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BRINGING OUT THE BEST

Improvements in the Granite Wash: Black Kettle Field

AADE Symposium – Tulsa
February 17, 2016

Acknowledgements

LEE THOMAS – VP DRILLING & COMPLETIONS

RICHARD TRUEHEART – DRILLING DIRECTOR

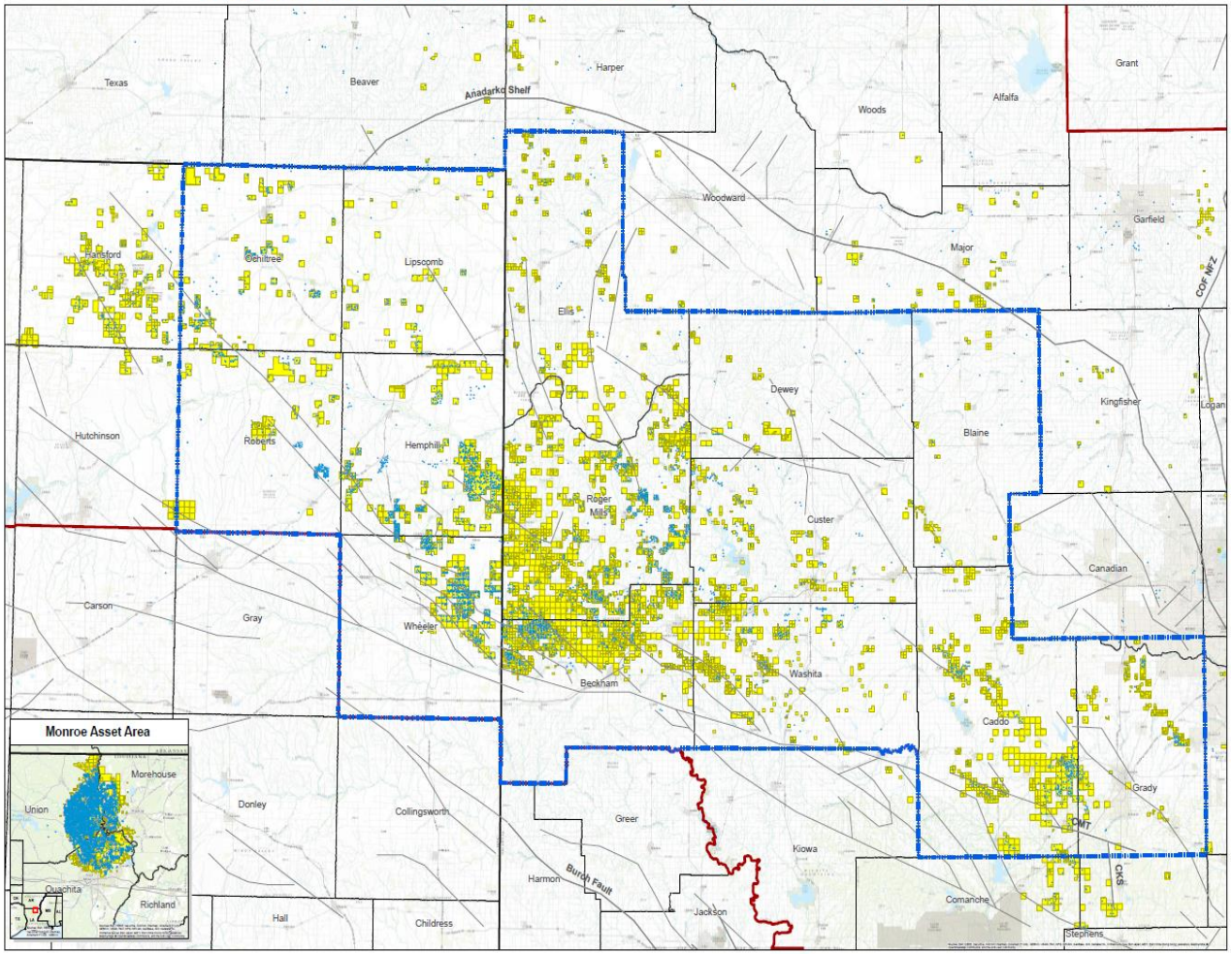
TODD ECKHARDT – DRILLING ENGINEER

BRETT MUNKRES – DRILLING ENGINEER

JOHN ROLAN – DRILLING SUPERINTENDENT

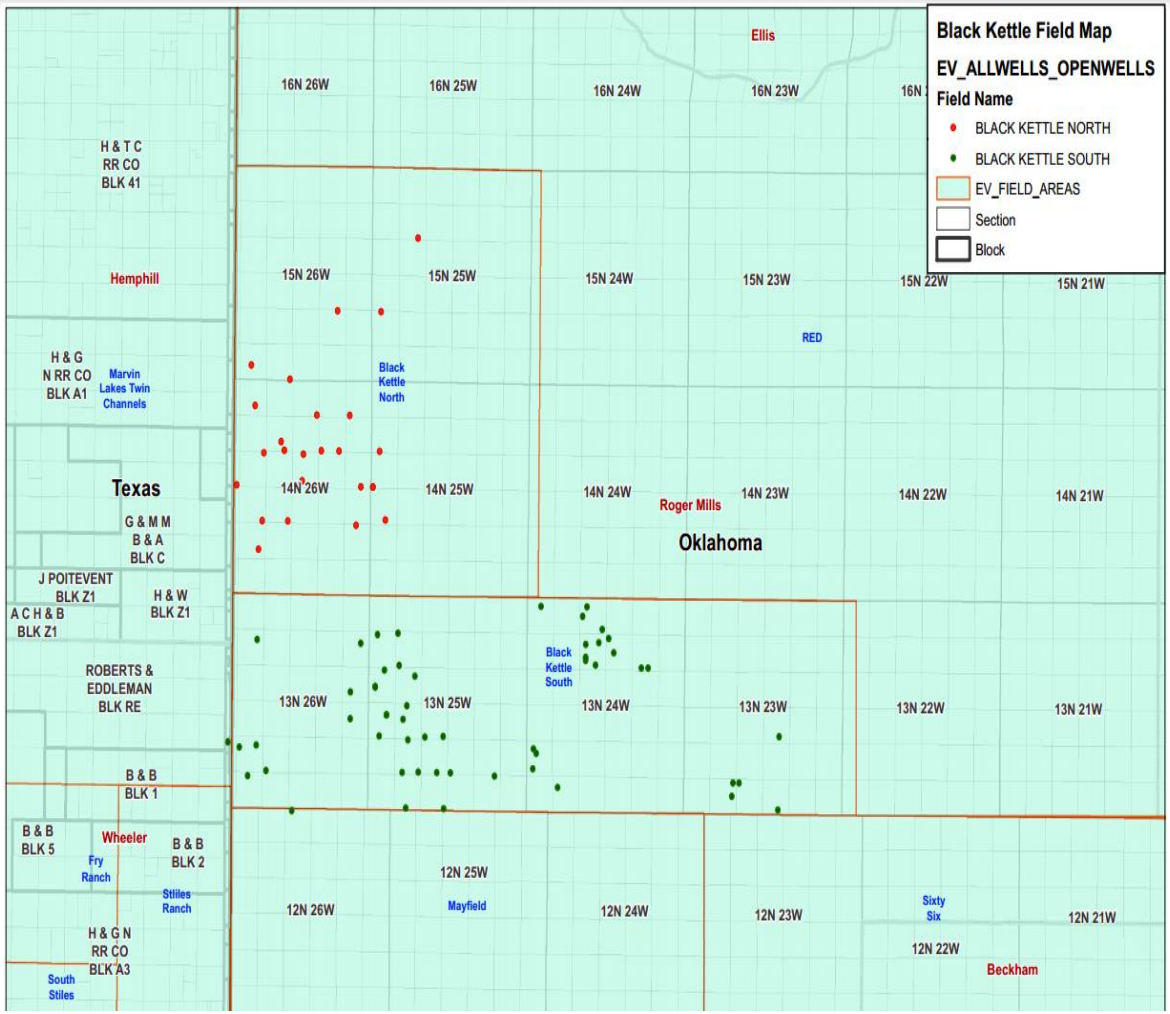
ARNIE BARTELS – DRILLING SUPERINTENDENT

Greater Mid Continent Asset



- Position Assembled via Multiple Acquisitions starting from 2013 - 2015
