



OUR US OILPATCH TOMORROW

Allen Gilmer, CEO twitter: [allengilmer](#) LinkedIn: [Allen Gilmer](#)

August 2016

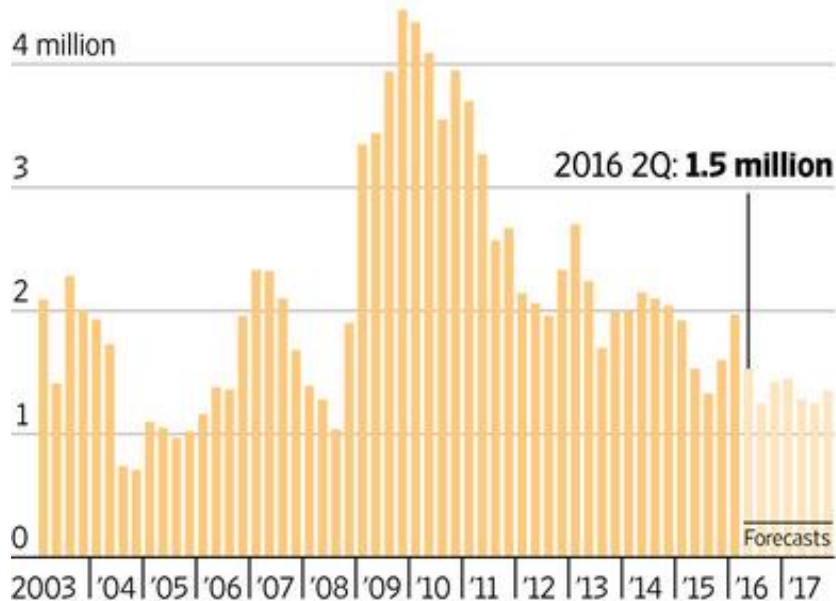
LESS MARGIN FOR SUPPLY INTERRUPTIONS

Little to Spare

The Organization of the Petroleum Exporting Countries' ability to respond when oil supplies fall has dwindled in recent years.

OPEC's spare crude oil-production capacity

Millions of barrels a day, quarterly data



*Numbers may not add up due to rounding †Neutral zone: An area between the borders of Saudi Arabia and Kuwait

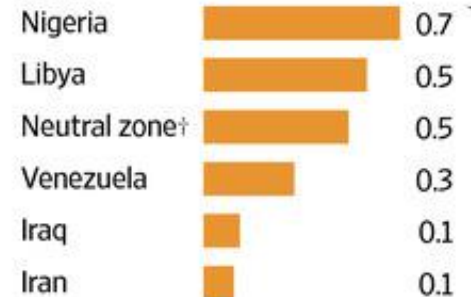
‡Includes Colombia, Ghana, Italy, North Sea and Yemen

Sources: Energy Information Administration (capacity); Energy Aspects (outages)

Oil-production outages for May 2016*

Millions of barrels a day

OPEC



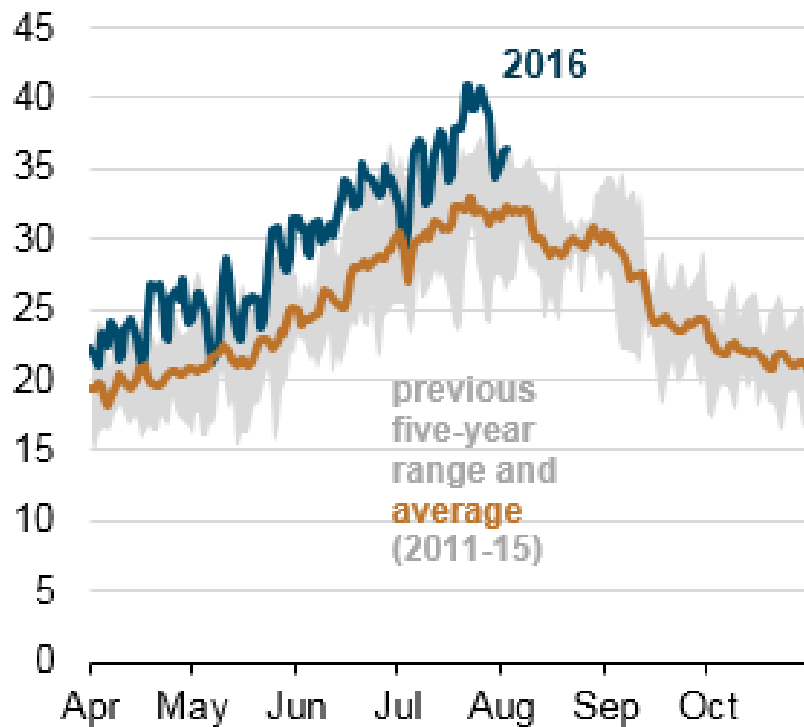
NON-OPEC



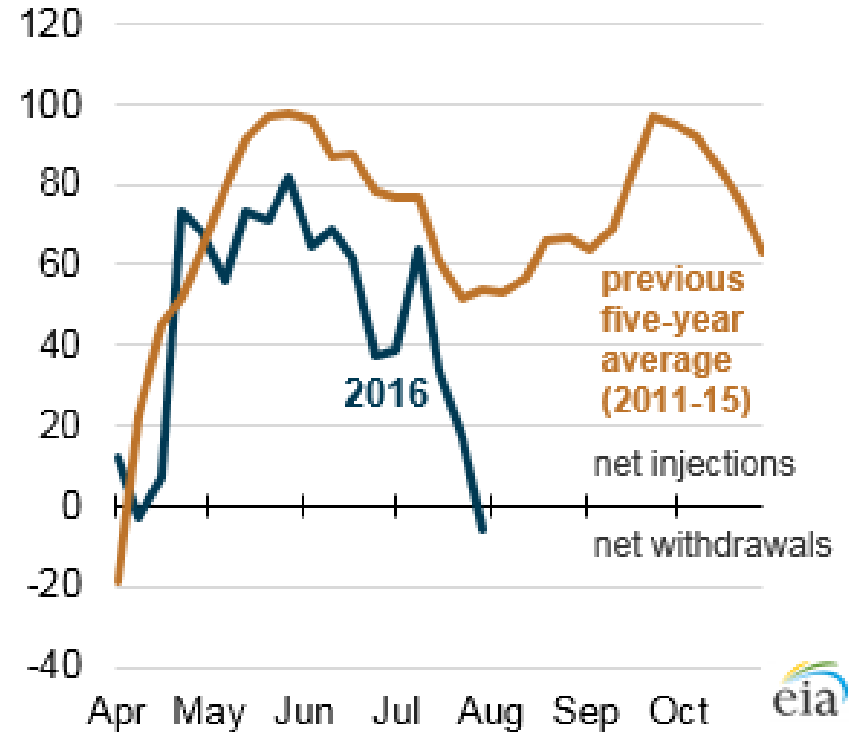
Total:
3.4
million

THE WALL STREET JOURNAL.

Natural gas used for power generation
billion cubic feet per day

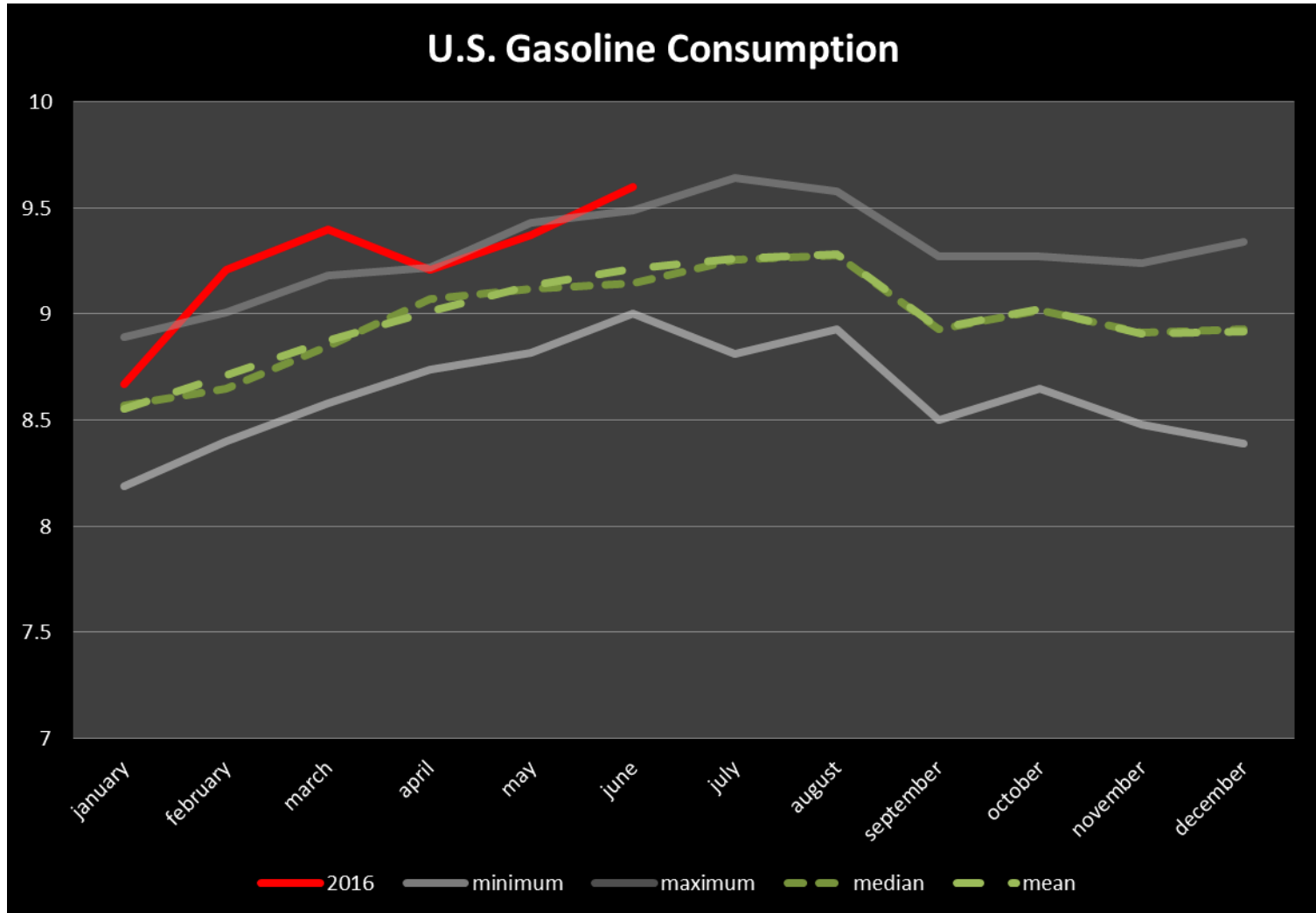


Weekly natural gas inventory changes
billion cubic feet



HYDROCARBON CONSUMPTION GROWING

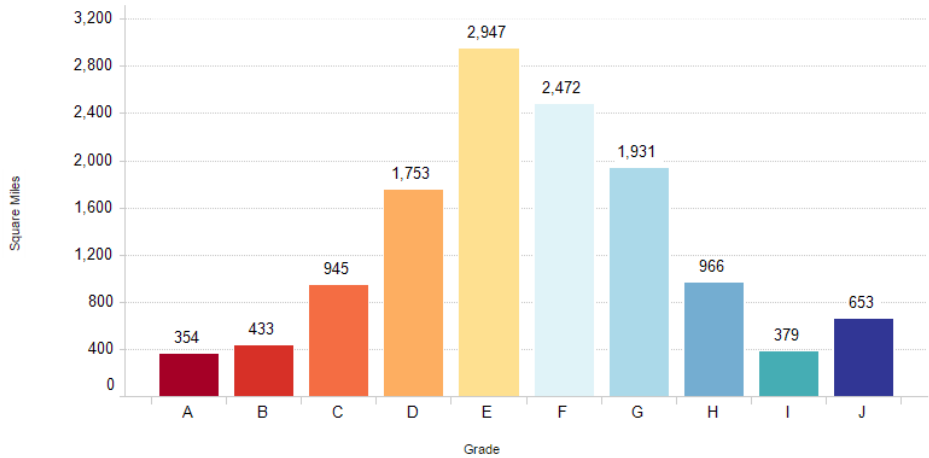
Cheap Gasoline = More US Driving in Bigger Vehicles



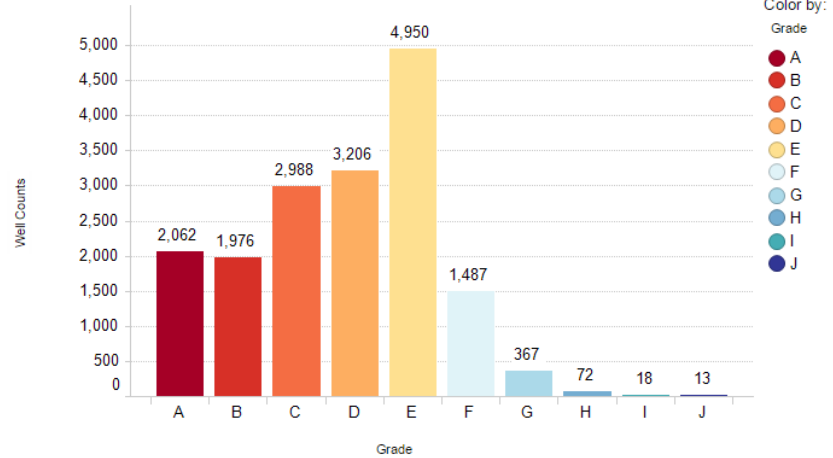
HOW BIG IS THE DOMESTIC PRIZE?

