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TECHNOLOGY CONFERENCE

24-25 AUGUST 2011
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Factory Style Drilling and Completions Techniques Critical to Long-Term Success in Unconventional Resource Plays

Mark Clevenger
Thursday, 25 August 2011



Since 1983, Alvarez & Marsal has helped clients to improve performance by taking a hands-on, execution-oriented approach

About A&M

- ▲ Founded in 1983 by co-CEOs Tony Alvarez II and Bryan Marsal
- ▲ 1,700+ professionals
- ▲ 36 cities; 16 nations; 4 continents
- ▲ 300+ Managing Directors

North America

New York (Global HQ)

Atlanta	Miami
Birmingham	Nashville
Boston	Philadelphia
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Dallas	San Francisco
Denver	Seattle
Detroit	Toronto
Houston	Vancouver
Kansas City	Washington, D.C.
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São Paulo (Latin American HQ)

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Strategy	Information Technology	Finance	Human Resources	Operations	Merger Integration
<ul style="list-style-type: none"> ▲ Corporate and Business Unit Strategy – Strategic Assessment – Portfolio Optimization ▲ Growth Initiatives – Mergers and Acquisition Strategy – Market Assessment ▲ Marketing Strategy – Customer Analytics – Pricing Strategy – Product Profitability – Channel Strategy ▲ Operational Efficiency – Cost Management – Outsourcing Strategy – Process Improvement 	<ul style="list-style-type: none"> ▲ CIO Support Services ▲ IT Strategy and Governance ▲ IT Performance Improvement and Cost Reduction ▲ IT Outsourcing Analysis and Strategy ▲ IT Program and Change Management ▲ Software and System Integrator Evaluation and Selection 	<ul style="list-style-type: none"> ▲ Finance Strategy ▲ Planning, Performance Management and Reporting – Planning and Budgeting – Performance Reporting – Business Analysis / DSS ▲ Finance and Accounting Operations – Account To Report – Procure To Pay – Order To Cash – Process Controls ▲ Shared Services ▲ Treasury, Cash Management and Tax Transformation ▲ Accounting Advisory and Remediation 	<ul style="list-style-type: none"> ▲ HR Operational Improvement – HR Strategy / Structure – Policy Review and Compliance ▲ Performance and Rewards – Total Rewards: Compliance, Strategy, Design, Implementation – Performance Management ▲ Talent Management – Talent Sourcing – Career Management – Management Development – Succession Planning ▲ Change Management – Training Strategy and Development – Communication Management 	<ul style="list-style-type: none"> ▲ Assessment and Optimization – Supply Chain – Well Planning – Drilling and Completions – Production Operations – Midstream Operations – Manufacturing – Logistics and Distribution – Maintenance ▲ Lean Six Sigma ▲ Organization Transformation ▲ Process Transformation 	<ul style="list-style-type: none"> ▲ Program Management ▲ Integration Strategy – Business Strategy – Synergy Targets – Communication and Change Management ▲ Plan and Execute Day 1 / 100 Goals – Functional Integration – Customer Retention – Synergy Achievement – Employee Retention – Cultural Integration

Alvarez & Marsal has assisted over 100 Energy and Natural Resource companies improve performance



Today's Agenda

We will develop an understanding why pad drilling and simultaneous operations is becoming widely accepted as a means of achieving operational excellence and highlight a roadmap to success.

- I. What is Factory Style Operations
- II. What is the E&P Factory
- III. How it has been implemented in E&P
- IV. Critical Success Factors & Key Implementation Challenges
- V. Questions



