

Trends Transforming Roles in Drilling

Definitely, Not Your Father's Oil Patch



I would like to thank the International Association of Drilling Contractors for accepting my presentation of this exciting and timely subject at their World Drilling Conference in Istanbul, Turkey June 19, 2013. Unfortunately this conference was canceled immediately prior to its commencement due to the protests ongoing in Istanbul June 2013. This presentation is now being released by DE WARDT AND COMPANY.



Introducing John de Wardt

John de Wardt is an independent, global, oil and gas management consultant specializing in Strategic Planning, Lean Manufacturing and Value Delivery Systems.

John's 37 years of work experience in 29 countries includes operations, engineering, contracts and management roles with ICI, Shell, Forasol/Foramer and Halliburton. He founded his consulting practice in 1994 and has a client list of 63 companies. John has published 24 SPE / IADC papers and industry articles many of which describe leading edge innovations in drilling. He has been a committee member on the SPE / IADC Drilling Conference for 20 years and was the Program Chairman of the SPE Drilling Systems Automation Technical Section 2010 – 13.

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The thread through this presentation commences with some thoughts on the global situation that can affect drilling trends, continues with a discussion of the distinction between independents (with a focus on those in the USA), reviews the various forms of outsourcing drilling that are being practiced, discusses changes that can occur in the roles between operators and their suppliers culminating in a description of the potential impact on drilling contractors.

Forces at work will reshape relationships

- Global thoughts
- Differential between Independents and Majors – especially Shale drilling
- Outsourcing
 - Well Management companies
 - Growth of Integrated Project Management
 - Emergence of Production Enhancement Contracts
- Changes that could occur in operator role and relationship to suppliers
- Impact on Drilling Contractors

The structure of the drilling industry has changed quite significantly since outsourcing of the drilling operations commenced. Initially, oil companies owned their own rigs. This practice started to change after the Second World War although some oil companies continued to own and operate rigs through the 1980's. Oil company ownership in drilling rigs transitioned primarily to many platform rigs and shared ownership in some high specification offshore floaters. The latter were considered as assets and often bought and installed by the operator's facilities team with limited regard to the requirements of the drilling operations team. It is seminal to note that the spin out of drilling rigs by operators created some of the highest regarded brand name drilling contractors in the business – examples include Santa Fe and Global (Marine). It is also noteworthy to reflect that in USA land drilling operations rigs were

How has drilling industry structure changed?

- Originally oil companies owned rigs
- Late 1940's oil companies formed / spun off drilling contractors (Santa Fe, Global, ...)
- Up to 1980's Drilling R&D by Majors
- 1990's onward – Drilling technology development by suppliers
- Integrated services / integrated project management / well management
- Next shift????

initially a drilling derrick / mast with suppliers bringing the equipment and services required to drill the well. Slowly, drilling contractors absorbed many of these supplier provided activities – one such example is the mud system. This was an absorption of services through the provision of equipment with the drilling rig. A similar approach is underway currently as drilling contractors add services, such as directional drilling, driven by their feeling they need to add revenues. It is interesting to wonder if this is a beneficial or a detrimental trend.

Another large effect in transition from operators to suppliers has been the shift of R&D investment and work from the customer (the operator) to the primary technology

suppliers (the service companies). It is well known that in the 1970's many major oil companies invested heavily in drilling R&D culminating in many patented applications including the first MWD tool. Today, oil companies no longer drive this R&D. Drilling R&D is now undertaken by major service companies investing to maintain competitive advantage and by startup companies, formed by entrepreneurs, with technology ideas and business savvy.

Integrated services have advanced from a marketing catchword to an outsourced performance based offering. It has advanced from simply bundling service and product offerings that delivered little additional value to delivering additional production through performance based contracts.

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Dichotomy in Well objectives

Fundamentals for oil company value

– Cost, schedule, functionality = ability to produce (gather data)

- Majors
 - Focus toward reserves / production away from cost / schedule
- USA Independents
 - Fast focus on cost (+ schedule) and production
- International Independents
 - Tend to mimic majors (playing the reserves)

Well objectives ultimately drive the value equation to which all processes and suppliers services must align, regardless of the appropriateness of the business model. The business of constructing wells ultimately always aligns itself to the fundamentals that drive operator values: cost, schedule and functionality. That is not to say that safety and environment are not part of this; they are more likely to be a minimum condition of satisfaction (MCOS) to be awarded the work.

Evidence suggests that major operators have been focusing on adding reserves and increasing the amount of production they have current access to as this appears to drive their stock price value. It does not mean that well

construction cost and efficiency is not important; it just appears to be masked by these other criteria. USA independents in contrast have set the stage of a major global shift in oil and gas dynamics through exploiting shale reserves; they have done this through aggressive campaigns and demonstrated ability to deliver productive wells in a low cost environment. This ability is unlikely to be challenged by other operators even those who are entering the USA market through buying up independent operating companies.