Grading Map: Grade based on BOE (20:1) ▾

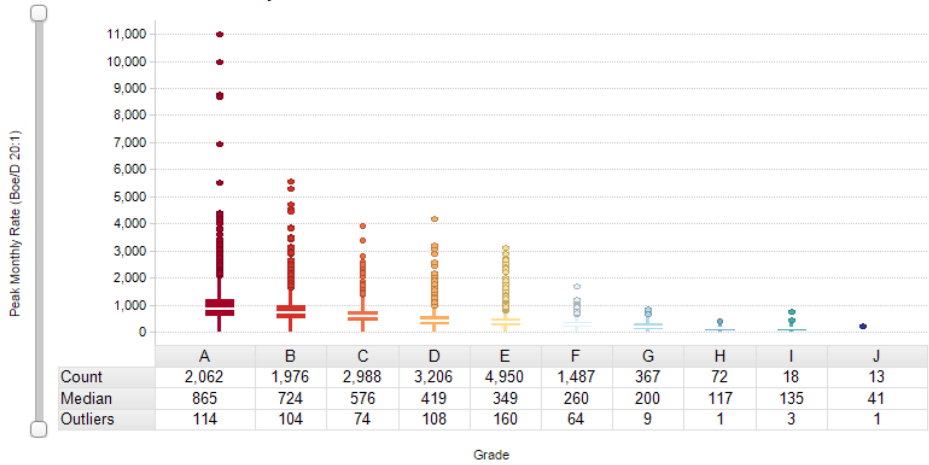
Grid Cell Distribution



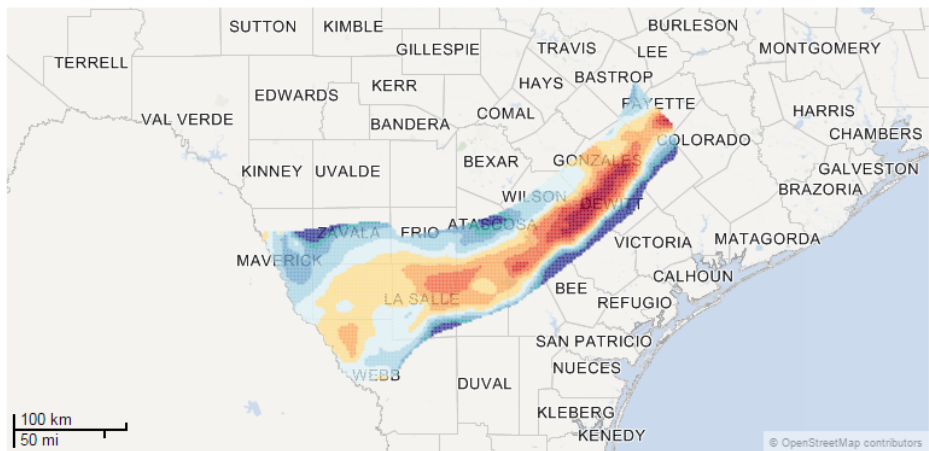
Well Distribution



Box Plots Of Observed Peak Rate By Grade



Grading Map



Eagle Ford Overall Developed Acreage

25% Overall at 80 Acres, 33% Net Economic Barrel at 80 Acres

12.5% at 40 Acres, 16.5% at 40 Acres

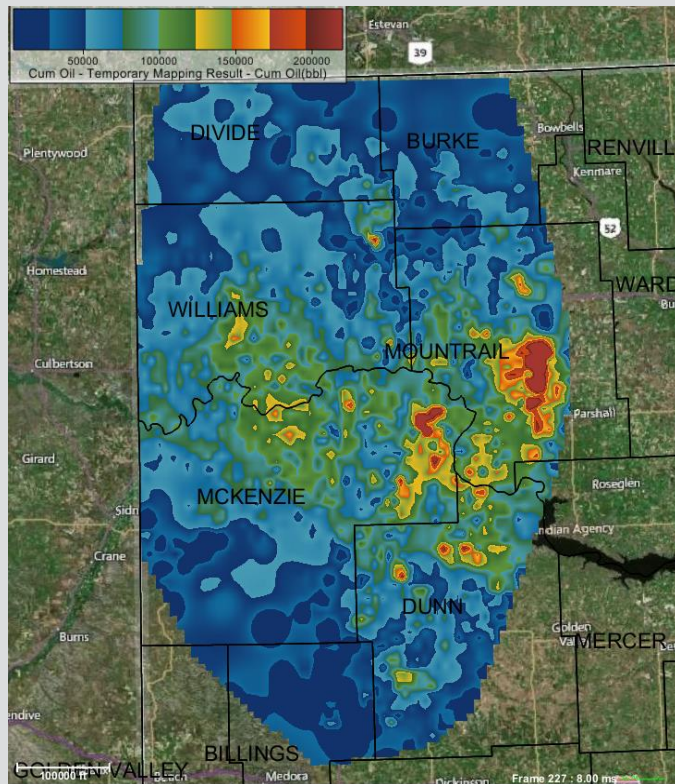
Variable	Value	Suggested	Definition
Lateral Length (ft)	5,626	5,974.79	Sets lateral length for future wells. Lateral length for existing wells is based on actual lateral lengths. Suggested value represents average of all lateral lengths in the play.
Wellbore Spacing (ft)	660	330, 660, or 1320	Sets wellbore spacing distance for all wells, including existing wells.
Land Efficiency Factor (%)	90 %	90 %	Total land area is reduced by this percentage to account for unleaseable acreage and bypassed acreage due to wellbore and lease geometry inefficiencies.

Play	Grade	Total Land Area (mi^2)	Proportion of Play (%)	Cum Play (%)	Wells Drilled	Lateral Length (ft)	Land Area Drilled (mi^2)	Land Area Drilled (%)	Wells Remaining
Gulf Co...	A	354	2	2	2,062	5,360	290.7	82.1 %	428
Gulf Co...	B	433	3	6	1,976	5,476	284.6	65.7 %	1,003
Gulf Co...	C	945	7	13	2,988	5,938	466.7	49.4 %	3,232
Gulf Co...	D	1,753	13	27	3,206	6,134	517.3	29.5 %	8,350
Gulf Co...	E	2,947	22	50	4,950	6,267	816.0	27.7 %	14,400
Gulf Co...	F	2,472	19	69	1,487	6,342	248.1	10.0 %	15,028
Gulf Co...	G	1,931	15	84	367	6,287	60.7	3.1 %	12,638
Gulf Co...	H	966	7	91	72	5,391	10.2	1.1 %	6,458
Gulf Co...	I	379	2	94	18	5,335	2.5	0.7 %	2,544
Gulf Co...	J	653	5	99	13	5,150	1.8	0.3 %	4,401

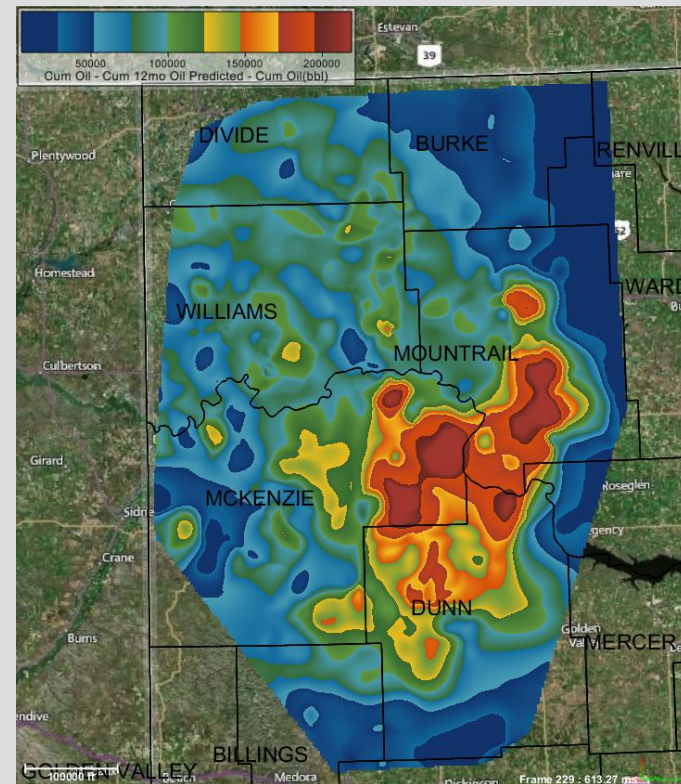
NORMALIZING PRODUCTION MAPPING

- Desire to create a predictive production map as though every well was drilled and completed the same
- How do we do this in a robust and repeatable way?

Actual 12 month Cum Oil



Predicted 12 month Cum Oil



We know it is improvable... so what is the component ROI of doing so?

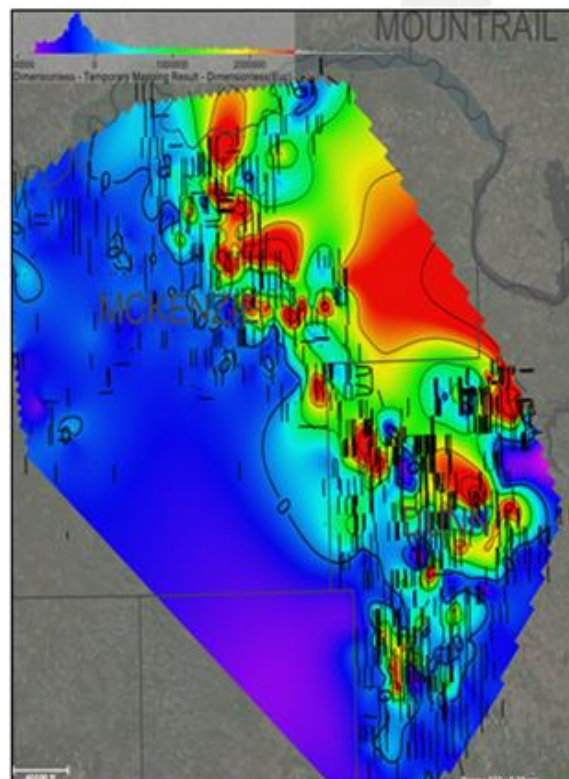
PREDICTED PRODUCTION MAPS BASED ON TIER 2 DUNN & MCKENZIE NON-LINEAR REGRESSION MODEL

This shows the revenue difference between the 700 lbs/ft model and the 400 lbs/ft model

Assuming:

- 10,000 ft laterals
- \$0.20/lb of proppant
- \$40/bbl return for oil

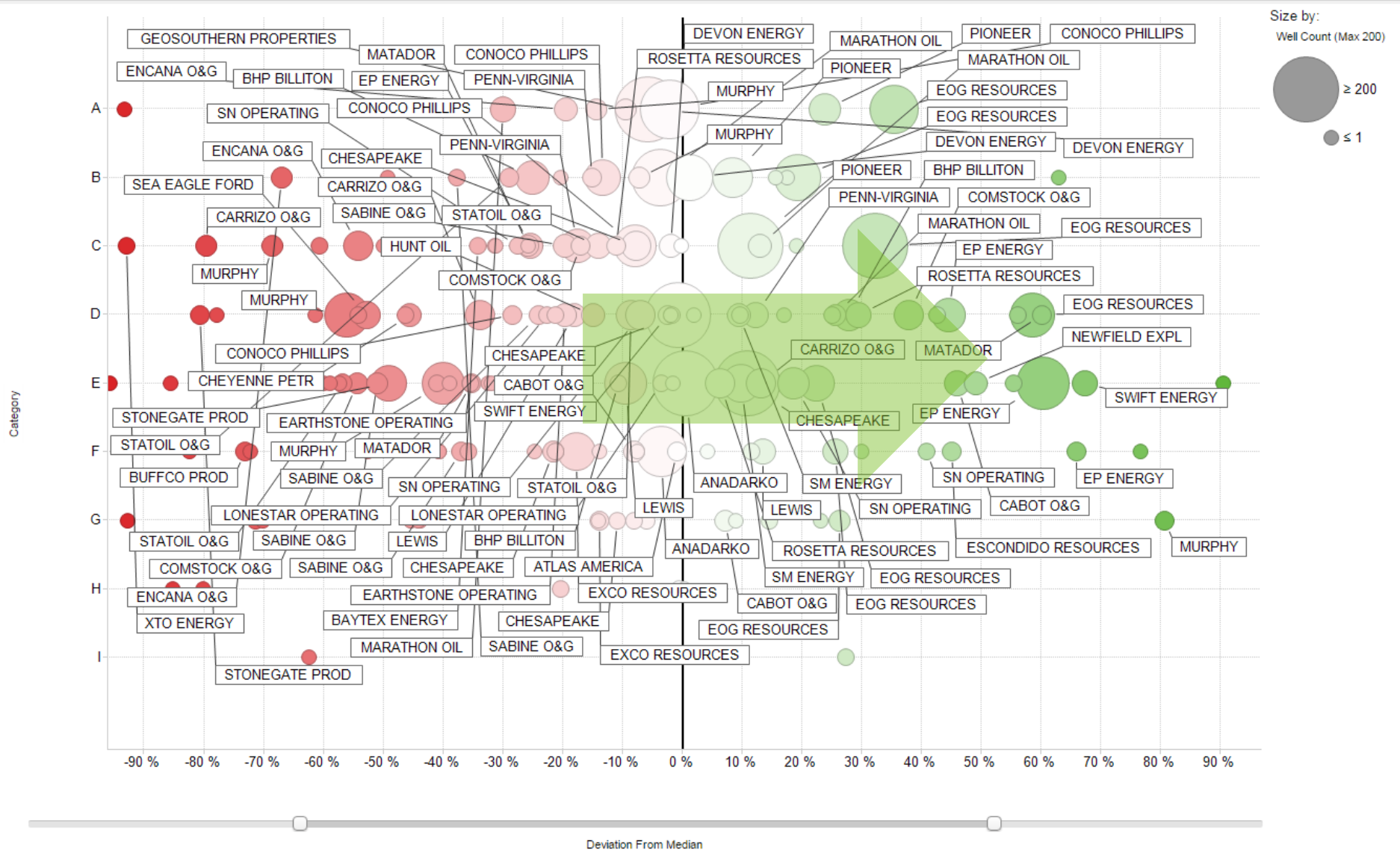
Red: ~\$2MM+ gain
Cyan: ~\$50k gain
Dark blue & purple: revenue loss



Operator Differential By: Grade Rollup: 6 Month Cum

See OPERATOR BENCHMARKING tab for detailed instructions.

Product: Boe Oil-Gas Equivalence: 20 Wellbore: HORIZONTAL



50% Better?

PROVEN: THESE IMPROVEMENTS ARE ACHIEVABLE

EAGLE FORD-

USGS: 5.1 BBOE Economically Recoverable Reserves

PRODUCED TO DATE: 2.1 BBOE

EUR of WELLS DRILLED TO DATE: 3.1 BBOE

PERCENT DRILLED: CASE 1. 33%= 9.3 BBOE; CASE 2. 16.5%= 18.6 BBOE

OPERATOR IMPROVEMENT: CASE 1. 12.4 BBOE; CASE 2. 25.35 BBOE

BOE/SQ MI: 4-11 MMBOE; 43.3 BBOE – 119 BBOE (20-28% Recovery)

PERMIAN BASIN-

12x thicker source, 7x larger surface area (12x7=84)

BOE/SQ MI: 50-180 MMBOE; so inline with more measured source

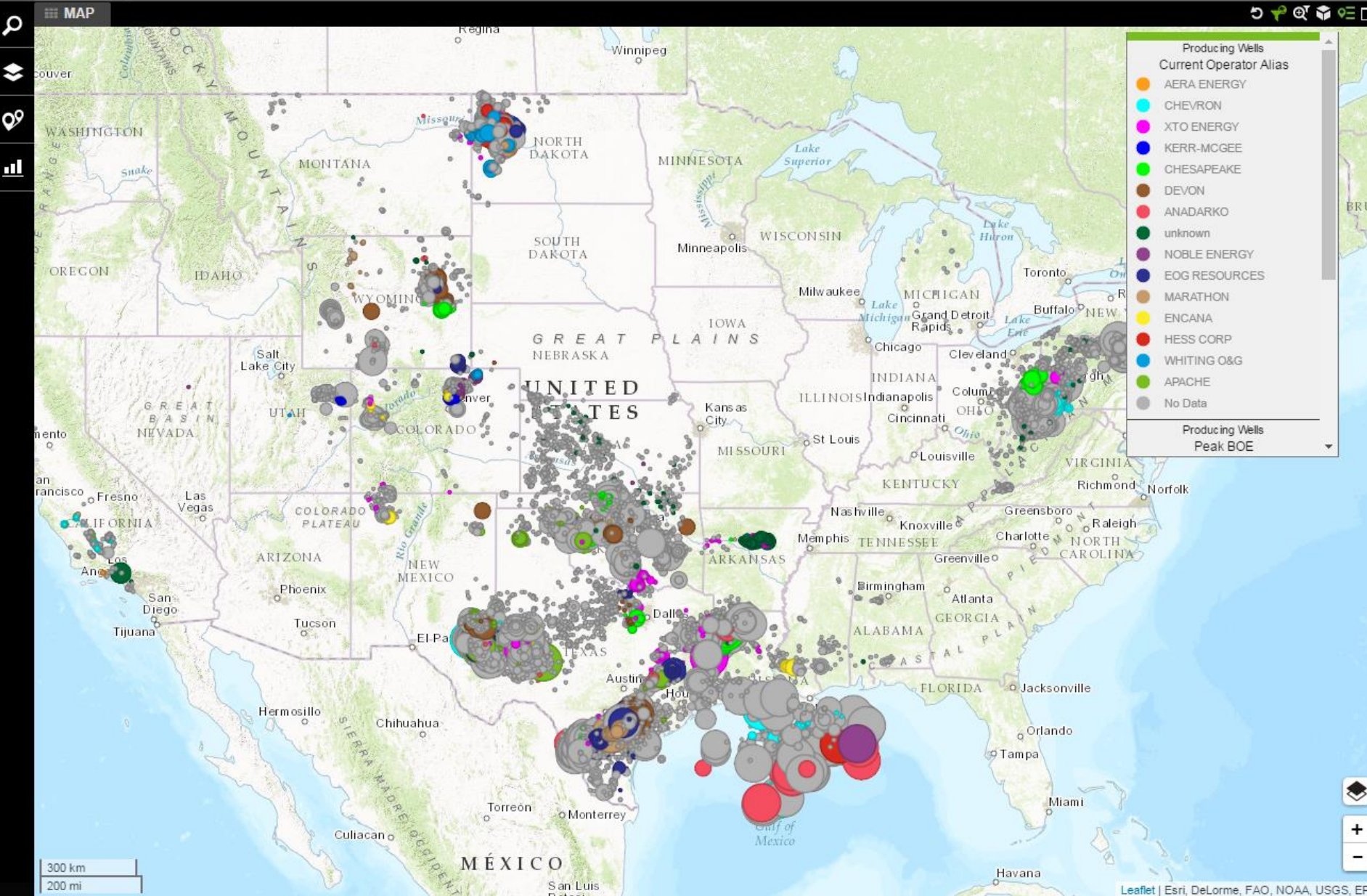
12.4 BBOE x 84 = **1.041 TBOE RECOVERABLE**

25.35 BBOE x 84 = **2.129 TBOE RECOVERABLE**

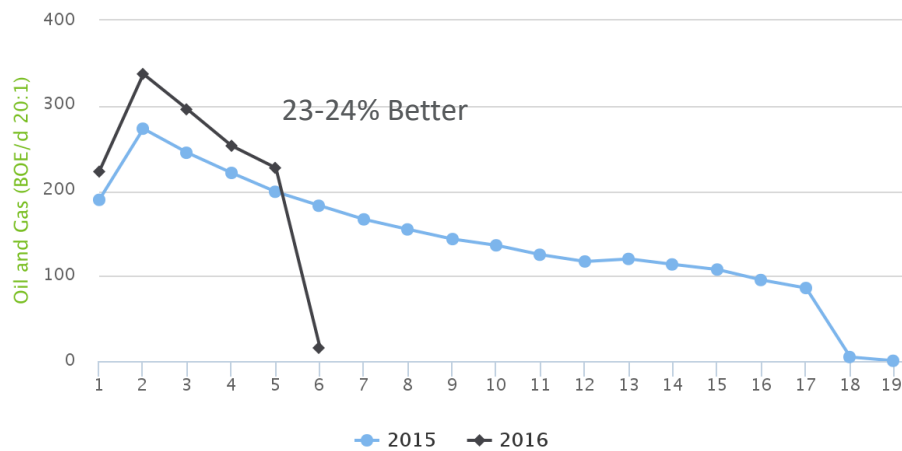
SAUDI ARABIA- 268 BBOE

VENEZUELA- 297 BBOE

WHAT IS UPSTREAM OIL & GAS ACTIVITY AND HOW WILL IT EFFECT SUPPLY?

