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How to Reduce Costs and Manage Risk in the Upstream Oil & Gas Industry with Enterprise Project Portfolio Management Solutions

Executive Overview

The upstream petroleum industry today faces unprecedented waves of added costs and new regulatory challenges as it tries to navigate the shoals of risk management toward preserving its bottom line.

The historical risk factors—e.g., commodity price volatility, geopolitics, etc.—facing the industry have become more complex. Oil and gas price movements are now tethered more to macroeconomic influences than they are to physical supply and demand factors; that makes hedging through commodity-related financial derivatives—a key risk management tool—a dicier proposition. A "brain drain," aka the "Great Crew Change," was a critical issue just a couple of years ago for oil and gas companies seeing their pool of qualified personnel dwindle; it will return with a vengeance as activity continues to rebound with economic recovery. Sociopolitical concerns are also changing the playing field with such emerging issues as resource nationalism and foreign investment restrictions. A growing tendency is seen among many nations to capture more rent from the development of hydrocarbons—both out of economic impulses as well as a result of market intervention to promote other energy sources for environmental and energy security reasons.

At the same time, huge capital costs have grown even larger, given the industry's increasing proclivity for mega-projects that leverage economies of scale. Mega-projects have become commonplace in the upstream oil and gas industry, as activity fans out in more challenging physical environments. With the expanding project scope comes bigger challenges to manage project risk.

Offshore oil and gas development increasingly tilts toward the mega-project scale because of the burgeoning exploratory success the industry is enjoying in ultra-deep waters, where development project costs routinely run into the billions and schedules can span half a decade or more.

Such projects entail enormous challenges in logistics, planning, scheduling, communications, data management, and risk analysis. With mega-projects comes a great need to better collaborate and share information across the value chain that ultimately will drive down costs and increase the accuracy of delivery dates. Owner-operators, contractors, and suppliers working in the upstream petroleum industry all must find innovative solutions to minimize complexity and risk in these massive undertakings, as it becomes a top priority to have all players on a project team work more closely together.

All of these factors and more are adding costs or reducing revenues and creating new risk management challenges for oil and gas companies.

Add to those concerns a greatly heightened regulatory oversight and public scrutiny regarding environmental and safety risks.

Mitigating such risks and demonstrating the wherewithal to accommodate them add tens of billions of dollars in the cost of capital, debt, and operations for oil and gas companies, crimping profitability even in an era of relatively comfortable commodity prices.

The upstream industry must grapple with new compliance constraints, permitting hurdles, and risk-reduction measures in an ever-evolving regulatory environment. Adding to the urgency is the uncertainty over future regulatory regimes, which alone complicates planning and budgeting for both long and short-term petroleum industry projects.

Combine that regulatory uncertainty with a still-recovering global economy and the traditional volatility of an industry whose fortunes are tied to commodity price movements, and you have a daunting mix of challenges for managing oil and gas projects throughout their life spans.

Project lifecycle management solutions, such as Enterprise Project Portfolio Management (EPPM) solutions from Oracle's Primavera, enable executive and project leaders alike to successfully manage costs and reduce risk in such a volatile climate. This paper will address some key management issues facing the upstream petroleum industry from an enterprise project and portfolio management lifecycle perspective—and how EPPM solutions can help minimize risk and thus cut costs.

Introduction

The oil and gas industry has always been the embodiment of undertaking high risk in pursuit of high reward.

Early wildcatters relied on rudimentary and superficial indicators to discover oil and then "rolled the dice" with the drillbit. Failure was far more common than success. Natural gas was a dangerous waste product to be flared off. Gasoline was a loss leader to ensure your crude found a home. The standard of only 1 in 10 exploratory wells being successful persisted even into the 1960s, despite the application of more-modern technology.

As it has matured and evolved from the "Greatest Gamblers" era of the wildcatters, however, the industry has shifted its approach to risk. Today the operating paradigm for the industry is closer to a tightly controlled manufacturing-style business model than it is to the Boom Town mentality of yore. That is not to say that boom-and-bust swings no longer happen or that such a business model makes it easier to manage risk. Quite the contrary: a "factory" business model means dealing with tighter margins and less room for error.

Accordingly, the focus for oil and gas companies is on how to manage all kinds of risk in order to rein in costs. And that task is more daunting than ever for the upstream sector of the oil and gas industry.

Exploration and production (E&P) companies have made great strides in reducing the risk of failure in drilling from a geologic standpoint. Since the early 1970s, the rate of success in

exploratory wells has more than tripled to about 45%, thanks to advances in subsurface imaging and downhole drilling technologies.

