

Emerging Trends and Technologies for
UNCONVENTIONAL RESOURCES

Brady Murphy

Senior Vice President
Business Development & Marketing

HALLIBURTON

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Economic Evolution Of **UNCONVENTIONALS**

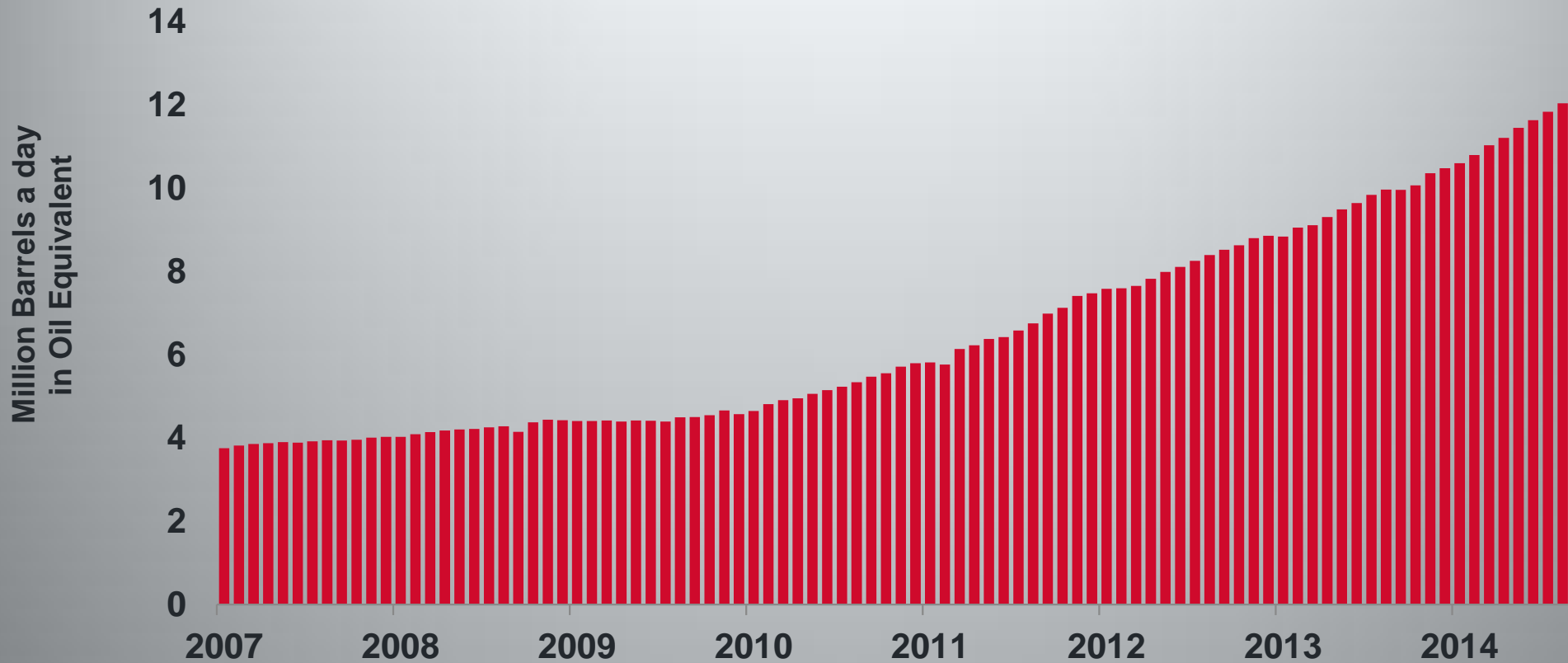
Make It
BIG

Make It
WORK

ACQUIRE ACREAGE
DEPLOY HORSEPOWER
DEVELOP SUPPLY CHAINS

TAKE RISKS
EXPERIMENT
INNOVATE

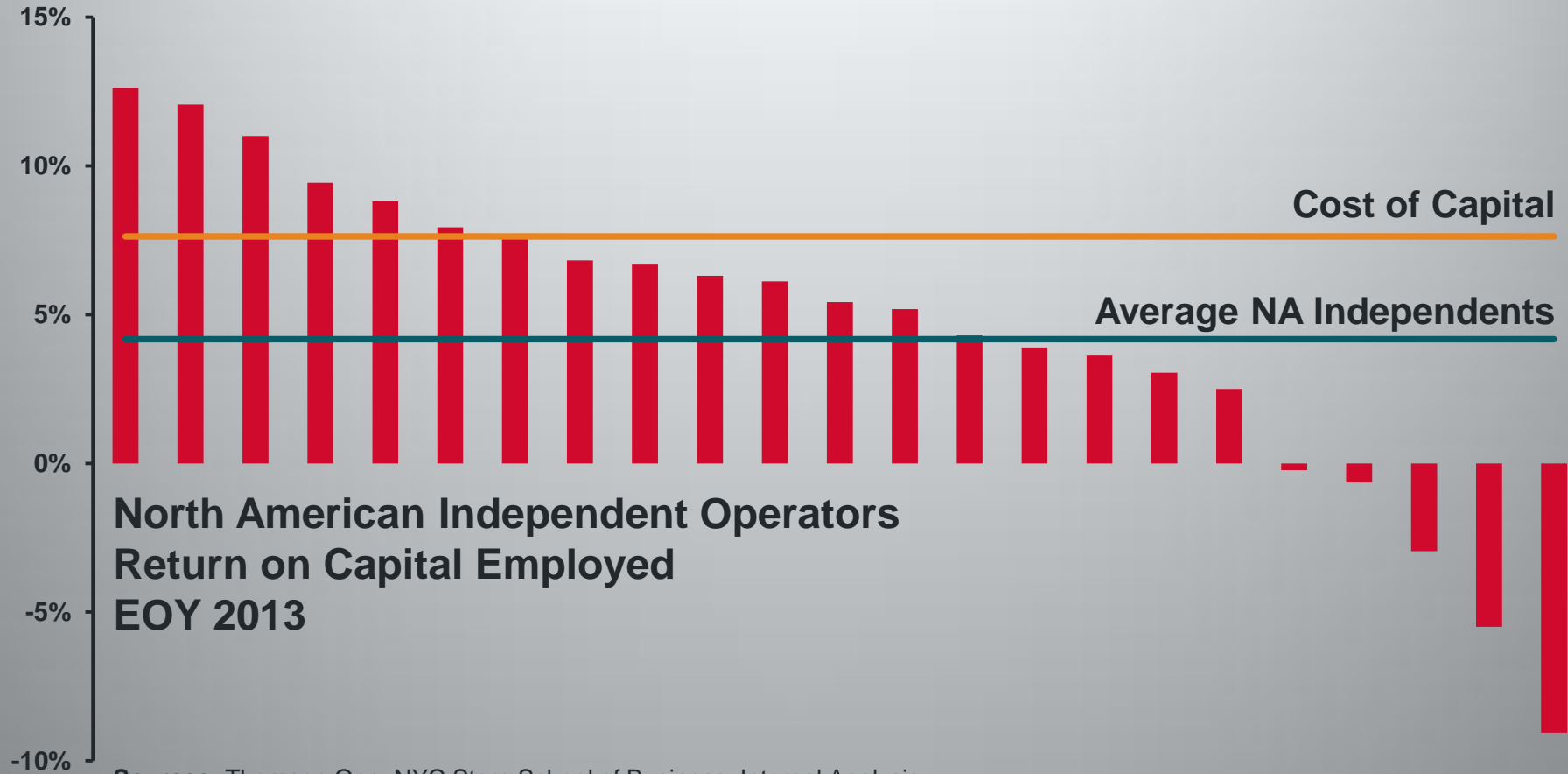
Oil and Natural Gas Production



In the Bakken, Eagle Ford, Haynesville, Marcellus, Niobrara, Permian and Utica fields

Source: Energy Information Administration

The Commercial And Economic Imperative



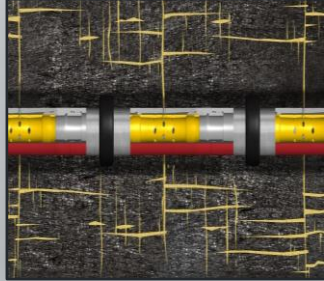
North American Independent Operators
Return on Capital Employed
EOY 2013

Sources: Thomson One, NYC Stern School of Business, Internal Analysis

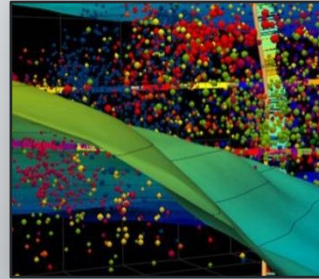
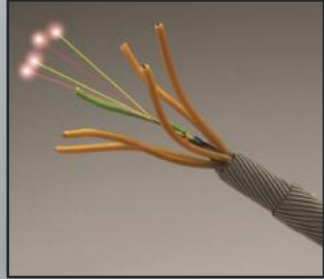
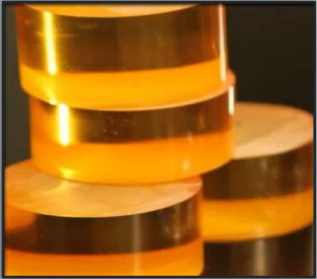
The diagram illustrates the relationship between Operational Efficiency, Well Productivity, and Cost Per BOE. On the left, a green arrow points up to the text "OPERATIONAL EFFICIENCY", and a teal arrow points up to the text "WELL PRODUCTIVITY". A horizontal line is drawn below "OPERATIONAL EFFICIENCY". To the right of this line is an equals sign. Further right is a large red arrow pointing down, followed by the text "COST PER BOE" in large black letters, with "(PRODUCTION UNIT COST)" in smaller red letters below it.

