



***CORDAX 2021 IDEAL CO₂/EOR
LOGGING SOLUTION***

***DON HERMAN, MANAGER US SALES AND BUSINESS
DEVELOPMENT***

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CORDAX™

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- The Cordax patented formation evaluation technique is a **low-risk, very economic** way of collecting industry-proven openhole formation logging measurements.
- It is the only openhole logging service that gathers downhole data **without requiring a dedicated logging trip**.
- Because measurements are taken from within the LWT drill collars during the regular tripping process, the openhole logging operation is considerably **more efficient and cost-effective** than traditional logging processes.
- The technology is capable of capturing quality evaluation from vertical, highly deviated and **horizontal** well bores.

NO WIRES - NO WORRIES - NO WAITING

- The Cordax Logging While Tripping system provides a cost effective, safe methodology to obtain open hole logs, for the first time, risk free!
- Cordax can log any well you can get a bit to TD.....
 - Conventional Wells – vertical, wireline replacement. Difficult well bores, eliminates multiple wireline trips or conditioning pipe trips.
 - Unconventional Wells – Obtain industry quality data in laterals of all lengths. The Cordax GOLE system provides a roadmap for improved completions and a very attractive ROI due to well cost reductions.
 - CO2/EOR wells.....OH data safely and cost effectively
 - SWD Wells – most attractive cost saving logging method in the industry.
 - Gas Storage Wells – growing need in Q4 and 2021. Best way to log these wells.
 - Low Cost. No Risk. Little Rig Time. Log Every Well.

- **The Cordax Logging While Tripping system provides a cost effective, safe methodology to improve well ROI!**
- ***Reduce Completion Expenses (reduce # stages)***
- ***Improve Cluster Effectiveness and Completion Efficiency***
- ***Understand Geology for injection optimization***
- ***Low Cost – Low Risk – Little Added Rig Time – Why Not??***
- ***Seamless integration into Operator workflow***
- ***High level overview – To win, operators must do things different and Cordax provides the vehicle to make this a reality***

GLOBAL PRESENCE

Proven field execution with Over 1300 successful jobs

Performed since 2011

Qualified Data with >30 “Log-offs”

Against Schlumberger ‘thru-bit’, Weatherford and Halliburton

Some success examples due to ADNOC, Chevron, Apache and Devon and others in progress for comprehensive field-based evaluation and comparison plans.



- ★ Sales and Operations Centers
- 📌 LWT jobs performed

Patented and industry proven formation evaluation technique providing cost effective open hole logs with virtually no extra rig time and fewer operational risks (LIH) than alternate logging methods.

- ✓ API calibrated measurements
- ✓ Fully accepted by regulatory agencies

Innovative Deployment & Conveyance

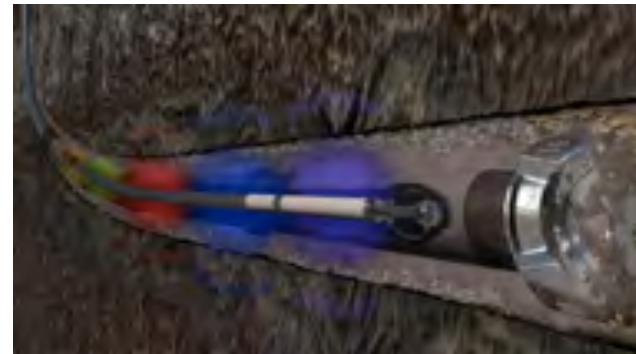
- Tools pumped down for measurement on trip out of well
- Virtually no extra rig time required
- Allows logging of any well trajectory
- No additional trip or hole conditioning required
- Measuring on trip out of well
- Battery/Memory power, no wireline

Secure Logging & Full Well Control

- Tools and radioactive sources safely located inside the drill pipe (LWT collar) during deployment and logging.
- Protected and fully retrievable at any time
- Pipe rotation and circulation at any time during operation
- Limited LIH risk exposure

Well Applications & Hole Conditions:

- First run in well
- Complex trajectory
- Horizontal wells
- Lost Circulation
- Bridged wells
- Underbalanced drilling
- Swelling formations
- Well previews

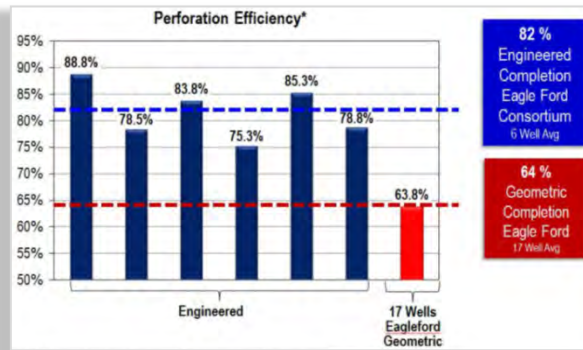


THESIS: INDUSTRY PROVEN

- Numerous studies show that positioning the frac (stage or pin-point) in the optimal place along the lateral will increase the well production potential.
- The studies further show that positioning your clusters in the optimal place within the stage will increase the potential cluster production contribution and will increase your frac efficiency often resulting in operational cost reduction.