Source: Alvarez & Marsal

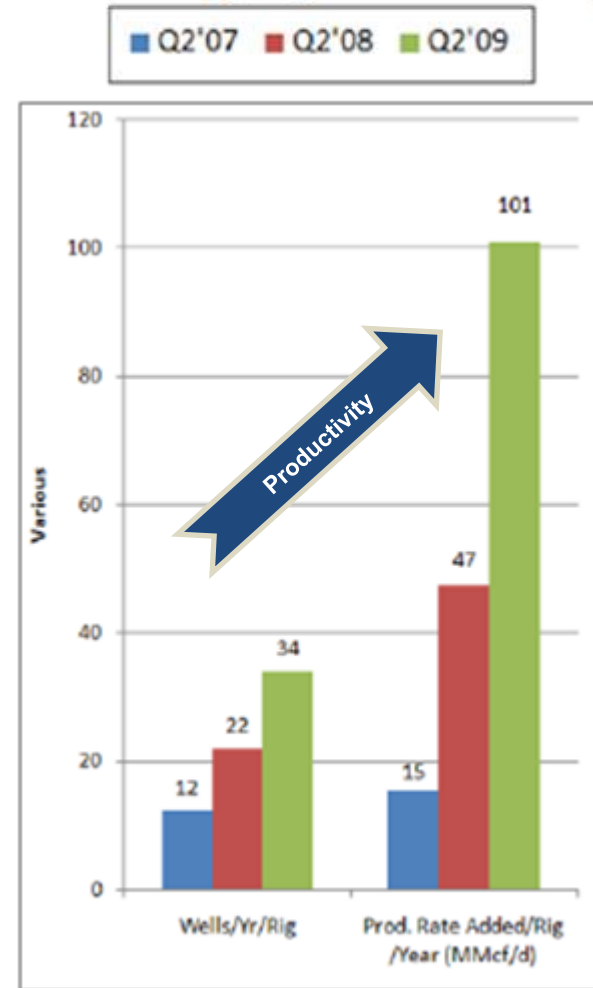


E&P Companies are under pressure to improve performance and operating efficiency

Many factors have increased pressure on players in unconventional resources to become more efficient:

- ▲ Acquired large tracks of land at high prices
- ▲ Leasehold is not held by production (HBP)
- ▲ Need to capture economies of scale
- ▲ Tight supply market for materials and services means must move fast
- ▲ Expiring hedges and low commodity prices are driving down profitability in gas plays

Southwestern Energy Fayetteville Efficiency Gains

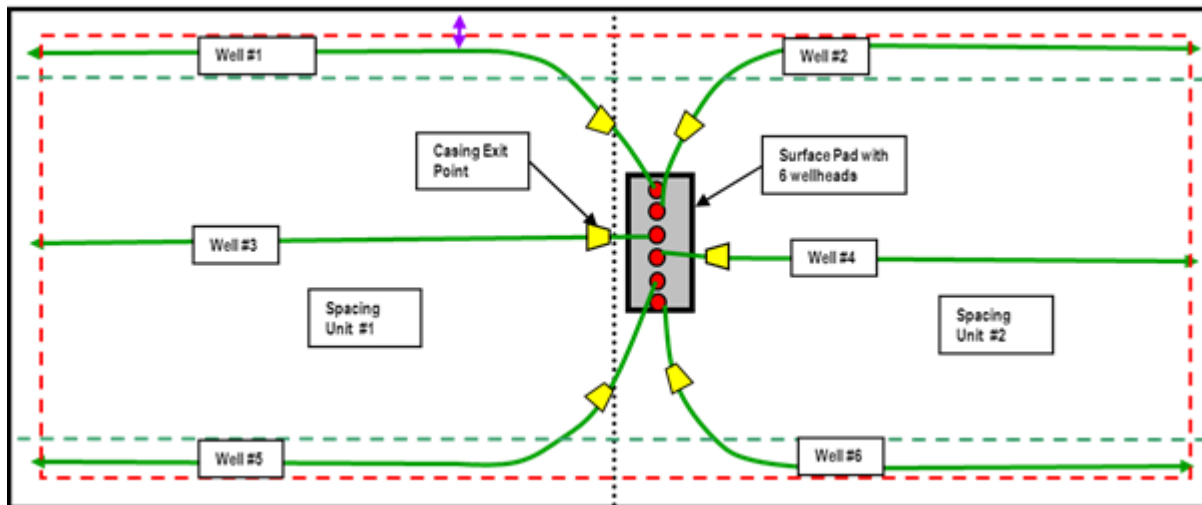


Source: Southwestern Energy Earnings Release

The game has changed...an emphasis on speed and efficiency

Many operators are turning to Factory-Style operations to drive efficiency and achieve economies of scale

