

Shallow Gas Production along the Cedar Creek Anticline in Southeastern Montana*

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Abstract

Fidelity Exploration and Production Company is the largest gas producer in the State of Montana. Its gas production comes from three main areas:

- Bowdoin Dome in North Central Montana.
- Coalbed natural gas in the Powder River Basin.
- Cedar Creek Anticline in Southeastern Montana.

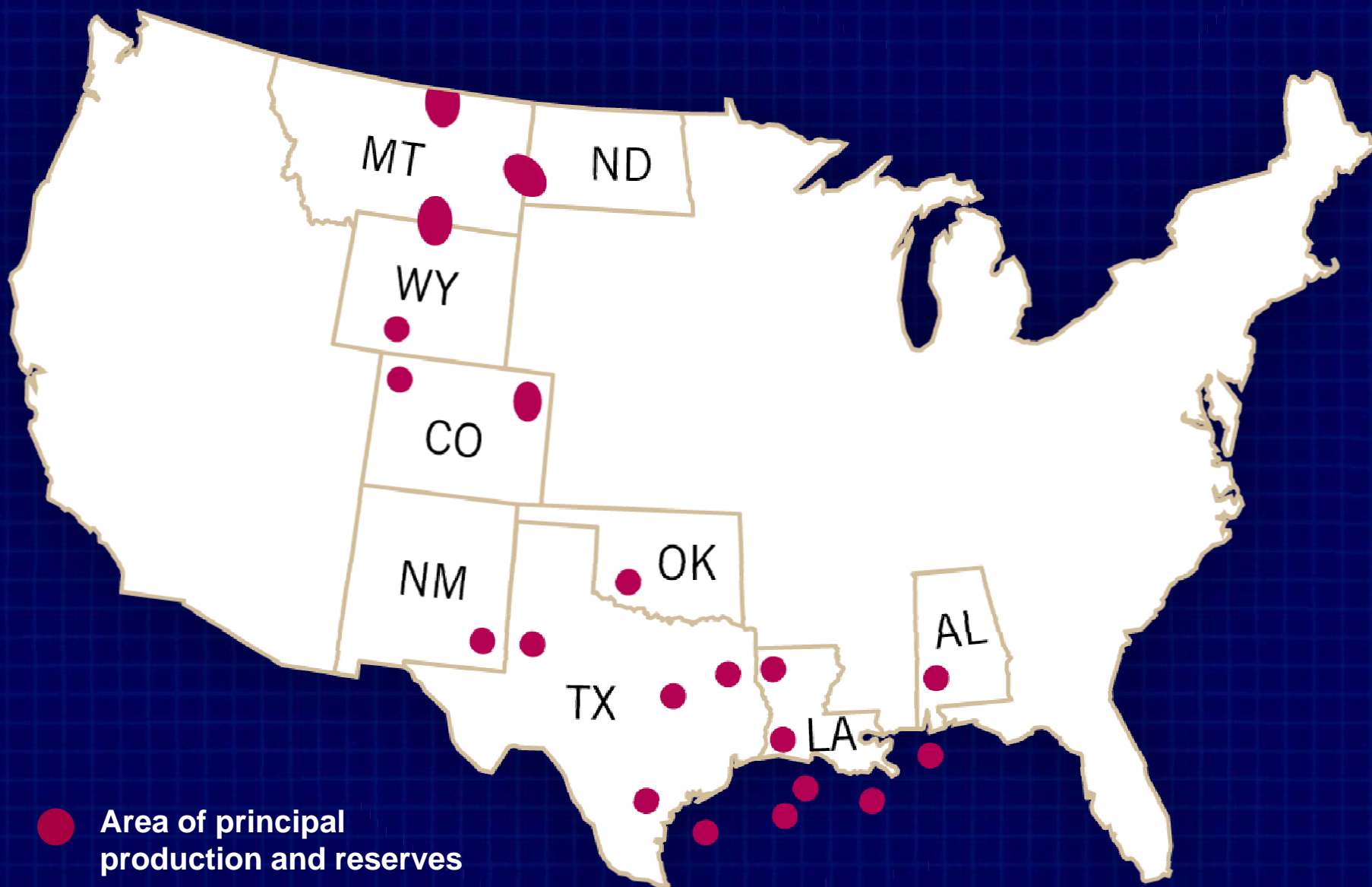
Fidelity has increased its production in the Cedar Creek Anticline from 5 mmcf/d to 68 mmcf/d in the last 10 years. Drilling, completion, and operation techniques have improved these shallow dry gas wells over the course of the past 10 years, and Dennis Zander; Area Operations Manager for the Northern Rockies Asset Team of Fidelity, touches on the success and failures of this production increase.

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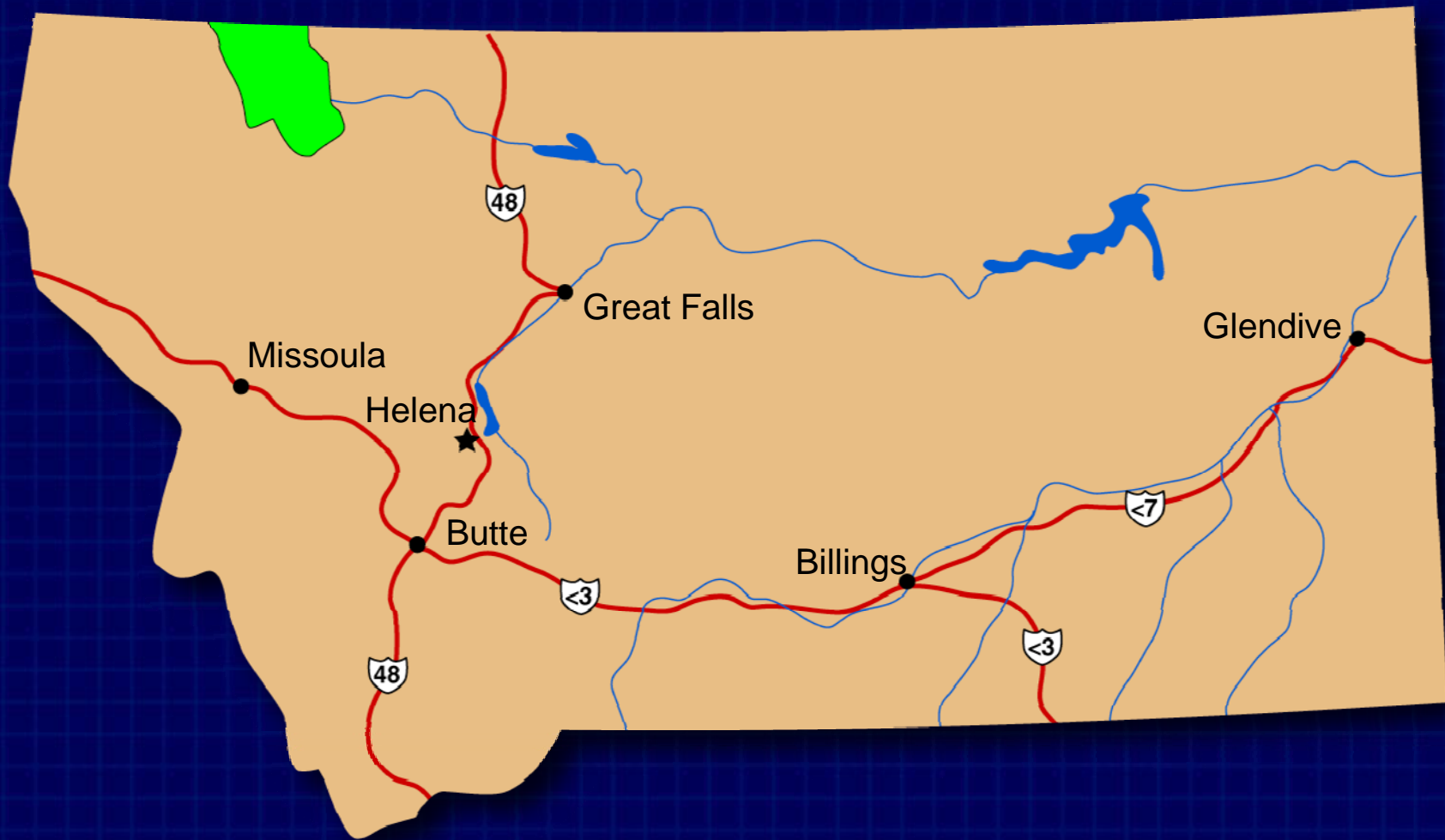
Dennis Zander
Area Operations Manager