  - Laredo Petroleum
  - SM Energy
  - QEP
  - Linn Energy
- EnerVest & Four Point Energy JV Formed in 2014
- Peak of 11 Rigs in January 2015
- Limited Capital Budget for 2016

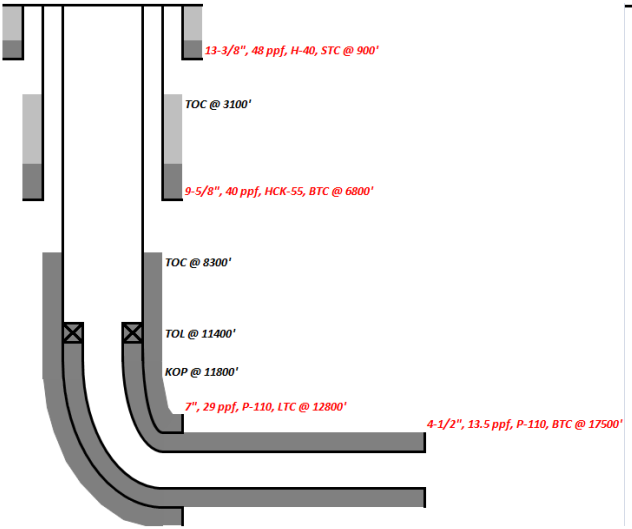
Black Kettle – Key Improvements



- Casing Design Evolution
- Drilling Fluid Approach
- Managed Pressure Drilling Operations
- Curve Drilling Practices
- Results

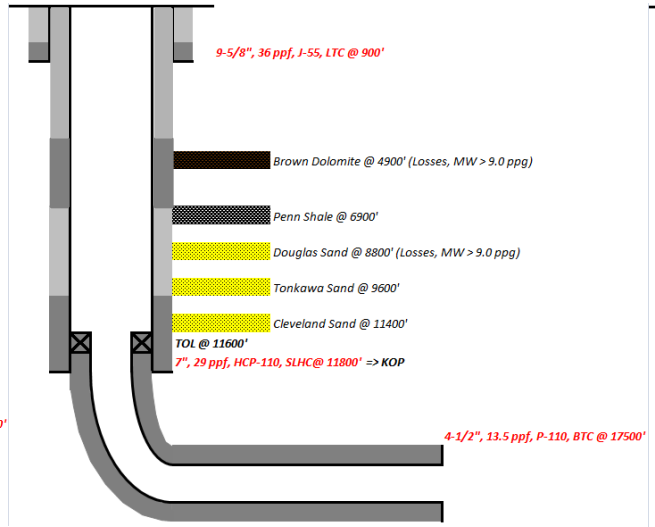
Casing Design Evolution

Generation 1



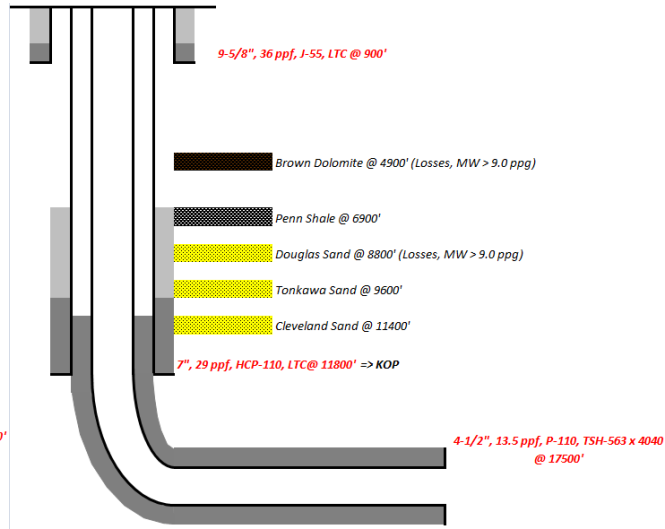
- Upper Intermediate
  - Brown Dolomite Concerns
- 7” Landed in Target
- All API Connections