$$\frac{\text{OPERATIONAL EFFICIENCY}}{\text{WELL PRODUCTIVITY}} = \text{COST PER BOE}$$

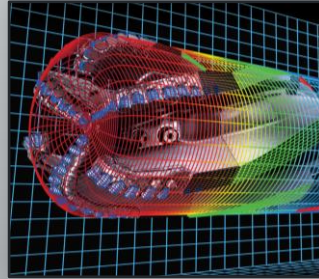
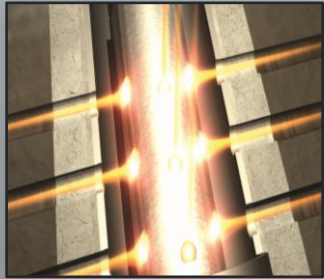
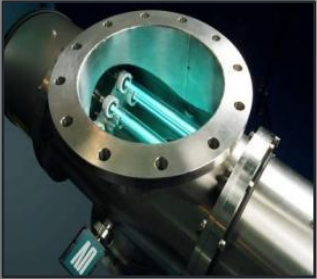
(PRODUCTION UNIT COST)



Reservoir Focused Strategy



Integrated Portfolio of Technologies



Superior Delivery Platform

Environmental Leadership

Economic Evolution Of **UNCONVENTIONALS**

Make It
SMART

Make It
BIG

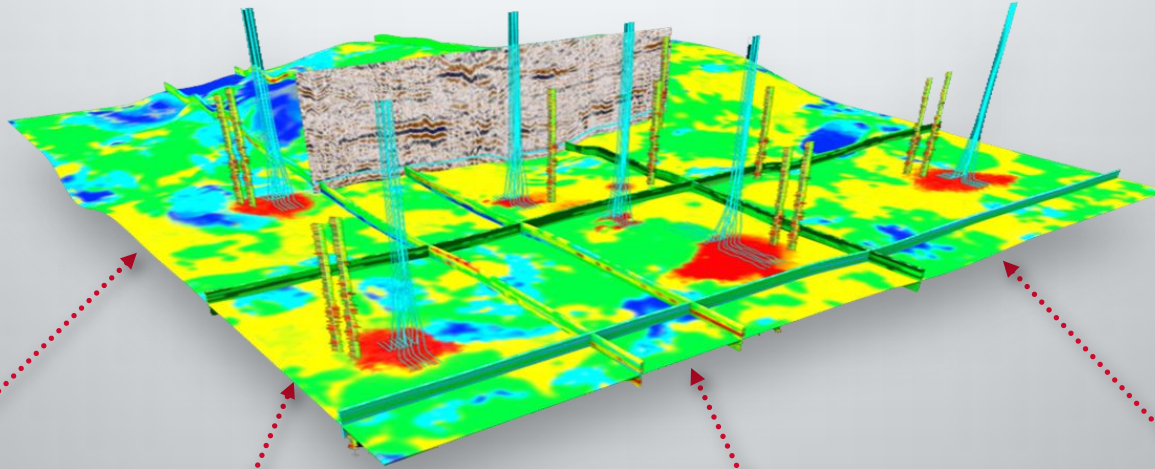
INTEGRATE
OPTIMIZE
EXECUTE
CALIBRATE

ACQUIRE ACREAGE
DEPLOY HORSEPOWER
DEVELOP SUPPLY CHAINS

Make It
WORK

TAKE RISKS
EXPERIMENT
INNOVATE