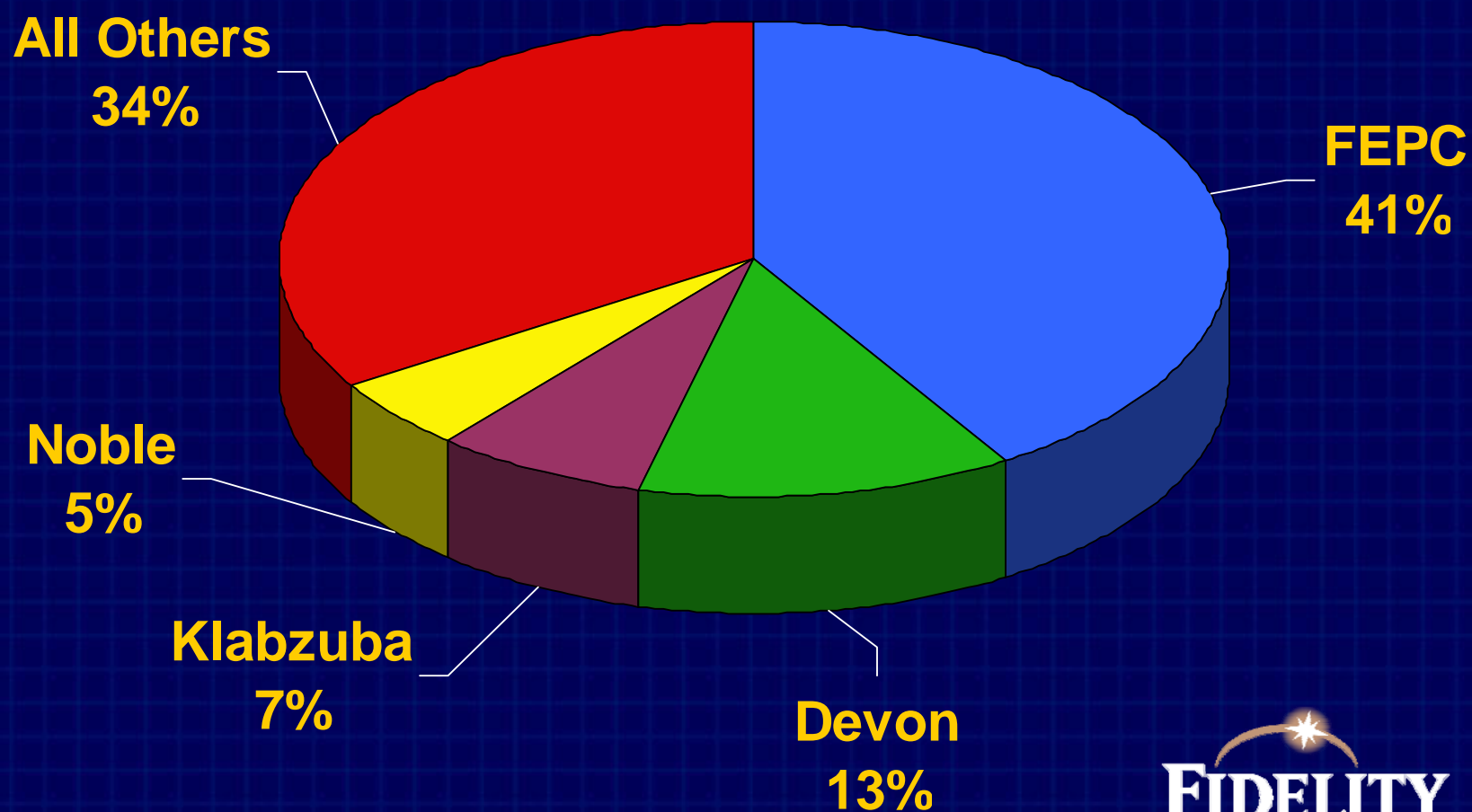


● Area of principal production and reserves

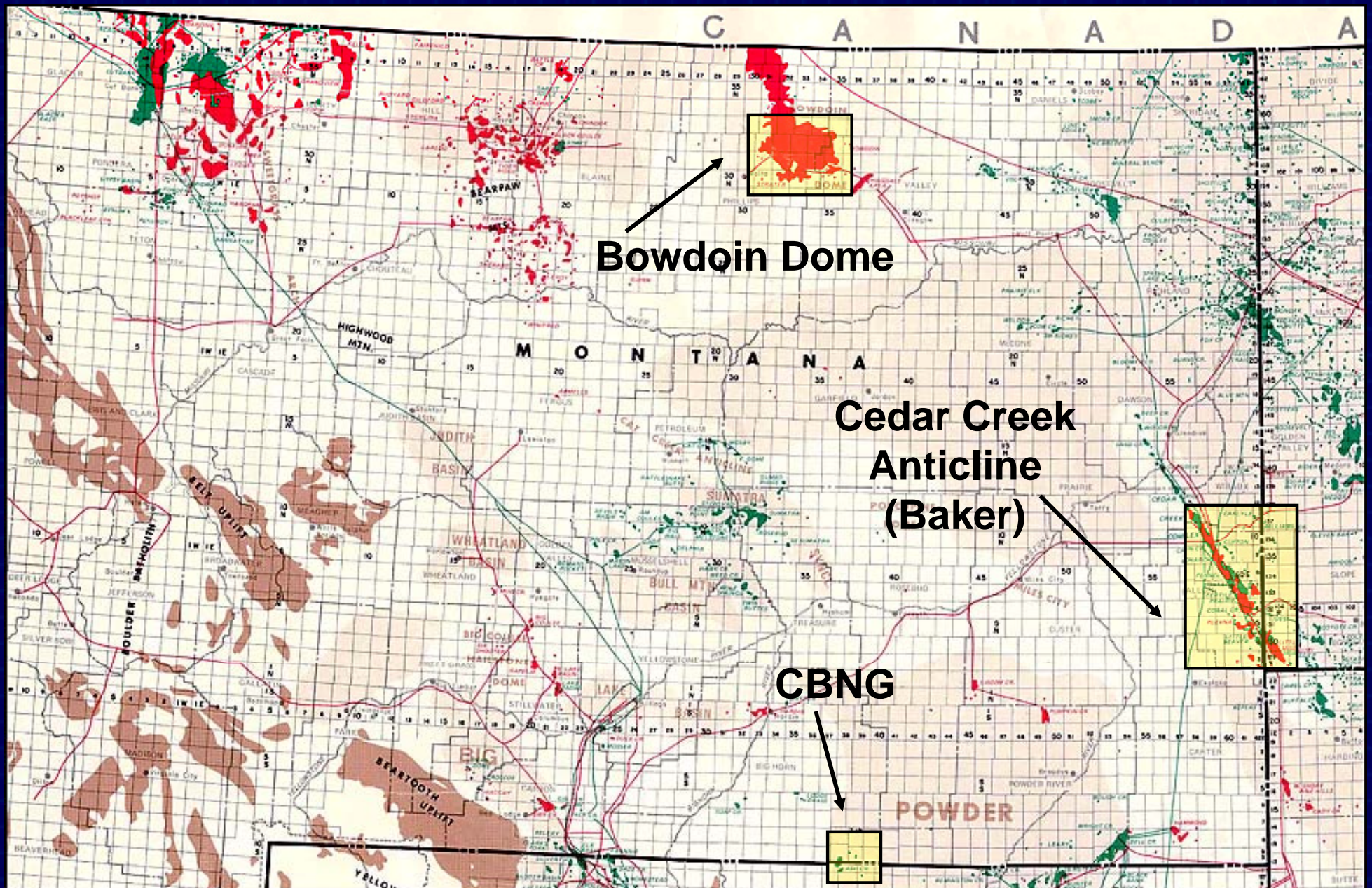


- Fidelity produced an average of **137.8 MMCFD** gross from Montana properties in 2007
- Production today has increased to a current level of **142.0 MMCFD**