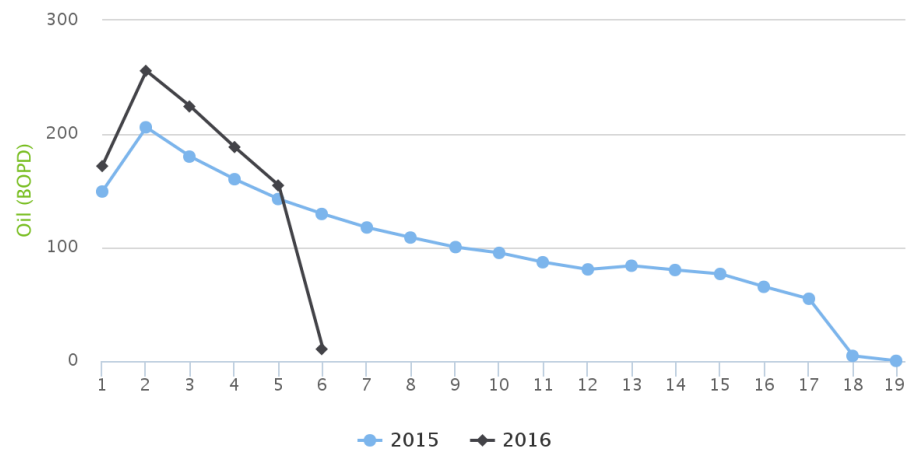


Vintage Type Curve Oil and Gas 20:1



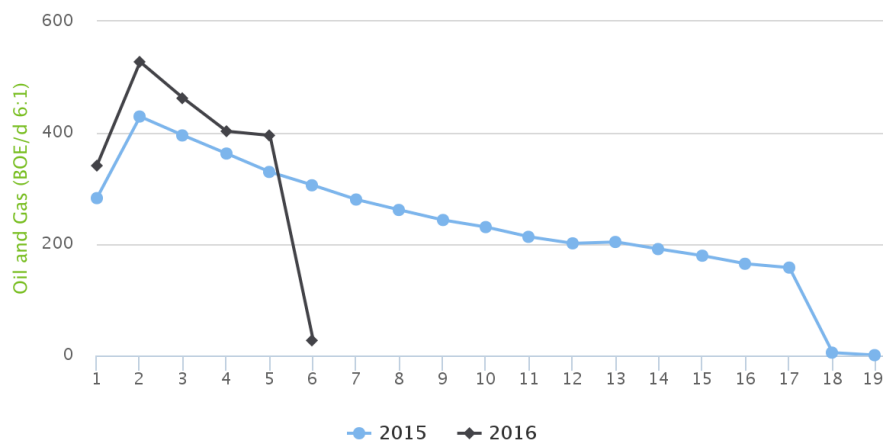
Drillinginfo

Vintage Type Curve Oil



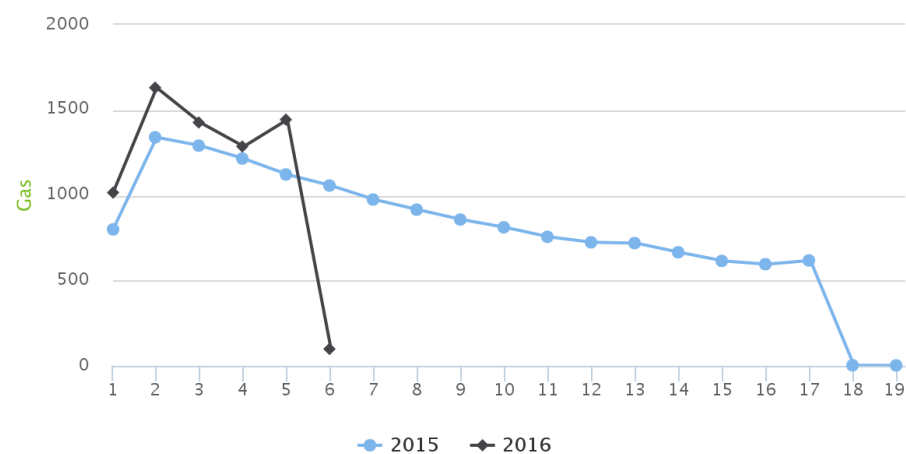
Drillinginfo

Vintage Type Curve Oil and Gas 6:1



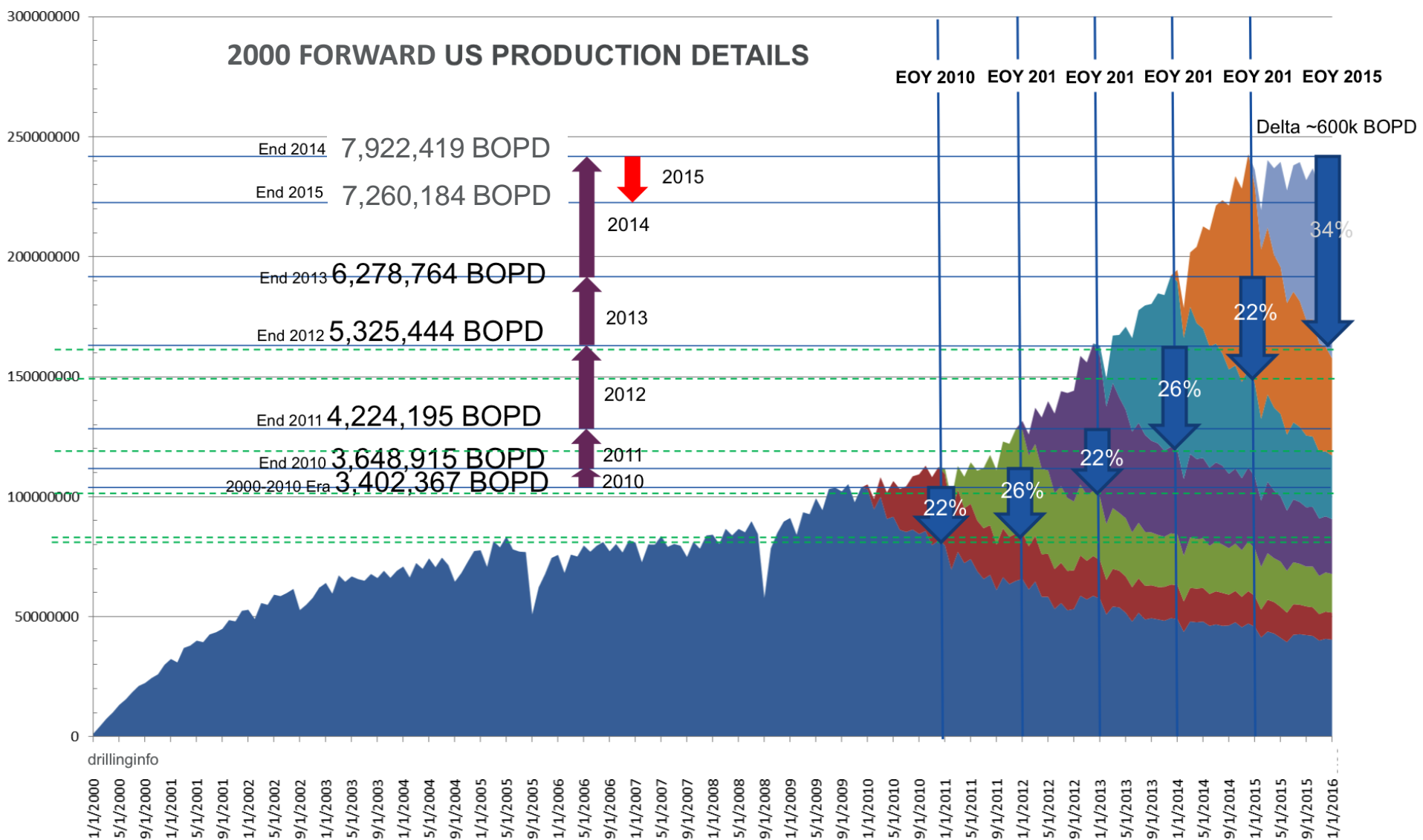
Drillinginfo

Vintage Type Curve Gas

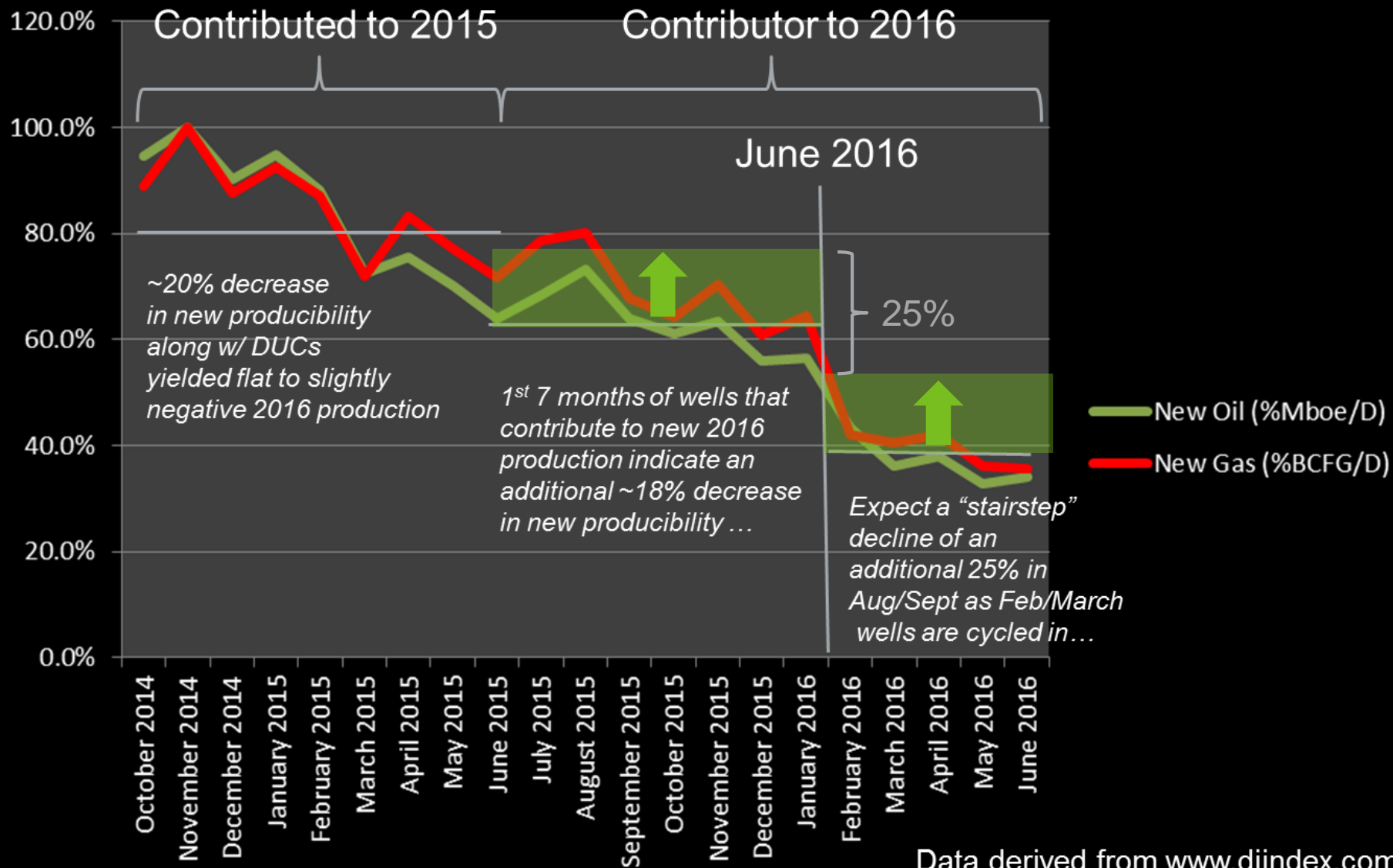


Drillinginfo

2000 FORWARD US PRODUCTION DETAILS



US New Drilling Gross Producibility