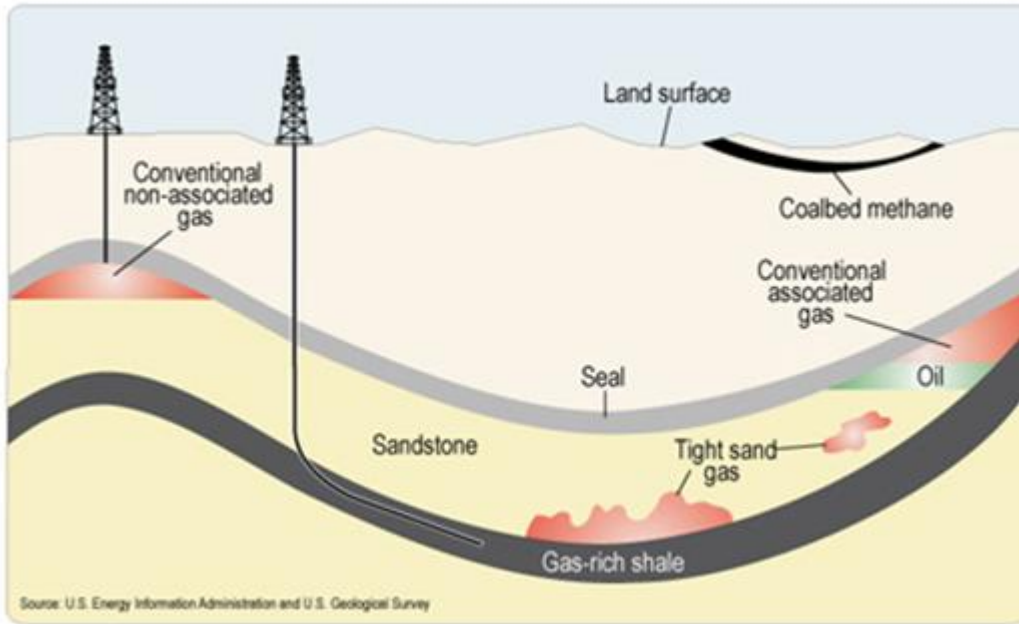
- ▲ Successfully deployed 8, 16, even 32 well pads
- ▲ Use of Fit-for-Purpose rigs
- ▲ Standardization of major equipment and services
- ▲ Demand based replenishment
- ▲ Continuous improvement efforts



Source: Alvarez & Marsal

Factory methods have been applied in every major shale play

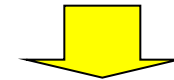
Unconventional resources ...



... vast contiguous formations of tight rock that hold vast amounts of oil and/or gas.

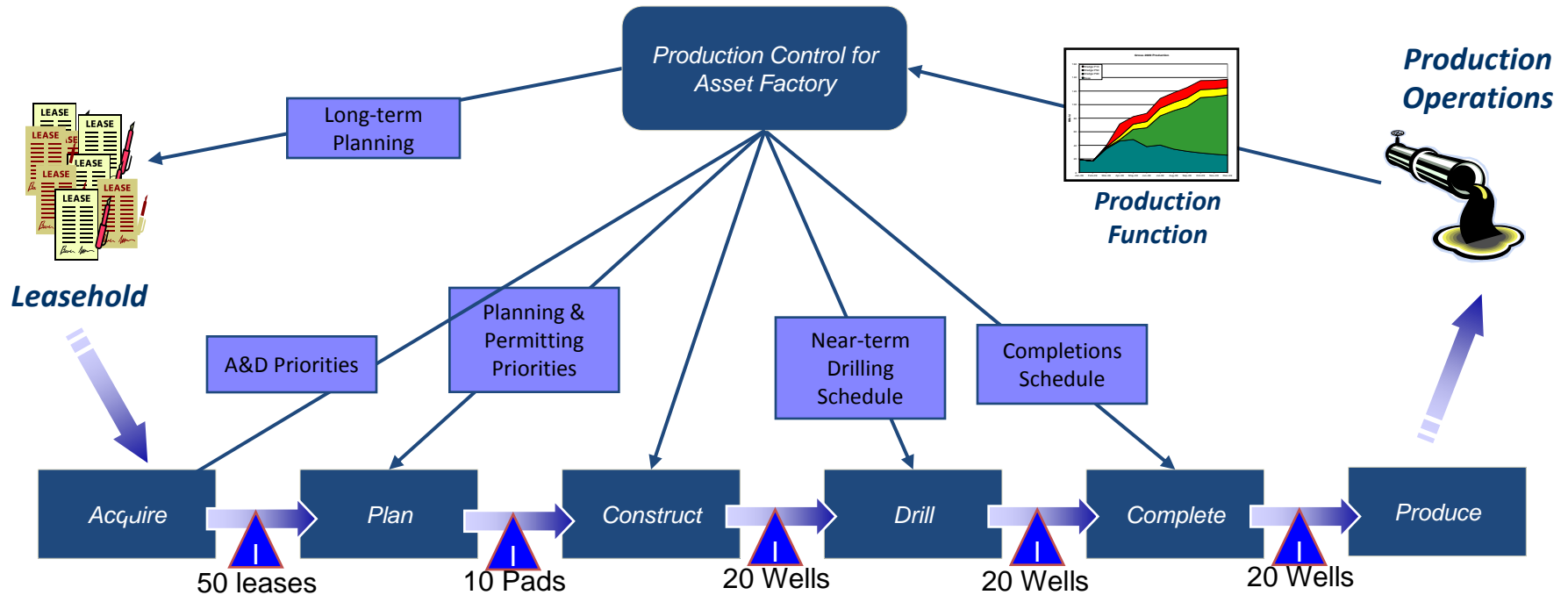
Unconventional resources provide an important component of “smaller, simpler, sooner.”

