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In North America, unconventional oil and gas represents the largest energy discontinuity of the past few decades. Gas production from these resources grew from 20.8 to 44.5 Bcf/D between 2006 and 2012 and now represents approximately half of North America’s supply. Oil production is growing and is beginning to affect world oil flows. The scale of this ongoing activity is far reaching: Capital investment in new unconventional oil and gas wells has reached USD 100 billion per year in North America alone. With worldwide reserves largely unexploited, the real growth in the sector may be just beginning.

Such rapid growth, combined with a high level of field development activity over a long period of time, is putting the traditional relationship between producers and service companies under strain, while also creating new opportunities for both sides.

Developing unconventional oil and gas resources presents an opportunity for change for three reasons. First, activities are relatively uniform, with multiple, repeated operations taking place in close proximity during the life of a basin. Second, field development goes on for much longer, with drilling and completion activities continuing for many years. Third, the primary source of value in such operations has shifted from the discovery of plays to their efficient development. These changes provide an opportunity for producers and service companies to reset historical relationships, preserving value and reducing cyclicality for both parties, while also potentially improving safety for those in the field.

Based on our experience in these emerging plays, we have identified a series of opportunities for operators and service companies to bring real innovation to oilfield development in the near term. Central to these opportunities is our belief that operators and service companies should focus on developing closer and longer-term relationships with each other. This will enable the industry to unlock significant value. In particular, companies should focus on three areas: transparent operator-supplier contracting practices, joint supply chain optimization, and lean field operations.

**Transparent Contracting Practices**

The increased repetition and sheer longevity of activities associated with unconventional oil and gas drilling—a company may drill in a basin for 10 years—means that some procurement practices have the potential to provide much more than they can in the conventional environment: Procurement levers that may not be worthwhile in a conventional 1-year, 10-well project could be incredibly valuable when applied to a 1,000-well program over a decade.

Companies will need to choose their levers with care, however. In conventional oil and gas, producers may favor strategies that deliver savings by squeezing supplier margins. With relatively short contracts at stake, suppliers may be willing to accept such arrangements, especially during a cyclical downturn. They are likely to be far less accommodating when negotiating a multiyear contract. In that case, the most effective procurement practices will be those that enhance collaboration and joint value creation between operators and service or equipment companies.

*For the purposes of this article, unconventional oil and gas is defined as any resource that requires horizontal drilling supported by hydraulic fracturing.*
Three particular levers stand out. They have been utilized in the past, and many are experimenting with them today. Much progress remains to be made, however.

**Bundling over time and across basins.** Operators often contract for conventional drilling rigs and services for relatively modest drilling “campaigns,” or on 3- to 6-month call-off contracts. The long-term continuous activity associated with shale drilling means operators and suppliers can explore joint cost savings and productivity improvements derived from the predictability of longer-term contracts. In particular, if operators can provide predictable base-load volume, suppliers enjoy greater certainty of utilization for their equipment, people, and facilities. Therefore, they should be willing to supply their services and equipment at reduced cost.

**Allocating work based on supplier performance.** By allocating additional opportunities to suppliers based on their record of safety, cost, on-time delivery, and quality performance, owners can drive improvements across all these metrics. Distributing work in this way promotes competition between service providers that will tend to drive overall productivity up, as oilfield service companies compete for operators’ business, and work to avoid being labeled as a poor performer in a basin or region. It also allows the oilfield service companies that perform best to establish a leading position in a basin. Once established, that position is likely to become a sustainable competitive advantage, as operators will need a good reason to switch.

**Gain sharing.** The shift to longer-term relationships between service providers and operators will bring the opportunity to collaborate on improving drilling and completion productivity, and to share the resulting benefits. This type of relationship has worked well in the construction industry, with contractors sharing the value of changes in a project schedule through early completion incentives and penalties for delays. For this approach to work in unconventional oil and gas, incentives will need to be carefully designed and performance rigorously tracked. Among other things, this will ensure that suppliers do not compromise safety or environmental protection in an effort to complete their work faster.

