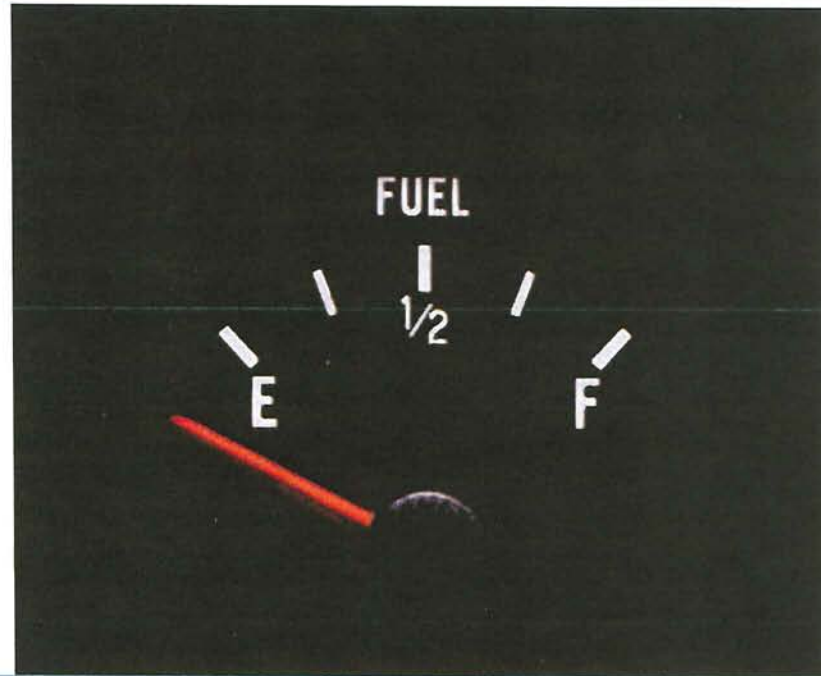




## Wyoming Oil and Gas Conservation Commission

Thomas E. Doll  
State Oil and Gas  
Supervisor



You may view the OGCC rules at <http://wogcc.state.wy.us> by clicking on "Rules and Regulations" in the right hand column of the home page. Click on the Bucking Horse Icon "Download Rules and Regulations". Click on "Agency", scroll down to "Oil and Gas Conservation Commission" then select "Current Rules" then click "Search" to view the rules. Chapter 3 Sections 8, 22 and 45 address the well integrity and hydraulic fracturing requirements.