- ▲ Predictable, scalable reserves & production adds
- ▲ Reduced cycle time from ‘discovery’ to first production
- ▲ Manufacturing approach can be replicated across plays/continents



A Lean Approach!

What is the “E&P Factory?”

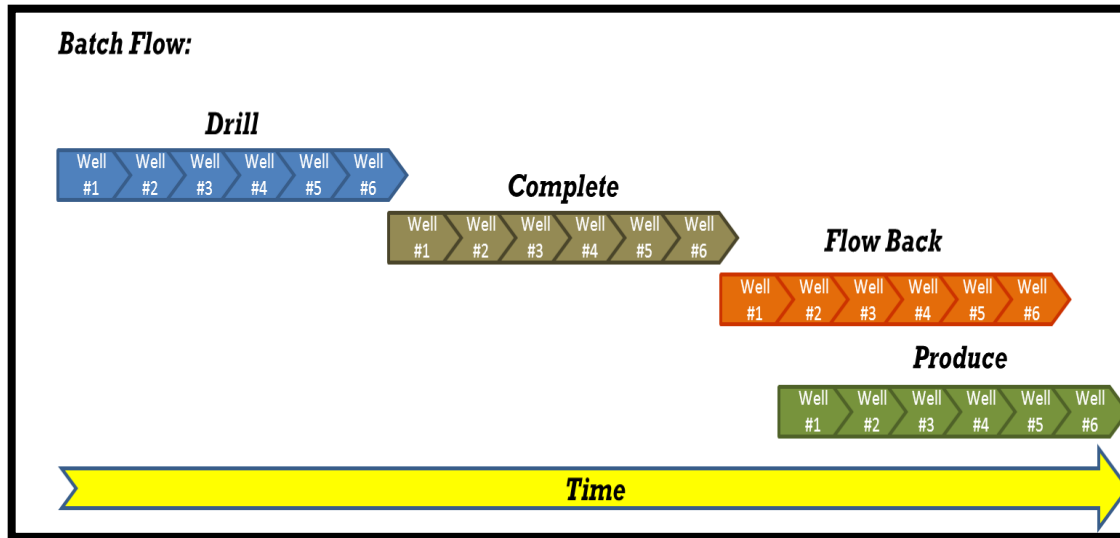


Source: Alvarez & Marsal

The E&P Factory seeks to reliably deliver producing wells at a consistent pace set by the production function by:

- ▲ Focusing on well delivery rather than functional or technical excellence
- ▲ Integrating functional teams in an end-to-end well delivery process
- ▲ Standardize pads to accommodate future infill wells
- ▲ Facilitating feedback and learning plans back into process for future wells
- ▲ Efficient use of suppliers & human resources through reliable planning & performance

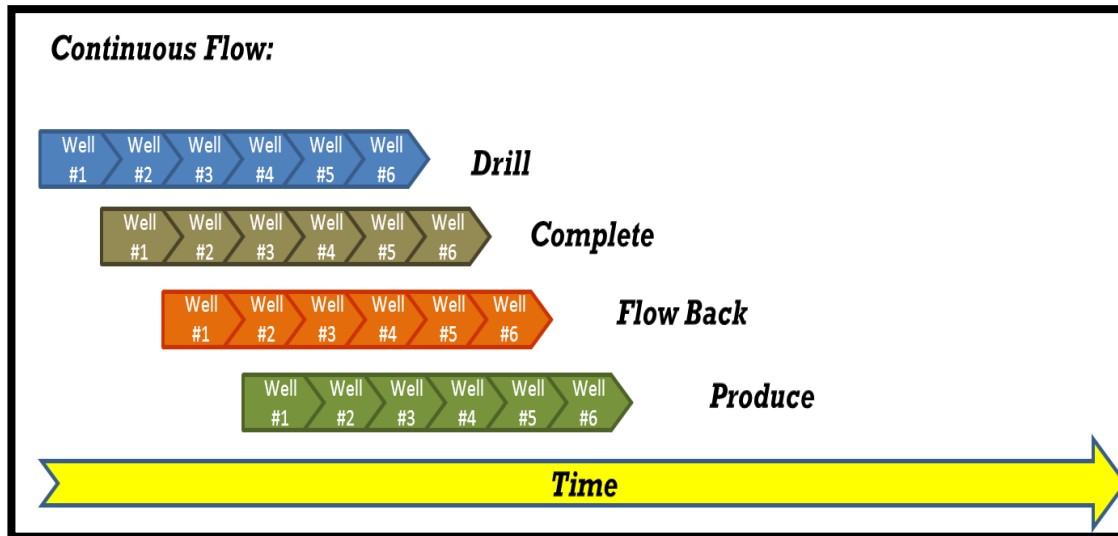
Traditional Pad Based Drilling based on Batch Flow