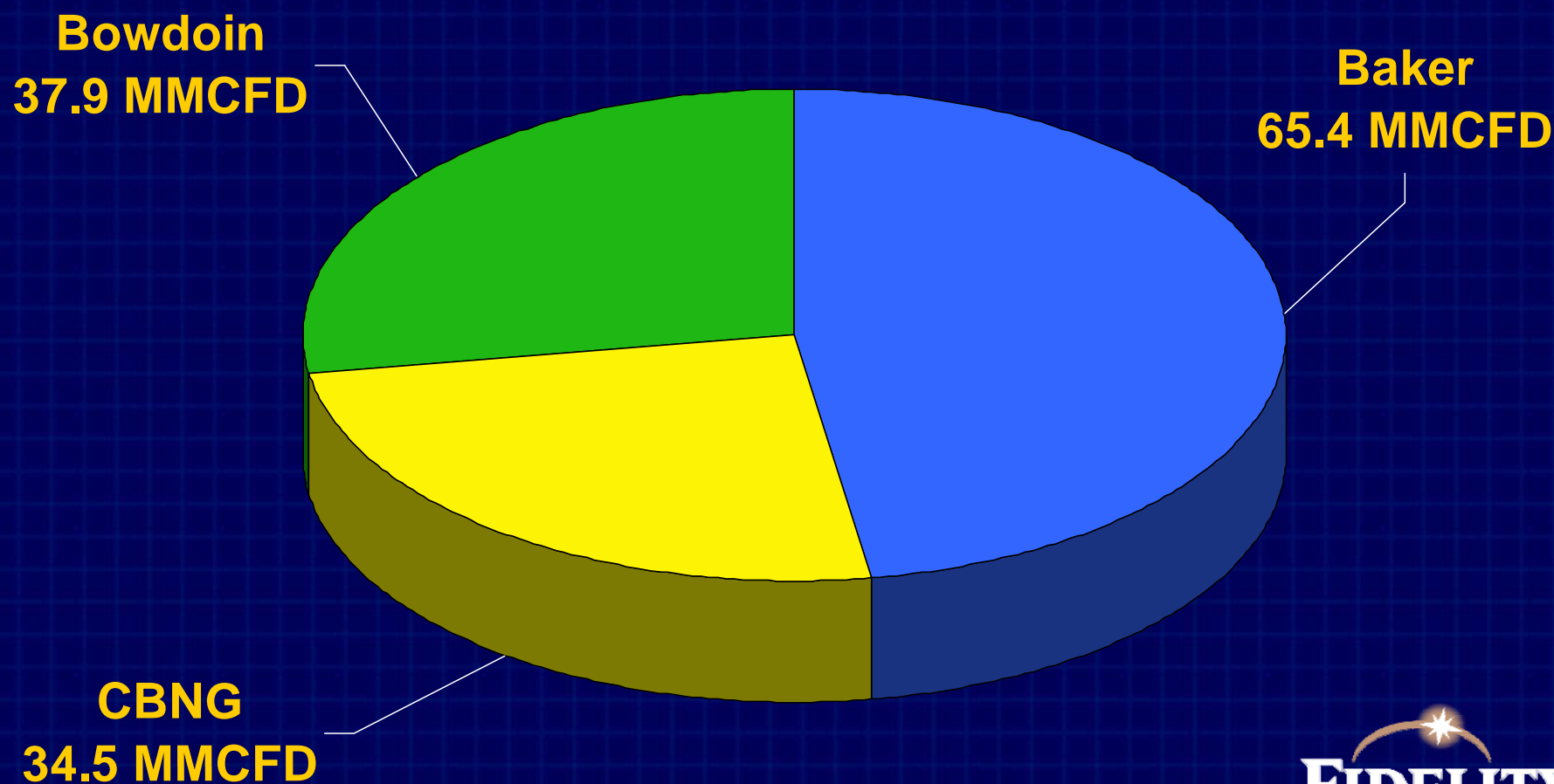
Top Montana Gas Producers 2006



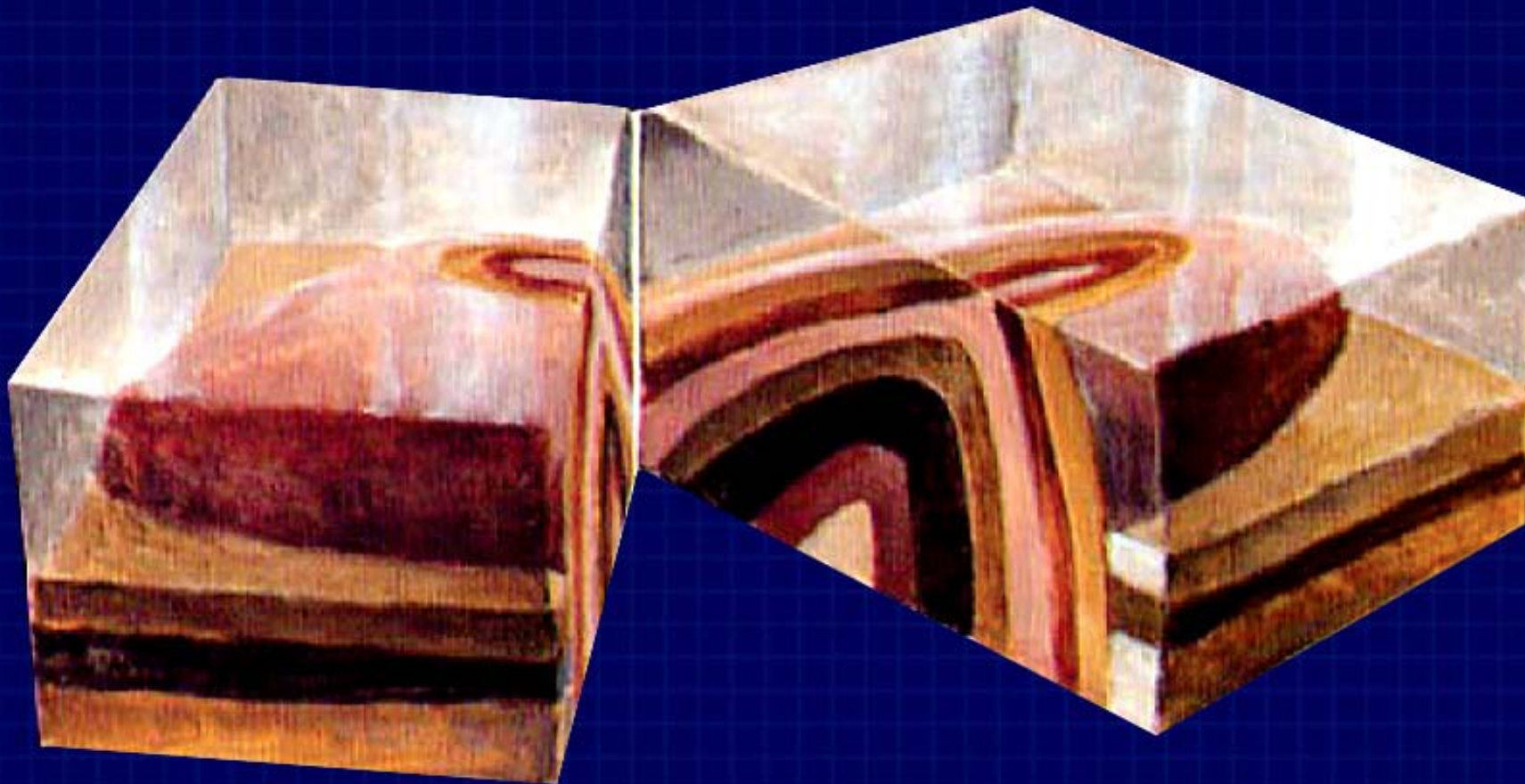
Oil & Gas Map of Montana



Fidelity-Operated Production in Montana for 2007



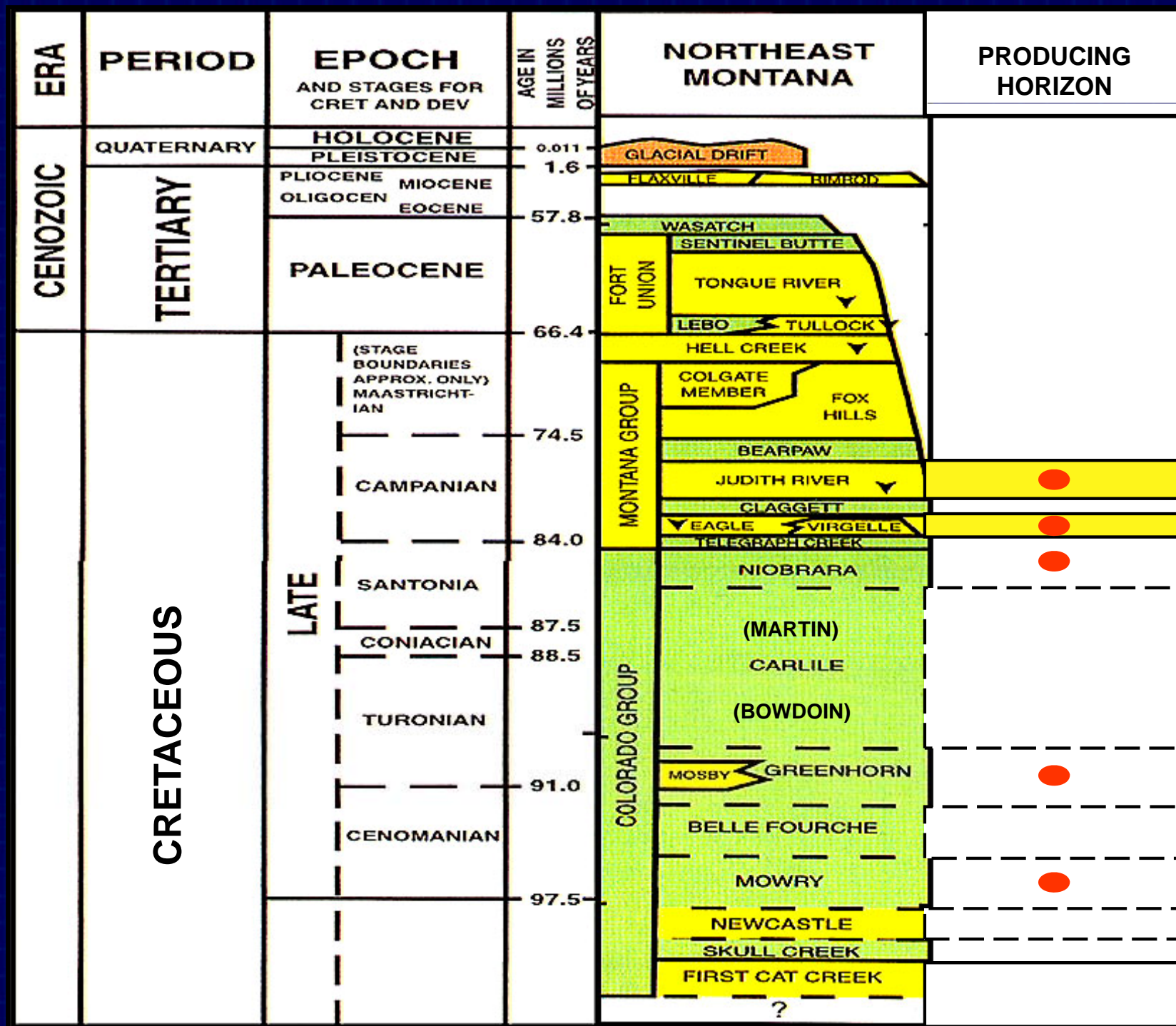
Cedar Creek Anticline



Geologic structure extending 120 miles in length along the southeastern edge of the Williston Basin

Gas Production

- **Biogenic Gas**
 - Produced from the shallower, Cretaceous- age formations
- **Judith River Formation**
 - Found at a depth of approximately **800** feet
 - Produced **105 BCF** of gas before conversion to a gas storage reservoir
- **Eagle Formation**
 - Found at a depths between **1,200 to 1,800** feet
 - Produced **197 BCF** to date and is the target of our current development program





A topographic map of the Baker Field area. The map features contour lines representing elevation, with labels such as 1200, 1300, 1400, 1500, 1600, 1700, 1800, 1900, 2000, and 2100. Several well locations are marked with purple circles, some of which are highlighted with yellow