CYPHERSM Seismic-to-Stimulation Service



RESERVOIR
CHARACTERIZATION



WELL PLANNING
AND PLACEMENT

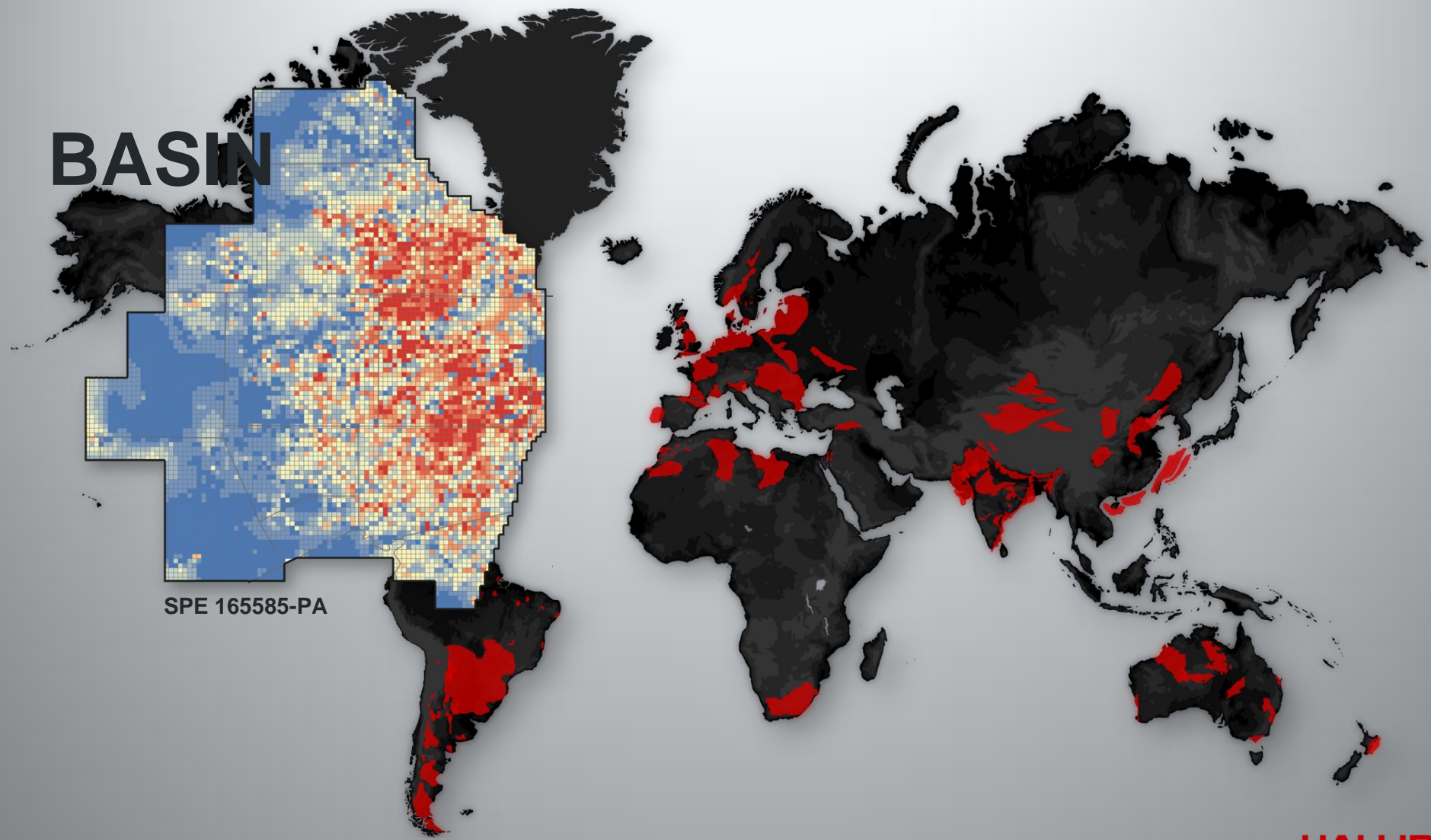


COMPLEX FRAC MODEL/
COMPLETION DESIGN



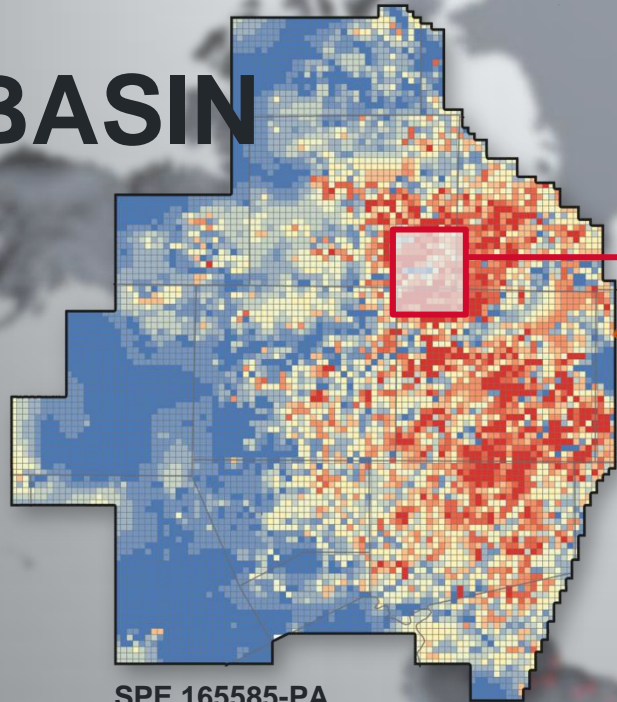
PRODUCTION MATCHING/
OPTIMIZE MODEL

BASIN



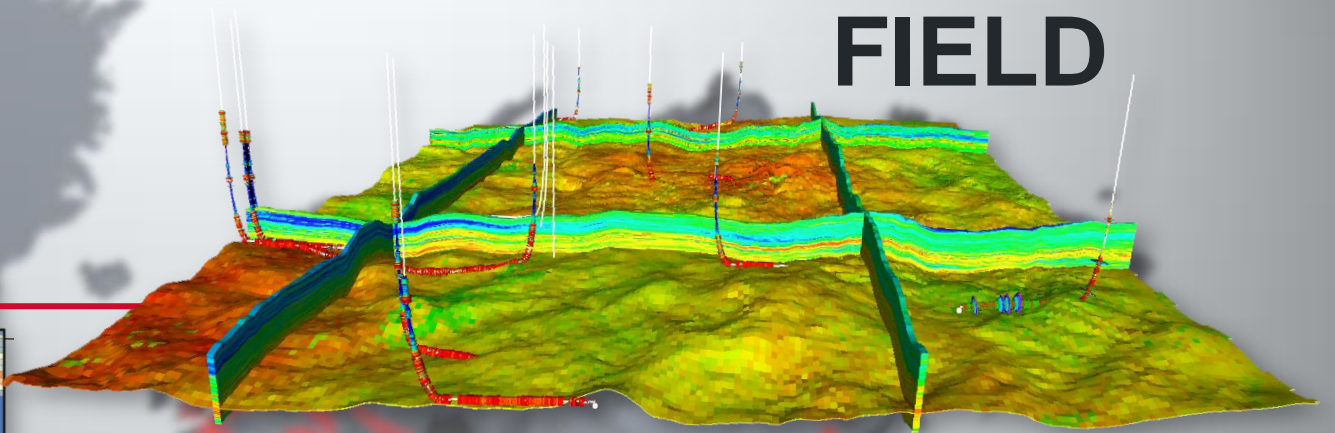
SPE 165585-PA

BASIN

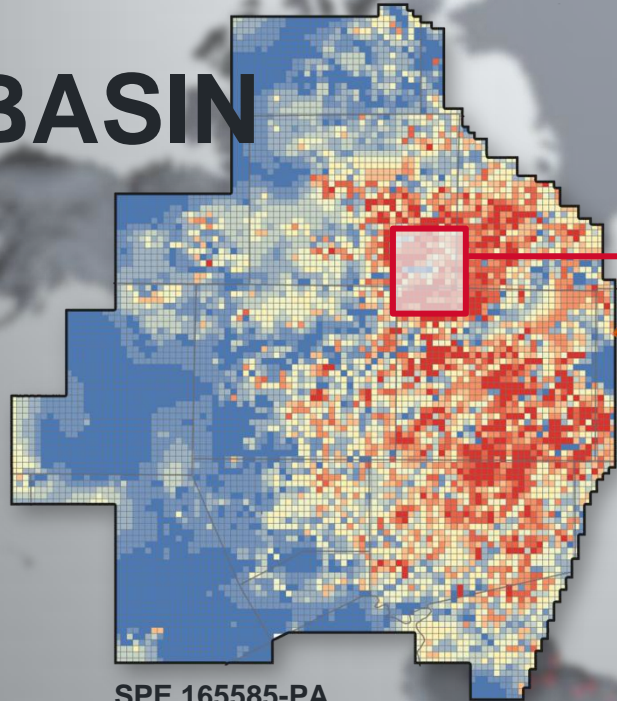


SPE 165585-PA

FIELD

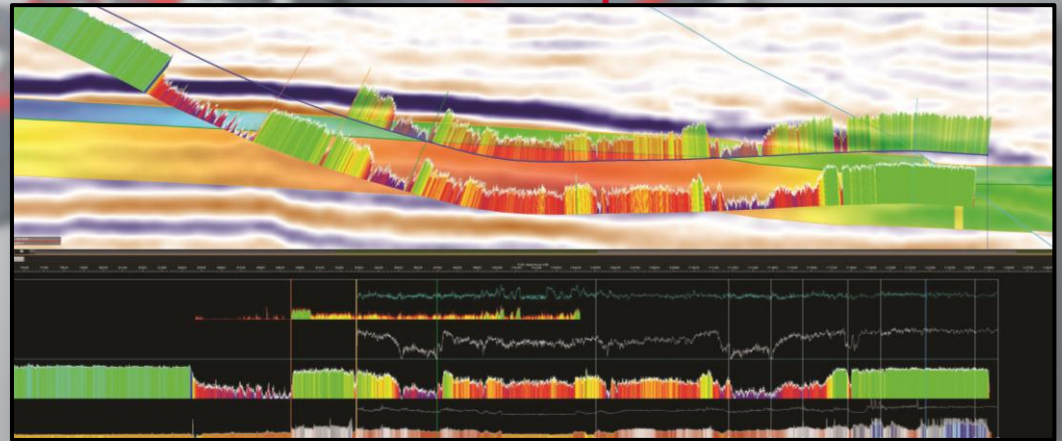
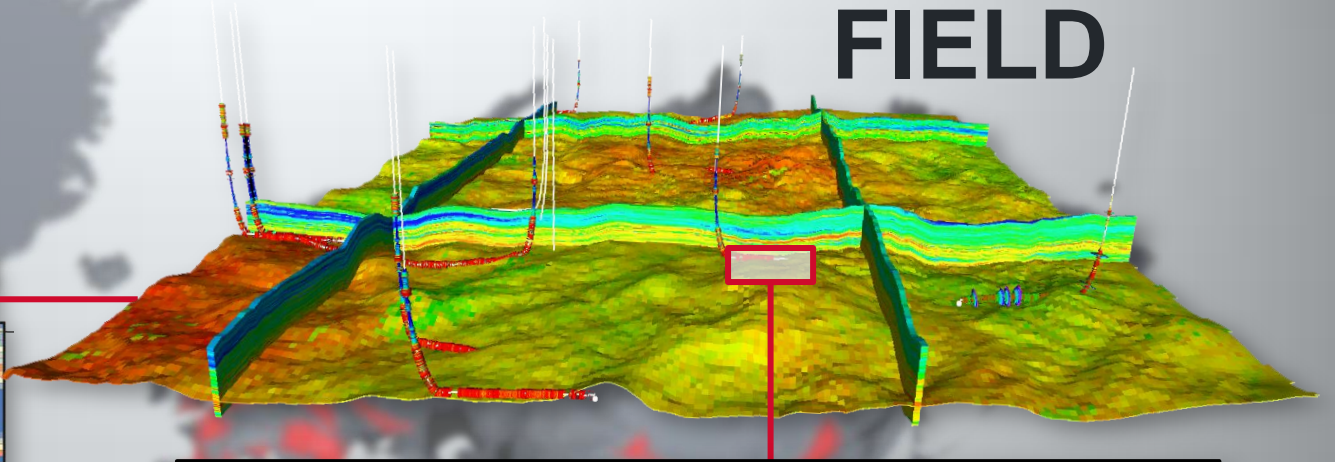


BASIN



SPE 165585-PA

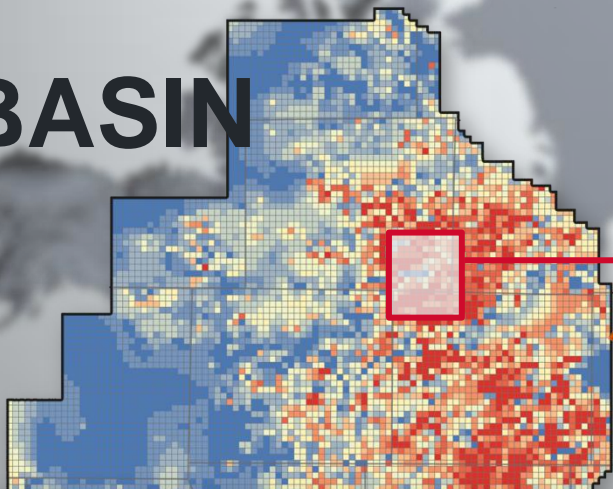
FIELD



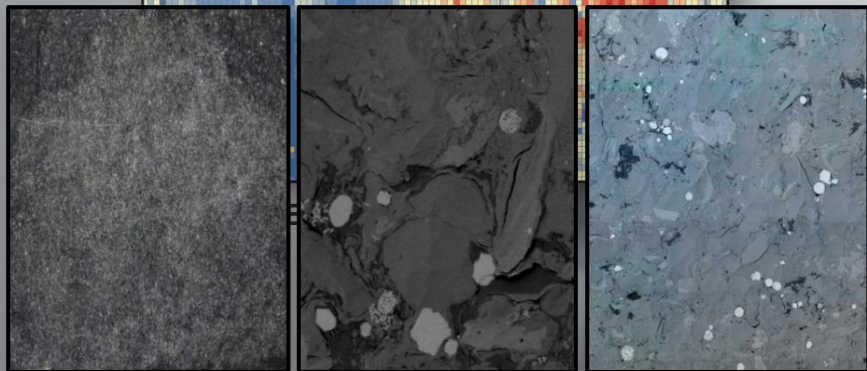
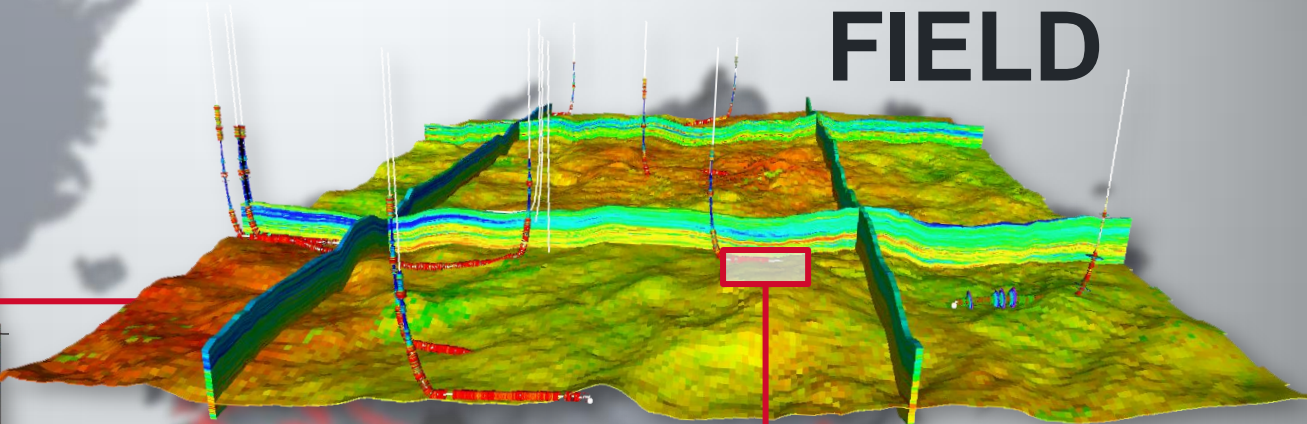
WELL