Source: Alvarez & Marsal

- ▲ Drill all wells on a location before completing and flowing back
- ▲ Optimizes drilling and completion schedules in isolation
- ▲ Reduces surface disturbance as fewer pads are required and surface facilities are shared
- ▲ Significantly lengthens time from Spud to 1st Sales tying up working capital
 - Ex: 300+ days from 1st Spud to 1st Sales for 6-well pad scenario

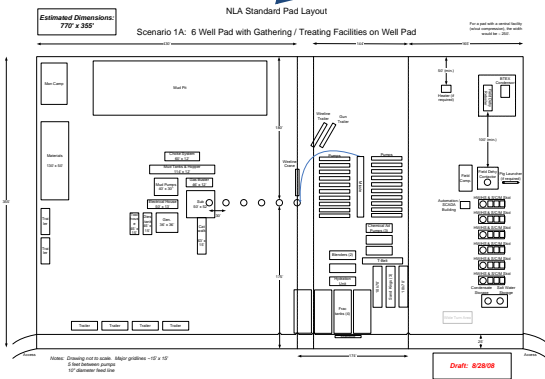
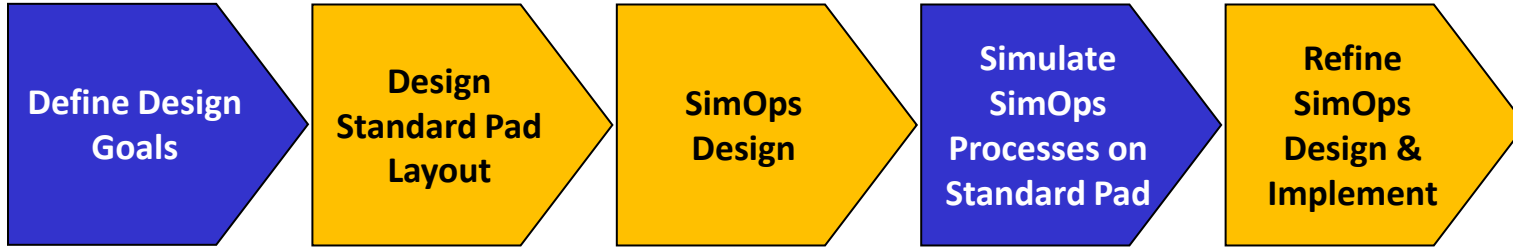
Implementing Continuous Flow through Simultaneous Operations



Source: Alvarez & Marsal

- ▲ Based on the idea of “Just in Time” manufacturing - *produce only what is needed when it is needed*
- ▲ *Continuous flow can be achieved by drilling, completing and producing from the same pad at the same time*
- ▲ Significantly reduces time from Spud to 1st Sales tying up working capital
 - Ex: 65 days from 1st Spud to 1st Sales for 6-well pad scenario