circles. A red dashed line runs diagonally across the map. A black outline highlights a specific area in the upper left, labeled 'Baker, North Eagle Unit'. Another black outline highlights a larger area in the lower right, labeled 'Cedar Creek Unit 8A'. A third black outline highlights a smaller area within the Cedar Creek Unit 8A, labeled 'Cedar Creek Unit 8B (Eagle & Judith River)'. The map also shows various geographical features like 'Twin River' and 'Little Beaver Cr. Fm.'.

Baker, North Eagle Unit

Baker Field Map

Cedar Creek Unit 8A

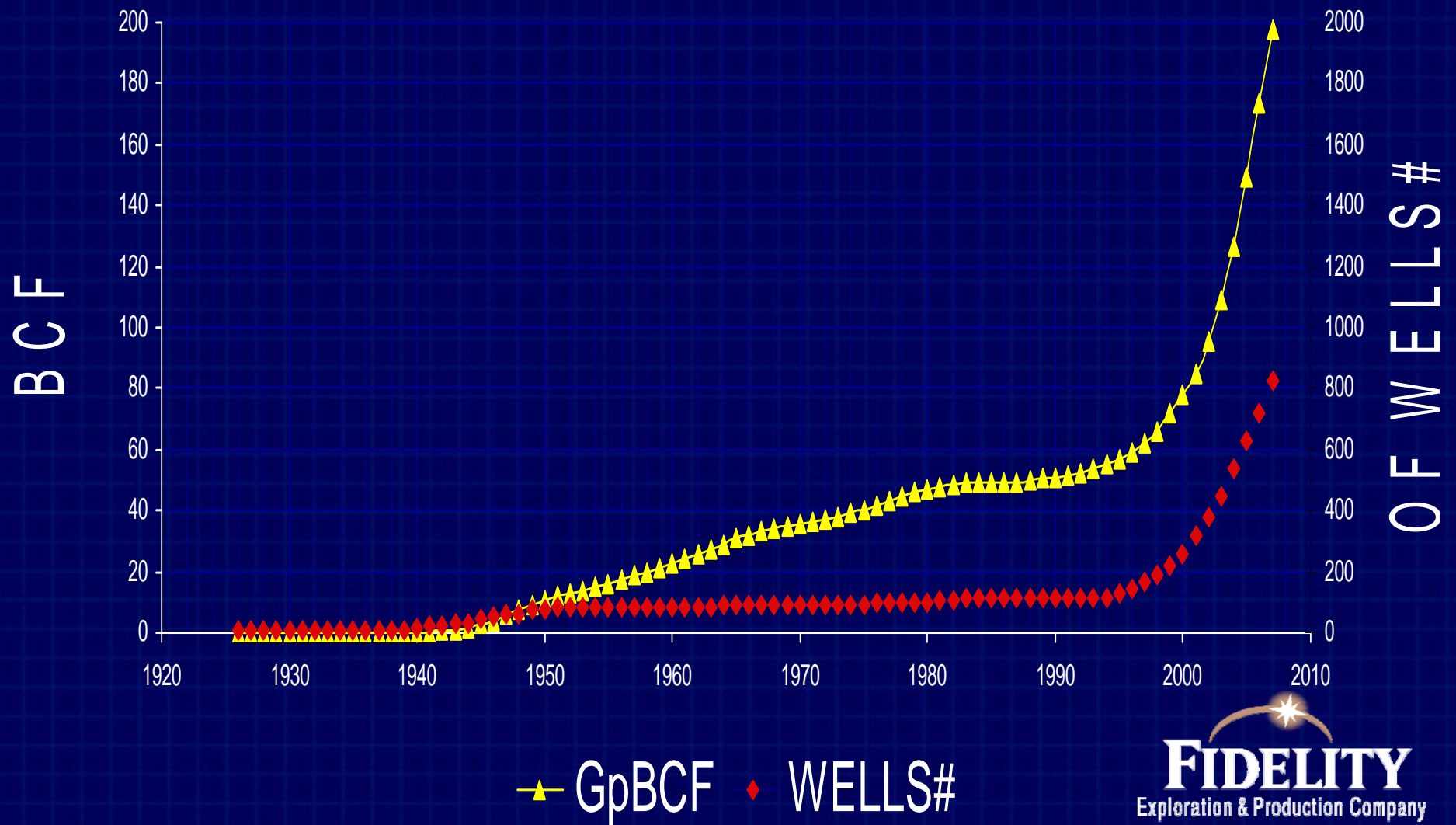
**Cedar Creek Unit 8B
(Eagle & Judith River)**








Baker Field

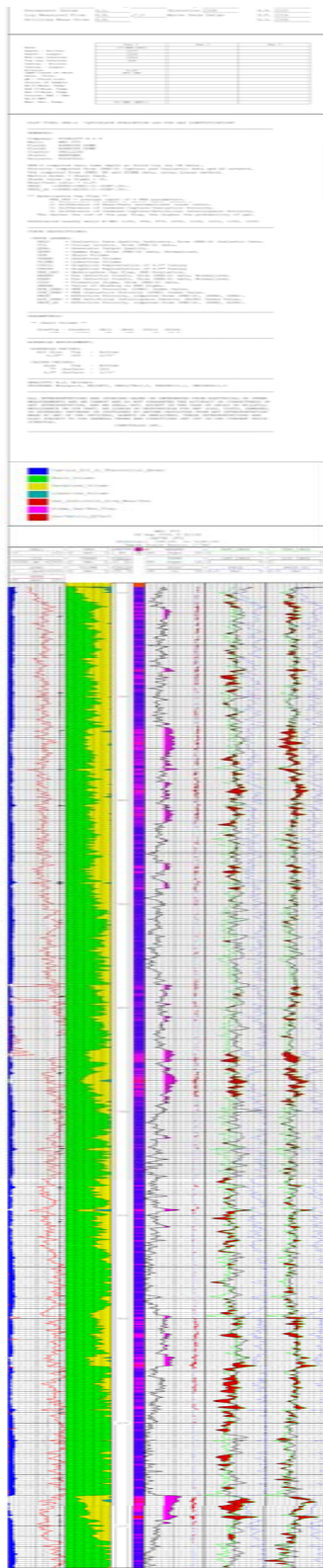
- Shallow gas on the Cedar Creek Anticline discovered in 1915
- 1st produced gas from Judith River Formation; now a gas storage reservoir owned & operated by Williston Basin
- Fidelity produces gas from 850 wells in the Eagle Formation
- Eagle Formation: shallow (~1,500'), thick (300' to 500') reservoir
- Very shaly sandstone reservoir; hence, very low permeability