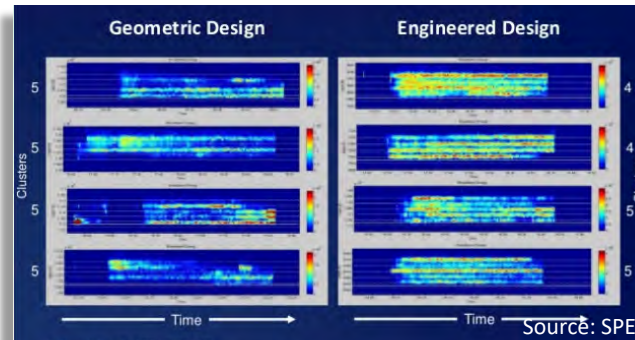
SPE 166242

Perf Cluster Contribution to Production



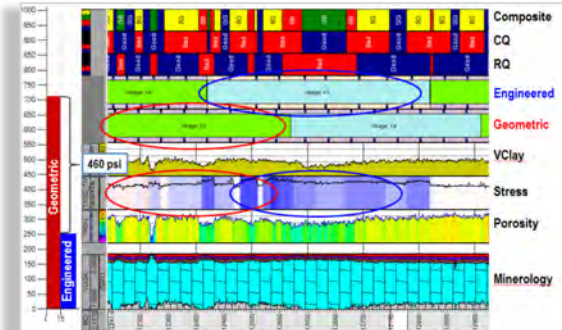
SPE 120591

Measurement Techniques for US Land Shale HydroCarbon Plays



SPE 166242

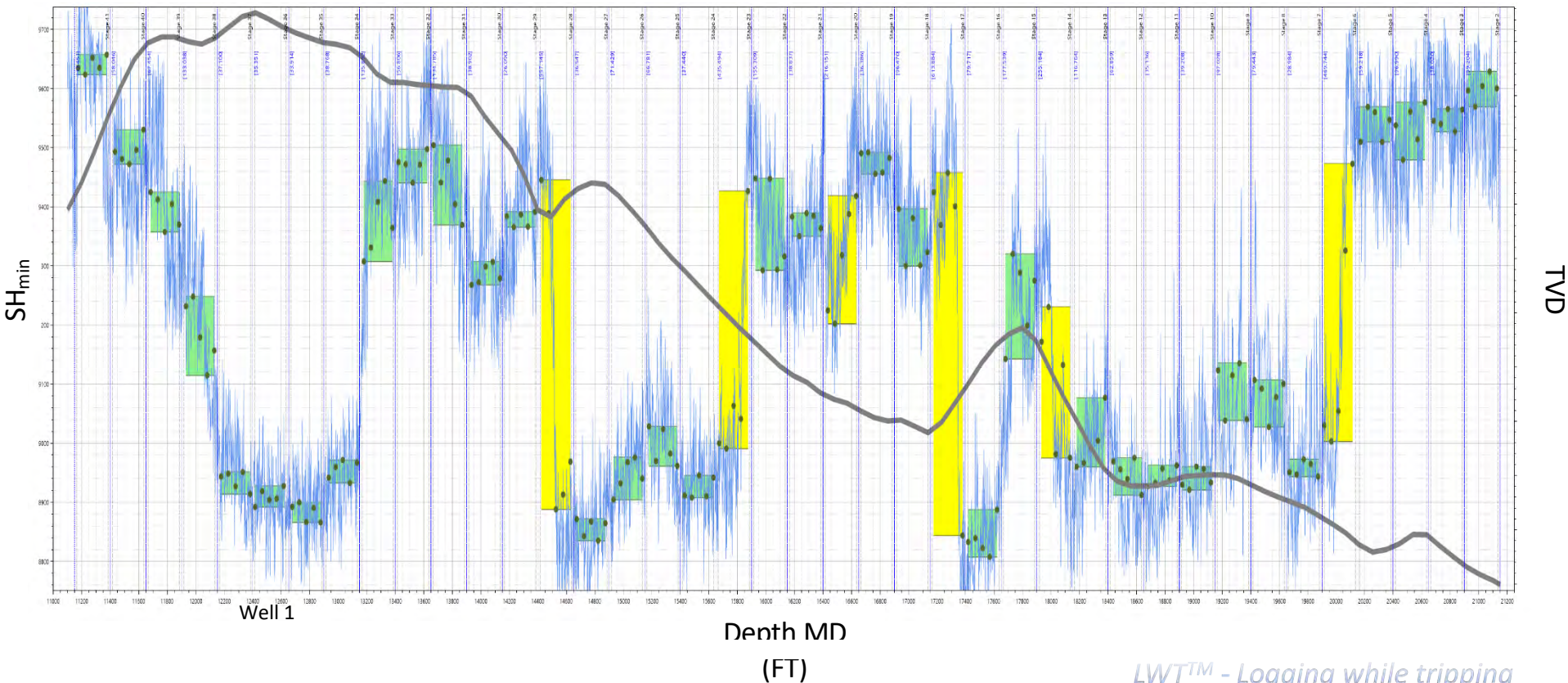
Eagle Ford Completion Optimization Using Horizontal Log Data



FIELD COMPLETION DESIGN - ZONETUNER™



Field design left several stages straddling areas of significant changes in VCLAY and SH_{min}



Perforation friction tuned to ensure high cluster efficiency through managed facies windows

Efficient way to stimulate more footage per stage and yet ensure all perf clusters stimulated...