Simultaneous Operations Design & Execution



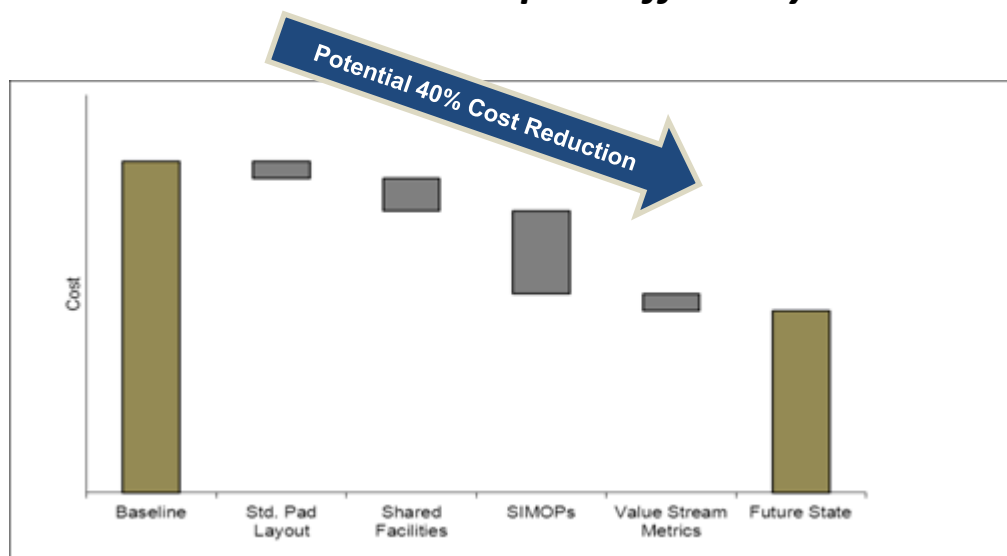
Phase	Well	Drilling	Completions	Production	Gathering	Sequencing / Comments
Pre-Rig Arrival	All	✓			✓	<ul style="list-style-type: none"> Construct pad Set flow lines and equipment
Drill Well 1	1	✓				<ul style="list-style-type: none"> No simultaneous operations. Drill Well 1 through TD immediately skid the rig to Well 2.
	2					
	3					
	4					
Drill Well 2	1		✓	✓	✓	<ol style="list-style-type: none"> Drill Well 2 surface hole and intermediate hole 29 days. Frac crew arrives after the rig has “rigged up” on Well 2 and begins fracturing Well 1 ASAP. Well 1 should typically be completed (including flowback test) by the time Well 2 has been drilled to the intermediate point. Drill Well 2 lateral. Connect Well 1; IP. Place cage over Well 1 wellhead.
	2	✓				
	3					
	4					

Completed through focused cross-functional workshops with service provider partners

E&P Factory drives

- ▲ Lower total well delivery cost from pad construction through first sales
- ▲ Reduce drilling and completion costs
 - *Ex: \$13M to \$6M per well across a 36 month period*
- ▲ Scalable processes and infrastructure capable of efficiently supporting maximum operational levels anticipated over the expected lifecycle (~40 rigs)
- ▲ Higher day-to-day predictability of activity
- ▲ Greater understanding of value drivers
- ▲ Synchronized value creation activities (i.e., construction, drilling, completion) with pace of production plan

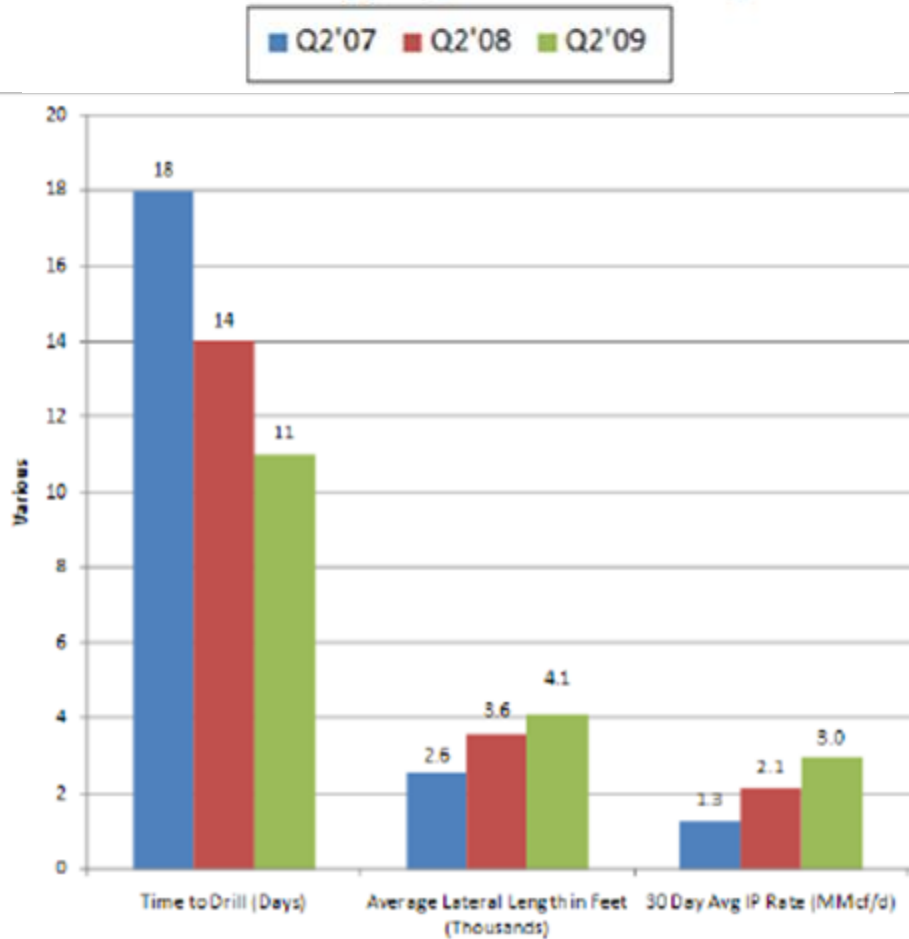
Continuous flow speeds time to production and enhances capital efficiency