In contrast to both the majors and the USA independents, there is a significant expansion of global independent oil companies. This has been driven by readily available capital for investment into oil and gas leases and indigenization of established oil provinces. Many of these independents are founded by and resourced with personnel with global operating experience within the major operators. This brings with it the focus on reserve growth and a lack of operating efficiency. These companies are often able to trade up their asset value based on portfolio success, relegating drilling performance to a secondary criteria of success.

Low cost US gas = global shift

- Energy and feedstock
 - Massive investments (one example \$24 Billion plant)
- Reducing imports
- Exporting coal
 - Reducing global price of coal
- Gas price independent of oil

**USA economic growth will be significant
founded on low energy / feedstock cost**

Low cost gas in the USA is creating a global shift in both investment and country economic performance. There are those who seem to view this from the outside as a “flash in the pan” event. This is probably driven by a remote view of the fast decline curves associated with such developments. Here again, the USA independents have established their ability to respectively drill and frac “to create the reservoir” and offset the fast decline curves through the addition of low cost wells. The limited extent of production from each well drives the need to continuously add wells to compensate for the production decline curves. This is becoming a manufacturing process and is very different to a traditional reservoir

development.

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One of the biggest aspects of the USA Shale development is that it was created by USA Independent oil companies. They operate in an environment that has four critical drivers which may, or probably do not, exist elsewhere. Horizontal drilling is a routine operation offered by many service companies worldwide. High horsepower for fracking is available primarily in the USA, many other areas of the world do not have these resources and it will require a lot of investment to create sufficient assets for the necessary level of service. Hedging gas sales has become a common practice through the financial exchanges in the US; the ability to do this is not common around the globe where contract prices tend to predominate. Ultimately access is the issue, where governments own the subsurface rights the cost and time to access is often high. In the US, subsurface rights owners have a desire to develop their assets and have a right to access through the surface owners. This creates a far more competitive environment to promote development than one controlled by a government.

Low cost US gas = global shift

- Energy and feedstock

Created by USA independents:

- Horizontal drilling
- High horsepower / multi stage fracking
- Hedging sales prices
- People not government own subsurface rights

USA economic growth will be significant founded on low energy / feedstock cost

Are major operators succeeding or failing?

- ROCE falling (FT April 2013)
 - Happened in 1980's – value erosion
- Project delivery delays continue (IPA)
 - Still not improved
- Shale gas / liquids developed by independents
 - Horiz, Fracs, Hedging,, low overhead
 - Majors buying in – can they deliver?
 - Global shales require equivalent model – who can do it?

In considering future trends, the ability of major operators to satisfy their shareholders ought to be considered. There are published articles that suggest major oil companies are eroding their shareholders value due to a reduction in the return on capital employed (ROCE). It is unclear if this will have a long term impact however it is a force in the market that could drive some key business decisions. Underlying the above observation, the industry standard for measuring project performance continues to evaluate major oil industry projects very poorly on their ability to be successful. If these projects continue to fail to deliver on schedule and cost in a flat or declining oil / gas price environment they will impact company profitability.

This leads to the question if non USA independents can realize value from exploiting shale gas and oil given their more cumbersome and slower to respond infrastructures. The answer is probably NO; ExxonMobil has already indicated this outcome through divorcing its corporate ExxonMobil infrastructure and operating procedures from its wholly owned affiliate XTO. Shell has just announced a write down of its North American shale assets by \$2 billion without providing details as to specifically where and why.

There is operational differentiation between USA Independent oil companies and Major Operators. The real issue is "what does this mean" for the industry.

Could ExxonMobil disappear by 2020? It is not an unheard of experience in other business; doing very well one day and gone the next. While it may not be ExxonMobil, it surely raises the question if the major operators can survive in their current format.

**Differentiation
Independents and Majors**

What is it and what does it mean

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You may ask what drilling has to do with this; well in response I suggest that there are two very key drivers where drilling now has a huge impact on major operator performance. The first, and obvious, is the risk to the company associated with catastrophic events. I will not pursue this further as it is well understood after recent, extensively published events. The second is the ability of the drilling operations department to access the reserves to create production at an economic cost in an expeditious time frame. This is what the shale drillers have established however I challenge the global operators to prove they consistently deliver to this challenge. Interestingly, a book is soon to be published in which the proposition of ExxonMobil disappearing as a result of the aggressive exploitation by the USA shale drillers is offered as a real possibility.

ExxonMobil disappears by 2020
Unable to compete in a low cost world

IBM 2011 - "Nearly all the companies
our grandparents admired have
disappeared."

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New Players are emerging and establishing a strong presence in the upstream business. Three key types of new players are discussed in this section.