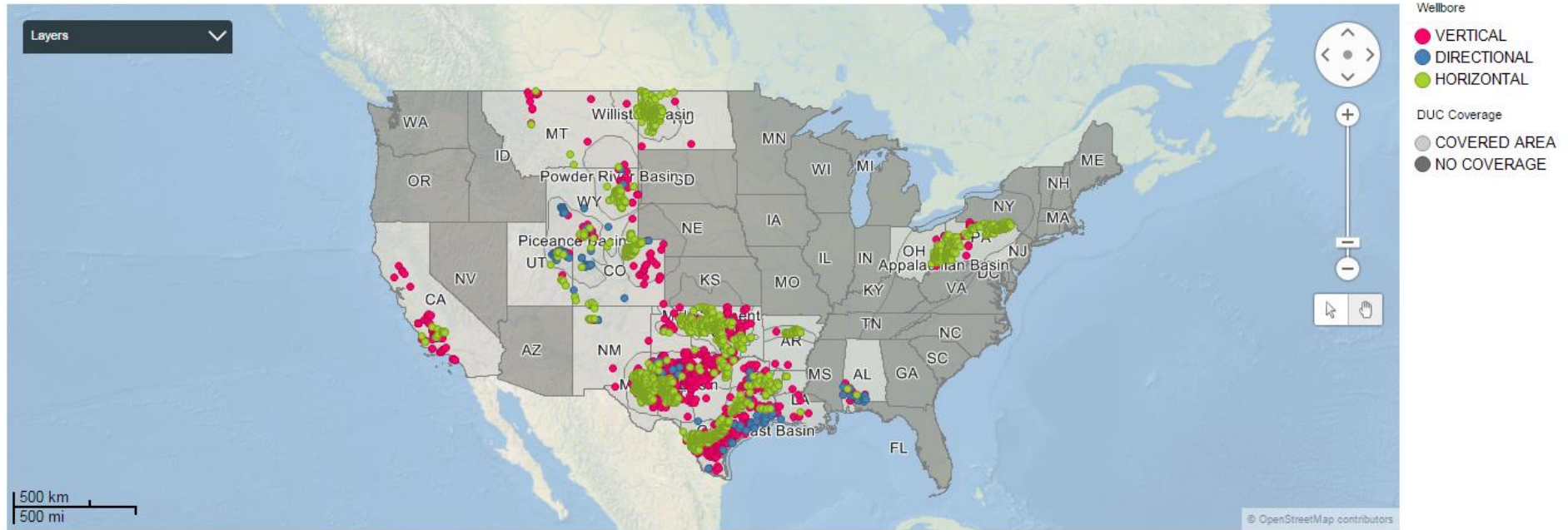


Data derived from www.diindex.com

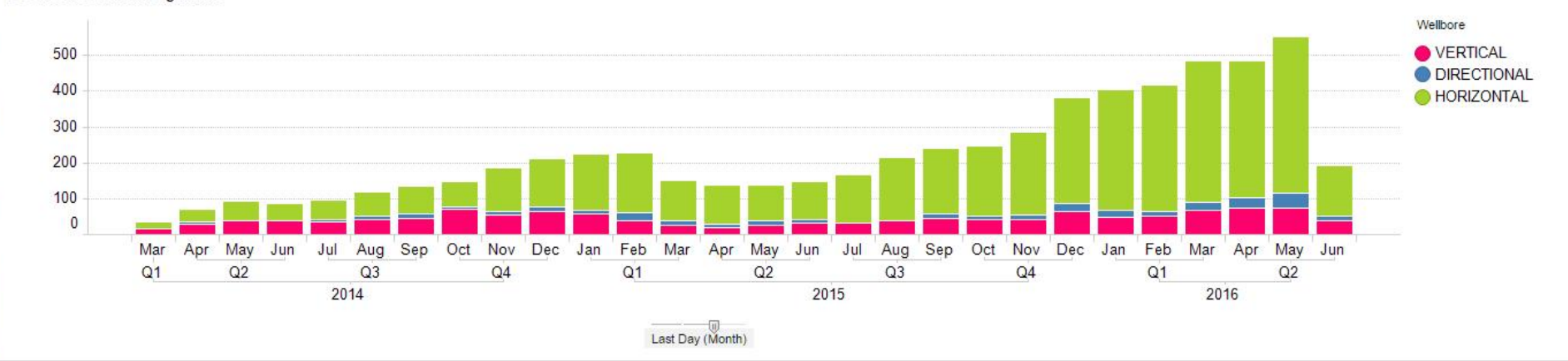
Color By: Wellbore ▾

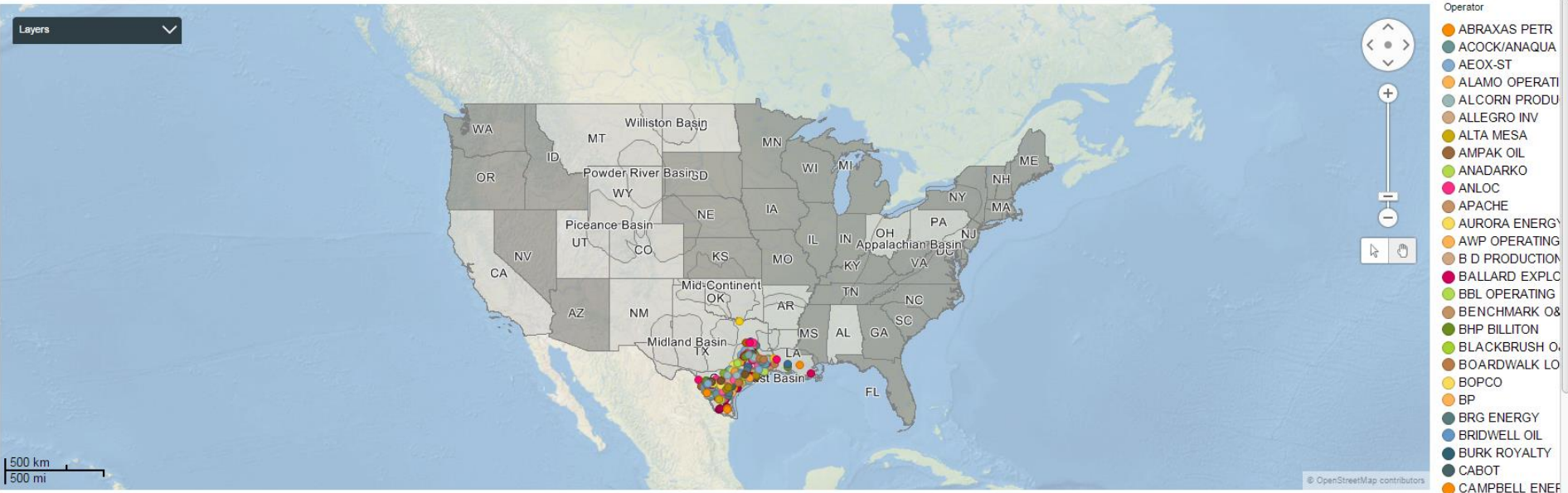
Updated: Sunday, June 12, 2016

Drilled But Uncompleted

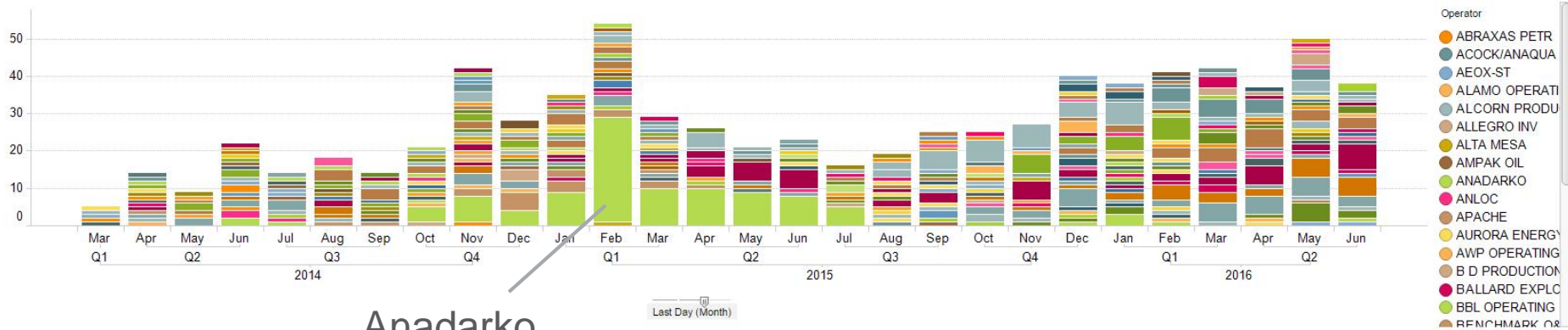


DUC Well Count Though Time

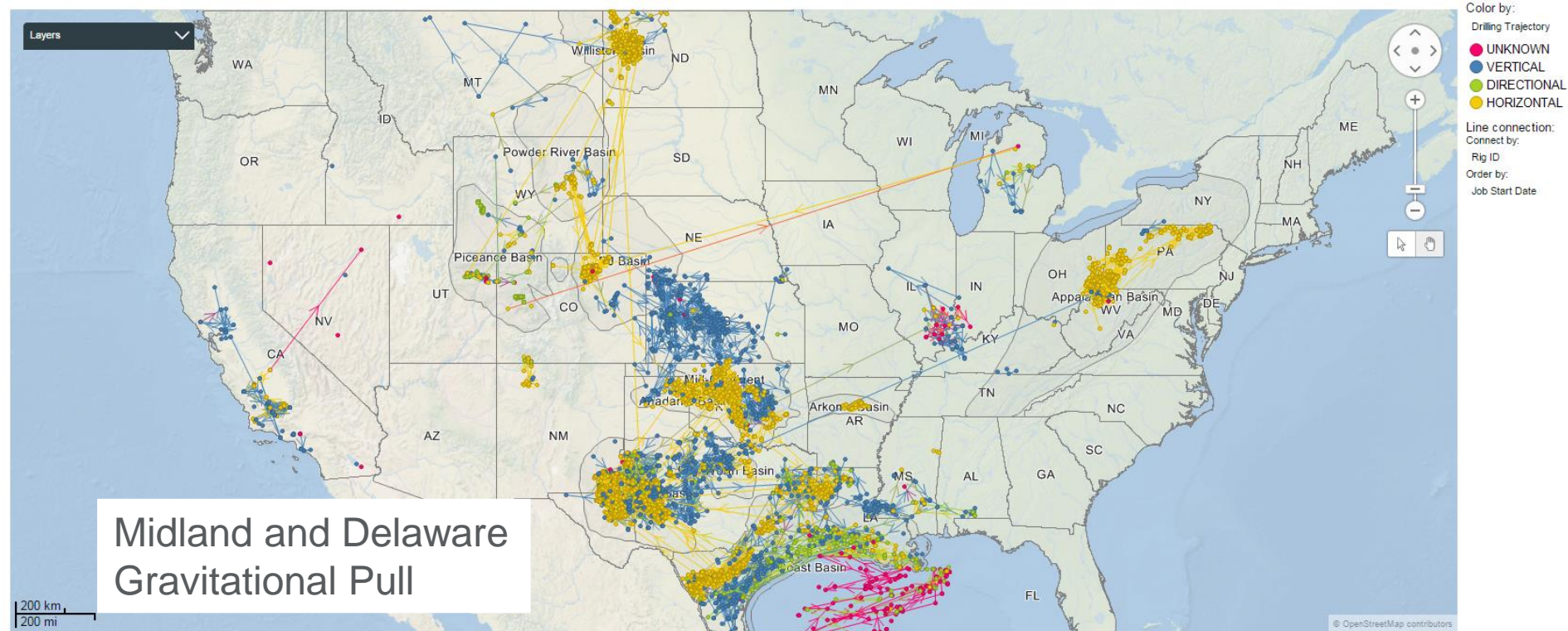




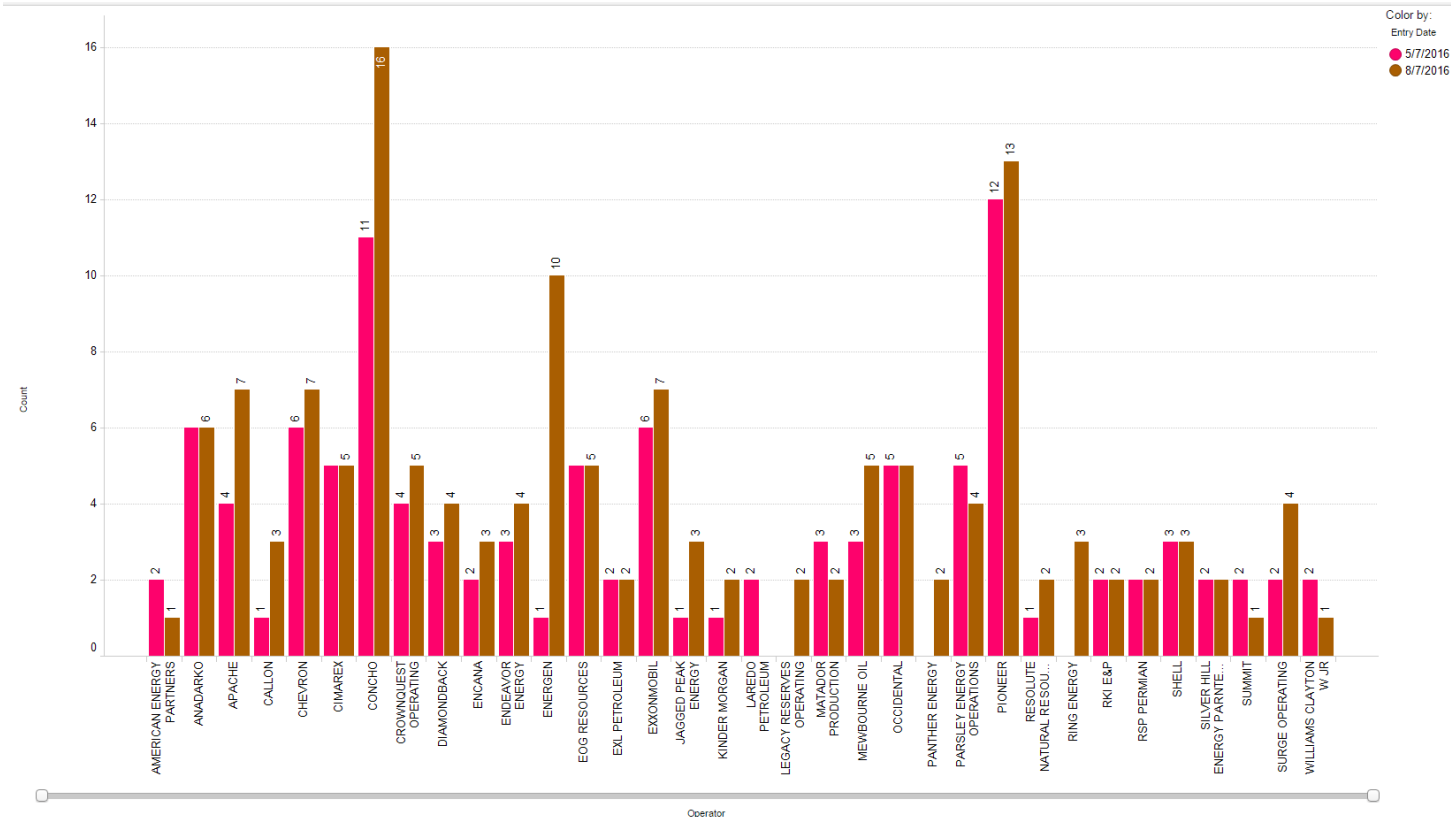
DUC Well Count Though Time



Drilling Rigs, Last 12 Months.