BAKER FIELD EAGLE PRODUCTION

1926-2007

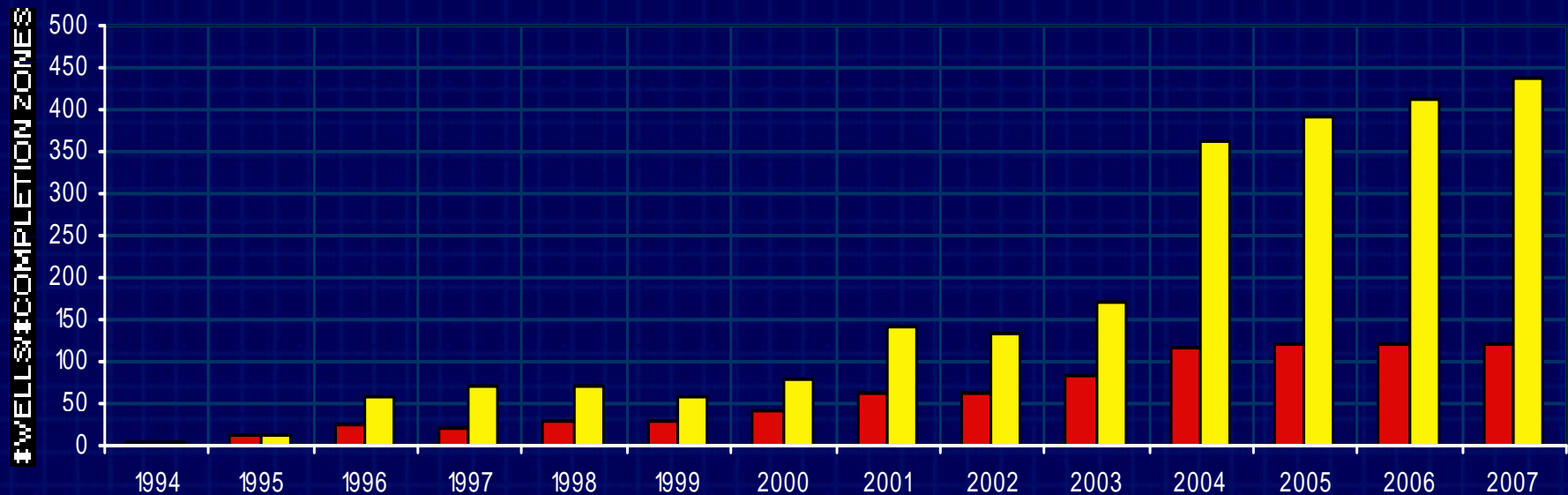


-  Capture Fit to Theoretical Model
-  Shale Volume
-  Sandstone Volume
-  Limestone Volume
-  Gas Indication from Near/Far
-  Sigma Gas/Res Flag
-  Gas/Matrix Effect