Generation 2



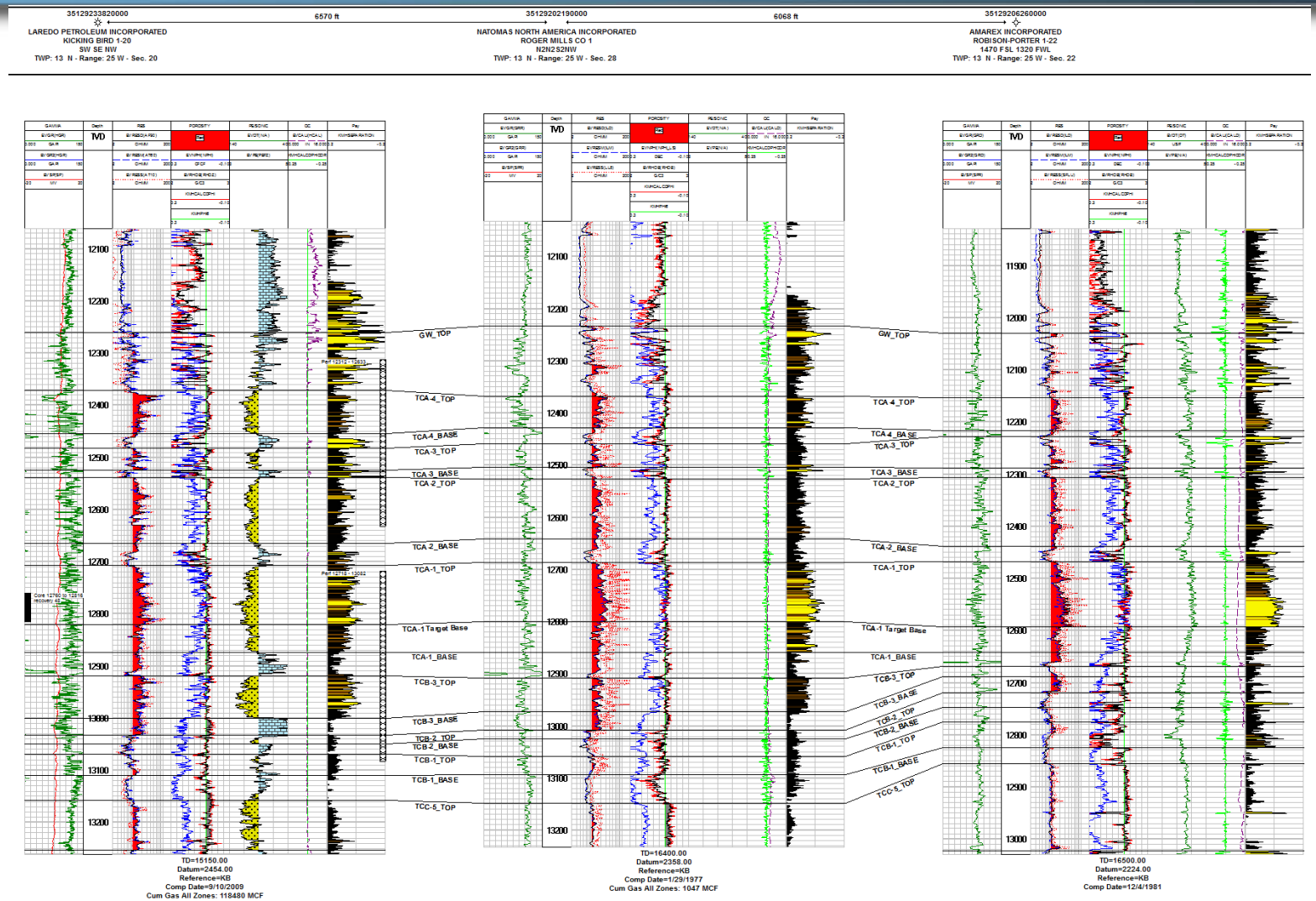
- Eliminated 1st Intermediate
  - Downsize Surface Casing
  - Top Set Target
- 7” Casing Failures
  - Semi Premium Connections
  - 7” DV Tool

Generation 3



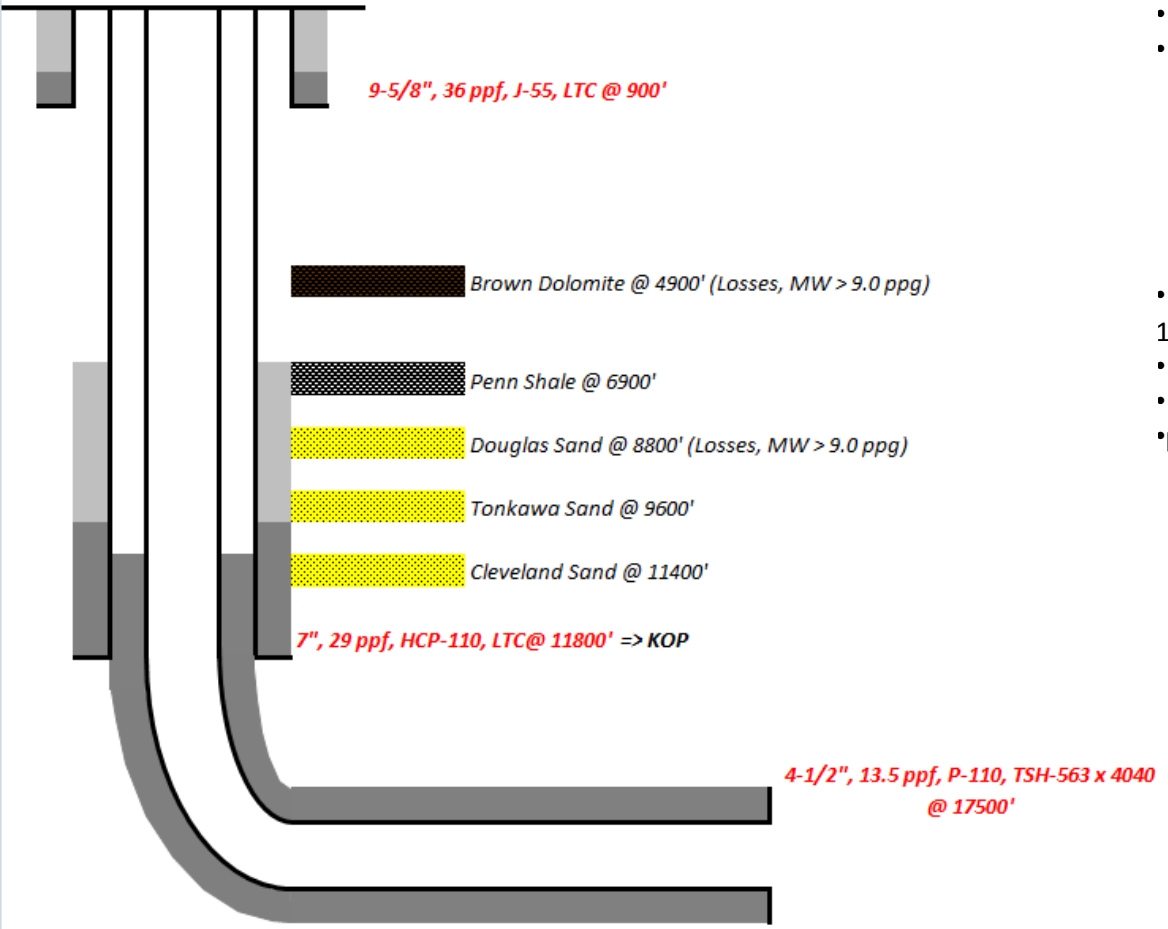
- 7” Casing Failure
  - 4-1/2” Longstring with Premium Connection in Vertical
  - Eliminate DV Tool on 7”
- Deeper Set 7”
  - Enhance MPD Operations

Intermediate Casing Point



Mud Program

Generation 3



- LSND, 9.0 ppg, 40 sec/qt VIS
- Utilize pre-hydrated gel hi-vis sweeps

- LSND to 4500’ and displace to DISPERSED w/ 10 ppb CS Hulls
- API FL < 20
- 9.0 ppg, 40-45 sec/qt VIS
- pH 11-12, Excess Lime 0.5 ppb minimum

- OBM, 10.7-11.5 ppg, 40 sec/qt VIS
- 80/20 OWR
- HTHP @ 250°F: 8-10
- 6/3 Rheologies: 7-10