Midland and Delaware Rig +/- Last 90 Days

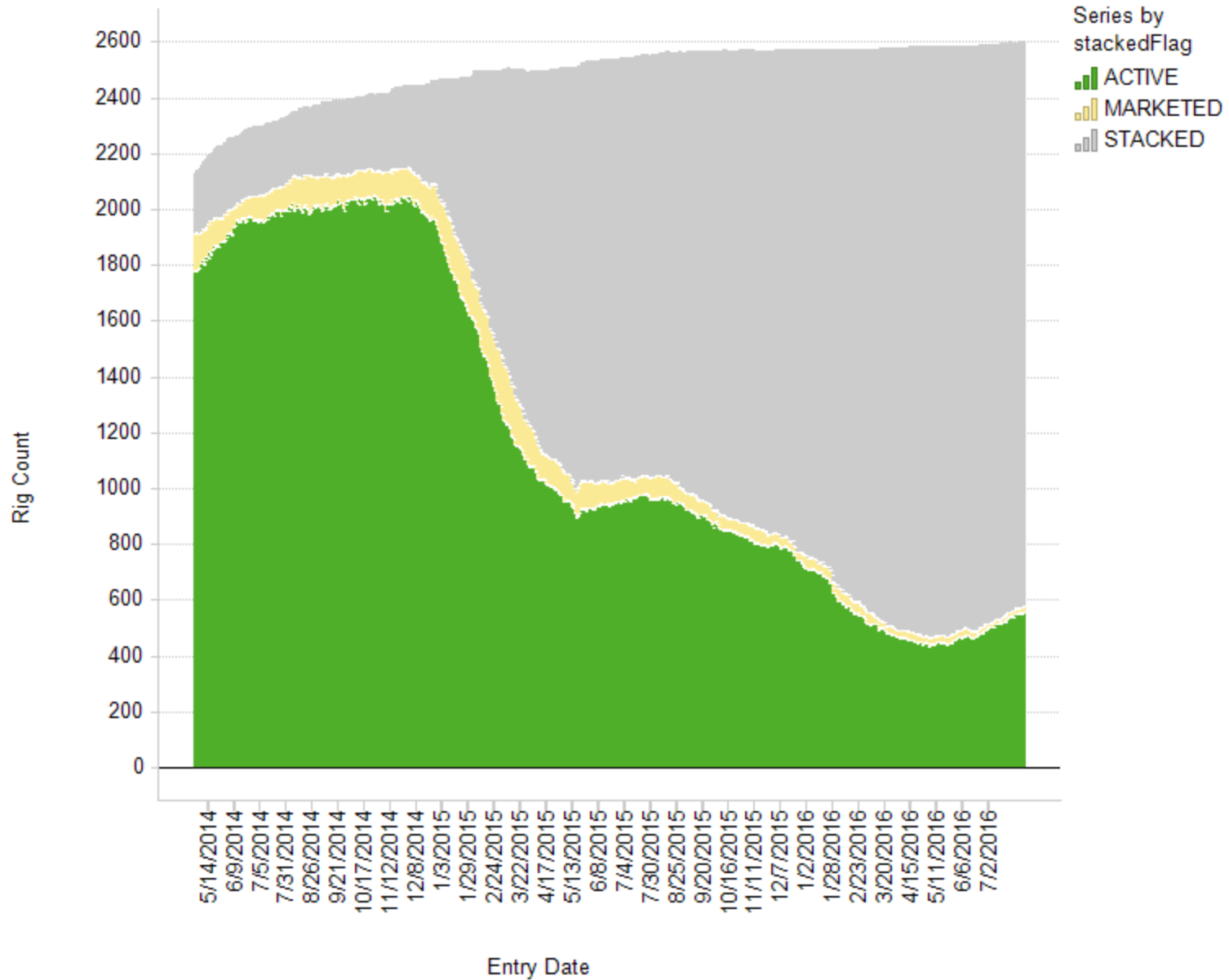


Energen	9
Concho	5
Concho	5
Apache	3
Panther	3
Ring	3
Callon	2
Jagged Peak Energy	2
Mewbourne	2
Surge	2
Chevron	1
Chevron	1
Crownquest	1
Diamondback	1
Encana	1
Endeavor	1
ExxonMobil	1
Kinder Morgan	1
Legacy Reserves	1
Pioneer	1
Resolute	1
Anadarko	0
Cimarex	0
EOG	0
EXL	0
Occidental	0
RKI	0
RSP Permian	0
Shell	0
Silver Hill	0
Matador	-1
Parsley	-1
Summit	-1
Clayton Williams	-1
American Energy Partners	-2
Laredo	-2

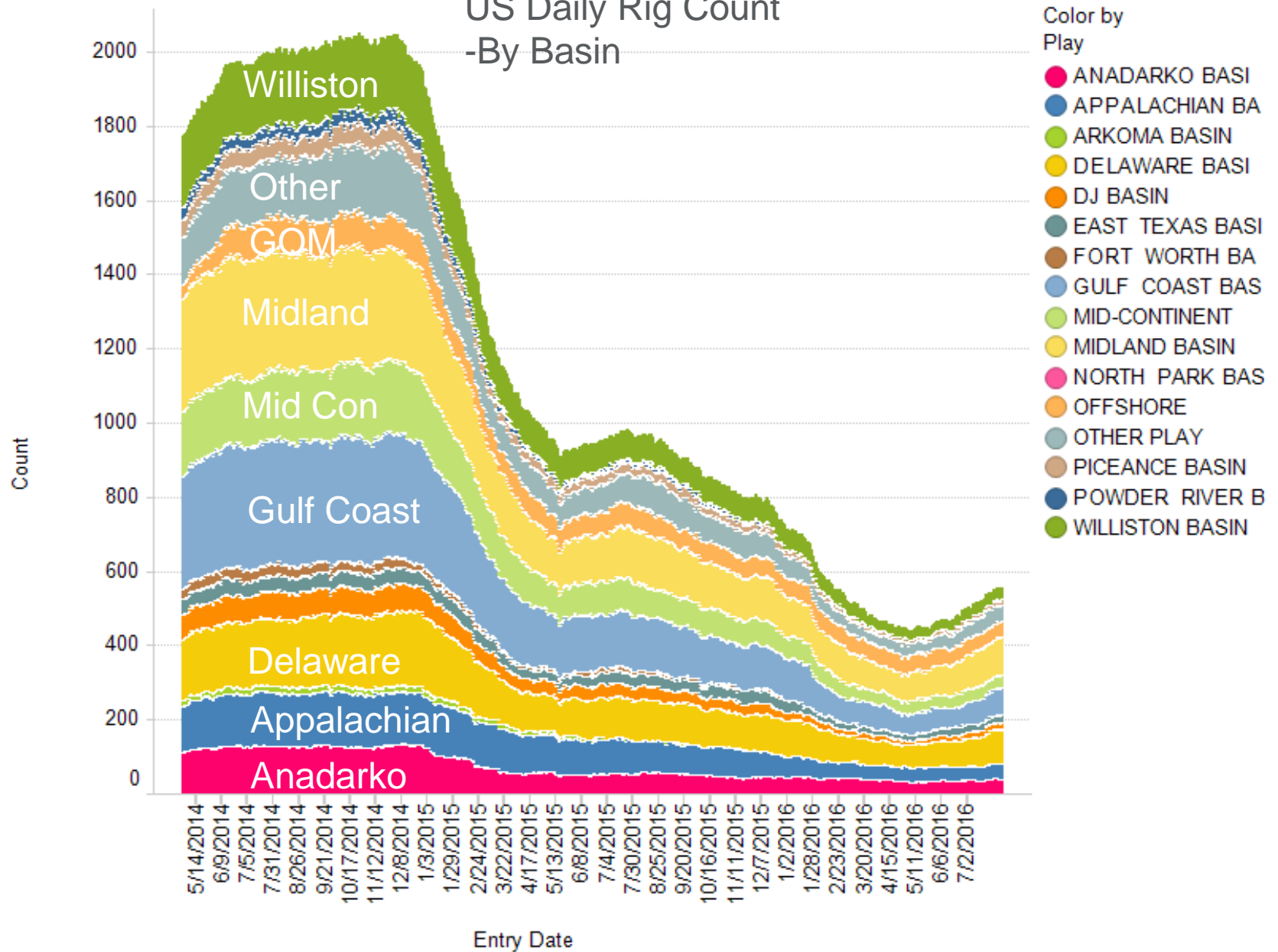
For every company dropping rigs, there are 3.5 adding...