Source: Alvarez & Marsal

Implementing continuous flow means tackling numerous challenges

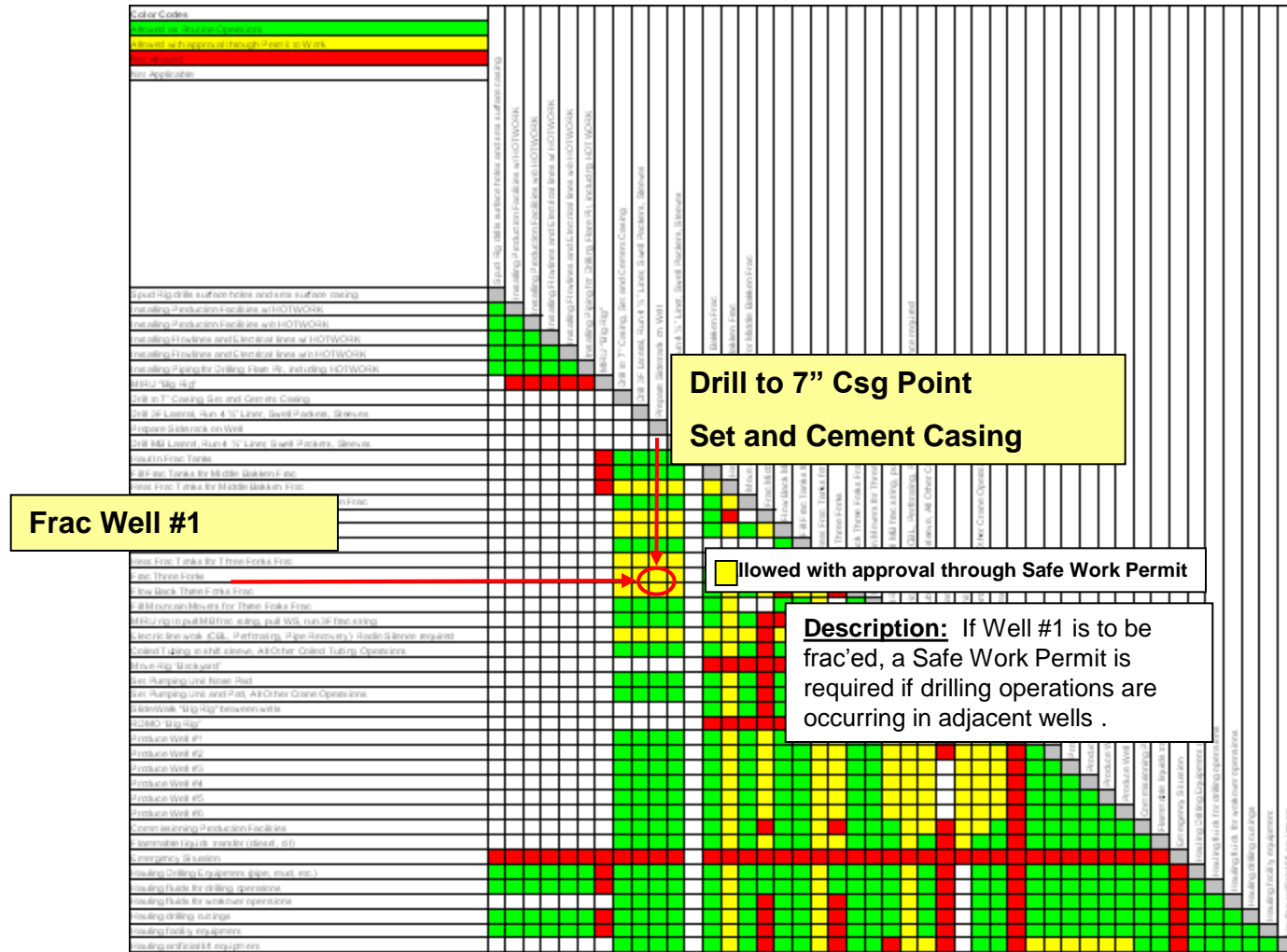
Southwestern Energy Fayetteville Efficiency Gains



