

Improving Drilling Performance by Leveraging New Data Aggregation and Visualization System

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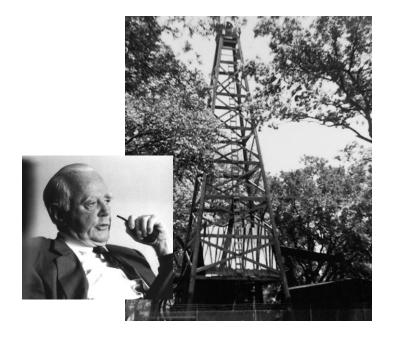






HUMBLE BEGINNINGS

- From initial seed capital of \$250,000
- \$62 billion in total assets at year-end 2015
- Founder Raymond
 Plank instilled a
 culture that enabled
 Apache to forge a
 unique path





Apache's strategy for value creation

| Operational Flexibility | Strategic objective to live within cash flow Diverse inventory of short, intermediate and long cycle projects Dynamic planning and centralized capital allocation process |
|---|---|
| Growth from Unconventional North America | Extensive economic inventory anchored by Permian Basin Visible long-term production and cash flow growth Ability to find and develop new plays organically |
| Cash Flow from Int'l & Conventional North American Assets | Sustainable production and free cash flow through step-out exploration and development Legacy onshore North American production base with low decline rates and significant free cash flow |
| Strong Financial Position | Manageable debt level with minimal near-term maturities ~\$4.7 billion liquidity Strong cash margins per BOE |
| Capital Allocation | Actively manage the portfolioAllocate capital for long-term by using fully burdened rates of return |

The values at our core



Region structure

Increased centralization with a balance of power between functions and regions

PERMIAN

Midland Basin and CBP/NW Shelf

HOUSTON

Canada, Mid-Continent and Gulf Coast

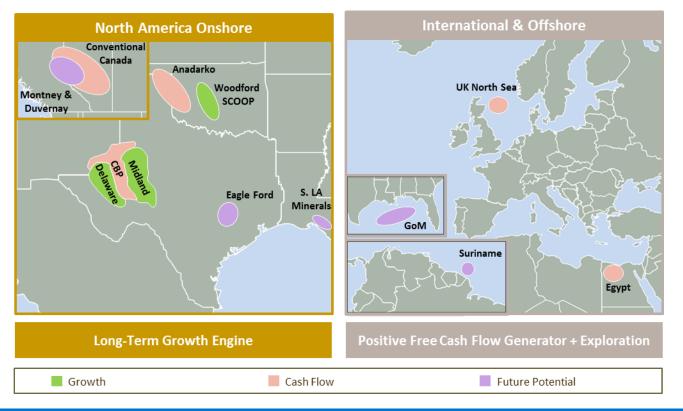


DELAWARE BASIN

INTERNATIONAL AND OFFSHORE Egypt, North Sea and GOM

Balanced portfolio

Focused on North American Growth



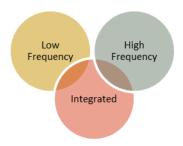
Why Do this project?

- With drop in oil price, large efficiency drive and improving performance to drive down well costs and make more acreage economic
- To be successful, the use of data is crucial to accelerate these efforts
- Strategic drive to be data-driven in our decision-making
- Drilling Challenge
 - Current real-time data vendors use, at best 20+ year old technology to gather and display data on proprietary systems
 - Not easy to move data and combine high with low latency data sources
 - No enterprise store of real-time data
 - Impedes use of high-end analytic tools, to develop models to use in real-time to accelerate performance and learning