**Oil and Gas  
Commission Rules:  
Chapter 3 Section 45  
Chemical Disclosure**

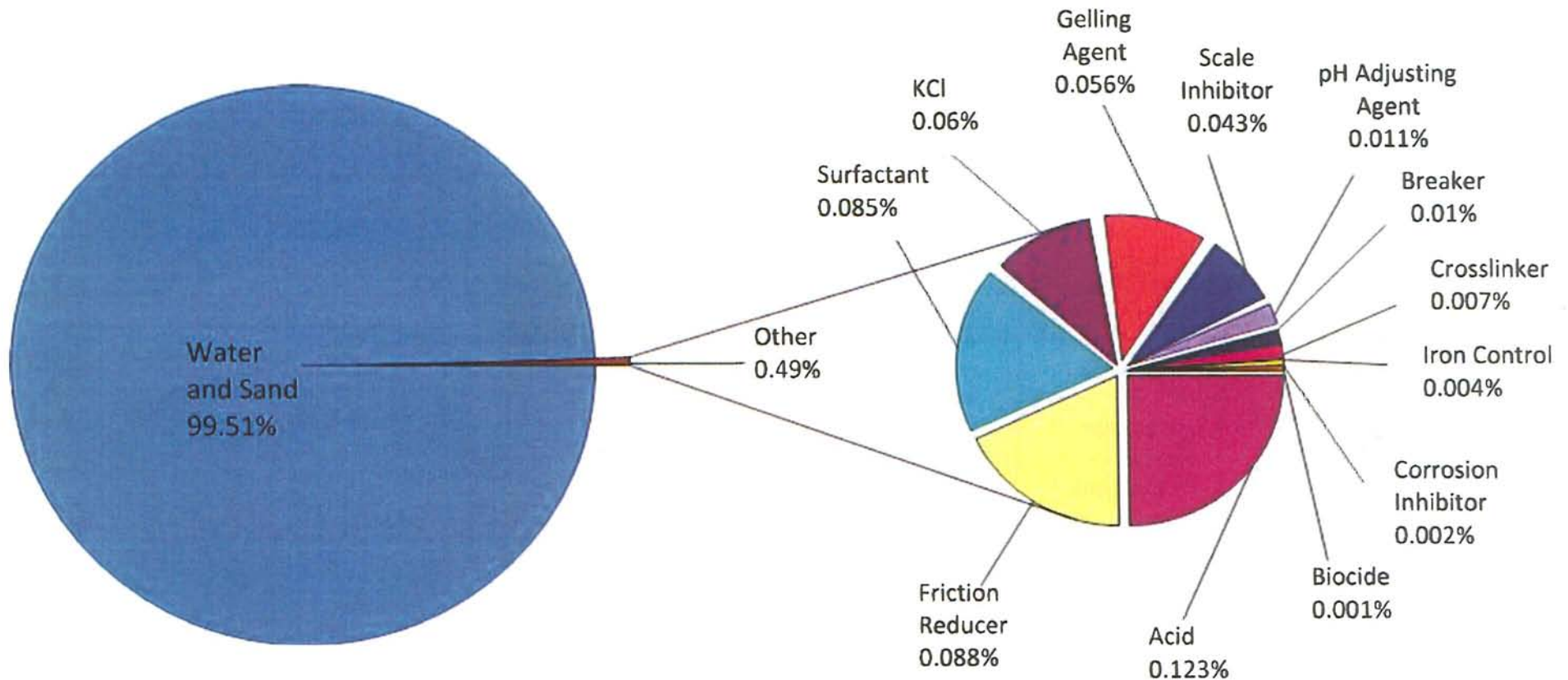
Additive	Additive Type	Chemical Compound	CAS-No
GW-3LDF	(Gel)	Petroleum Distillate Blend	64742-46-7
		Guar gum	9000-30-0
Caustic	(Buffer)	Sodium Hydroxide	1310-73-2
XLW-30AG	(Xiliinker)	Hydrotreated light distillate	64742-47-8
XLW-32	(Xiliinker)	Methanol	67-56-1
		Boric oxide	1303-86-2
FRW14	(Friction Reducer)	Hydrotreated light distillate	64742-47-8
		Ethoxylated alcohol	68439-50-9
Claytreat-3C NE940	(ClayStabilizer) (Non Emul)	Tetramethyl ammonium chloride	75-57-0
		Methanol	67-56-1
		Isopropanol	67-63-0
		2-Ethyl hexanol	104-76-7
		Polyoxyethylene glycols	25322-68-3
		Solvent naphtha (petroleum)^ heavy arom.	64742-94-5
		Ethoxylated alcohol^ branched	78330-19-5
		Ethoxylated alcohol^ branched	78330-20-8
		Naphthalene	91-20-3
		1^2^4-Trimethyl benzene	95-63-6
Magnacide 575	(Biocide)	Tetrakis(hydroxymethyl)phosphonium sulfate	55566-30-8
GBW-23L	(Breaker)	White mineral oil	8042-47-5
		Magnesium hydroxide	1309-42-8
		Magnesium peroxide	14452-57-4
		Magnesium oxide	1309-48-4
HP CRB	(Breaker)	Ammonium persulfate	7727-54-0
		Crystalline silica quartz	14808-60-7
HPCR-B-LT	(Breaker)	Ammonium persulfate	7727-54-0
		Crystalline silica	7631-86-9
GBW-5	(Breaker)	Ammonium Persulfate	7727-54-0
Silica Sand	(Proppant)	Silican Dioxide	14808-60-7

This chemical disclosure information, as well as planned injection rate and volume, constituent composition, and pressure is required to be submitted prior to approval to do the work. In addition, the operator must provide the actual injection rate and volume, constituent composition, and pressure.