Well Management Companies

What do they do and how do they do it?

Well Management companies are possibly the longest established with examples dating back to the 1980's. These companies built themselves to meet a need for external capability to operate as a drilling department. This has evolved as these organizations gained strength and developed joint operator programs in which the well management company operates a rig and services for multiple customers over multiple wells.

These companies have established a place in the business based primarily on the outsourced drilling department. They often fulfill this role in

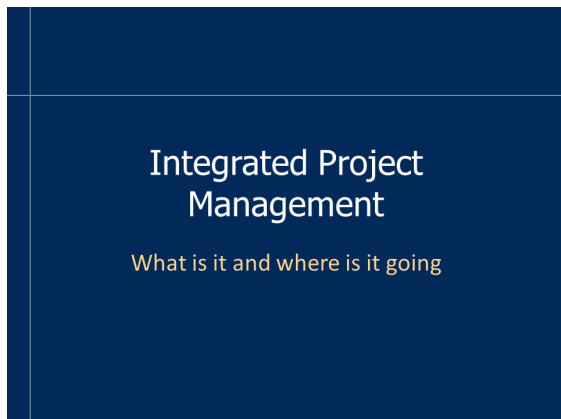
single string ventures – one off operations to drill a remote exploration well. Campaigns have become the forte of some companies to the extent that they contract the rig and services under one “umbrella” for multiple oil company clients. This methodology has yielded value through avoiding the manning up and down, multiple contracting and other inefficiencies experienced by single companies versus a campaign approach. The focus of the well management companies is to achieve the well sub surface objectives in terms of a well bore that meets the clients’ desire. These contracts usually deliver industry standard performance as there is little direction or incentive from the client to seek

WM has a place in the business

- **Outsourced drilling department**
 - Clients without internal resources
- **Often Single String Ventures**
 - Remote exploration well(s)
- **Often multi well / multi company campaign**
 - Package a rig / service offering for multi clients
- **Focus is achieving objectives**
 - Get the data versus highest performance

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improved performance.



Integrated Project Management, a term coined by one service company that is now gaining broad acceptance as the description of an offering, has grown significantly in the last 10 years. The revenues of this type of offering are often obscured by the overall product line revenues reported by the larger service companies providing this service. A few years ago, an analysis broke apart the reporting data and discovered that one major service company appeared to be growing the revenues of this service at 18% year on year.

Integrated Project Management (IPM), after an initial struggle in the 1990's, has become an accepted form of contracting. Initially this was driven by NOC's outsourcing but has recently been taken up by IOC's in areas where they prefer others to establish the resources for well construction. The contract is essentially a fully outsourced construction of wells usually including completion. These more routine development wells are typically offered in large packages which can be worth hundreds of millions of dollars. The reported growth above is a key indicator of growth of this business, however recently a qualitative assessment of the number of rigs operating under this form of contract, and a form of contract closely associated with it – Integrated Service Management, appears to be over 20% of worldwide operating land drilling rigs. This figure indicates that this form of contracting has become well established. IPM companies access drilling rigs they own or partially own through shareholdings in a drilling contractor or contract rigs from the market. Their preference is to use their own drilling rigs since these can be modified to suit the particular operations and can be readily incentivized to align performance objectives.

- Full outsourcing of well construction for a fixed price
 - Multiple wells / focus on performance / \$300 million
- NOC's initial buyers
 - IOC's now buying in certain cases
- Biggest suppliers are major service companies
- Activity trend appears to be rising
 - Player was growing 18% year on year
- Some access own rigs / partner rigs



The most recent evolution of these forms of contract is the Production Enhancement Contracts (PEC). These contracts have been put in place to drive increased oil and gas production in older fields. Essentially this form of contract outsources operations for a field or group of fields in a geographical area. The contracts are designed to reward increases in production over a baseline developed from historical production rates. Obviously, field production and maintenance is a key activity. Combined with an aggressive workover program, this usually succeeds in maintaining the agreed level of production against the tendency for natural decline. The large financial rewards often lay in the additional production above the agreed baseline. This typically requires an aggressive multi string drilling campaign. The drilling performance focus often delivers completed wells at a rapid pace and outstrips the rate at which sub surface departments can develop targets – with consequences of rig activity suspension. In

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contrast to many oil companies, where subsurface targets are built into an inventory that defines rig contracting, these performance contracts exhaust the supply of locations and create a complete turnaround for the work flow in the business. Subsurface output goes from "push" to "pull"; an accidental incursion into the methodologies of Lean Manufacturing. These contracts are extremely long term, often a 2 year initial period leads into a 25 year term. The necessity to drill many wells at a rapid pace over such a long term creates a financial environment where rig ownership outweighs rig contracting.