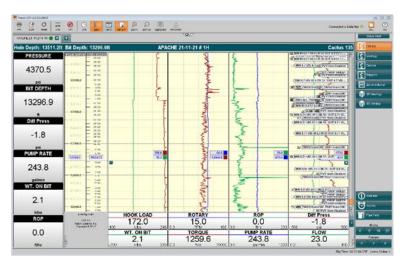
Data Strategy Goals/Deliverables

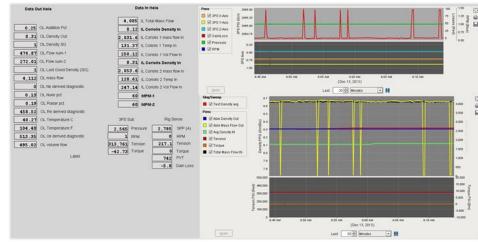
- Hi/Lo Frequency Data Quality
 - Clean important historical data
 - Seek better data
 - ▶ Hold the gains
- Easy Data
 - Aggregation
 - Manipulation
 - Reporting
- Actionable Data/Information
 - Predictive
 - Optimize
 - Discover
- Develop Competency, Resources
 - Visual analytics
 - Advanced analytics
 - Data/information aggregation
 - Process metrics
 - Algorithm development





Drilling EDR vs Process Control Visualization





High frequency data project – Phase 1

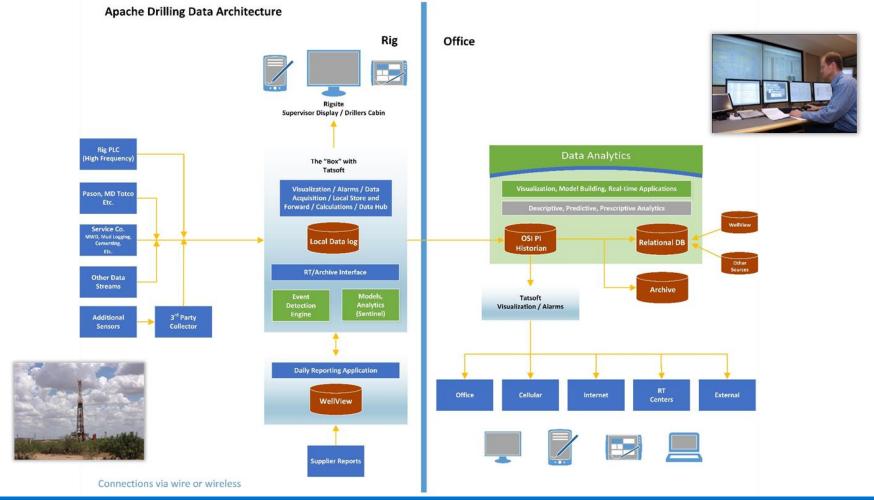
- Configure Tatsoft FactoryStudio at the rig site to give typical user experience
 - At rig site system has Visualization / Alarms / Data Acquisition / Local Store and Forward / Calculations / Data Hub / Database and open executable layer
 - ► Capable of taking <u>all</u> available data sources via communication protocols (OPC-UA, WITS, WITSML, to 4/20 ma signals) and data digital file formats
 - ▶ Time and depth views available to user
 - Instituted key rig site sensor calibration validation effort
 - Capable of 100 hz data, 1000 tags, 7 day storage onsite
 - Streaming rig state, modeling, executable algorithms
 - Running Bayesian network physics model in real-time to detect sensor data problems
 - Read/write capability onsite with Daily Reporting standalone at rig
 - Access to meta data needed to do modeling and reporting
 - ▶ Building capability to summarize high frequency data and auto fill drilling reports
 - Working on full traceability and transparency on all data from sensor measurement to storage to analytics
- Six systems deployed
- Video



Drilling Data Aggregation and Visualization







Results

- Deployed to six drilling rigs successfully
- Moving to full production as we speak including loading historical data from approximately 800 wells
- ► Ready to start Phase II which will leverage models to build smart alerts and alarms, more reports, data analytics
- Estimated value to Apache to date ?
 - Cost less than current vendor systems with increased capability
 - Continue tracking value going forward

Conclusion – moving forward into Phase II



Contact Information

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Questions

Please wait for the microphone before asking your questions

State your name & company

Please remember to...

Complete the Survey for this session



Thank You

"Not everything that can be counted counts, and not everything that counts can be counted."

Albert Einstein, Physicist