+39

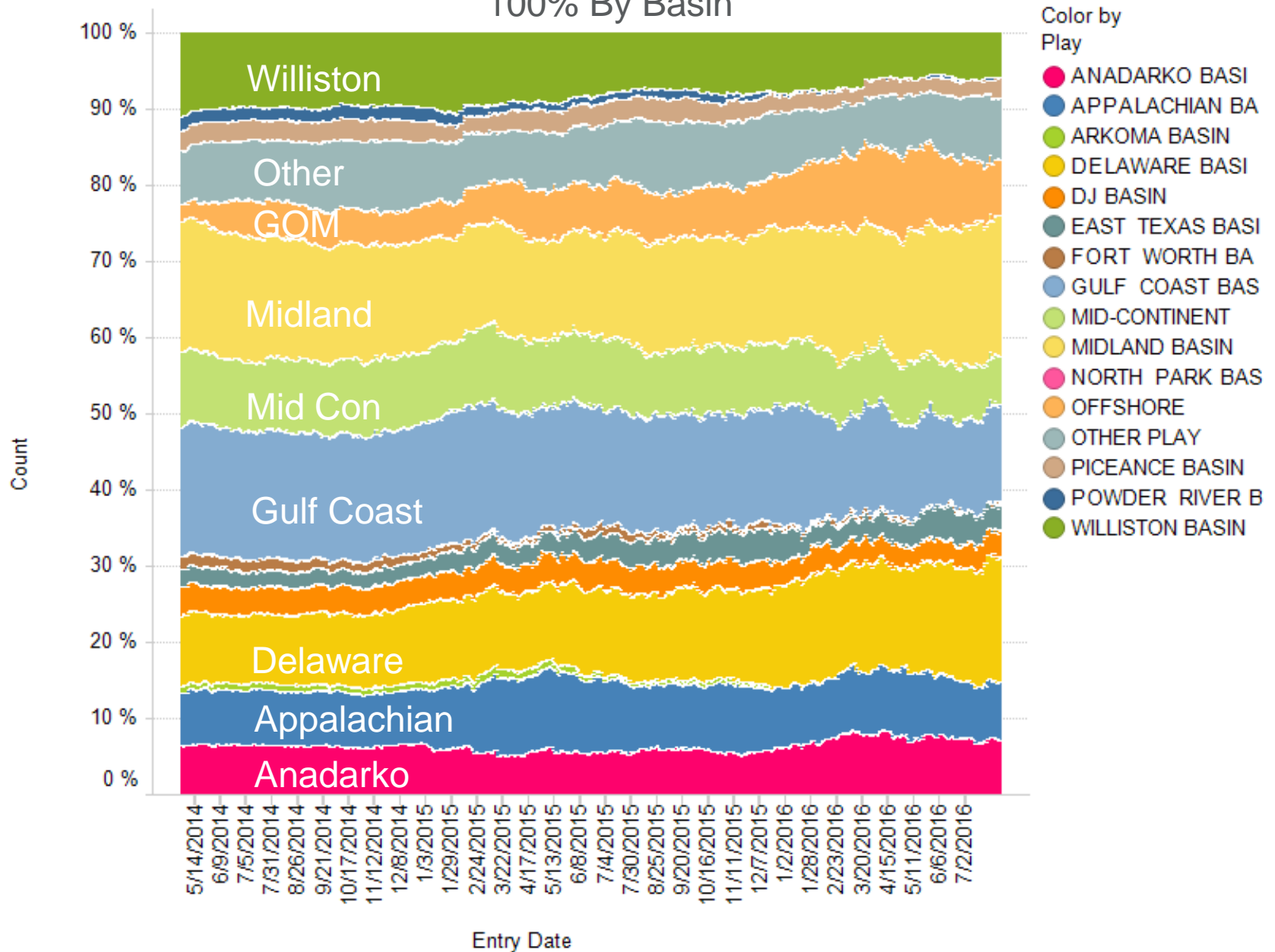
US Daily Rig Count



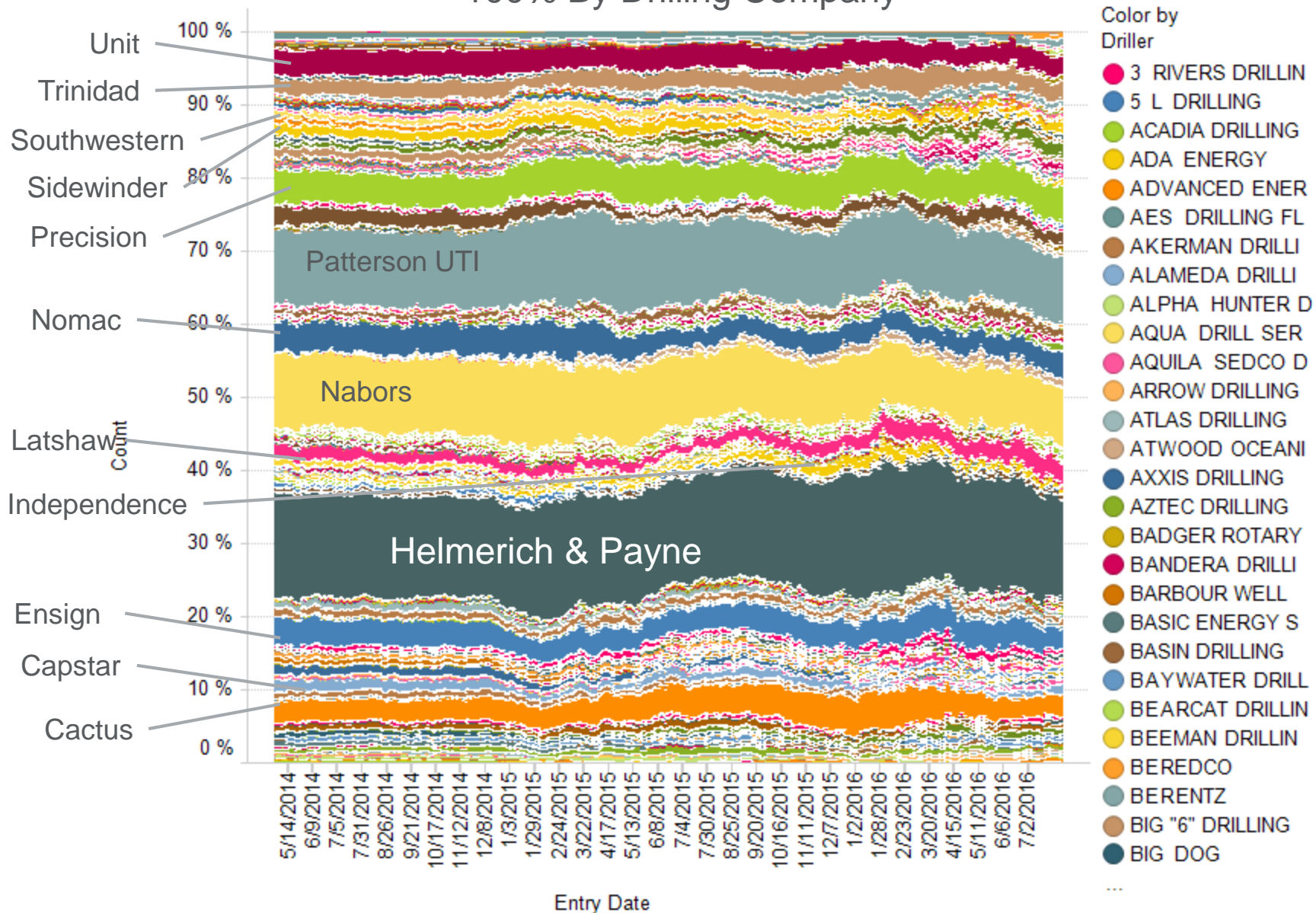
US Daily Rig Count -By Basin



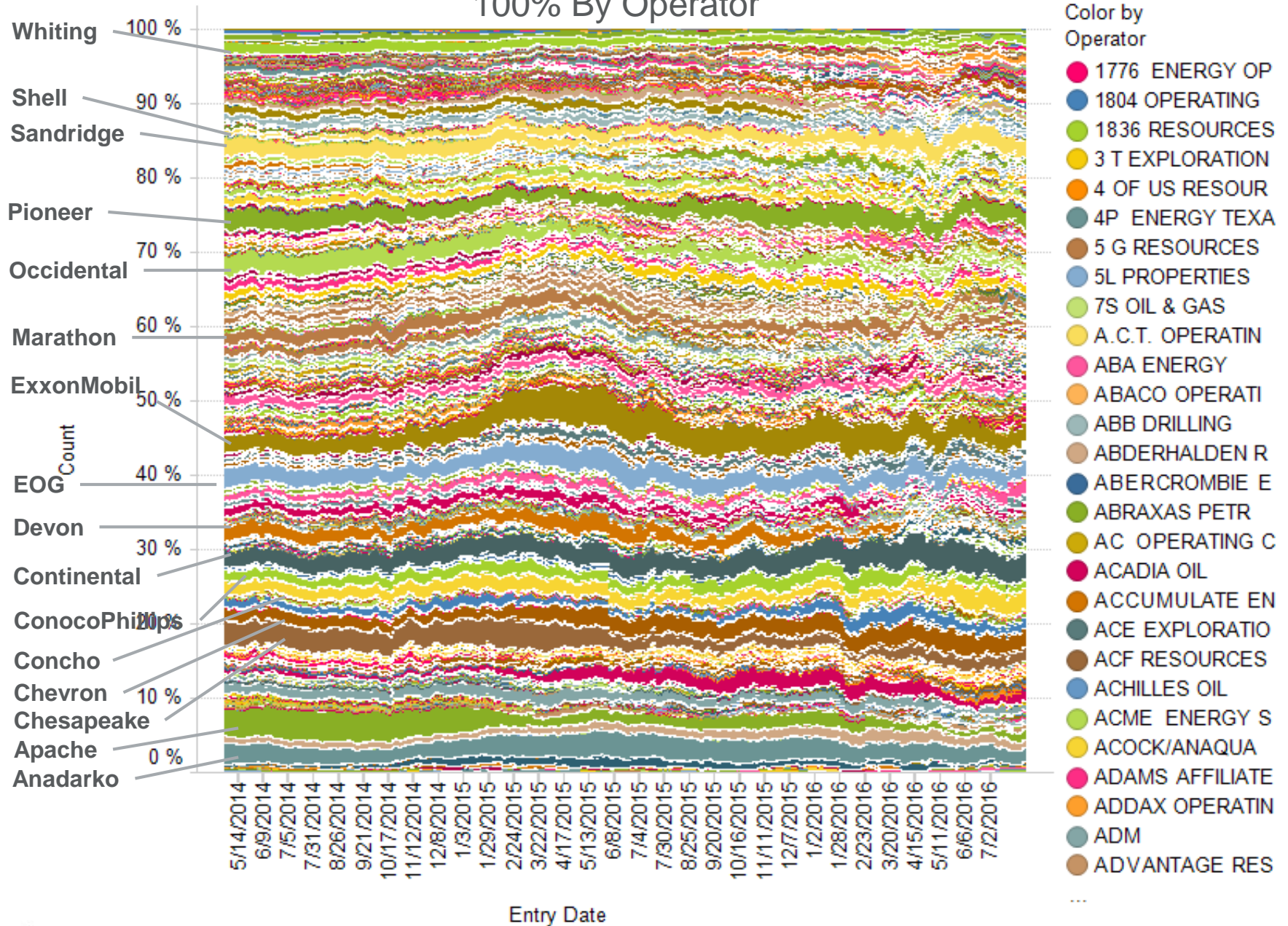
100% By Basin



100% By Drilling Company



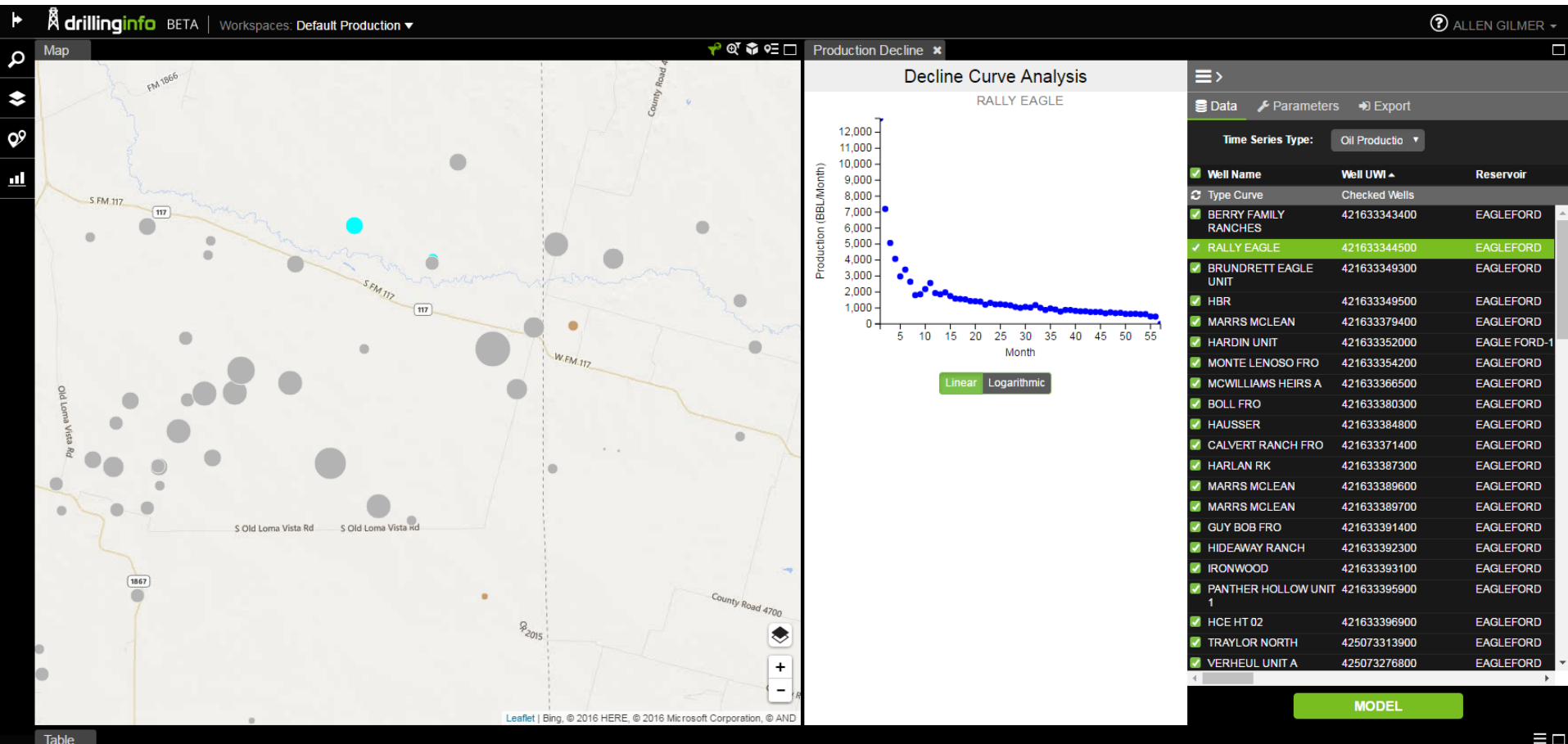
100% By Operator





Color by
Driller

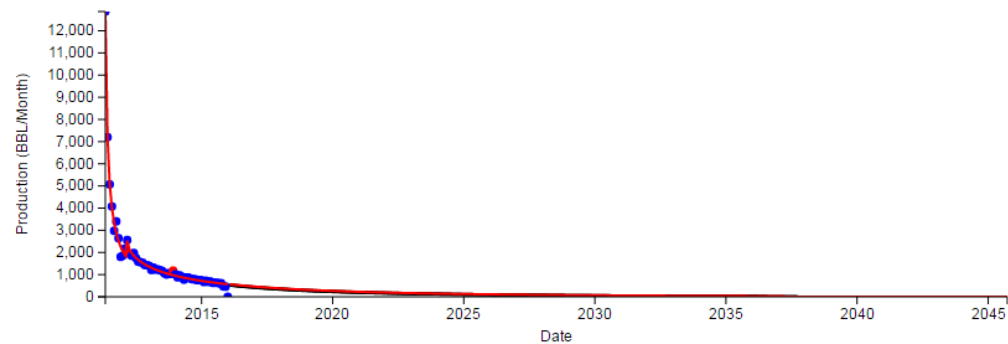
- ADVANCED ENERGY
- ALPHA HUNTER DRILLING
- ARROW DRILLING
- ATLAS DRILLING
- ATWOOD OCEANICS
- AZTEC DRILLING
- BADGER ROTARY DRILLIN
- BARBOUR WELL
- BASIC ENERGY S
- BASIN DRILLING
- BAYWATER DRILLING
- BEREDCO
- BIG DOG
- BIG E
- BIGARD & HUGGARD DRIL
- BISON DRILLING & FIELD
- BLACK CREEK DRILLING
- BLAKE INTERNATIONAL RI
- BLUE LINE DRILLING
- BOB POUND DRILLING
- CACTUS DRILLING
- CAPSTAR DRILLING
- COASTAL DRILLING
- CRUDEWELL DRILLING
- CYCLONE DRILLING
- D&D DRILLING
- DAN D DRILLING
- DIAMOND OFFSHORE DRI
- ...