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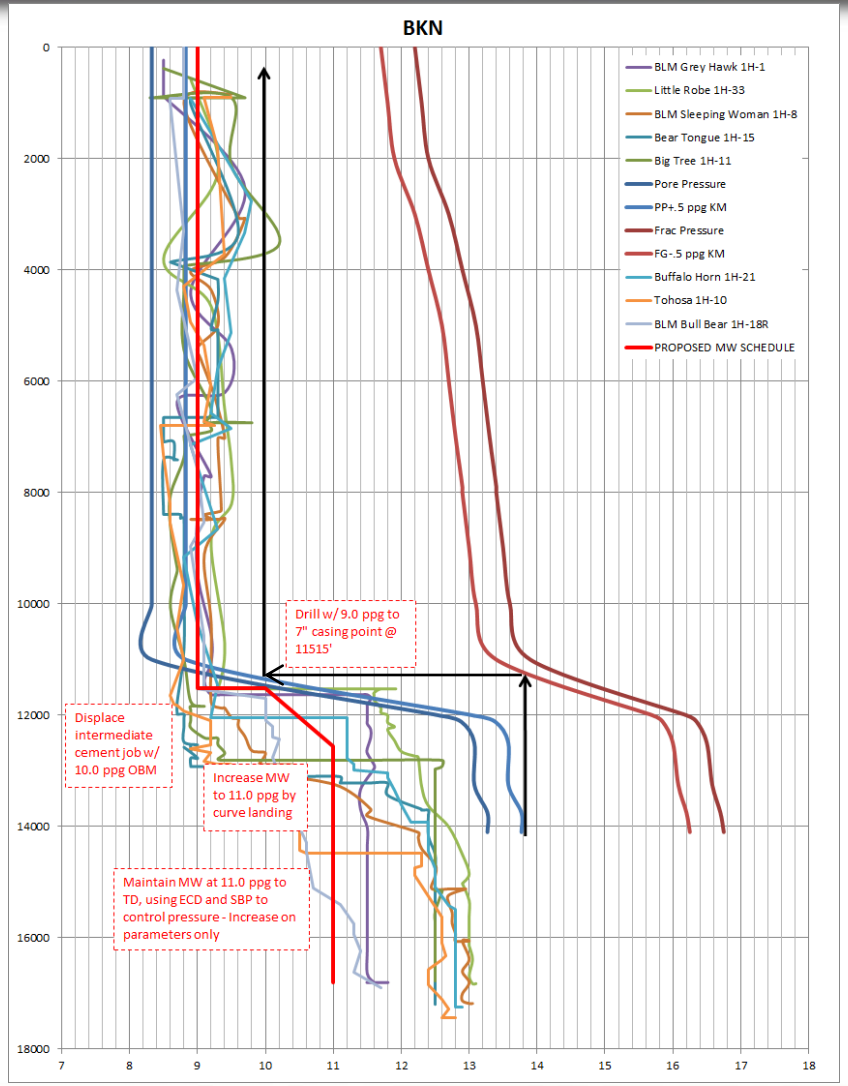