Each of these levers will have different effects on different categories of goods and services. For hard goods such as wellheads, bundling a certain volume with a single supplier may be more valuable than attempting to performance manage the supplier’s manufacturing process. For services in which skilled labor is more important such as horizontal drilling, detailed performance management with the appropriate incentives is likely to be more effective.

**Joint Supply Chain Optimization**

There are two main opportunities to improve the supply chain in unconventional oil and gas: optimizing the composition of the equipment train that moves through the field to drill and complete wells, and managing the flow of goods and services to this train. Both opportunities are enhanced by collaboration between operators and suppliers.

In conventional onshore engineering and production, delivery of oilfield goods and services is typically organized around a single drilling rig. The high volume of activity and relatively limited customization required in unconventional development makes it more appropriate to organize around a “drilling and completion train” that is composed of multiple drilling rigs and hydraulic fracturing spreads. Basin-specific subsurface requirements and well design will largely dictate the appropriate composition of this train. A typical train may consist of two tophole drilling rigs, five horizontal drilling rigs, and two high-pressure hydraulic fracturing spreads. Collaboration between owners and equipment providers, and between the providers themselves, can reveal significant opportunities for the optimization of the design and operation of a train. For example, a number of rigs might share one water pond or certain kinds of equipment, or one experienced drill rig supervisor might supervise four managers-in-training at four nearby rigs.

A single unconventional well will require a large number of truck deliveries and pickups over its lifetime. Given this high level of activity, optimizing the physical delivery of goods and services is particularly important. Field service companies are natural owners of this work and, by allocating long-term support contracts, owners can expect significant cost and quality benefits as providers invest in improved logistics and transportation infrastructure. Economies of scale provide additional opportunities for performance and efficiency improvements. These can be facilitated by allowing one service provider to build scale within a basin, or through the development of collaborative logistics efforts between different providers. For the service companies, this work provides a secure revenue stream, which is particularly useful during times of lower activity.

**Lean Operations**

Unconventional oil and gas is one of the last industries to undergo the “lean revolution” that started with manufacturing decades ago and has continued through service industries such as banking. The opportunity to increase value by reducing waste and variability and increasing flexibility is significant. And if the acceleration of international development further increases constraints on personnel, equipment, and expertise, it will become even more so.

To date, operators and contractors have gained efficiencies by conducting similar operations in larger batches, such as drilling more wells on the same pad. Much less attention, however, has been paid to improving the efficiency of frontline operational tasks or in improving the interaction between different parts of the process, such as site preparation, drilling, completion, and production, or between operators and service providers.
There is a significant lean operation opportunity here. Drilling and completion operations are among the most complex, high-risk processes in the upstream unconventional space. Even in the same basin, it is common for there to be significant performance differences between crews working for the same operator. Furthermore, the complex nature of the work—in particular, the large number of interfaces involved—creates considerable waste: idle time waiting for work permits to be issued or for supplies to become available, and so on. Improved communications and collaboration between different providers, facilitated by the project owner, are critical to reducing these forms of waste. When this way of working becomes institutional, the rate of industry learning increases too, thus lowering total extraction costs and improving safety.

Based on our experience, the application of lean operation principles and an integrated operating system to a drilling rig and high-pressure hydraulic fracturing spread could drive waste out of the system to the tune of 15% to 20% of drilling costs. The largest opportunities lie in eliminating idle time among frontline crews by debottlenecking administrative routines, improving planning, optimizing logistics, and disseminating best practice working procedures.

Being able to produce profitably when gas prices are as low as USD 2 to USD 3 per MMBtu is becoming a necessity. In such an environment, operational levers are critical. Over the next 2 years, we believe that successful operators will drive down costs through new ways of collaborating with suppliers. They will also significantly change procurement practices from short-term transactions to longer-term base-load contracts that include performance metrics and gain-sharing agreements.

More broadly, it is in the best interest of suppliers and operators to start collaborating to drive productivity through lean operations and supply chain optimization. Players who collaborate successfully will likely be the biggest winners of all. JPT

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