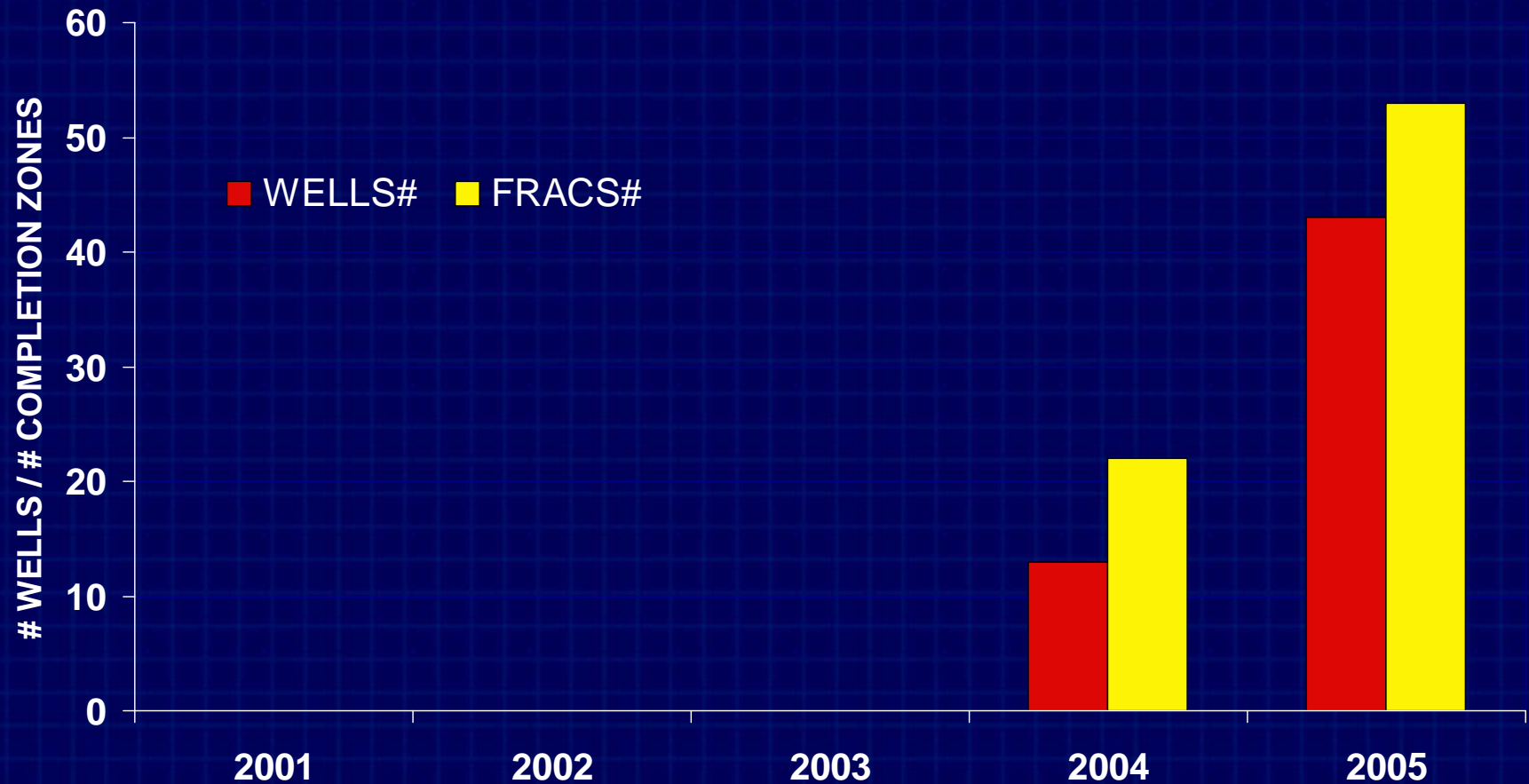
CASED HOLE POROSITY LOG

BAKER #WELLS vs #COMPLETION ZONES



■ WELLS# ■ FRACS#

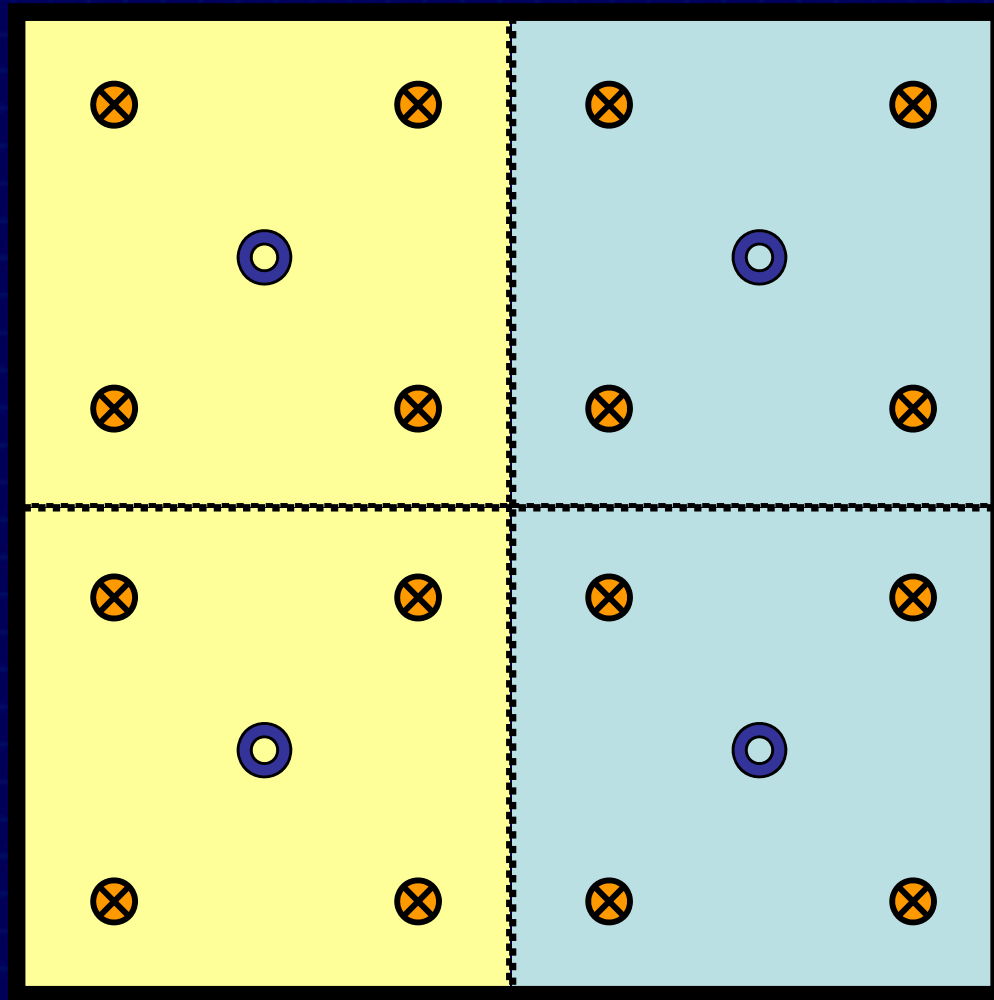
Baker # Wells vs. # Recompletion Zones





Baker Field

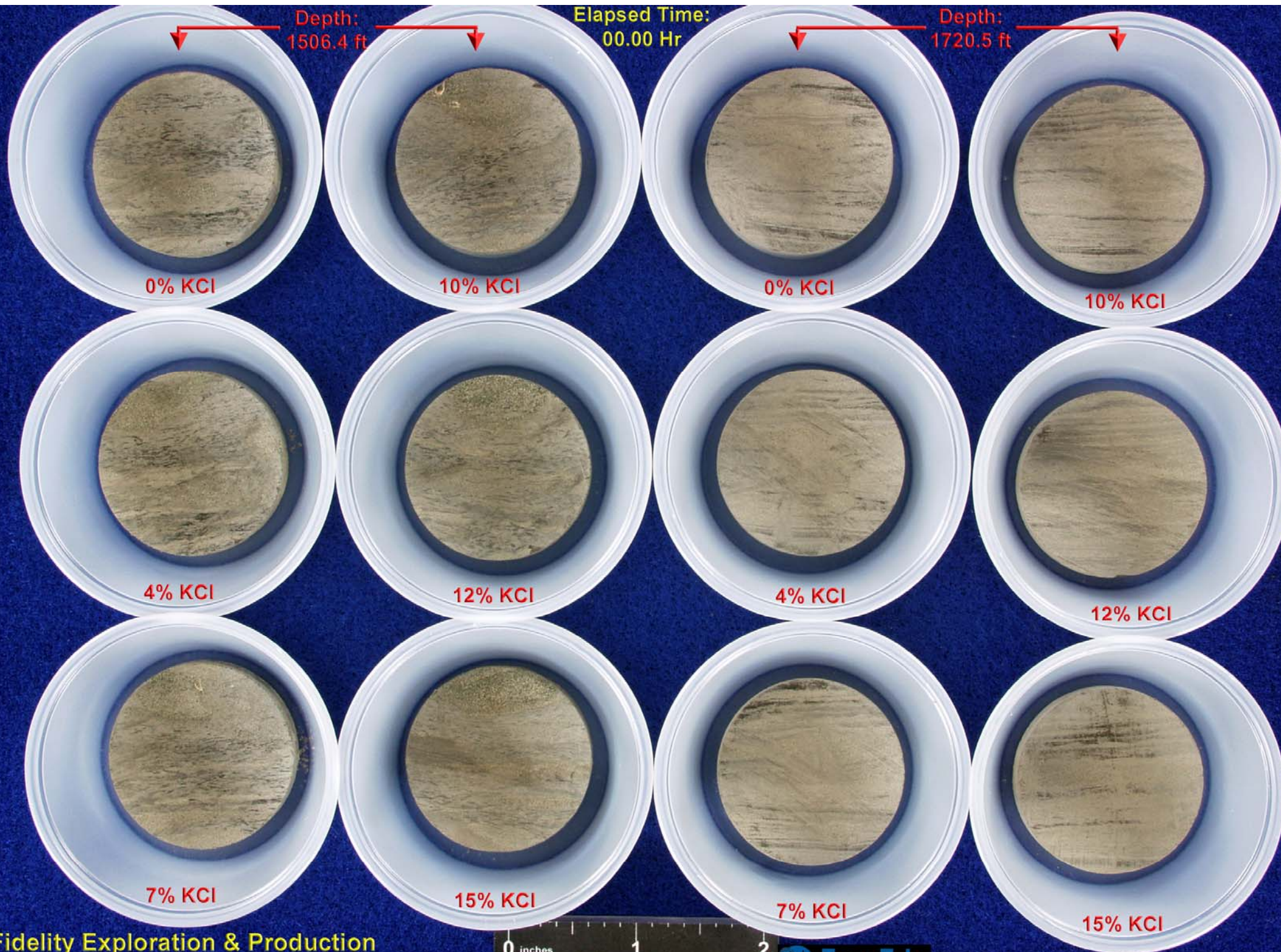
- Field developed on 320-acre spacing per 1961 Order
- 2nd well per 320 allowed per 1997 Order
- Spacing waived in Baker North Eagle Unit in 1994
- Spacing waived in Unit 8A & Unit 8B in 2001
- Order to allow up to 10 wells per 320 on non-Unit lands granted in 2003
- Spacing waived in Unit 8B in North Dakota in 2005