PEC drills fast to produce

- Outsourcing field operations
- Contract rates reward increase in production rates over baseline
- Typically drilling wells is fastest means to success
 - + Intervention in old wells
 - Pulls on subsurface delivery of well targets
- 2 year initial then 25 year contract

Operator Role and Relationship to Suppliers

What changes could occur

Traditional business model impedes improvement

- Lacks alignment to performance
- Is there alignment to well objectives?
- Lacks alignment for technology application
 - Impeding growth of Drilling Systems Automation
- Who is the General Contractor?
 - GC has responsibility to deliver the well
 - Schedule, cost, functionality

Fundamentally, the operator role and their relationship to suppliers defines the business model. The traditional business model is being challenged more and more as it is perceived to inhibit the development of new technologies such as Drilling Systems Automation.

The current model lacks alignment with the actual performance objectives of the operator; in reality these are, lower cost and faster delivery wells. It is not obvious that a traditional day rate contract matches this desired outcome of the operator.

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Next are the well objectives, it is all about accessing reserves and producing them. While this is obviously the responsibility of the operator, there is a reasonable logic that requires the suppliers to work toward this goal. The traditional contracts do not reward this behavior so why should it be expected to happen. The next level is technology application, there have been excellent results achieved through technology application however the advent of drilling systems automation has highlighted that there are limited incentives to deliver technological improvements under standard drilling and service contracts. This has led to the question – Who is the Integrator for Drilling Systems Automation? Similarly, the question can be asked – Who is the General Contractor in Well Construction? The general contractor (GC) is the entity who takes responsibility to deliver the well according to the customer requirements defined in the engineered design. The GC is also responsible to meet performance objectives in terms of safety, schedule, cost and functionality, which includes quality. The GC hands over the well to production operations either pre-commissioned or not commissioned depending on the phasing of these activities.

Supply Chain Management Commodity vs. Value?
<ul style="list-style-type: none">• Separation of SCM from operations is alarming<ul style="list-style-type: none">– Driven to commoditization– Value realization is diminishing• Fundamental lack of service value recognition<ul style="list-style-type: none">– Unable to articulate– Fail to benchmark / measure KPI's
Differentiation: <ul style="list-style-type: none">• Greater performance from IPM, PEC• Faster development by Independents (USA)

An issue facing the acquisition of services from drilling contractors and other suppliers is the methodology employed by the operator in their tendering process. Some major oil companies have transitioned the whole tendering process into their supply chain management departments which has led to a drive to commoditize services and a focus on pricing. The input for value realization from the operations departments appears to have diminished. These companies seem to fail to realize the negative impact on their overall well delivery performance because they fail to benchmark or define acceptable Key Performance Indicators (KPI's) and therefore cannot articulate the value loss.

Potential Impact on Drilling Contractors

The analysis above leads to some observations concerning the potential impact on drilling contracts.

Very large, long term IPM and PEC contracts often require long term use of a drilling rig. In many cases these companies commence operations with rigs rented from drilling contractors primarily due to

Rig supply – why rent, just buy

- Rental market has functioned well
- Ownership can create improved business alignment
- Design drilling machine(s) for the field
 - Long term contracts
 - Automation application (Rio Tinto Autonomous Mine)

the short lead time to start of operations and high mobilization costs for distant rigs. However, it soon becomes obvious that the long term costs of drilling wells can be better managed using a purchased rig. A number of USA Independents have also demonstrated this through creating their own vertically integrated drilling contractor. Once the purchase of a rig can be justified, two advantages become obvious; the performance of the wholly owned drilling contractor can be fully aligned to the well delivery performance without the need for special contractual models and the purchased rig can be purpose designed to the specific field performance objectives. This can then lead to advanced adoption of automation in the

drilling rig because the owner will realize the benefits directly and there are no misaligned contractual drivers to inhibit this. Mining automation developed by Rio Tinto has shown significant advancements because they buy the machines and then deploy and manage them in their own mine.

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A common observation across the industry in workshops and forums discussing performance and technology application is that the deep offshore and land drilling models have dissociated and form the ends of the spectrum for business models, technology application and the like. Large (multi well / long duration) and highly cost sensitive land drilling projects will take more control over the drilling rigs through direct acquisition or control of the drilling contractor as a shareholder or owner. Alignment of business models through payment rewards for meeting operator objectives will grow as the desire for alignment spreads across the industry.

Performance stress will require operators to outsource to a general contractor (IPM / PEC) or develop a competent general contractor department or subsidiary to manage their own drilling operations.

What conclusion can we draw?

- Deep Offshore and Land model dissociate
- End users will buy / control access (land) rigs
 - “Back to the future”
- Aligned business models will grow
 - \$ rewards for objectives & improvement
- Traditional business model will get a shake up
 - General contractor will be re-established

Thank you

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