



## Business impact

Production disruptions can be devastating — e.g., the 2007 hurricane season brings a “one in 10 chance of 278 million or more barrels, or loss of half of the normal annual production over the next year.”\*

## Challenges

- **Equipment interdependency.** Since each piece of equipment can depend on many others, root cause problem identification is difficult since the cause can be far removed from where the problem was discovered.
- **Variable complexity and volume.** With hundreds of variables on every piece of equipment, it's impossible for any human to monitor all that at once.
- **Multiple monitoring systems.** Each type of equipment monitors key parameters in isolation; the inability to monitor multiple systems at once makes it hard to detect subtle patterns that could indicate problems.
- **Lack of predictability.** Without a way to predict problems in advance, you're always reacting to fix problems once they occur rather than proactively avoiding and mitigating risks.
- **Undocumented processes.** Within the next decade, 50 percent to 60 percent of workers who troubleshoot and maintain systems will retire, taking their knowledge and expertise with them.

\* Source: “Oil & Gas Industry braced for 2007 hurricanes,” [www.GlobalContinuity.com](http://www.GlobalContinuity.com), May 23, 2007.



**THE  
POWER  
TO KNOW®**

## How can we predict production disruptions far enough in advance to enable proactive response?

### YOUR GOAL: Mitigate the impact of unplanned shutdowns

Today's exploration and production (E&P) companies operate in extremely hazardous conditions and face enormous daily challenges. Political instability in many oil-producing countries has created a volatile crude oil and gas market. And with existing reserves rapidly depleting, competition for finite resources has put pressure on companies to lower operating costs while raising finding and recovery rates. But locating and extracting new reserves from more difficult and environmentally sensitive regions requires more complex technologies and more specialized skills and equipment. A lot can go wrong. Harsh environmental conditions can wreak havoc on materials and equipment, leading to unstable equipment parameters that are a huge safety threat. And equipment failures can mean unplanned shutdowns while repairs or replacements are made.

While some form of surveillance—including 3D and 4D seismic downhole sensors—is used on all systems and equipment, the amount of data produced per system and across operations is enormous. There's too much complex information to make sense of in the time needed to make quick, accurate decisions. While geographic, geologic and geopolitical challenges abound, perhaps the industry's biggest challenge is how to turn volumes of complex data into useful, relevant information that will enable business-critical decision making that can avoid production disruptions.

### OUR APPROACH

Predicting and preventing production disruptions is only possible if you can access and analyze *all* relevant data—historical *and* real-time—from key metering, monitoring and surveillance systems. We approach the problem by delivering software and services to help you:

- **Achieve a single, integrated view of all relevant information**—including historical, right-time and real-time data—regardless of source or format.
- **Ensure the accuracy and reliability of that information** with embedded data quality techniques that standardize and cleanse data so that it's ready for analysis.
- **Detect hidden patterns and anomalies that identify particular events** by using advanced data mining techniques to sift through streams of complex data.
- **Predict when unplanned events—such as equipment failures—will occur** using sequence analysis to identify upcoming events based on workflow rules that you define.
- **Mitigate the impact of unplanned shutdowns** with automated, early-warning alerts that are routed to the appropriate operations engineer and escalated, if needed.
- **Enable knowledge sharing and collaboration** by tapping into a knowledge system that stores past responses to events and is continuously updated with best practices.

For 30-plus years, companies have relied on SAS® to handle complex forecasting and management needs with large data volumes. SAS solutions for the E&P sector enable you to assemble data from many platforms and systems to create a picture of what *has* happened and then transform it with analytic and predictive capabilities to project what's *going* to happen—the foresight that can increase your production uptime.

## THE SAS® DIFFERENCE: True big-picture monitoring across all operations

All systems and equipment in E&P operations have some sort of metering, monitoring or surveillance system—each producing staggering volumes of data. Only SAS delivers a comprehensive view across *all* systems and equipment, taking into account system interdependencies to accurately monitor overall performance. With SAS, you can:

- **Better understand your operational risks of equipment failure, human error and more**, with powerful, predictive analytics on a level unavailable anywhere else.
- **Empower previously disconnected groups to share information and work together more efficiently**, using SAS' integrated, collaborative environment.
- **Add new functionality as needs arise**, taking advantage of SAS' flexibility and scalability, to ensure that your potential for continual improvement never ends.

SAS software is unique in that it doesn't replace the diverse systems you already have in place. Rather, it sits on top of what you have, turning raw data from all systems and equipment into information that can be directed to the right person, in the right format, at the right time. The result is true big-picture monitoring on a scale no other vendor can provide. And with SAS, you can take a modular approach to implementation, starting where needs are greatest and building on as operations grow and needs evolve.

### CASE STUDY: An upstream E&P operator in a harsh offshore environment

#### ■ Situation

Complex production processes and multiple metering, monitoring and surveillance systems produced huge volumes of data. But with multiple specialty areas overseen by different departments, contractors and subcontractors, the resulting silos made it impossible to interpret all that data to support meaningful decisions and timely interventions that could prevent production problems from occurring. The company was in need of a big-picture view that would enable greater—and more proactive—management oversight of all operations, without having to replace all existing systems.

#### ■ Solution

SAS delivered a solution that fit with the company's existing systems and included:

- Data management capabilities to consolidate data sources from multiple metering, monitoring and surveillance systems into a single view.
- Sophisticated data mining for exploring historical, real-time and right-time data to spot trends that could provide early warning of possible production disruptions.
- Advanced predictive analytics to accurately predict problems and send automated alerts to the appropriate person for proactive problem solving.

#### ■ Results

- Key decision makers have a big-picture view of all systems and processes.
- Problems are identified early enough in advance to enable proactive problem solving, fact-based decisions and lower operating costs.
- Production disruptions are avoided.

#### ■ The vision

##### Data integration

What if you could turn raw data from all monitoring and surveillance systems into a meaningful, big-picture view of performance across all your operations?

##### Embedded data quality

What if data quality was an embedded part of the process so you could have absolute confidence in the accuracy and integrity of your analyses?

##### Advanced data mining

What if you could analyze streams of data against multiple historical references to spot patterns that could signal potential unplanned shutdowns?

##### Predictive analytics

What if you could accurately predict production disruptions far enough in advance to enable preventive actions that would stop problems before they could cause a costly shutdown?

##### Automated alerts

What if early-warning alerts were sent automatically to the appropriate person for intervention so there would be no question about who bore responsibility for solving the problem?

##### Easy knowledge sharing

What if analysts could more accurately predict occurrences and stage interventions based on historical data that has been captured, analyzed and archived?

### SAS FACTS

- For the fourth consecutive year, SAS was recognized as one of the Intelligent Enterprise "Dozen," a list of the top 12 most influential IT solution providers.
- SAS has more than 140 customers in the oil and gas industry.
- SAS reinvests 24 percent of revenues into R&D every year.

Learn more about SAS® software and services for energy at:  
[www.sas.com/industry/energy](http://www.sas.com/industry/energy)



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