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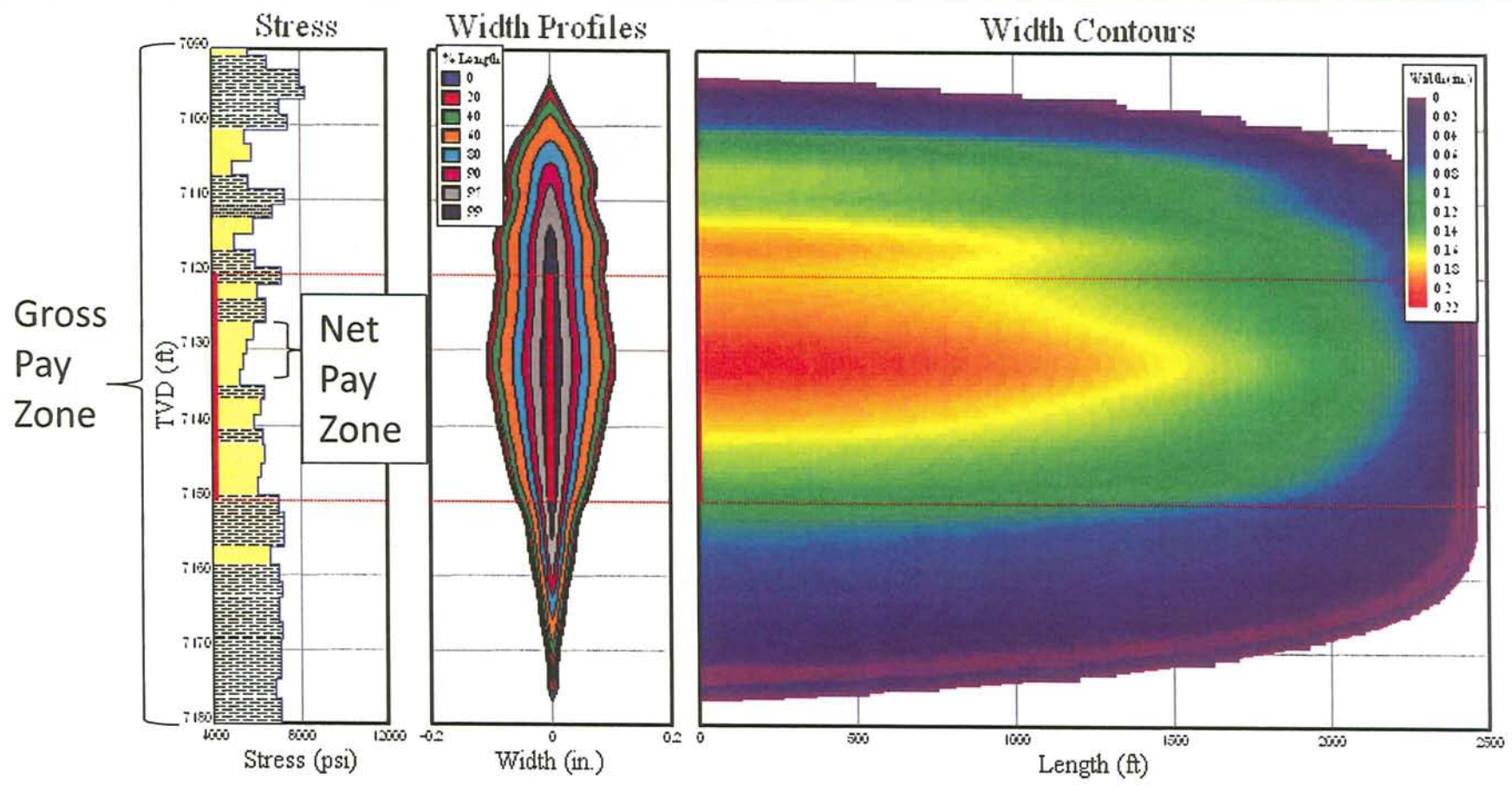


Typical Hydraulic Fracture Stimulation Fluid Chemistry Constituents



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Hydraulic Fracture Stimulation Model