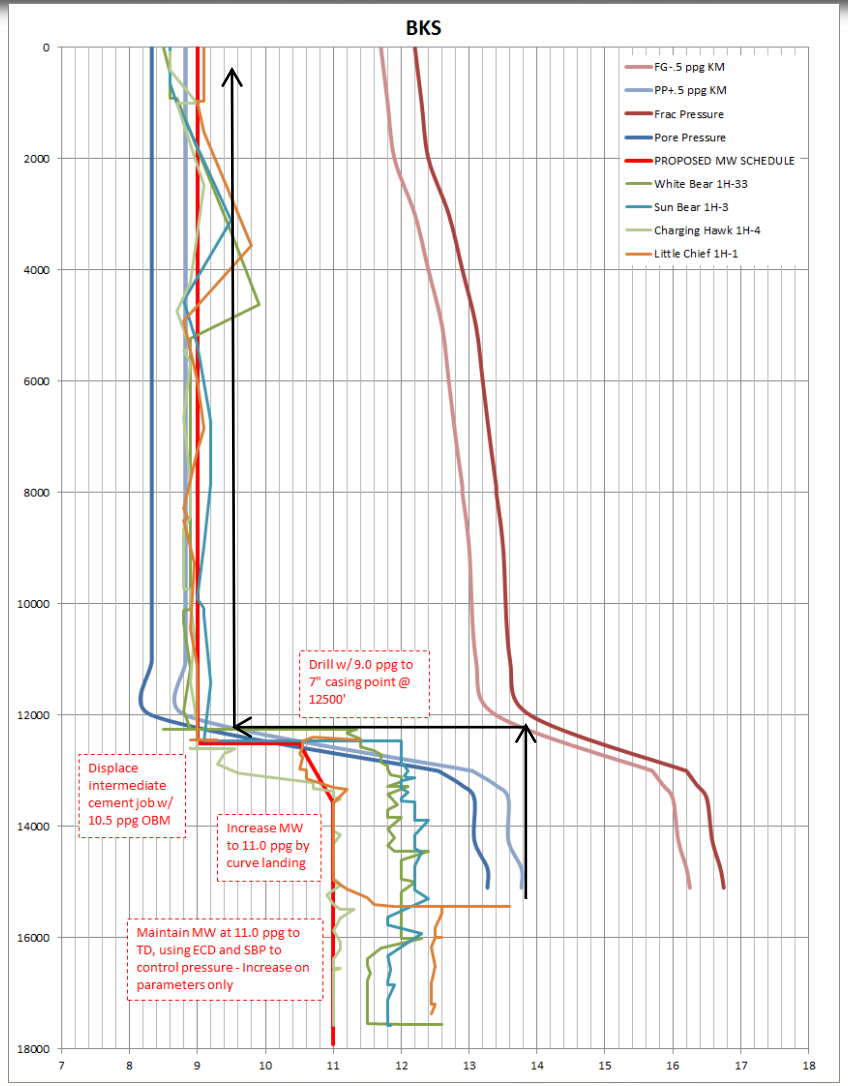
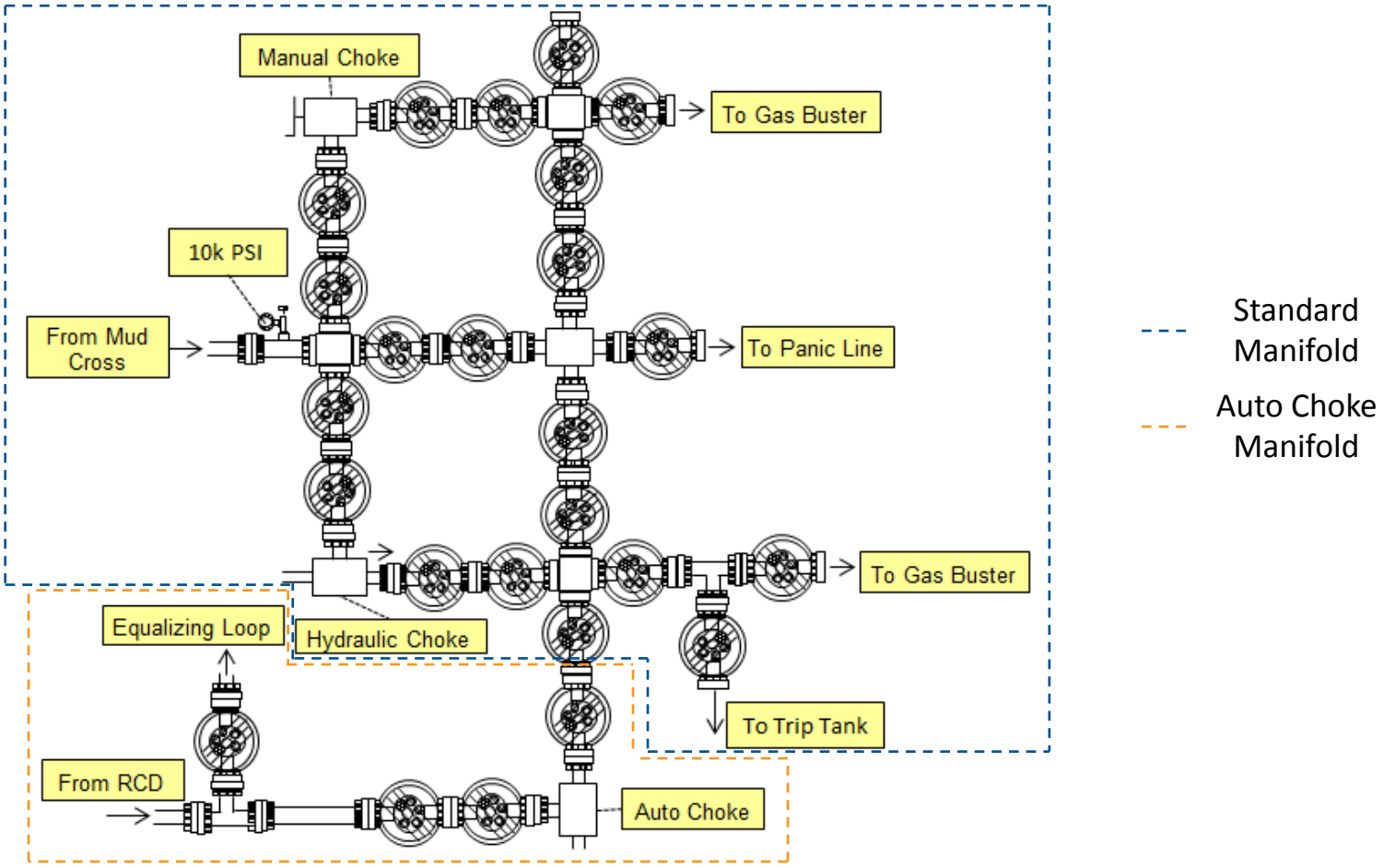
- 6/3 Rheologies: 7-10