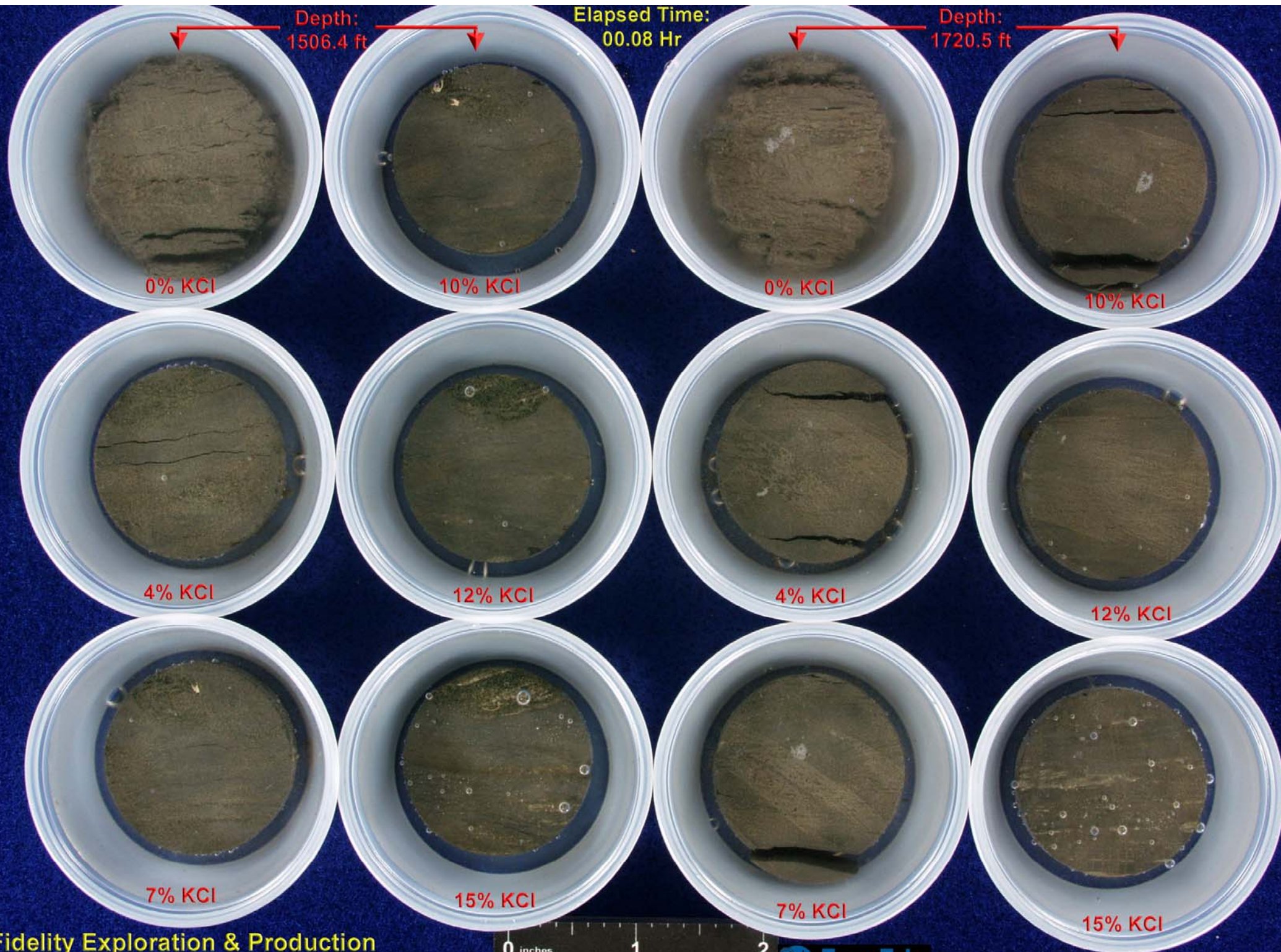
Increased Density Well Pattern

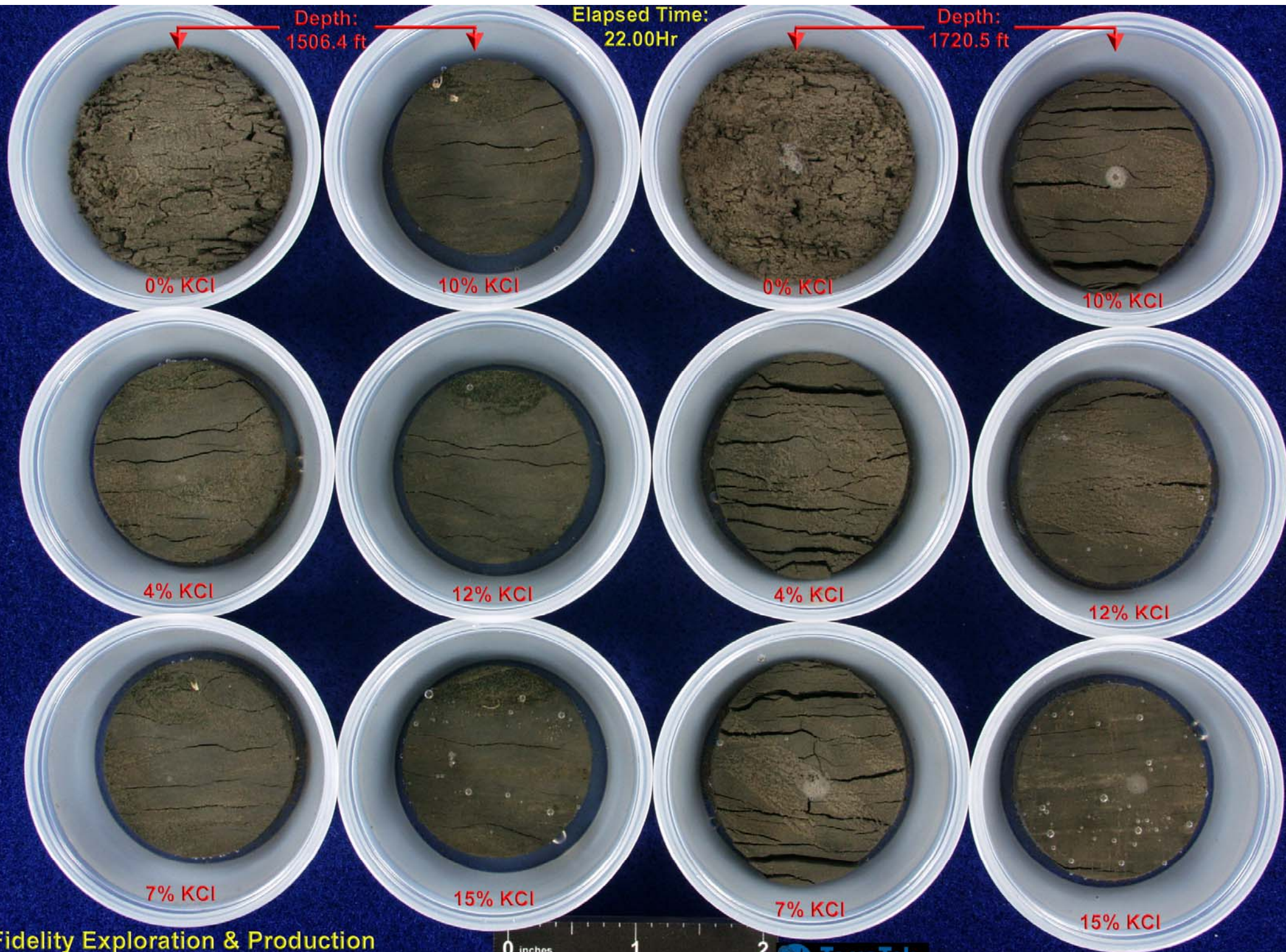


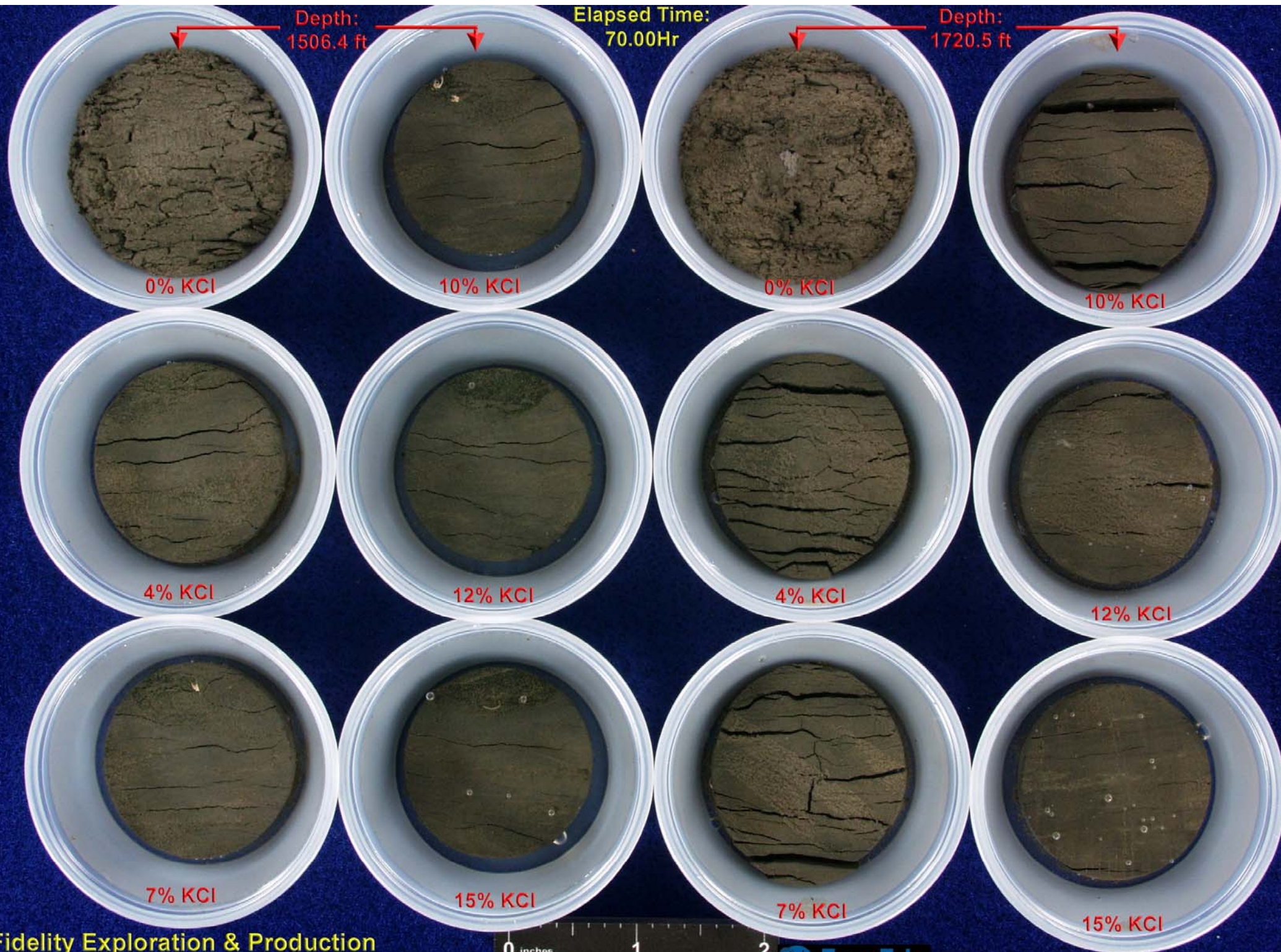
Governmental Section (640 AC) Non Unitized Lands	
	W/2 320 Acre Spacing Unit
	E/2 320 Acre Spacing Unit
	Existing 2 Wells/320 Acre Spacing Unit
	Increased Density Well Locations