HALLIBURTON

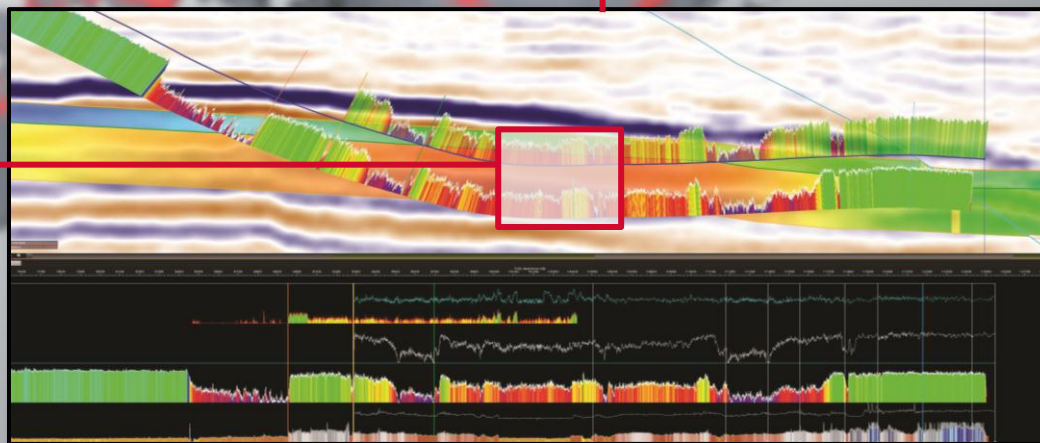
BASIN



FIELD

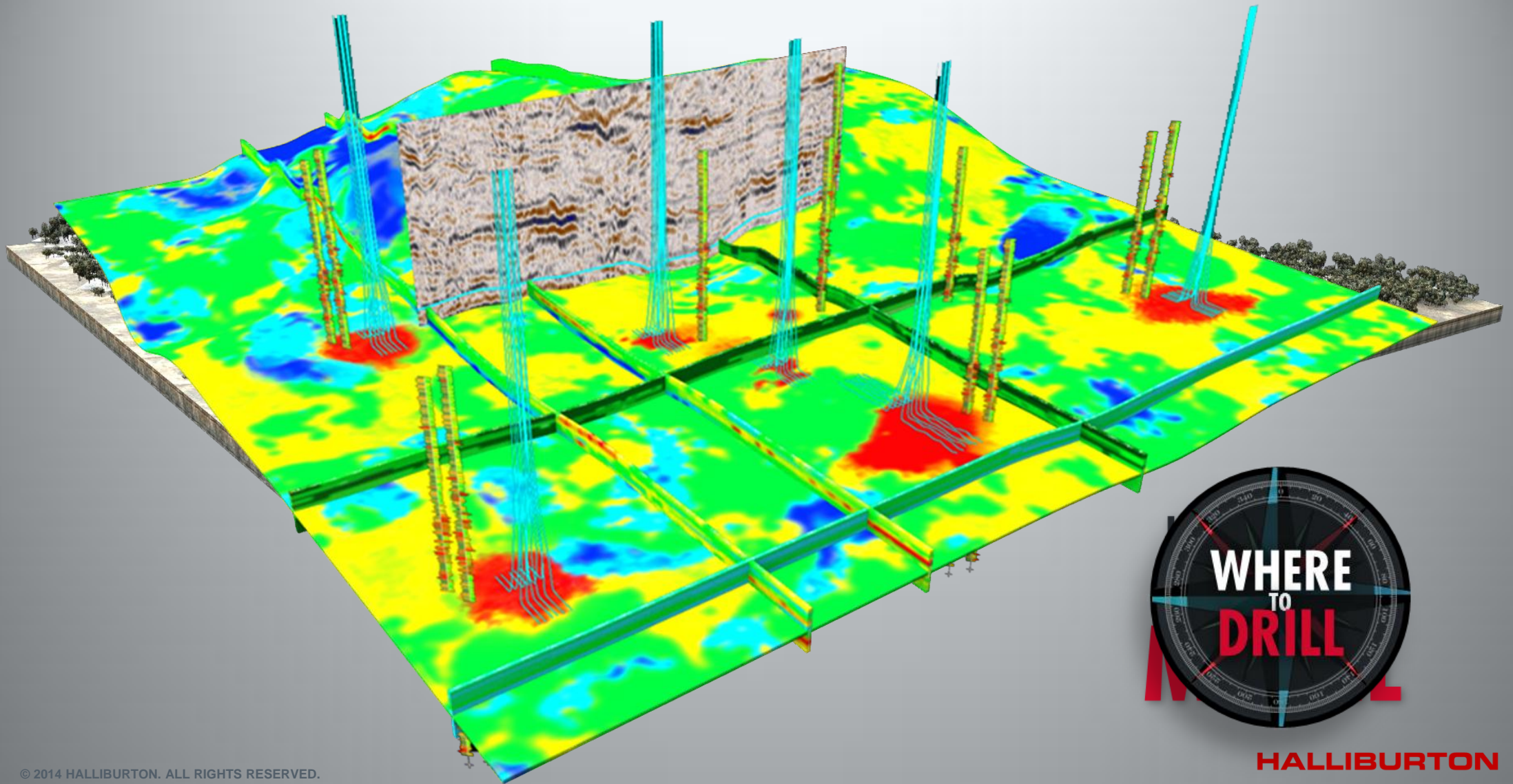


ROCK



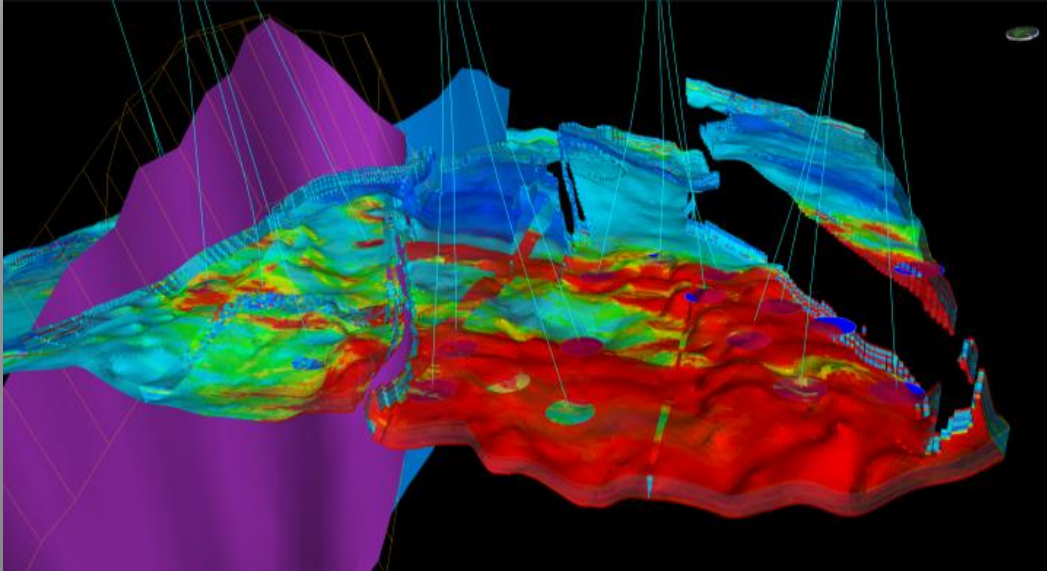
WELL

HALLIBURTON

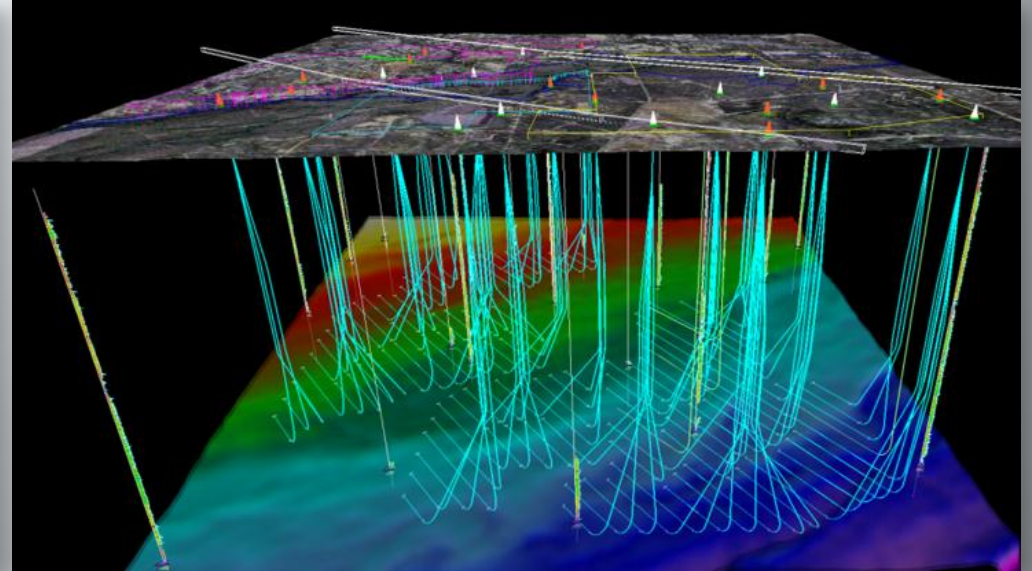




DecisionSpace[®] Well Planning



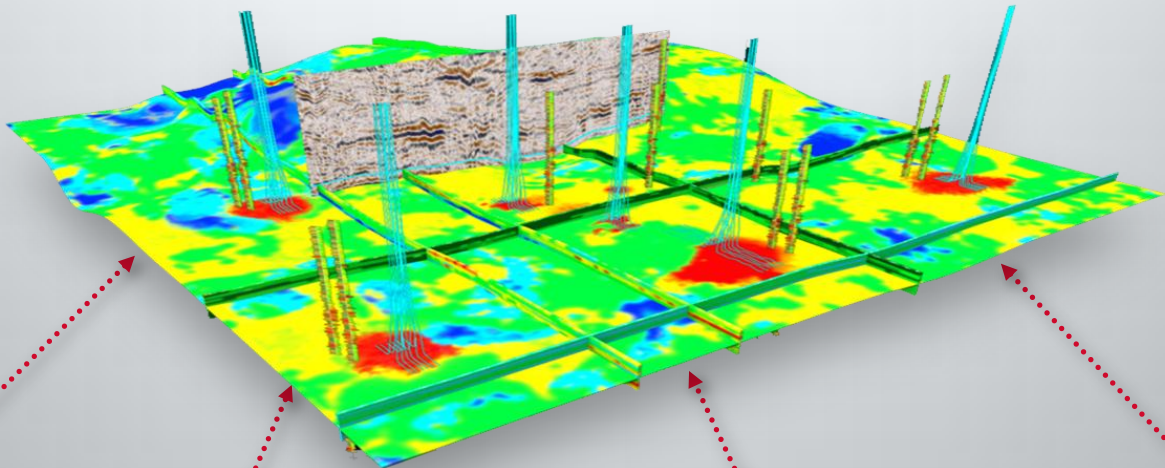
Greatly **Reduce**
Planning Cycle Times



Maximize Reservoir
Contact and Site Utilization

Enhance Well **Safety**

CYPHERSM Seismic-to-Stimulation Service



RESERVOIR CHARACTERIZATION



WELL PLANNING AND PLACEMENT



COMPLEX FRAC MODEL/ COMPLETION DESIGN