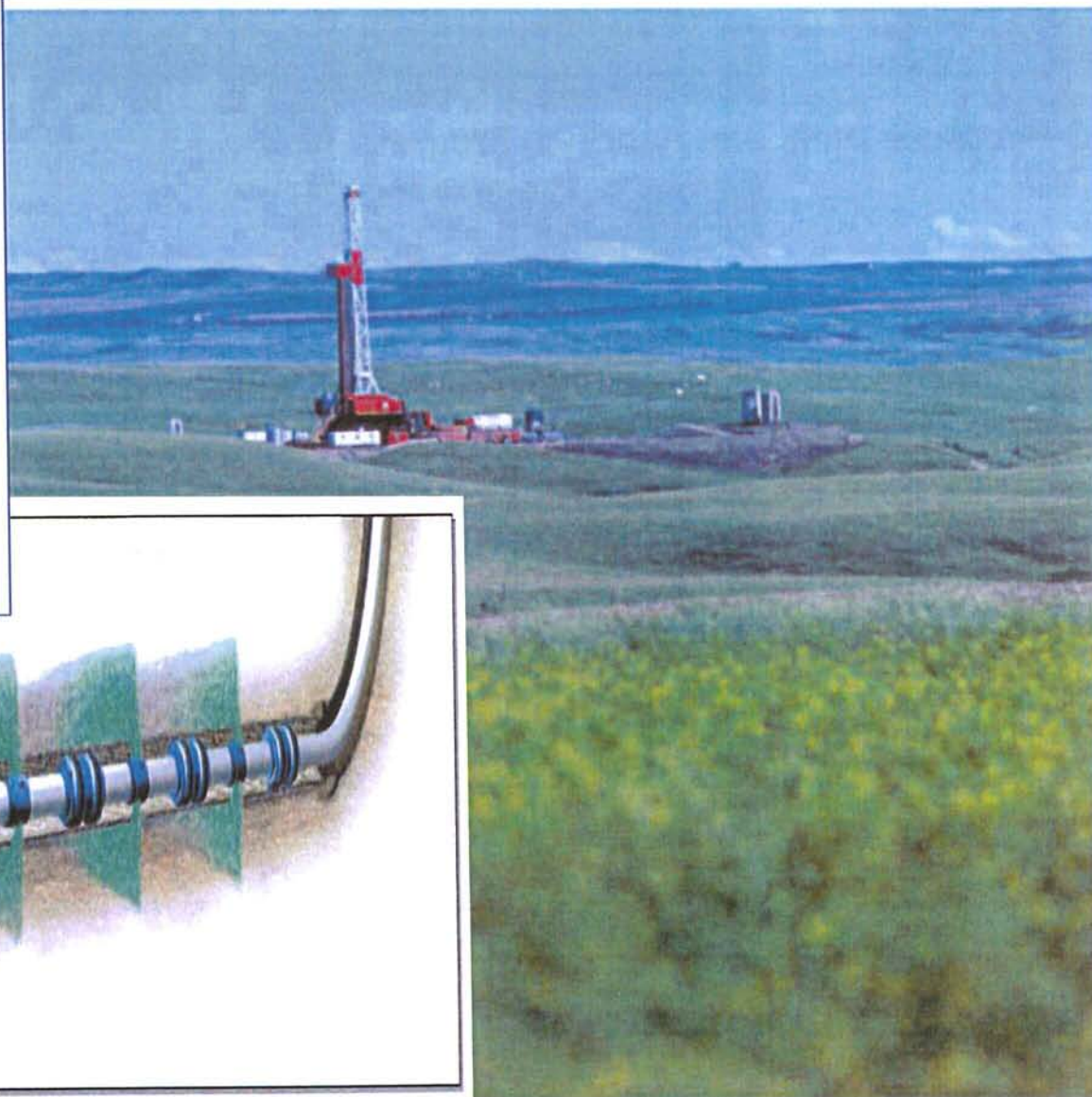


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State Oil and Gas  
Supervisor

### Development Issues:

Availability of Drilling Rigs & Crews:  
Horizontal drilling and hydraulic fracturing are essential – availability of rigs with experienced crews capable of drilling to 7,000 feet or greater vertically then 3,000 feet or more horizontally; availability of fresh water for drilling fluid make-up



Pay  
Zone



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ANADARKO SHAFT 13-65-10-4 H  $\approx$  172 FRAC TANKS

API 2120665

Rigging Up for Completion





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AMUNDARCO PROSSER 13-65-32-16 H PRODUCTION TANKS 8-400 BBL API #2120664