Source: Southwestern Energy Earnings Release

- ▲ Managing concurrent drilling, completions, and production activities on the same pad in a safe manner
- ▲ Standardizing pad design and layouts across multiple locations
- ▲ Managing lease expiry in non-HBP acreage positions – pad to pad cycle times are extended
- ▲ Allocating AFE costs across multiple wells on a given pad
- ▲ Increasing complexity of construction activities on larger pad footprints

Simultaneous Operations Requires Thorough Planning and Management of Risk



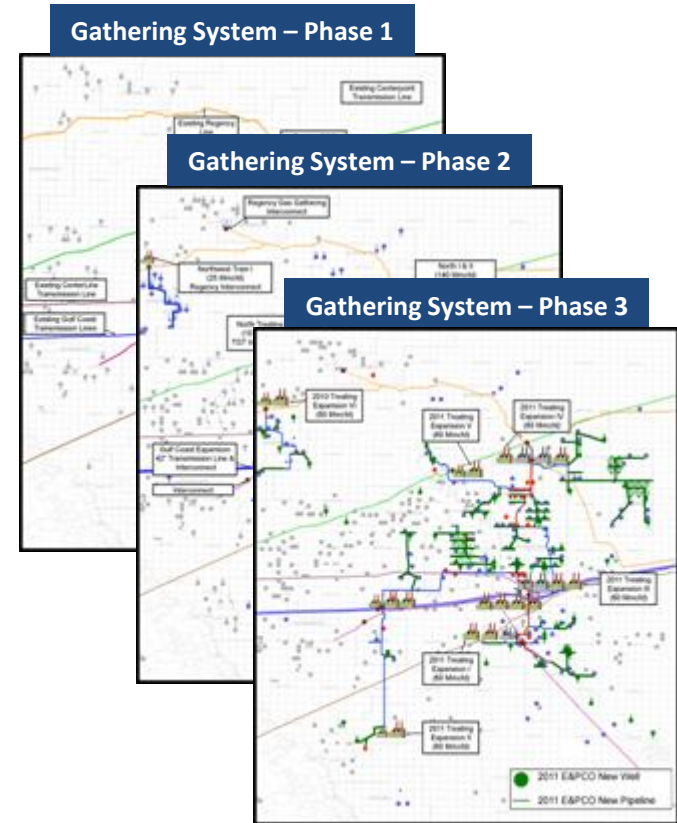
The E&P Factory extends beyond Drilling and Completions Operations

Drill Schedule



Source: Alvarez & Marsal

- ▲ Understand commercial options to support full-scale development
- ▲ Multi-generation plan for entire value chain (raw materials, drilling, completions, production, midstream)
- ▲ Business financial model / pro-forma
- ▲ Implement metrics to measure factory build out



Source: Alvarez & Marsal



Takeaways



Source: EnCana Oil & Gas (USA)

- ▲ Leading operators have successfully managed simultaneous operations on 8, 16, and even 32 well pads
- ▲ Realized 30-40% reduction in drilling and completion costs
- ▲ Must create continuous flow by operating in a factory like manner
- ▲ Requires a cross-functional team and collaboration across the value chain
- ▲ Focused effort to monitor and manage end-to-end performance metrics
- ▲ Focus on eliminating / reducing variability. Cost decreases will follow



Thank you!

Contacts

Mark Clevenger

Manager

Alvarez & Marsal Business Consulting

700 Louisiana Suite 900

Houston, Texas 77002

(O) (713) 547-3638

(C) (832) 443-1811

mclevenger@alvarezandmarsal.com

Lee Maginniss

Senior Director

Alvarez & Marsal Business Consulting

700 Louisiana Suite 900

Houston, Texas 77002

(O) (713) 547-3658

(C) (713) 301-1650

lmaginniss@alvarezandmarsal.com



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Relevant reading also from Alvarez & Marsal

- ▲ Utilizing Lean Concepts in E&P: The Time for Lean is Now
 - http://www.alvarezandmarsal.com/en/industries/energy/documents/BC_WP_LeanEP_2011.pdf
- ▲ Simultaneous Operations: The Key to Speed and Efficiency for Unconventional Oil & Gas
 - http://www.alvarezandmarsal.com/en/industries/energy/documents/BC_PadDrilling_2011_WP.pdf
- ▲ Oil & gas Royalty Disputes: Complex Lease Terms and Varying State Laws Create New Challenges
 - <http://www.alvarezandmarsal.com/en/industries/energy/documents/OilandGasRoyaltyDisputesFS.pdf>

