid monitoring system to control pump speeds to maximize production without reducing the fluid level in the hole to a low level that causes the pump to run dry, which can lead to damage. And that box is wired to also serve as a communications hub for up to 18 other well monitoring devices.

The pump control device is not unique. It performs many of the functions already done by devices sold by artificial lift companies and big service companies. The Smart Pumper's pitch is it offers a rugged, cost-efficient, simple-to-use option designed to work with widely used field monitoring equipment.

It was a good show for the company, which set up meetings with majors operating thousands of wells with unmonitored pumps, said Sid Shetty, a systems engineer for Direct DriveHead, which makes the Smart Pumper. The operators are looking for ways to reduce their costs at a time when oil prices are depressed, he said.

Based on the feedback since the conference, oil companies are interested in pump monitoring on new wells, but for older fields the cost per well seemed too high unless one device could monitor multiple wells, said Greg Boyles, founder and chief executive officer of Direct DriveHead.

The feedback points to a common question that defines the rate of digital change: Is the potential return for those running an operation worth the time, trouble, and cost of doing things differently?

"It is their business you are trying to impose this solution on," Crompton said. "How do you get them involved? Their metrics—production, safety, costs—have to get better as a result of that."

As for the question why field data is not more widely used, Crompton said, "We have not figured out how to create value out of it."

FIVE WAYS OF LOOKING AT CHANGE

Turning a new idea into a successful product requires making the leap from a small group of tech-savvy users to a broader audience. These consumer groups, described in the book *Crossing the Chasm*, are:

- ▶ **Innovators:** Users willing to volunteer time to help develop a product. Critical supporters during early development but lacking in spending power.
- ▶ **Early Adopters:** Companies with the leadership will necessary to commit resources to new things capable of offering a competitive advantage.
- ▶ **The Chasm:** Many new product developers fail to make the leap to the wider market, which has different attitudes toward what is new.
- ▶ **Pragmatists:** Users willing to try new ideas if they solved a significant problem that cannot be fixed otherwise. Seeking ideas endorsed by others and in regular use.
- ▶ **Conservatives:** Skeptical of new ideas and willing to stay with what works as long as possible.
- ▶ **Laggards:** Conservatives most resistant to change.

Digital Divide

Shell's global operations offer examples of what is digitally possible. It has wired fields with sensors and digital controls allowing it to remotely shut off valves to isolate zones if the monitoring indicates there is a problem, or exception, such as water production exceeding acceptable limits.

"We can visualize what is going on and analyze by exception and respond quickly to what is going on," said Frans Van den Berg, smart fields collaboration manager at Shell.

But for Shell and others in the industry, the level of digital technology used varies widely from field to field and country to country. The level of investment in old fields is not as high as in new ones.

For Statoil's shale operations, adding electronic monitoring and controls is seen as a path to improve safety, increase productivity, and meet regulatory mandates, said Russell Rankin, a geology manager for Statoil. But in remote locations, it often faces a lack of infrastructure, such as fiber-optic lines for high-speed data transmission, he said.

Even before the crash in oil prices, funds for this work were limited. "In

2013, budget there was a limit—it was a big expense to get fiber installed—it was delayed by spending cuts. You will probably see a bit of that this year," Rankin said, adding that expanded use of data at the wellhead will "require some quick wins."

The observation about the need for early wins dovetails with the thinking offered by the keynote speaker for the conference, Geoffrey Moore, a business consultant known for his work on the challenges of popularizing new technologies, which are laid out in his book, *Crossing the Chasm: Marketing and Selling High-Tech Products to Mainstream Customers*.

The popular book's title refers to the chasm between the relatively small group of tech-savvy pioneers who offer critical support and feedback early in the life of a new product, and the broader market of buyers who range from pragmatists—who are open to new ideas, but can think of a lot of reasons why not to use something new—to conservatives who will change when required.

While the nature of these groups of users and the strategies used by those companies able to cross the chasm are the stuff of a book, one consistent requirement for reaching that larger market is the ability to solve a significant problem