Location with rig and  
production tank  
battery





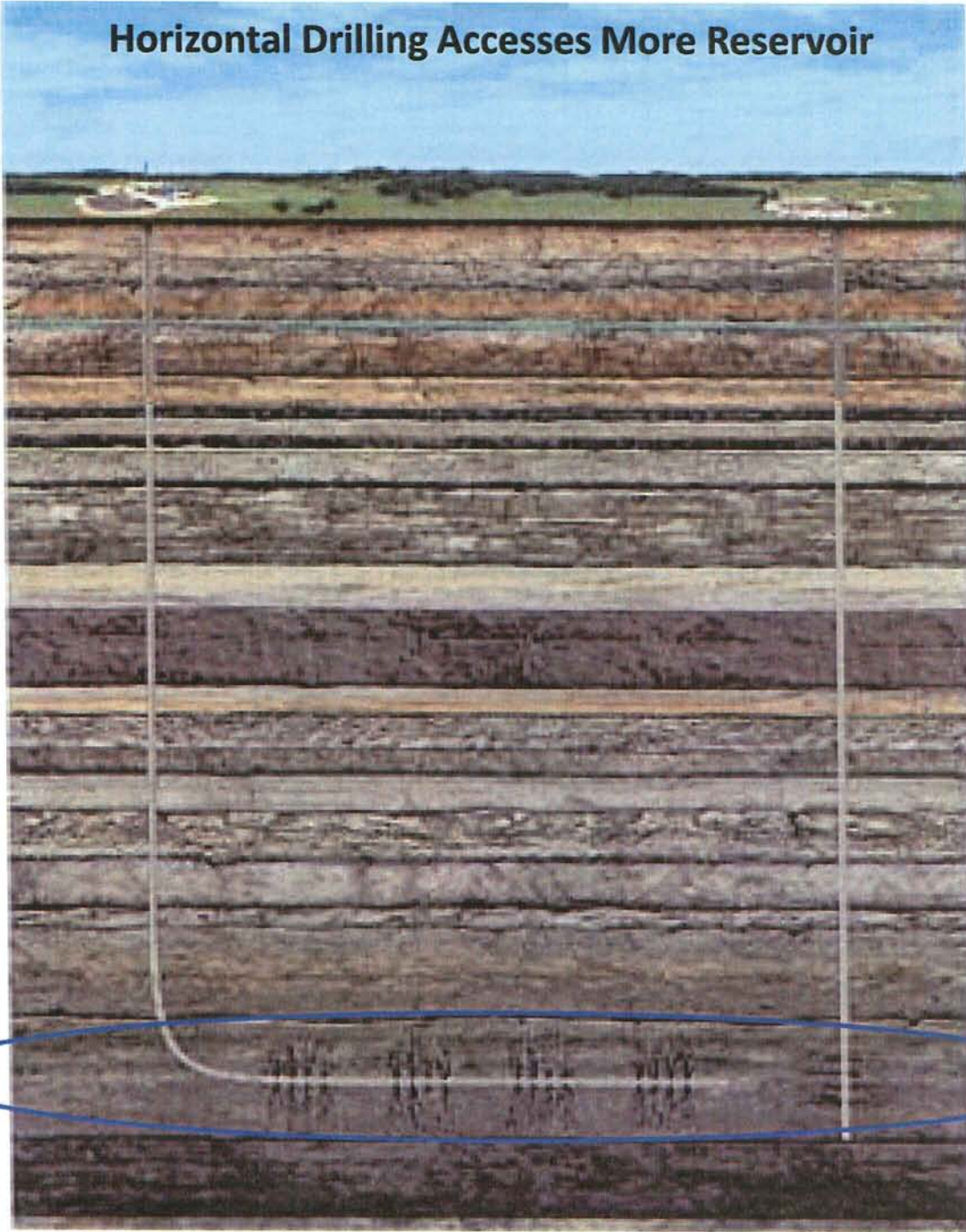
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Location Stake