MPD – MW Window

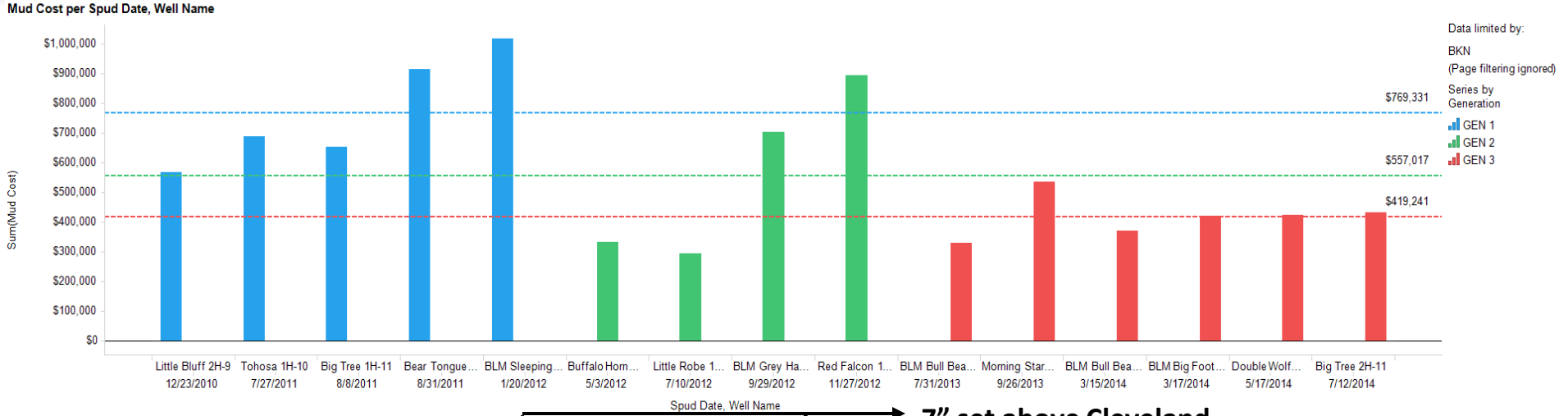


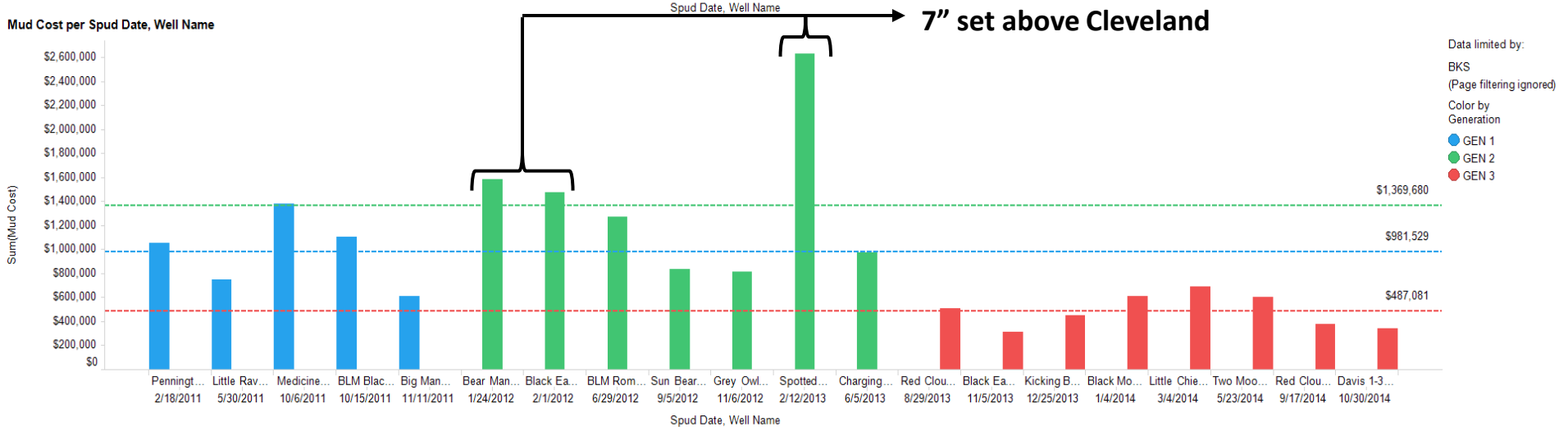


MPD Choke Manifold



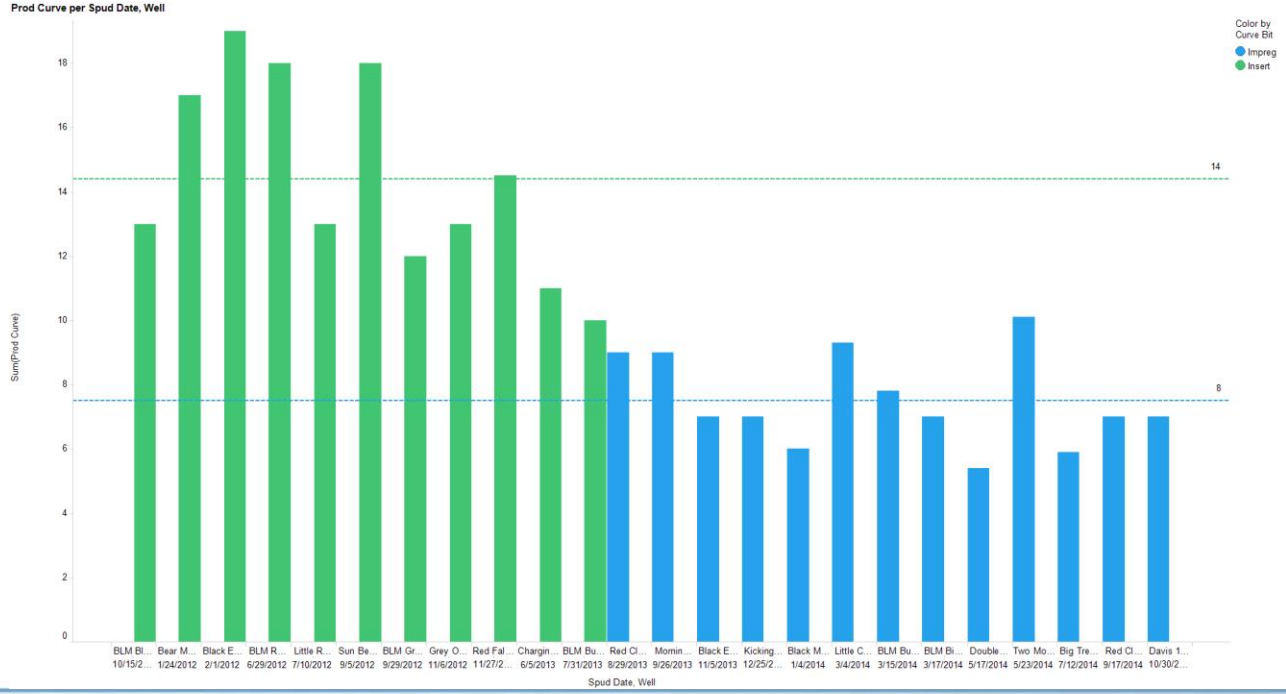
Mud Costs


Mud Cost per Spud Date, Well Name
Sum(Mud Cost)
$1,000,000
$900,000
$800,000
$700,000
$600,000
$500,000
$400,000
$300,000
$200,000
$100,000
$0
$769,331
$557,017
$419,241
Little Bluff 2H-9 12/23/2010
Tohosa 1H-10 7/27/2011
Big Tree 1H-11 8/8/2011
Bear Tongue... 8/31/2011
BLM Sleeping... 1/20/2012
Buffalo Horn... 5/3/2012
Little Robe 1... 7/10/2012
BLM Grey Ha... 9/29/2012
Red Falcon 1... 11/27/2012
BLM Bull Bea... 7/31/2013
Morning Star... 9/26/2013
BLM Bull Bea... 3/15/2014
BLM Big Foot... 3/17/2014
Double Wolf... 5/17/2014
Big Tree 2H-11 7/12/2014
Spud Date, Well Name
Data limited by:
BKN
(Page filtering ignored)
Series by Generation
GEN 1
GEN 2
GEN 3