A revolution in unconventional resource plays has changed the game yet again, ushering in a resource play "factory" model that virtually eliminates geologic risk. Drilling in waters too deep for conventional platforms has been another game-changer, opening up a whole new frontier and the best prospects for giant discoveries in the future. As always, the price risk is there, but operators factor that into their project planning. But even apart from commodity price volatility, new regulatory constraints threaten offshore and onshore drilling activity. How will an upstream company manage risk in its drilling project portfolio amid regulatory uncertainty? The relative scarcity and greater cost of capital also looms large for the upstream industry, with capex constraints becoming increasingly important as mega-projects proliferate. A recent survey of asset-intensive industries by the Aberdeen Group[1] found that capex constraints was one of the top two drivers—cited by half the companies surveyed—creating pressure to optimize asset management projects.

An increasingly complex and volatile business environment requires sound solutions for oil and gas E&P companies seeking to mitigate risk, enhance efficiencies, and rein in costs while developing projects and managing project portfolios. EPPM solutions provide robust collaborative tools to help meet those goals. They also maximize collaboration and integration, provide real-time and uniform program visibility and predictability in a way that goes beyond traditional solutions to optimize the value of a project throughout its lifecycle.

The following will outline specifically how EPPM solutions can help E&P companies to pinpoint the best strategies to develop and implement projects from conception through execution to endgame, which helps manage costs and reduce risk.

The upstream oil and gas industry is still in the midst of a sea change in terms of resource potential and opportunities. The drivers for this change are deep and ultra-deep waters and unconventional onshore oil and gas. These two new E&P frontiers present exciting new opportunities for an industry that for years had believed that there were rapidly diminishing prospects for adding oil and gas reserves at a giant scale. And in both instances they represent a long-term view of project economics and project portfolio management.

[1] Aberdeen Group, Mehul Shah, Cindy Jutras, "Project Management Practices for Asset Maintenance: A Guide for Power, Energy & Process Industries," October 2010.

Deepwater Opportunities

On the offshore side, deepwater potential has sparked fresh interest in new frontiers for large conventional oil and gas resources. The steady decline in production of conventional oil and gas from offshore sources in recent decades led the industry to strike out in ever-deeper waters in search of new giant discoveries. For example, recent projections indicated that deepwater production is expected to account for about a third of U.S. oil output by 2015, up from essentially zero in the mid-1990s. Worldwide, deepwater oil production has tripled just within the past decade.

Deepwater development efforts are invariably mega-projects that can entail the application of cutting-edge technologies and daunting logistics that might rival a NASA space shuttle launch. Planning for exploration, development drilling, and billion-dollar production facilities can stretch out over a decade or more and consume enormous company resources. These projects are not sensitive to short-term price movements because their lifecycle economics model is based on a long-term view of commodity prices.

But a myriad of factors can impact schedules and business decisions for these massive projects. And that poses significant risks not only for individual projects but also for entire portfolios of deepwater projects. For example, the recent ban on deepwater drilling in the Gulf of Mexico has already derailed near-term projections for the gulf's deepwater production growth and forced some key drilling rigs to exit that area, further complicating issues with deepwater operators' portfolios. Also, a go-slow permitting approach under a new regulatory authority has slowed all Gulf of Mexico drilling, including shallow-water activity, to a crawl. In addition, new oil spill liability thresholds could force more operators and drillers from the gulf or spawn consolidation among the smaller companies that remain.

The setbacks in the Gulf of Mexico deepwater campaign illustrate the kind of unforeseen developments that exacerbate risk management analysis.

EPPM solutions have served deepwater operators well by providing powerful yet easy-to-understand analytics they need for predicting likely outcomes as well as avoiding costly and time-consuming mistakes. EPPM applications make it possible to address problems long before they become a crisis and to quickly implement changes.

Deepwater Case Study

A case study involving a multi-billion dollar deepwater development project offshore Nigeria illustrates these benefits. In addition to drilling deepwater wells offshore Nigeria, the project entails the installation of subsea infrastructure including wellheads, flowlines, and riser, as well as a floating production, storage, and offloading vessel.

The project operator was faced with the huge challenge of estimating the project timetable, costs, and risks. This called for developing a baseline against which project execution and scheduling

would be monitored and controlled across the scope of hundreds of thousands of activities in multiple international locations. And all of this would have to occur in compliance with government directives on local content engineering, procurement, fabrication, construction, and integration.

The operator leveraged Oracle's Primavera P6 Enterprise Project Portfolio Management solution along with Oracle's Primavera Risk Analysis solution to tackle the development challenge. Together, the two solutions provide a consistent and accurate planning environment across the enterprise, taking into account project risk, resources, and budget.

With the Primavera solutions, the operator was able to drive more accurate and timely business decisions through reliable schedule and risk probability analysis. At the same time, the operator found it could reduce delays by creating, reviewing, and collaborating on the complex schedules and risk profiles.