Decline Curve Analysis

Results Info Probabilistic Reserves Probabilistic Parameters

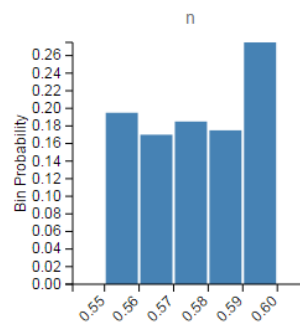
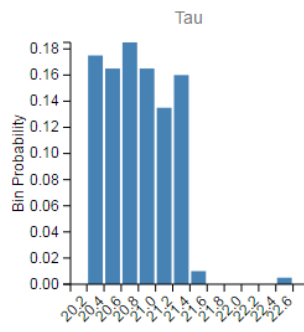
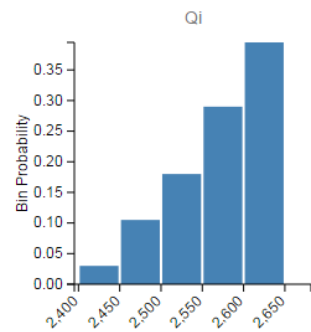
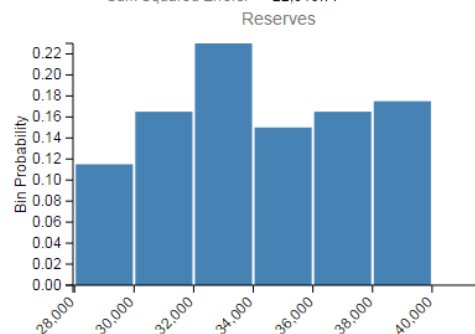
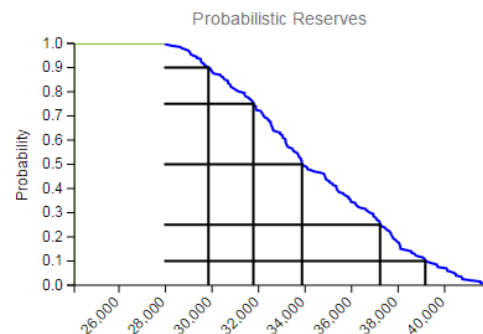
RALLY EAGLE



Linear Logarithmic

Best Fit Model: ☒ SEPD
Months: 57
Outliers: 2

Q1: 2,531.47
Tau: 22.76
n: 0.57
Sum Squared Errors: 22,619.77



Data Parameters Export

Model Type Selection

☒ Arps ☒ SEPD ☒ Duong
☐ Power Law ☒ Logistic Growth ☐ Hyp to Exp

If multiple models are selected, Auto Fit will identify the best model & fit. If a single model is selected, Auto Fit will only work with that model.

☒ Forecast Production/Reserves

Advanced Settings

☒ Perform Segmentation Analysis

Threshold: 2.5

☒ Perform Outlier Analysis

Error Deviations: 2.5

Forecast Parameters:

Number Bayesian Trials: 200

Number of Months to Forecast: 361

Month to Reference Forecast: ☐ First ☒ Last

Minimum Monthly Production: 30

Forecast Decline: ☒ From Model
☐ Exponential
☐ Minimum 0.2

Forecast: ☐ EUR ☒ Remaining Reserves

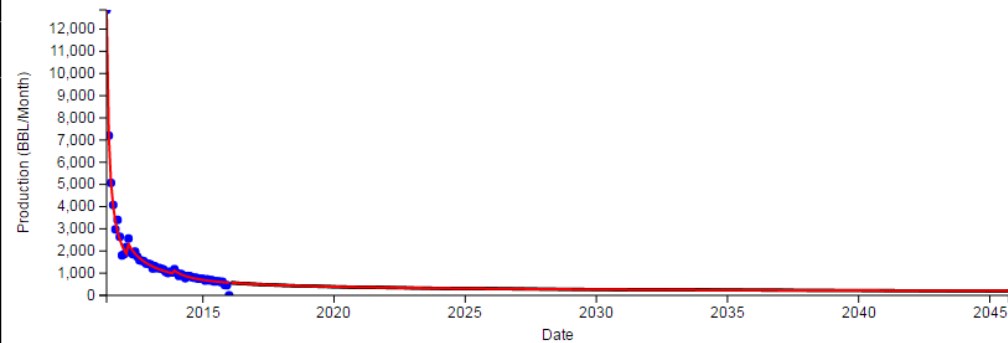
SEPD (Best Fit)
30-39k BO
30% variation...

MODEL

Decline Curve Analysis

Results Info Probabilistic Reserves Probabilistic Parameters

RALLY EAGLE

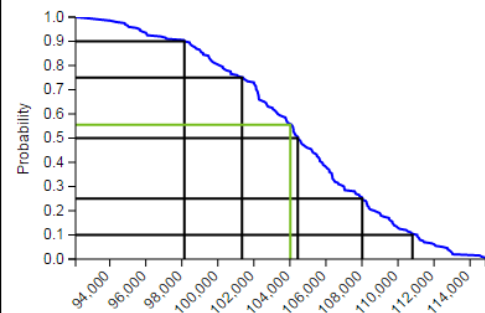


Linear Logarithmic

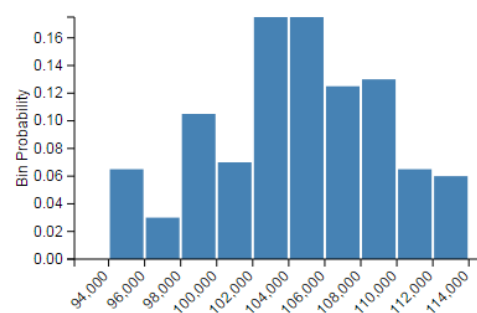
Best Fit Model: ☒ Arps
Months: 57
Outliers: 0

DI: 0.83
QI: 1,119.59
b: 2.45
Sum Squared Errors: 26,049.79

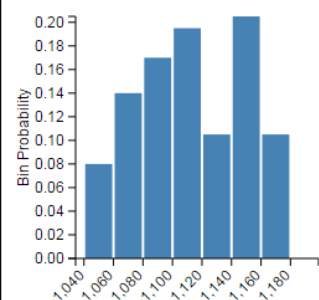
Probabilistic Reserves



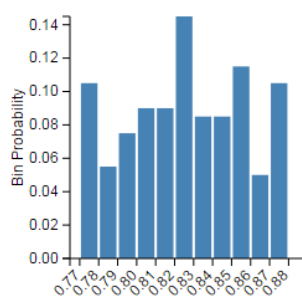
Reserves



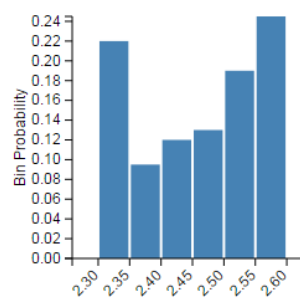
QI



DI



b



Data Parameters Export

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Next Best- ARPS
98K-111K

14% variation...

MODEL

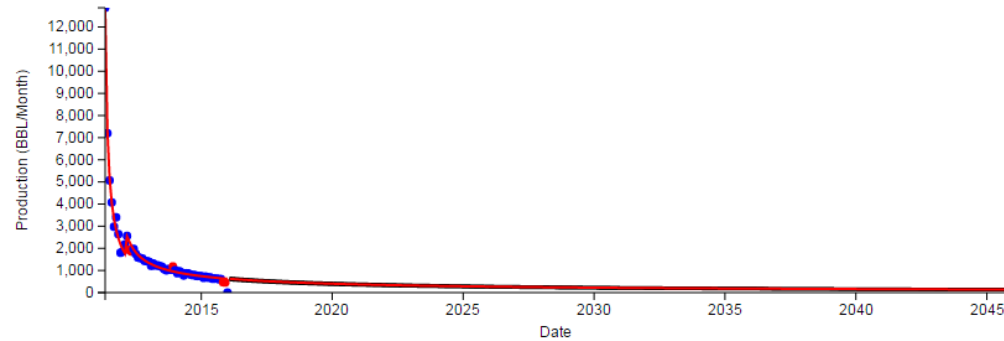
Decline Curve Analysis

Results Info

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RALLY EAGLE



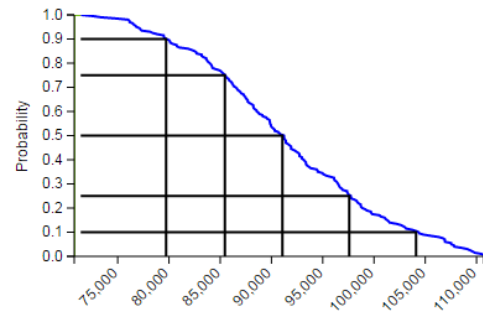
Linear

Logarithmic

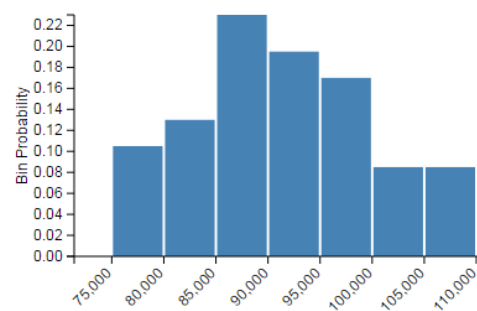
Best Fit Model: ☒ Duong
Months: 57
Outliers: 5

Qi: 2,530.98
a: 1.11
m: 1.17
Sum Squared Errors: 24,148.86

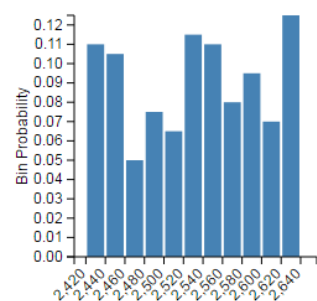
Probabilistic Reserves



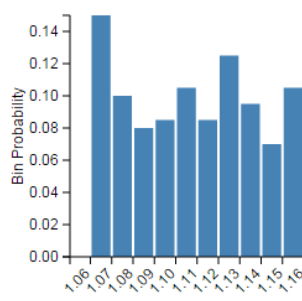
Reserves



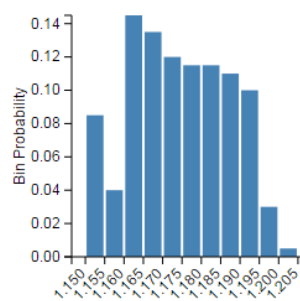
Qi



a



m



Data

Parameters

Export

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☐ Power Law ☐ Logistic Growth ☐ Hyp to Exp

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Forecast Decline: ☒ From Model☐ Exponential☐ Minimum 0.2Forecast: ☐ EUR ☒ Remaining Reserves

3rd Choice- DUONG
80K-104K

30% variation...

MODEL

THANK YOU