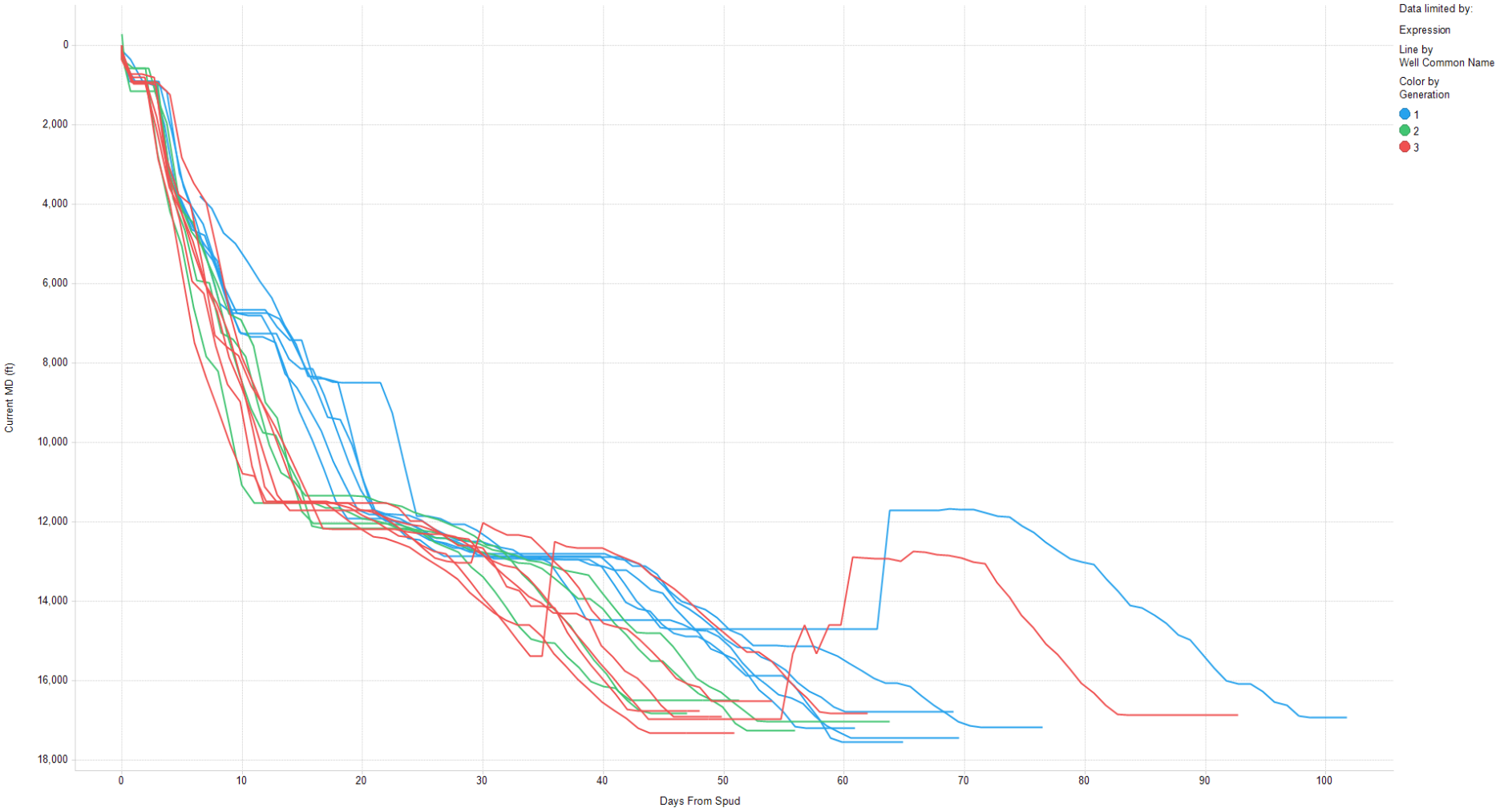

Mud Cost per Spud Date, Well Name
7" set above Cleveland
Sum(Mud Cost)
$2,600,000
$2,400,000
$2,200,000
$2,000,000
$1,800,000
$1,600,000
$1,400,000
$1,200,000
$1,000,000
$800,000
$600,000
$400,000
$200,000
$0
$1,369,680
$981,529
$487,081
Penningt... 2/18/2011
Little Rav... 5/30/2011
Medicine... 10/6/2011
BLM Blac... 10/15/2011
Big Man... 11/11/2011
Bear Man... 1/24/2012
Black Ea... 2/1/2012
BLM Rom... 6/29/2012
Sun Bear... 9/5/2012
Grey Owl... 11/6/2012
Spotted... 2/12/2013
Charging... 6/5/2013
Red Clou... 8/29/2013
Black Ea... 11/5/2013
Kicking B... 12/25/2013
Black Mo... 1/4/2014
Little Chie... 3/4/2014
Two Moo... 5/23/2014
Red Clou... 9/17/2014
Davis 1-3... 10/30/2014
Spud Date, Well Name
Data limited by:
BKS
(Page filtering ignored)
Color by Generation
GEN 1
GEN 2
GEN 3

Curve Drilling Improvements

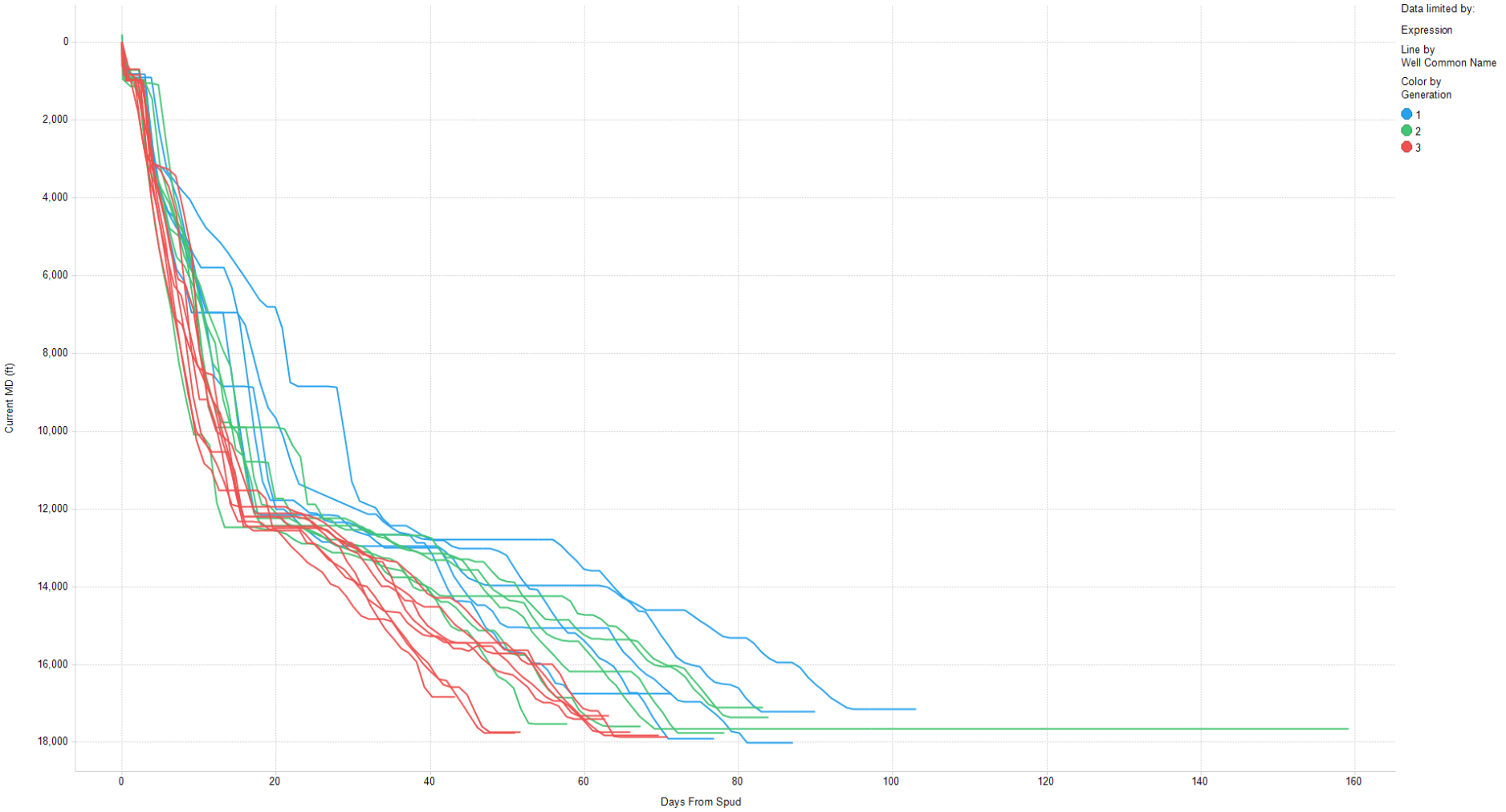
- Initially drilled with Insert bits
  - 4-5 bit runs per curve
  - Trip time
- Implemented Turbine and Impreg curve drilling
  - Single run
  - LCM sensitive