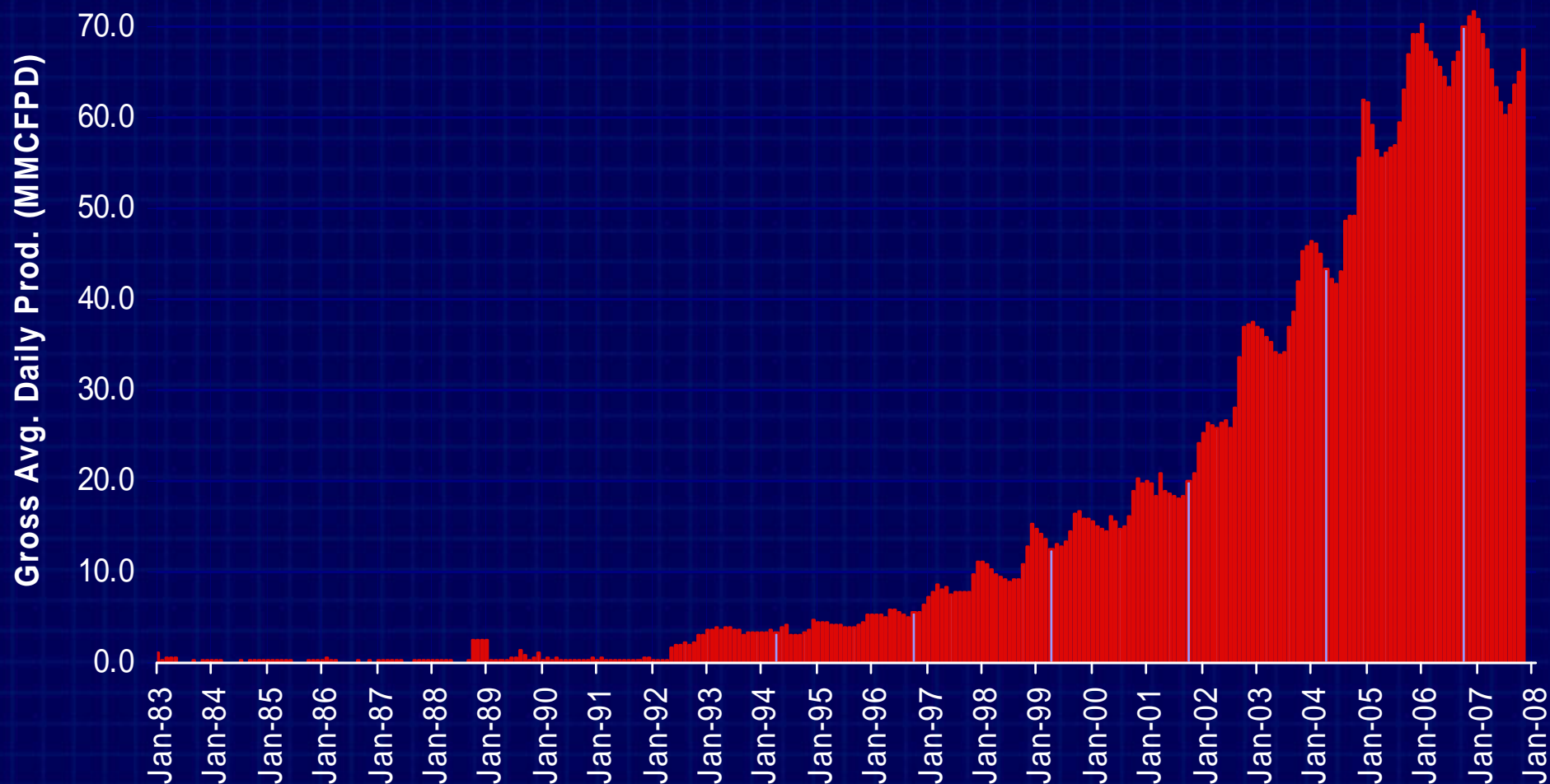
Fidelity Exploration & Production
Well: 2360 C



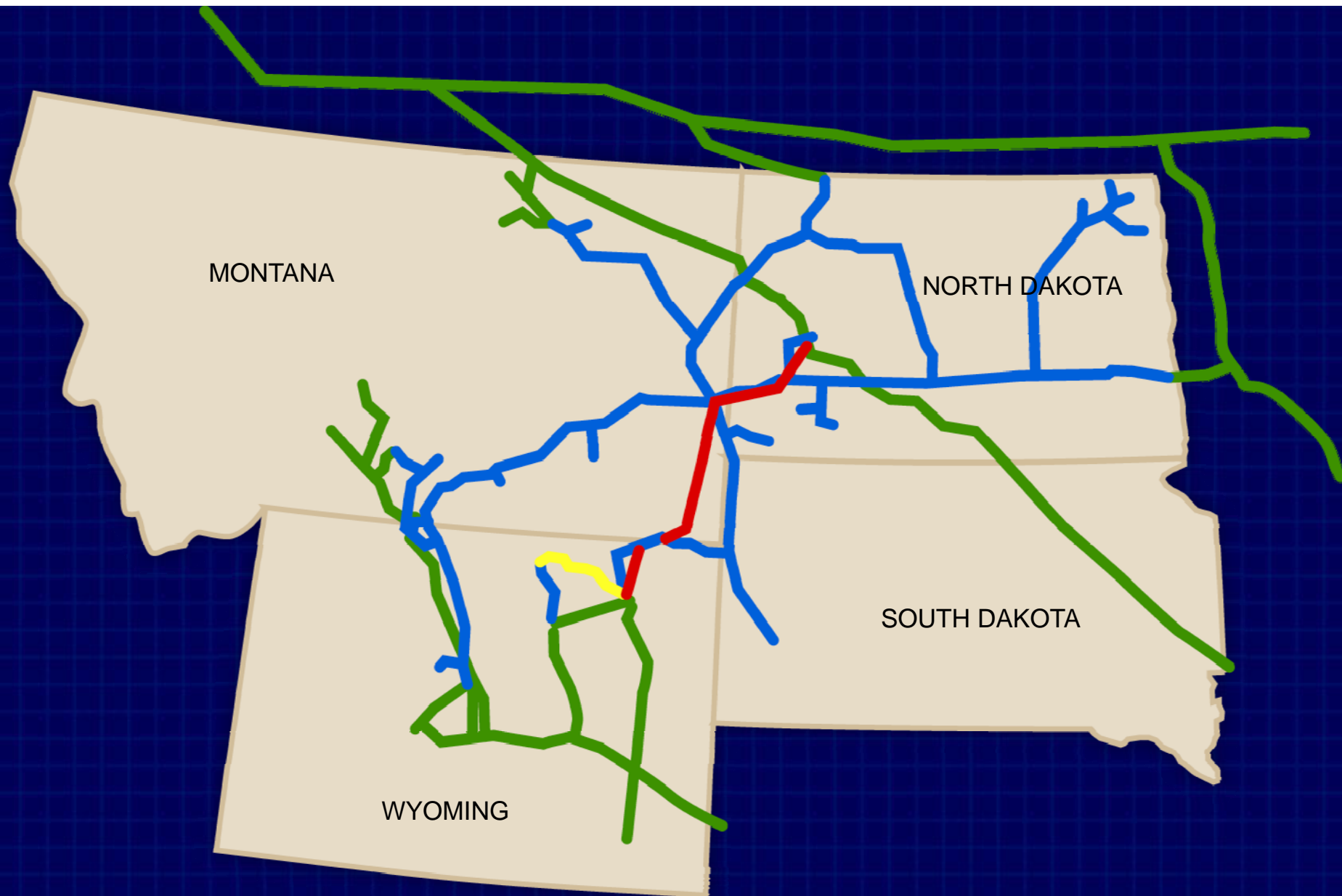
KCL PILOT TEST

- FRAC 5 WELLS KCL BASED N₂ FOAM
- FRAC OFFSETS FRESHWATER N₂ FOAM
- AVG. INCREASE 30 MCFPD/WELL
- AVG. RATE INCREASE 21 %
- AVG. EUR INCREASE 97 MMCF/WELL
- AVERAGE EUR INCREASE 34%

Baker Field Production







- Williston Basin Pipeline
- Grasslands Pipeline
- Interconnecting Pipeline
- Other WBI Holdings Pipeline



Northern
Rockies
Asset
Team



THANK YOU

