How can we manage risk and subsurface uncertainty in upstream assets?

sas
THE POWER TO KNOW®

■ Business Impact

"There needs to be a fundamental shift in the approach to drilling that allows for a more holistic view of operations and greater transparency regarding the impact of decisions across the value chain."*

■ Challenges

- **Disparate data.** Current processes, activities and workflows span multiple databases and software applications, resulting in disparate, siloed exploration and production data that create disconnects and layers of inefficiency.

- **Communication issues.** Siloed exploration and production environments result in broken or inefficient communication paths, which can prevent critical information from reaching those who need it.

- **Insufficient maintenance.** Poor maintenance planning increases the length of time that an asset is out of service, which raises costs and has a negative impact on production.

- **Geoscientific skepticism.** Reservoir scientists tend to mistrust statistics, which makes it difficult to transition from a traditional deterministic methodology to a stochastic approach.

**IT Impacts from the BP Oil Spill,* EI224330, July 2010, IDC Energy Insights

YOUR GOAL: Optimize exploration and production from mature fields

Each year, oil and gas companies lose 10 percent of their assets worldwide. Replenishing supply means buying other companies, increasing production or finding new fields. Given that it takes five to 10 years to bring a new field online, companies must balance near- and long-term asset development. Exploration of more geologically complex and remote areas – often with little supporting data analysis – is necessary to reach deeper hydrocarbon deposits. In addition, companies must optimize production equipment to extract assets at an expected pace.

To examine the exploration and exploitation projects in their current expenditure portfolios, companies must be able to quickly rescore internal rates of return while resetting underlying hydrocarbon reference pricing and assumptions based on development costs. This requires risk re-evaluations, improved risk controls and new risk management scenarios, all of which demand improved modeling capabilities. Production curve optimization is also necessary to ensure that maximum recovery is achieved for every well and reservoir.

OUR APPROACH

Data integration, risk assessment and quantification of uncertainty are key issues in petroleum exploration and development. We approach the problem by providing software and services to help you:

- **Improve the quality of data you rely on for critical decisions** by:
  – Integrating relevant data – historical, right time and real time – from multiple monitoring and surveillance systems across all GGRE disciplines into a unified view.
  – Automating all critical preprocessing tasks – merging data files, addressing missing values, clustering, dropping variables and filtering for outliers.

- **Increase the reliability of reserves information** using advanced modeling to generate reservoir models that truly reflect the spatial relationships between geological elements and their petrophysical properties – whether anisotropic or isotropic in nature.

- **Predict unplanned events** so you can take steps to mitigate their impact by using predictive analytics based on workflow rules that you define.

- **More accurately determine reservoir properties**, such as porosity and permeability, using spatial analytics that incorporate variograms, kriging and simulation.

- **Increase decision support across disparate upstream disciplines** by using data mining to create accurate predictive and descriptive models based on enterprise data collected from geology, geophysics, petrology and reservoir engineering.

- **Present probabilistic results in a dashboard environment** using flexible reporting capabilities that let you quantify uncertainty, provision fundamental and imperative flow simulation input, and mitigate potential risk.

SAS® enables more reliable drilling plans, improved secondary and tertiary recovery strategies, and a more comprehensive portfolio analysis of upstream assets.

THE SAS® DIFFERENCE: Reliable data for improved decision making

Successfully overcoming the challenges associated with oil and gas reservoir optimization – particularly those exacerbated by few direct observations – depends on your ability to integrate GGRE data, quantitatively describe heterogeneity and comprehend the range of uncertainty. SAS provides you with those abilities through:

- **Powerful data integration.** SAS provides an unmatched ability to collect and transform multiple, siloed data sources into a unified body of knowledge.

- **Collaborative business intelligence.** SAS delivers crucial technology that enables key team members to view and understand important analysis about well placement, stimulation strategies and well performance.

- **Predictive and spatial analytics.** Award-winning, proven and reliable, SAS Analytics provide the foundation for improved decision making across GGRE silos.

- **Flexibility and scalability.** SAS can grow and change along with you, adding new functionality as needs arise, so your potential for continual improvement never ends.

SAS has nearly three decades of experience working with energy and utility companies to develop solutions designed to help them achieve organizational improvements that have a direct impact on the bottom line.

CASE STUDY: Petrobras

■ Situation

Petrobras relies on senior geologists to analyze rock formations, seeking the best opportunities for maximizing existing wells or drilling new ones. The results of the analyses inform multimillion-dollar investments in constructing oil wells at sea. Therefore, the geologists need to fully understand reservoir characteristics to ensure maximum production from the upstream assets in accordance with contemporary economic plans.

■ Solution

SAS provided a solution for constructing analytic models that enable the company to identify rock breaks that produce oil or gas, significantly increasing the output of oil and helping to recuperate hydrocarbon supplements. The solution includes:

- Scalable data manipulation – evaluating vast amounts of geologic and historic production data.

- Customized intelligence – segmenting patterns of production that are specific to marine or terrestrial flow.

- Integrated analytics – for forecasting and predicting future reservoir production.

■ Results

- Achieved a daily record output of barrels of oil, nearly doubling the previous record.

- Increased volume from terrestrial wells by enabling technicians to evaluate and prolong the life of mature fields.

- Improved project profitability by maximizing production levels from extant reservoirs with enhanced appreciation of new well locations for maximum exploitation.

■ What if you could ...

Increase the reliability of your reserves information

What if you could ascertain decline estimates and ensure that wells were properly classified – despite poor data quality and sporadic logs – in accordance with production indicators?

Gain a better understanding of reservoir properties

What if you had access to predictive and descriptive modeling, forecasting and spatial analysis that incorporates variograms, kriging and simulation to better comprehend the reservoir?

Ensure high-quality data

What if you could encapsulate your exploration and production data across disparate geoscientific disciplines, as well as check incoming data in real time and eliminate errors before propagating them to other systems?

Improve decision making

What if you could rely more heavily on your GGRE data, accrued from geophysicists, geologists and reservoir engineers, and could make more reliable decisions that directly affect the share price of your company?

■ You can. SAS gives you THE POWER TO KNOW®.

SAS FACTS

- SAS has been in business since 1976 and today has customers at more than 45,000 sites worldwide.

- SAS has more than 90 customers worldwide in the oil and gas industry.

- SAS has been named a leader among nine vendors in "The Forrester Wave™: Predictive Analytics and Data Mining Solutions, Q1 2010."

Learn more about SAS software and services for oil and gas at: www.sas.com/industry/oilgas/