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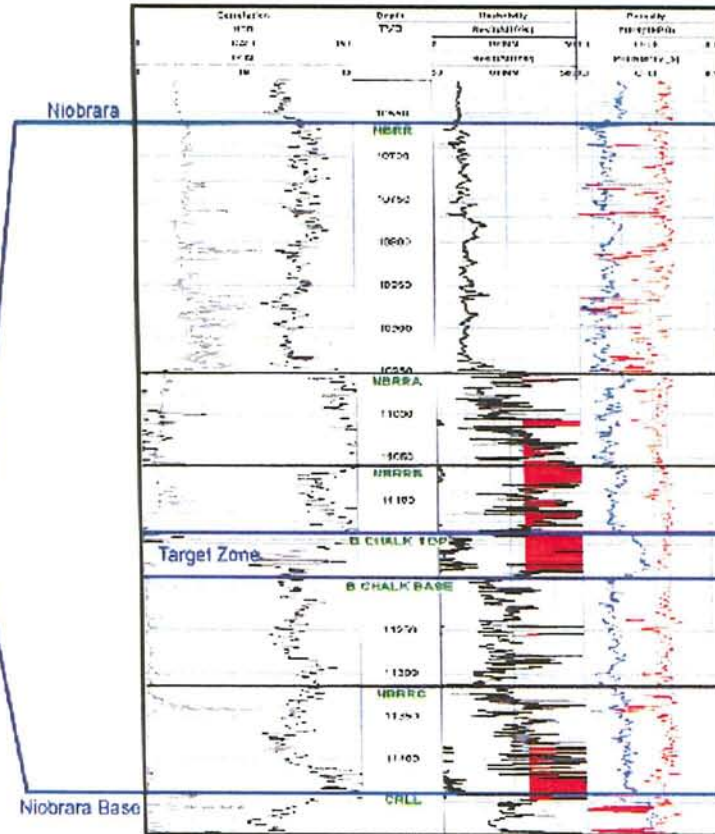
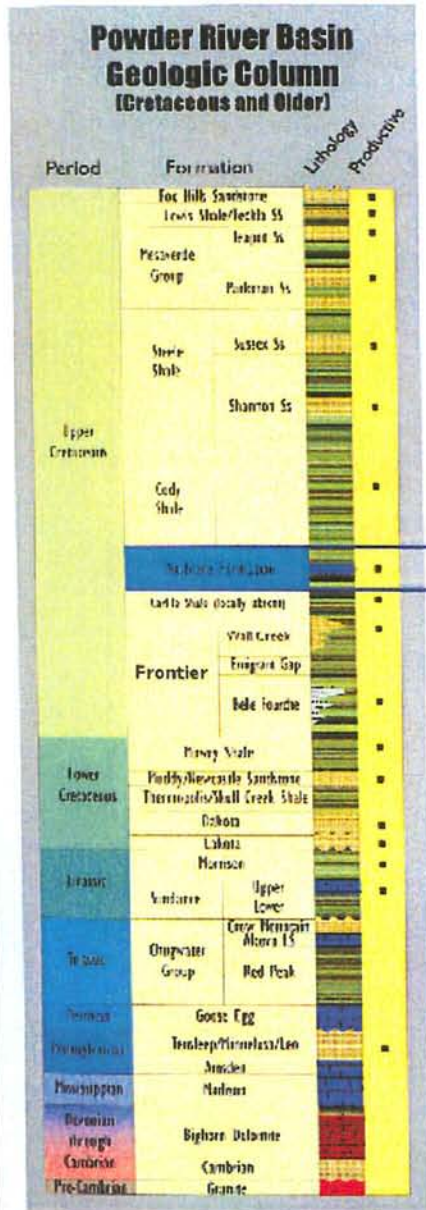
Shallow  
Aquifers at  
100's Feet