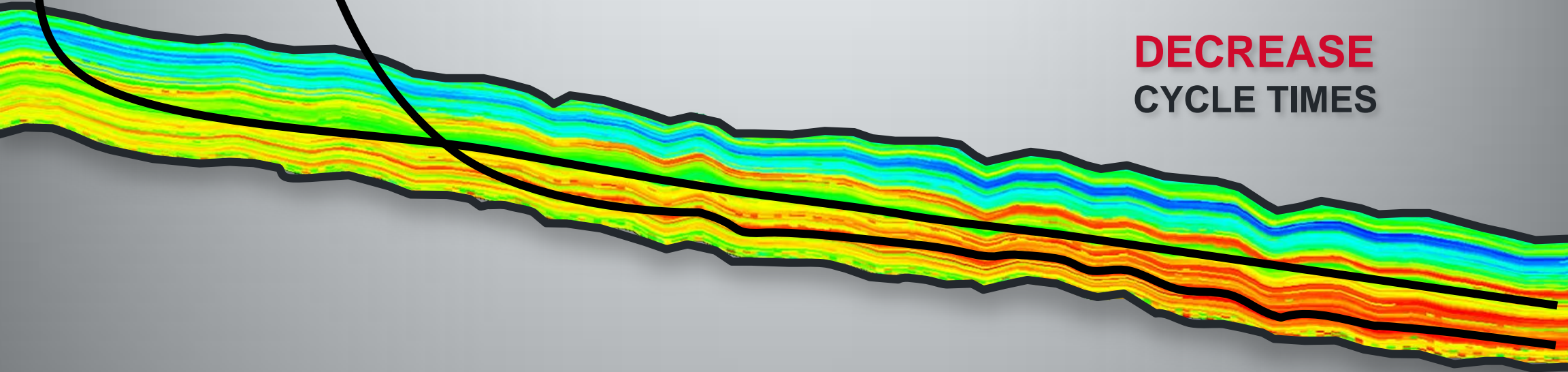
PRODUCTION MATCHING/ OPTIMIZE MODEL



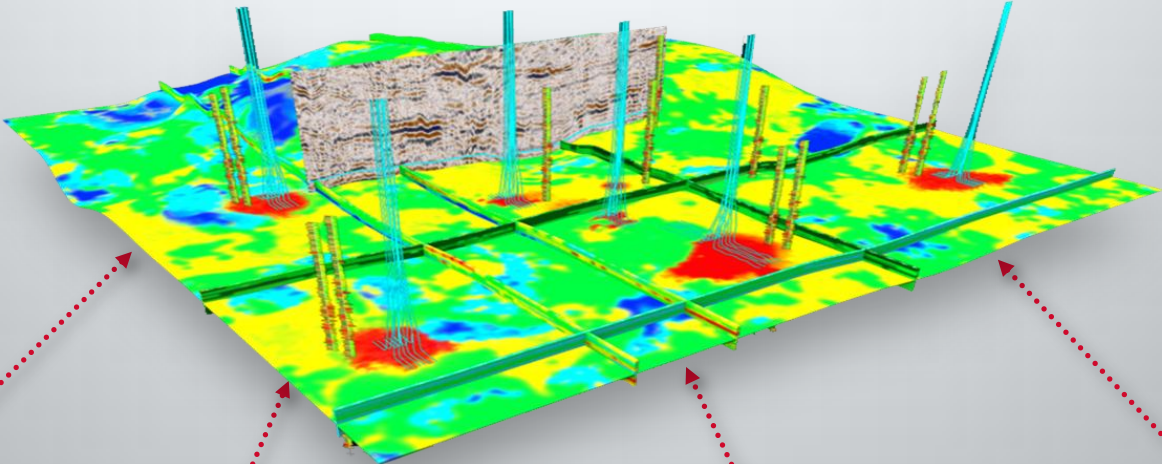
REDUCE
UNCERTAINTY

INCREASE
MARGINS

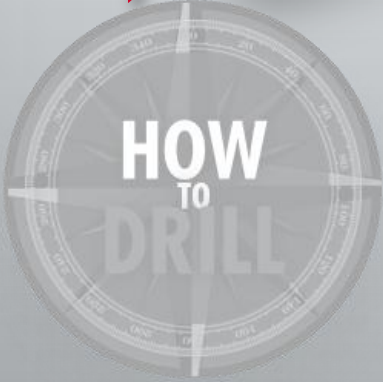
DECREASE
CYCLE TIMES



CYPHERSM Seismic-to-Stimulation Service



RESERVOIR CHARACTERIZATION



WELL PLANNING AND PLACEMENT



COMPLEX FRAC MODEL/ COMPLETION DESIGN

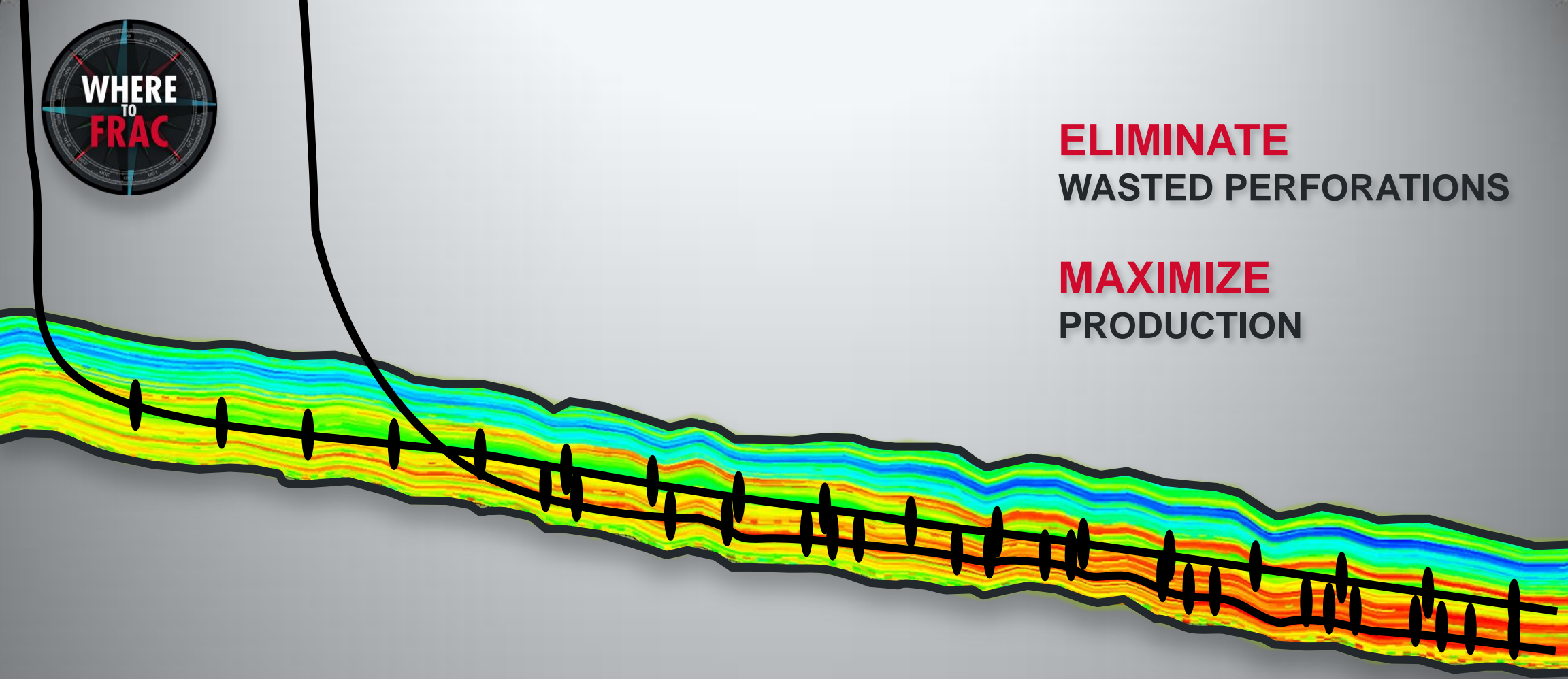


PRODUCTION MATCHING/ OPTIMIZE MODEL

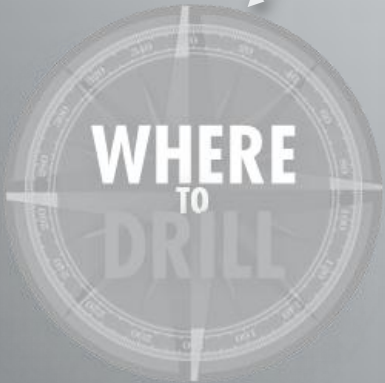
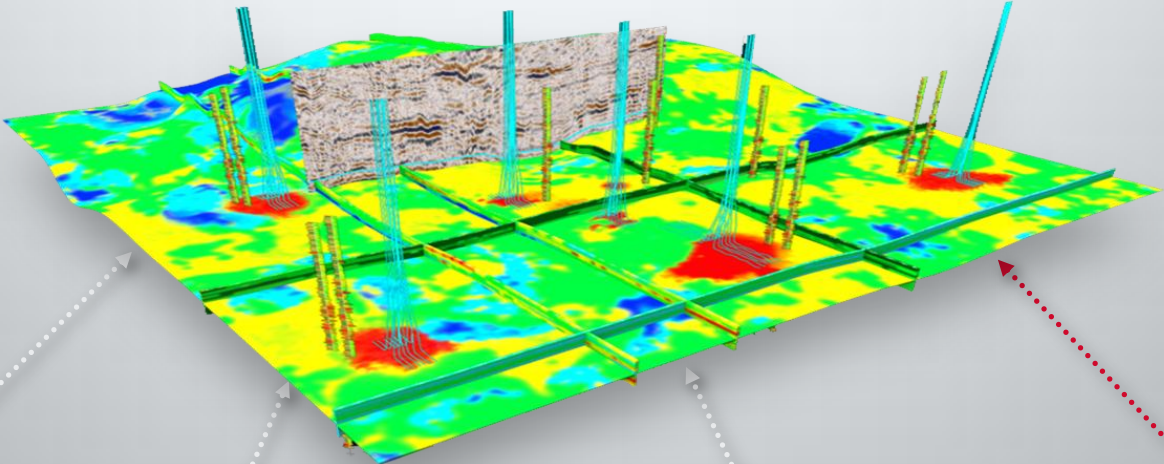