Depth vs Days – BK North



Depth vs Days – BK South



Design Comparison, Days

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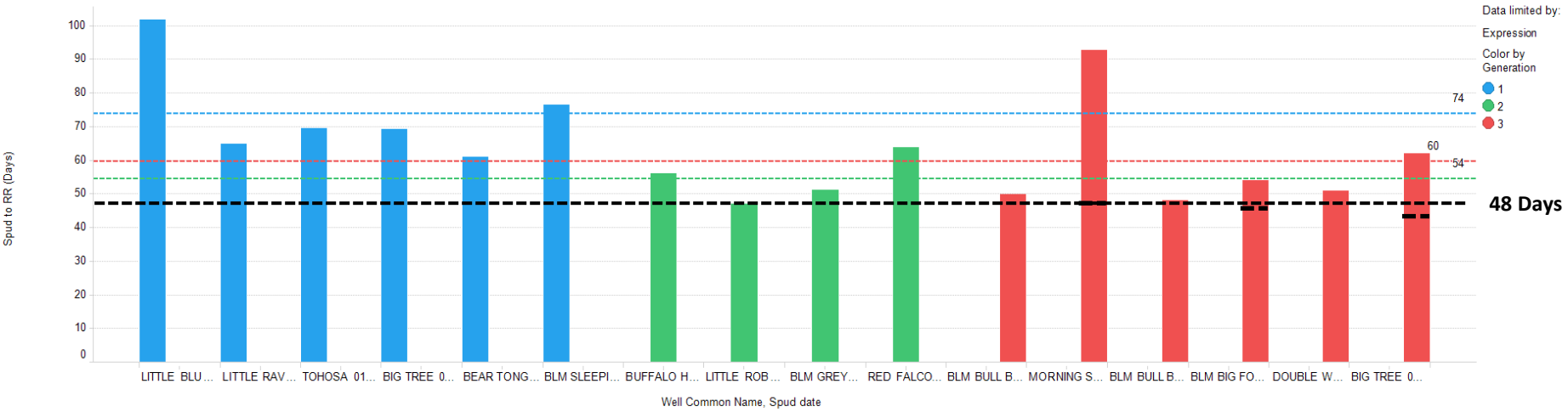
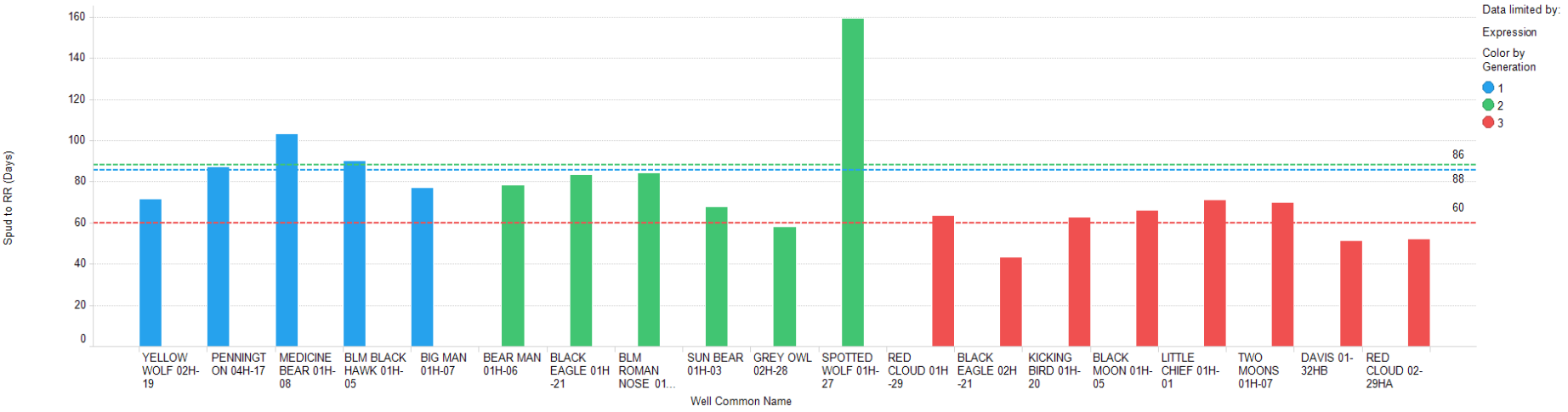
Black Kettle North



Black Kettle South



Design Comparison, Cost

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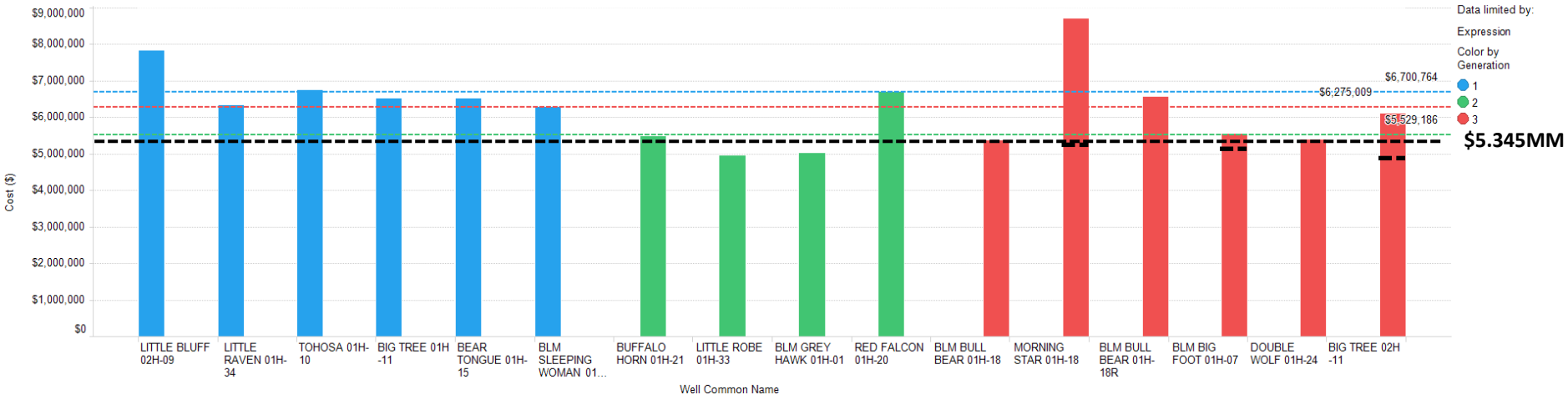
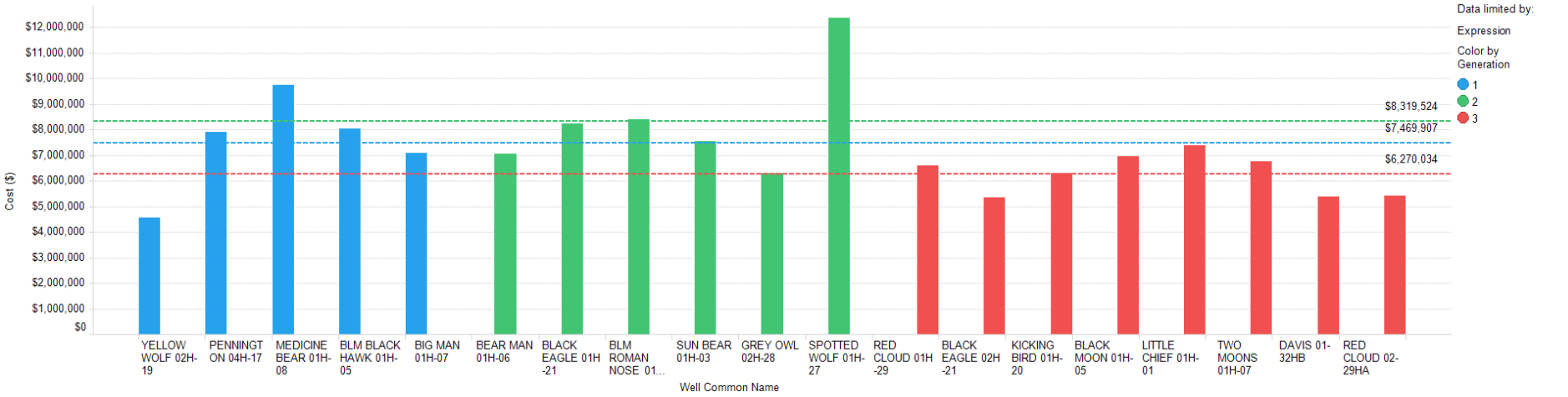
Black Kettle North



Black Kettle South



Conclusions

- Casing design, mud program, MPD operations, and curve drilling practices significantly reduced:
- Spud to RR Days
  - BKN: Decrease ~26 Days or 35% (Excluding Geo ST Time)
  - BKS: Decrease ~26 Days or 30%
- Mob through RR Costs
  - BKN: Decrease ~$1.355MM or 20% (Excluding Geo ST Cost)
  - BKS: Decrease ~$1.199MM or 16%

Questions?

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