Typical Completion:

Stages	40
Lbs. / Ft	1700
Ft / cluster	50
clusters / stage	5
Ft / stage	250

Improved Completion:

Stages	40
Lbs. / Ft	1705
Ft / cluster	51.5
clusters / stage	5
Ft / stage	257

GOLE Completion:

Stages	26
Lbs. / Ft	1722
Ft / cluster	49.6
clusters / stage	8
Ft / stage	397



Facies A: Higher Stress, Higher VCLAY



Facies B: Lower Stress, Cleaner, More Brittle

High Cluster Efficiency obtained with significantly lower capital investment

Completion and Total Well Cost Reduction – *Impact*

Traditional Completion:

40 total stages
10,300 Ft stimulated lateral
17,500,000 lbs.
\$3.8MM

GOLE Completion:

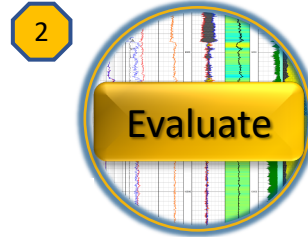
26 total stages
10,300 Ft stimulated lateral
17,500,000 lbs.
\$3.2MM

SAVINGS > \$600,000
> 15%

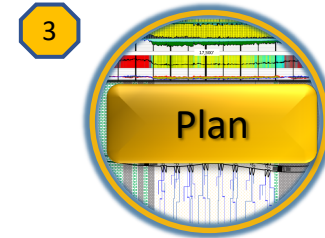
CONTINUOUS IMPROVEMENT PROCESS

Near Wellbore Rock Data Analysis

Near Wellbore Rock Data Capture



Geological Optimized Completion Design



1,2,3 PRE-FRAC DATA ACQUISITION AND COMPLETION DESIGN

4,5 POST-FRAC DIAGNOSTIC AND PRODUCTION ANALYSIS

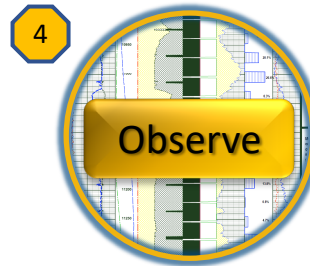
ResMetrics

➤ QUANTITATIVE TRACER MEASUREMENT

- 6 months of production sampling (oil & water)
- Determine the lateral production profile of the well



Production Analysis by Stage



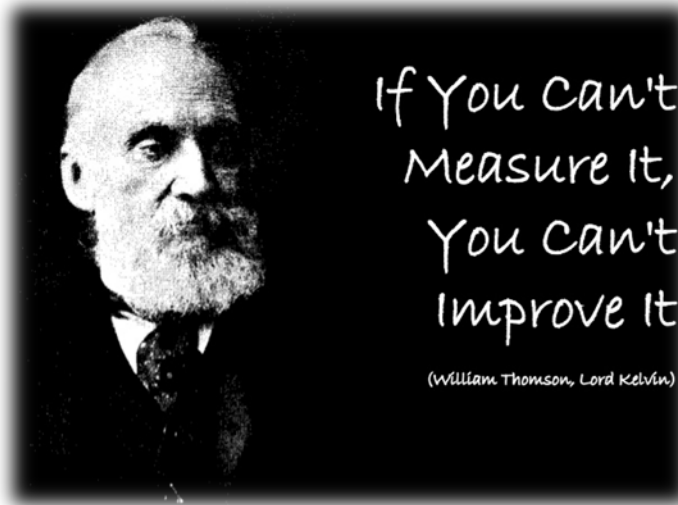
Near Wellbore & Frac Data Analysis

- CEL – Cluster Efficiency Log
- OWPM – Offset Well Pressure Monitoring
 - VFR – Volume to First Response
 - FFEP – Far-Field Extn Pressure

WE WANT TO HELP YOU TO IMPROVE YOUR WELL RESULTS WHILE LOWERING YOUR AFE

“Lead me to those who seek the truth, and deliver me from those who’ve found it.”

– Anonymous



“Change is an essential requirement for progress.

Better knowledge of the subject does not give better results!

Better results come from knowledge-based Changes / Actions”

– Ali Dansehy – Daneshy Consultants, AIME Honorary Membership and SPE Legion of Honor Award winner

SEE THE ROCK

UNDERSTAND THE ROCK

FRAC WITH PURPOSE