ELIMINATE
WASTED PERFORATIONS

MAXIMIZE
PRODUCTION



CYPHERSM Seismic-to-Stimulation Service



RESERVOIR
CHARACTERIZATION



WELL PLANNING
AND PLACEMENT



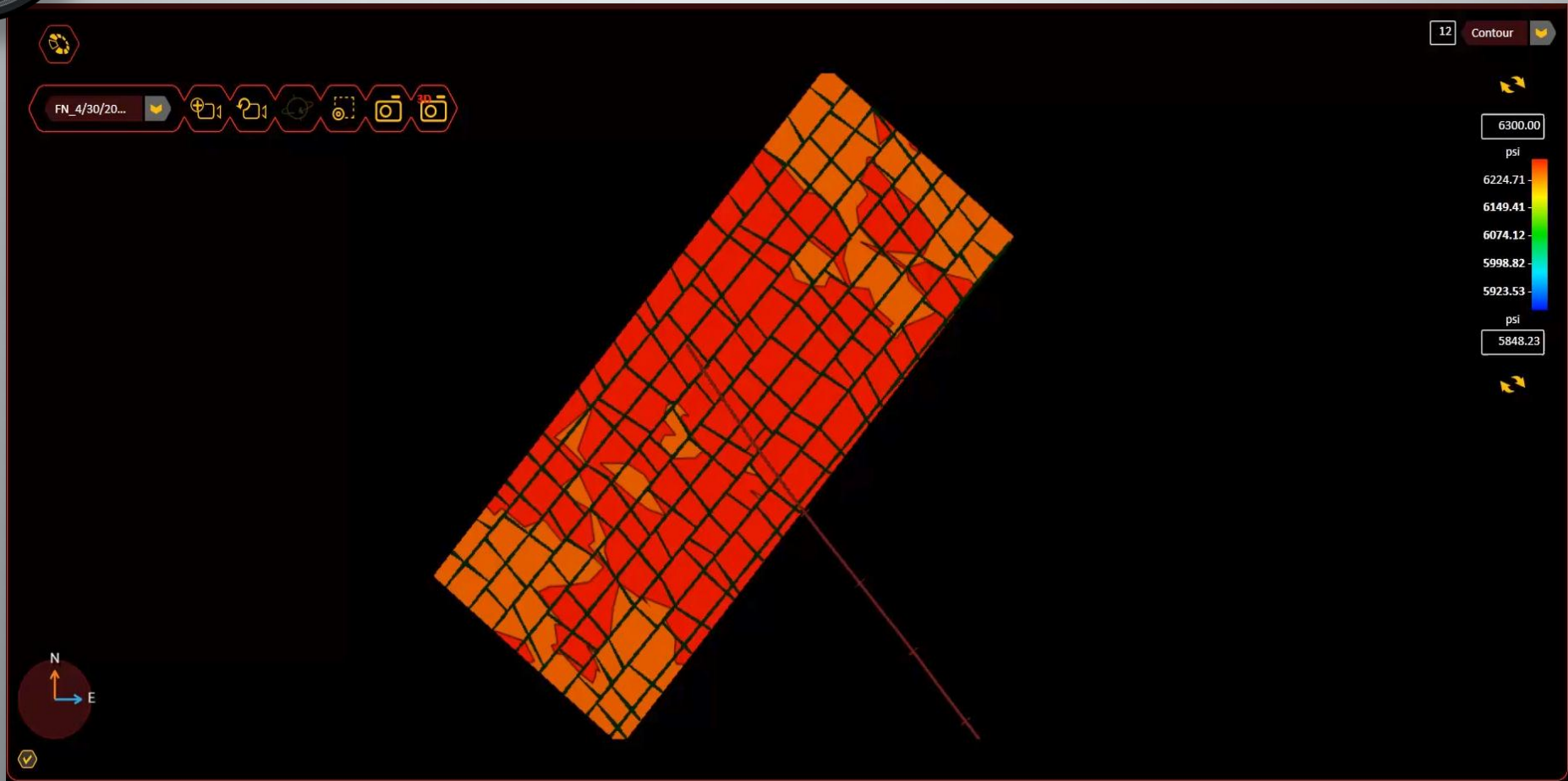
COMPLEX FRAC MODEL/
COMPLETION DESIGN