1000's Feet  
of isolating  
overburden  
rock

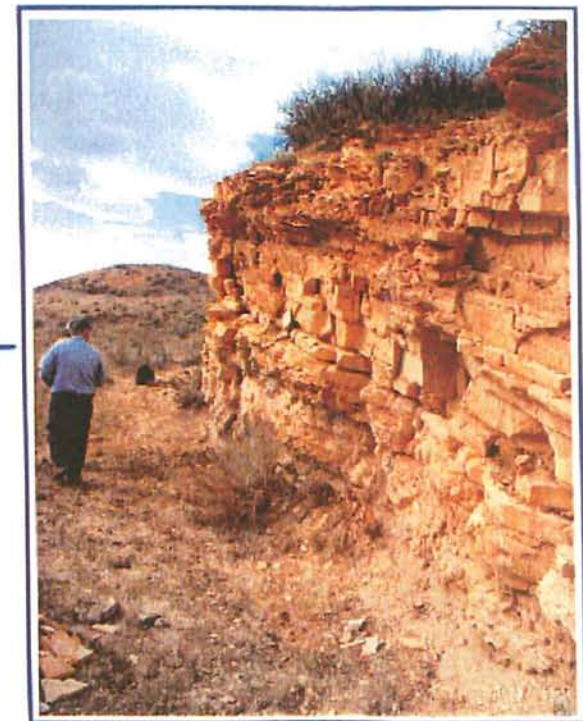
The  
Production  
Zone or  
Reservoir

# POWDER RIVER BASIN TYPE LOG

Modified from DOE



**Niobrara B  
"Chalk"**



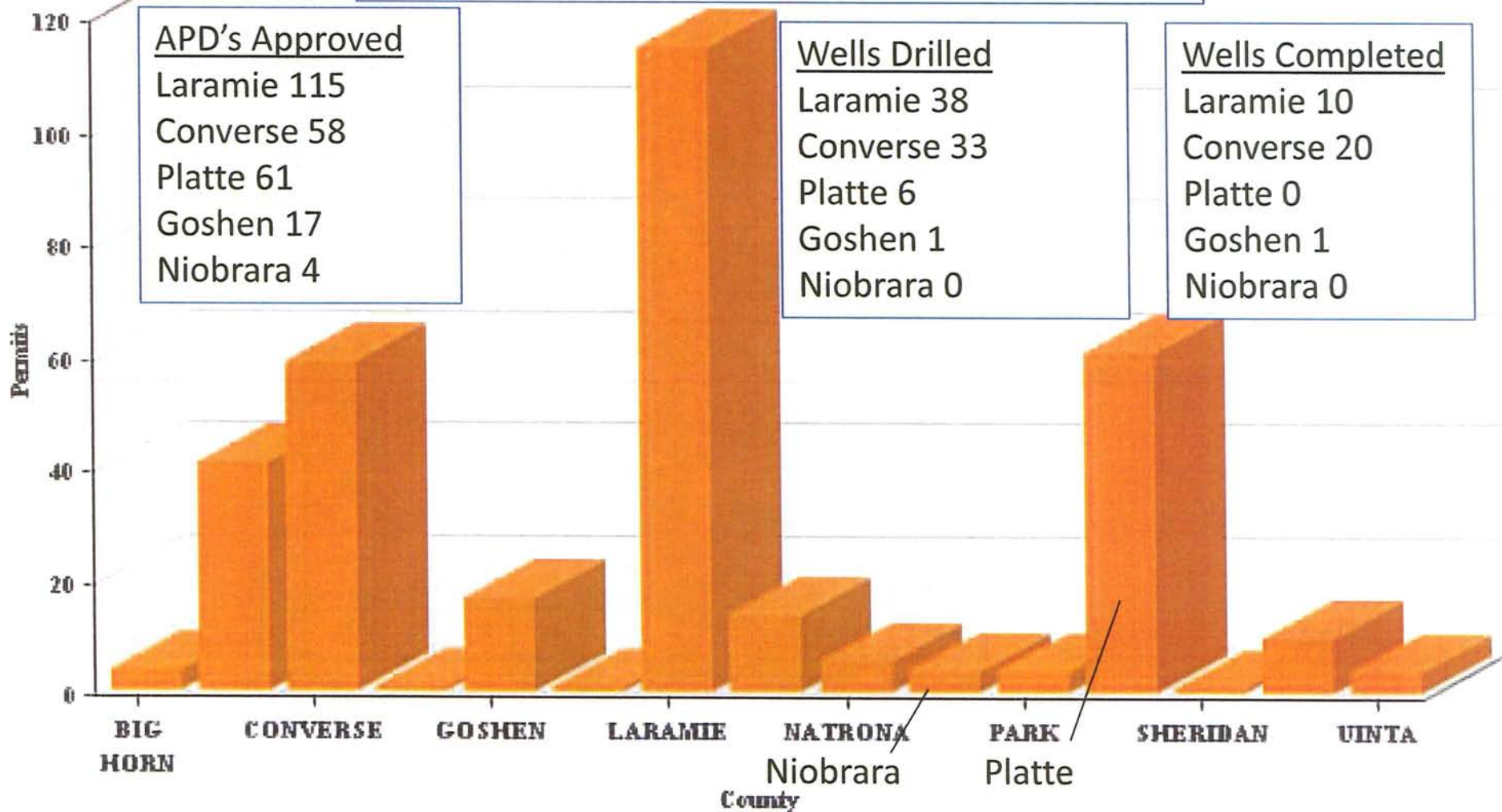
**Low – moderate matrix porosity**  
**Very low matrix permeability (microdarcy)**  
**Distinct chalky benches present**



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State Oil and Gas  
Supervisor

## HORIZONTAL APPLICATIONS FOR PERMIT TO DRILL as of 4 January 2011





## Wyoming Oil and Gas Conservation Commission

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State Oil and Gas  
Supervisor

### Partial listing of Operators by County:

#### Goshen:

- EOG Resources
- Chesapeake

#### Laramie:

- Anadarko E&P
- MBI Oil and Gas
- QEP Energy
- Texas American
- RKI Exploration & Production
- Rex Energy
- Simray
- Foundation
- Noble Energy

#### Platte:

- EOG Resources
- RKI Exploration & Production





# THE NATION'S ENERGY SUPPLY, 2008