Furthermore, the operator could readily perform live analyses to demonstrate risk assumptions and their likely impact on the full schedule.

Using these solutions, multiple planners worldwide could have simultaneous access to the same project data and master schedule and to view project detail at either a high or a granular level. They also could save time and avoid duplication by making live changes to the schedule.

Onshore Unconventional Oil & Gas

An even more unexpected revolution in oil and gas drilling is occurring in the onshore sector: unconventional oil and gas.

Unconventional resources, oil and gas shales in particular, have surged to the forefront of drilling activity in the U.S. This action is starting to spread to other countries as well, and some believe it may turn the global energy equation on its head. That already has happened in the U.S., where the pursuit of such resources is starting to dominate the active drilling rig count. In addition, the resulting eye-popping gains in reserves means that the nation now has more than a century's worth of proved gas reserves at current rates of consumption vs. a couple dozen years at most less than a decade ago.

The combination of advances in horizontal drilling, particularly steerable drilling systems, and hydraulic fracturing has enabled U.S. producers to economically develop and produce hydrocarbons from reservoir source rock—a game changer.

What's unique about these plays is that there is virtually no exploration risk. These low-permeability and low-porosity formations have been known for decades, and some are spread across vast areas, even several states. They just hadn't been economic to develop and produce until recently, thanks not only to new technology but also to a new business model—essentially a hydrocarbon "factory" in which fit-for-purpose drilling rigs drill essentially the same well

configuration time after time—sometimes from the same drilling pad, to minimize cost and the rig's footprint. It's a cookie-cutter approach that has proven exceptionally effective in continually improving play economics as each play matures.

A genuine frenzy of leasing activity ensues after a new oil or gas shale is shown to be commercial, and dozens of operators have secured millions of acres of prospective lands and identified tens of thousands of well locations targeted for drilling over many years. Managing these leaseholds and optimizing the employment and assignment of dozens of rigs across multiple basins over the years is a major challenge. While the capital and logistical challenges onshore are nowhere near as significant as they are offshore, changes in rig availability, rig rates, permit approvals, site access, availability of consumables and services, etc., can happen overnight vs. the long lead times seen offshore. To compound the difficulty, a flurry of merger and acquisition activity has been focused on the unconventional oil and gas plays, and the changes in ownership add another layer of complexity to managing drilling project portfolios.

Finally, a worrisome note regarding growing concerns in some locales about the environmental impacts of hydraulic fracturing may lead some operators to juggle their portfolios and shift their capital budgets to friendlier climes. Legislation governing hydraulic fracturing envisioned at the federal level could stretch the economic viability of many unconventional resource plays to the breaking point.

In addition, the industry has become a victim of its own success in unconventional gas resources. Supply growth has outstripped demand growth in the current environment, and the expansion of gas supply has some analysts convinced that the price of natural gas will be held to a low-to-modest range for years to come. That makes shaving costs of drilling operations in these otherwise fairly costly plays even more critical.

An Independent's Drilling Case Study

One large U.S. independent utilized Oracle's Primavera solutions that enabled the company to work in a "much more collaborative environment" and that "gives us shared resources across multiple entities, which is critical when scheduling the high-value assets we operate."

This producer benefited from the EPPM solutions by enhancing productivity—including a 15% improvement in reporting—and revenue generation through integrated development production operations. The independent also was able to improve by 30% the ability to schedule rigs based on requirements and availability.

The more collaborative environment not only helped to effectively manage complex operations via interactive planning sessions and a centralized project management database, it also reduced administrative time by 50%.

For the upstream side of the oil and gas industry, these solutions provide a marvelous suite of collaborative tools that help an E&P company answer the question, "To drill or not to drill," by enabling the operator to:

- Identify and select the right projects;
- Predict and manage risk;
- Reduce project complexity through interactive dashboards;
- Control and manage project portfolios in real time;
- Manage project change and quickly resolve issues;
- Improve collaboration;
- Implement earned-value management; and
- Control contracts and documents.

Conclusion

As the upstream oil and gas industry grapples with change in every sector and at every level, including an expanding regulatory oversight infrastructure, cost savings and operating efficiencies have become more important than ever.

The best tools for gleaning those benefits are those that provide standardized project planning and portfolio management; enterprise-wide unified reporting; optimized resource use; facilitated, real-time data exchange; comprehensive risk analytics; and simple integration to asset management and enterprise resource planning systems.

In the end, it's all about smartly using an approach, such as EPPM solutions from Oracle, that helps companies reduce costs at the project, portfolio, and enterprise levels through the project lifecycle.

The upstream companies that are able to implement the best approach to managing risk to their operations in the most cost-effective way will be the ones to best weather another tumultuous decade to come for the oil and gas industry.

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