PRODUCTION MATCHING/
OPTIMIZE MODEL

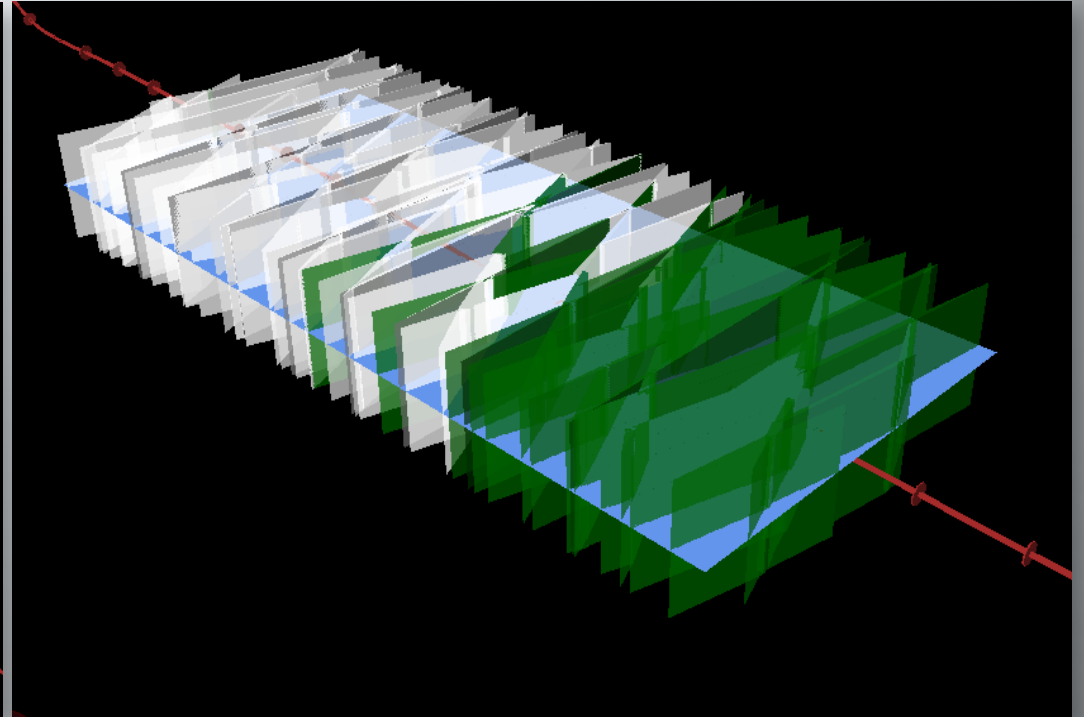
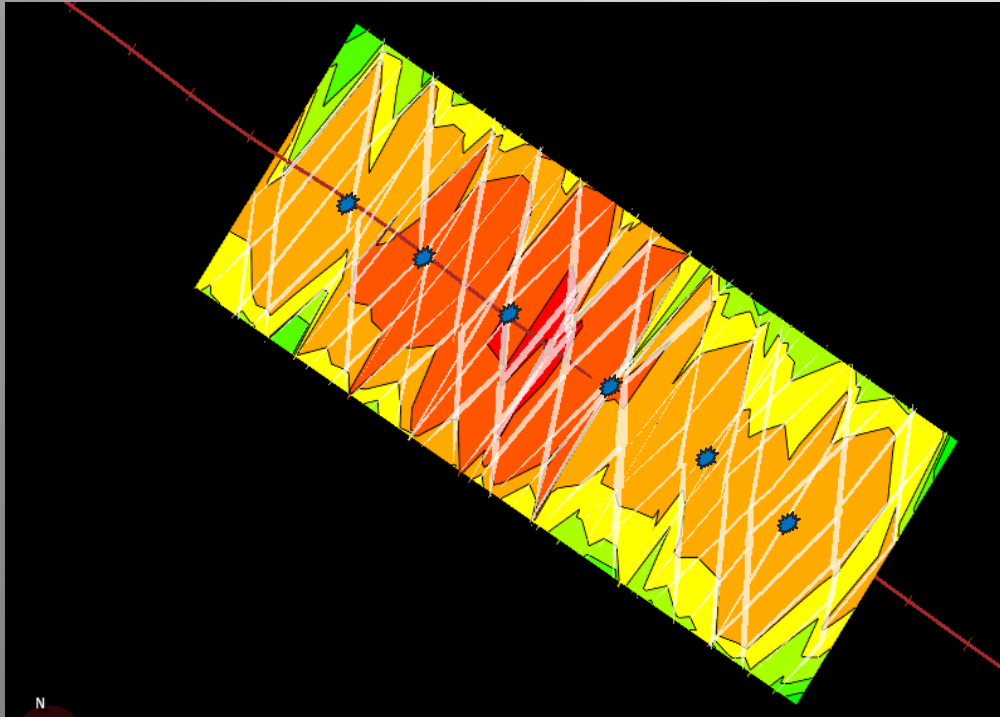


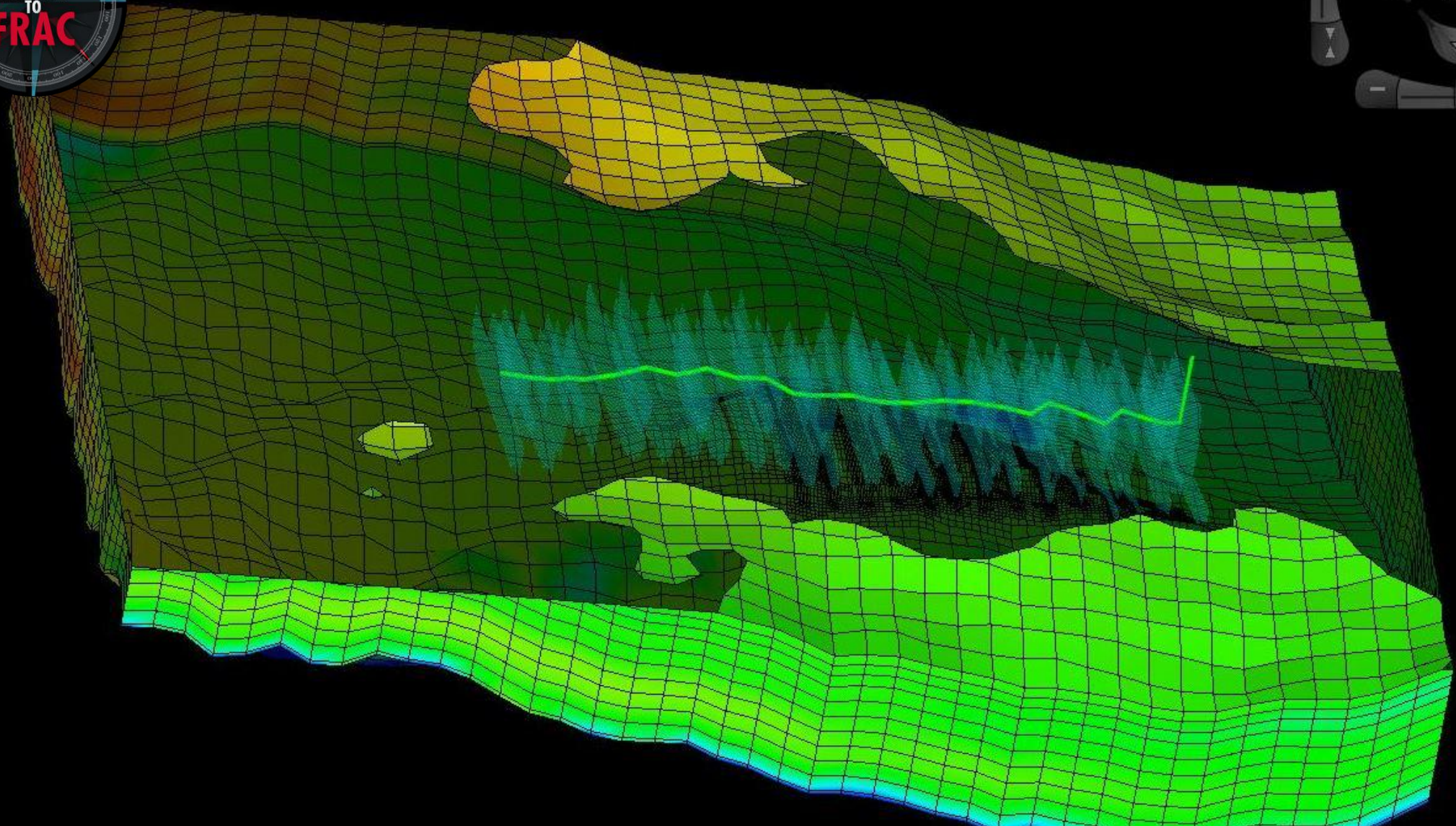
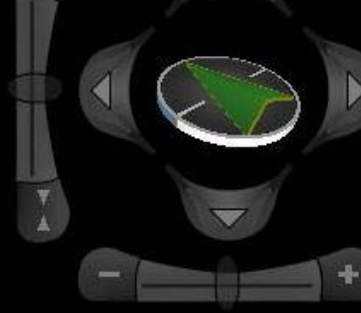
Complex Fracture Modeling





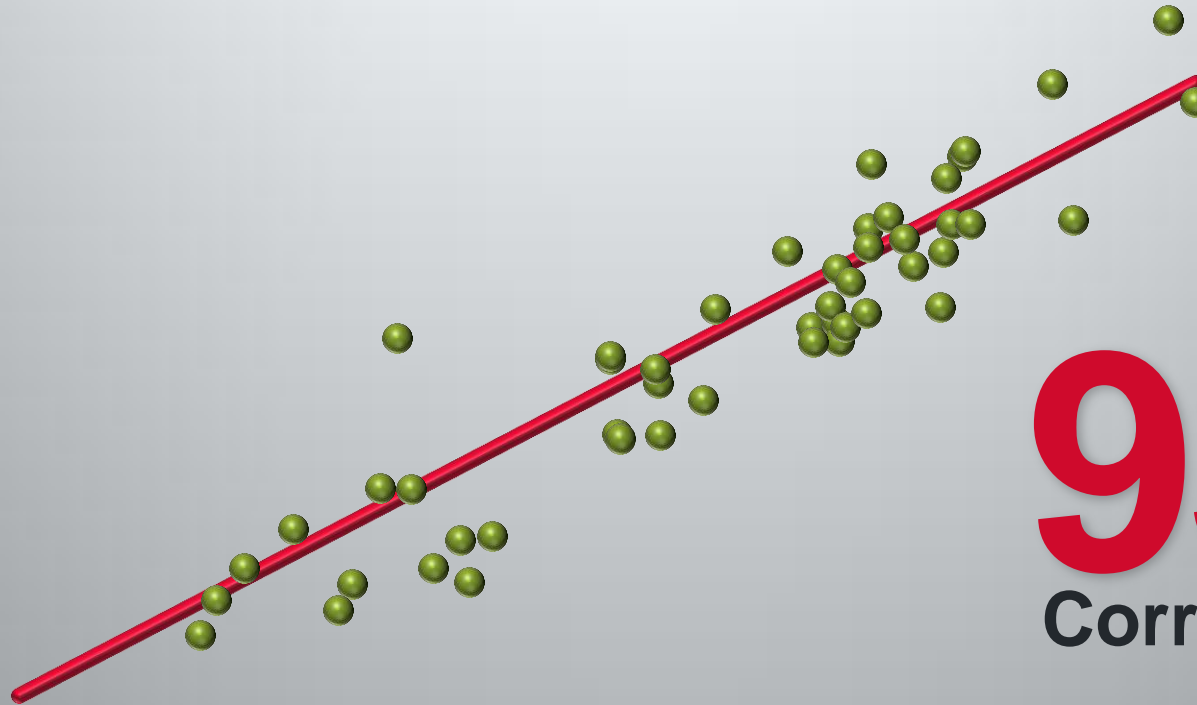
Complex Fracture Modeling





Eliminating Uncertainty – Marcellus Shale, Pa

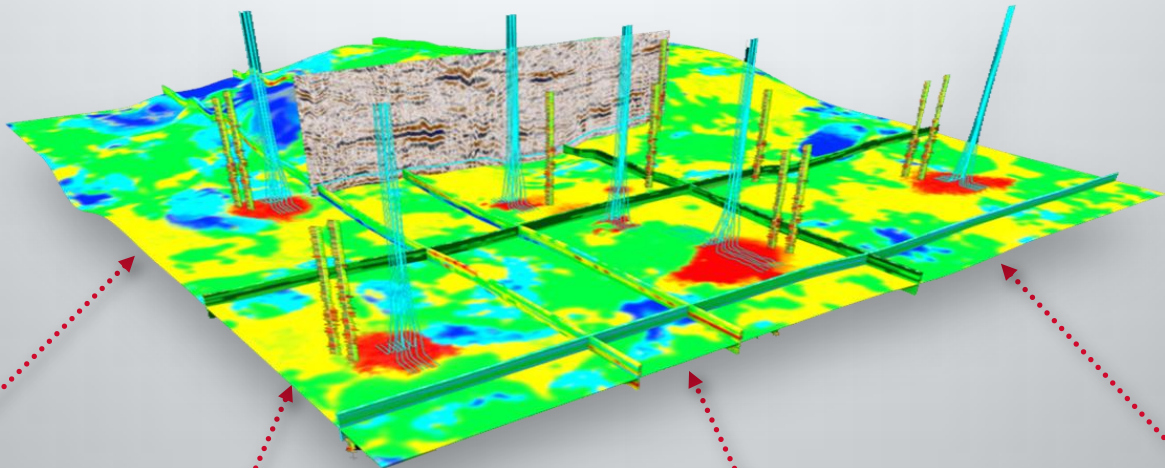
ACTUAL
Production



93%
Correlation

PREDICTED
Production

CYPHERSM Seismic-to-Stimulation Service



RESERVOIR CHARACTERIZATION



WELL PLANNING AND PLACEMENT



COMPLEX FRAC MODEL/ COMPLETION DESIGN



PRODUCTION MATCHING/ OPTIMIZE MODEL

CYPHERSM Seismic-to-Stimulation Service



OPERATIONAL EFFICIENCY

=



COST PER BOE

(PRODUCTION UNIT COST)



WELL PRODUCTIVITY

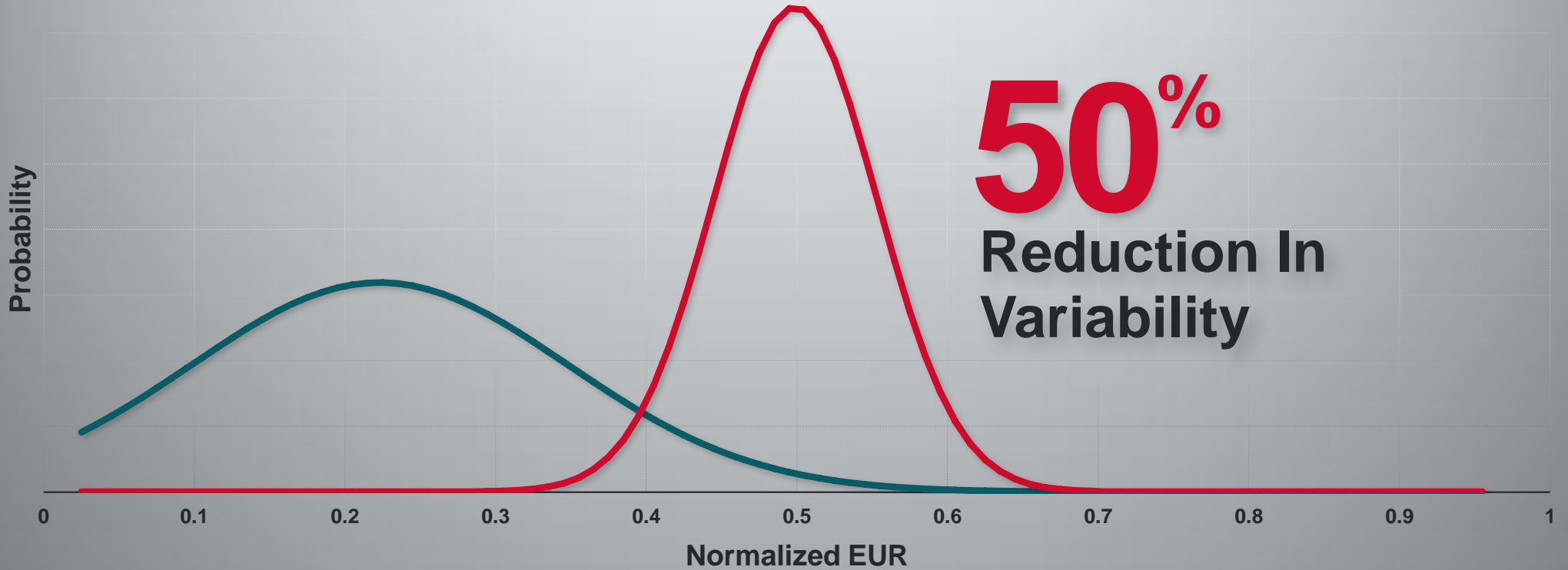


CASE STUDY



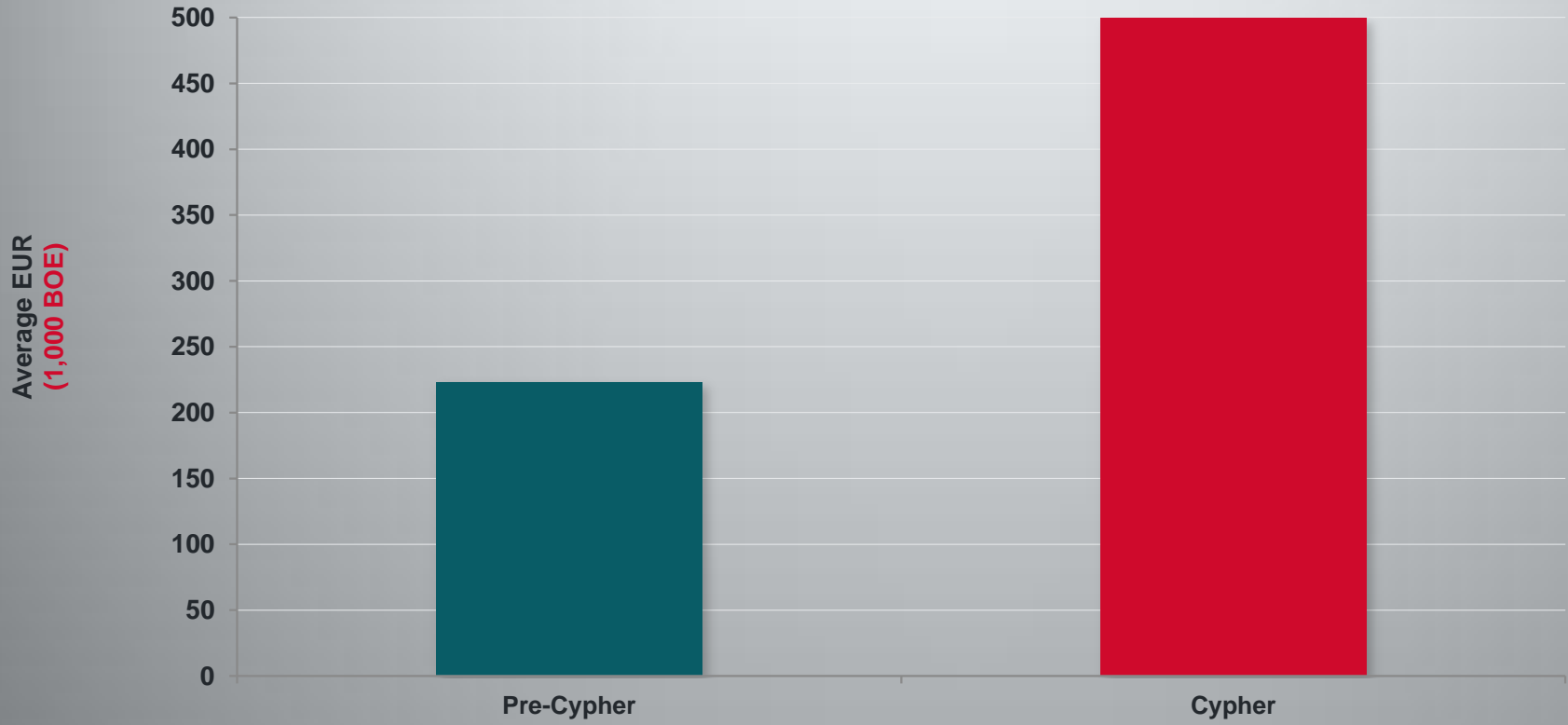
— Pre-CYPHER

— CYPHER





CASE STUDY



124%
Increase in
Average
EUR