

Kansas Unconventional Oil and Natural Gas Production: An American Energy Answer!



NATURAL GAS: FUELING AMERICA'S FUTURE

Chesapeake Energy Overview



- » Second-largest producer of U.S. natural gas and a Top 15 producer of U.S. liquids
- » Most active explorer for natural gas and liquids with 164 active U.S. drilling rigs
- » Employs over 12,000 people in 16 states
- » Applying unconventional thinking and state of the art technologies, Chesapeake has grown from a \$50,000 startup in 1989 to a \$30 billion enterprise today
- » Chesapeake is leading the industry effort to reduce American dependence on high-cost foreign oil and on higher emitting fuels through the greater use of natural gas in transportation and electricity generation

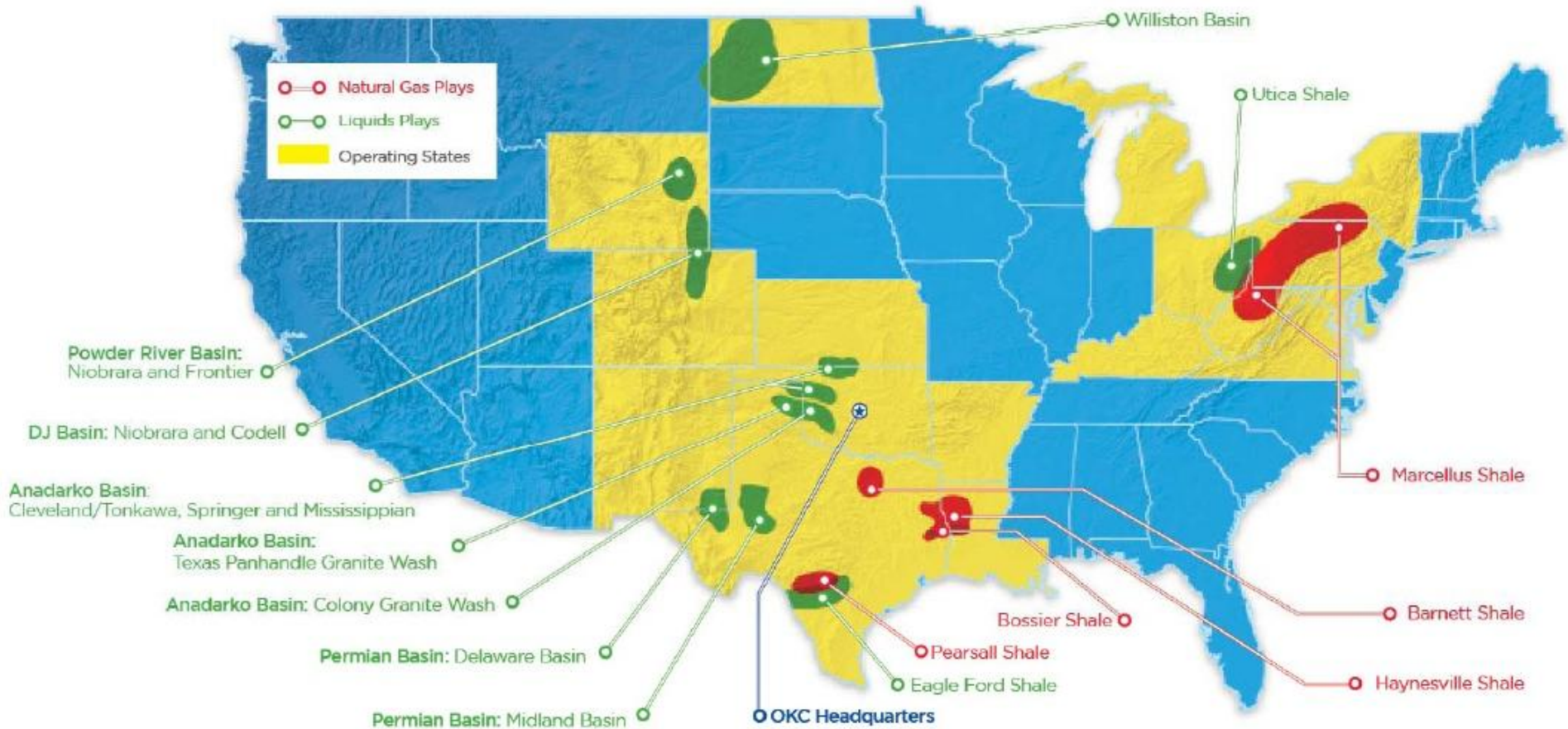
Just as the 19th and 20th Centuries were the Age of High-Carbon Coal and Oil, the 21st Century will be the Age of Low-Carbon Natural Gas and Natural Gas Liquids

Chesapeake Energy Corporation



- » Fortune 100 Best Companies to Work for 2008, 2009, 2010 & 2011
- » Outside magazine's "Best Places to Work" - 2010
- » WomansDay.com's 2010 "9 Companies with the Best Perks"
- » CivilianJobs.com's "2010 Most Valuable Employers (MVE) for Military"
- » GI Jobs magazine's 2011 Top 100 Military-Friendly Employer

CHK's Operating Area



Low-risk, U.S. onshore asset base; not exposed to economic, geopolitical or technological risks internationally or in the Gulf of Mexico

- Several Kansas counties are located in the Mississippi Lime formation, an unconventional liquids play in northern OK and southern KS.
 - CHK owns 1.5 million net acres in the Mississippi Lime, the most in the industry.
 - CHK operations could increase to 4 rigs in Kansas by year-end 2012.
 - ~23,000 Kansans are employed in the natural gas and oil industry with ~44,000 related jobs. The total economic impact is nearly \$3.3 billion.
- » Recently completed three wells; two in in Comanche county and Sumner County. Currently drilling our 4th well in Kiowa County.

Rig Activity - Most Active Operators In United States and In Kansas



National Rig Count

RANK	COMPANY	ACTIVE RIGS
1	Chesapeake Energy	164
2	ExxonMobil	64
3	EOG Resources	61
4	Devon Energy	53
5	Anadarko	50
6	Pioneer	46
7	Continental	40
8	Sandridge	36
9	ConocoPhillips	29
10	COG PET	29
TOTAL ACTIVE RIGS		1,815

Kansas Rig Count

RANK	COMPANY	ACTIVE RIGS
1	Sandridge	3
2	Ritchie Exploration	3
3	Cholla Res	2
4	Mikol Oil	2
5	Osage Res.	2
6	Lario O&G	1
7	Holl	1
8	Mull	1
9	Chesapeake	1
10	Shell	1
TOTAL KS RIGS		34

Technology Leading the Way – Job Creation



- **Reservoir Technology Center** – Chesapeake’s own laboratory to evaluate and analyze innovative and economical ways to extract hydrocarbons from Oklahoma’s diverse geology
- **3-D Seismic Visualization Room** - Chesapeake’s team of leading geophysicists explore and analyze 3-dimensional data taken from the geological layers in Oklahoma and Kansas
- **Operations** - New operation and drilling techniques enable producers to use precision and dramatically reduce operational and environmental footprints





Five Basics Steps

1. Site Selection/Preparation
2. Drilling
3. Completion
4. Production
5. Reclamation

Site Selection



Many factors go into selecting a drilling site:

- Geology
- Topography
- Access roads
- Pipelines and utilities
- Proximity to schools and homes
- Available water sources
- Proximity to wetlands, sensitive wildlife habitat or significant archeological sites

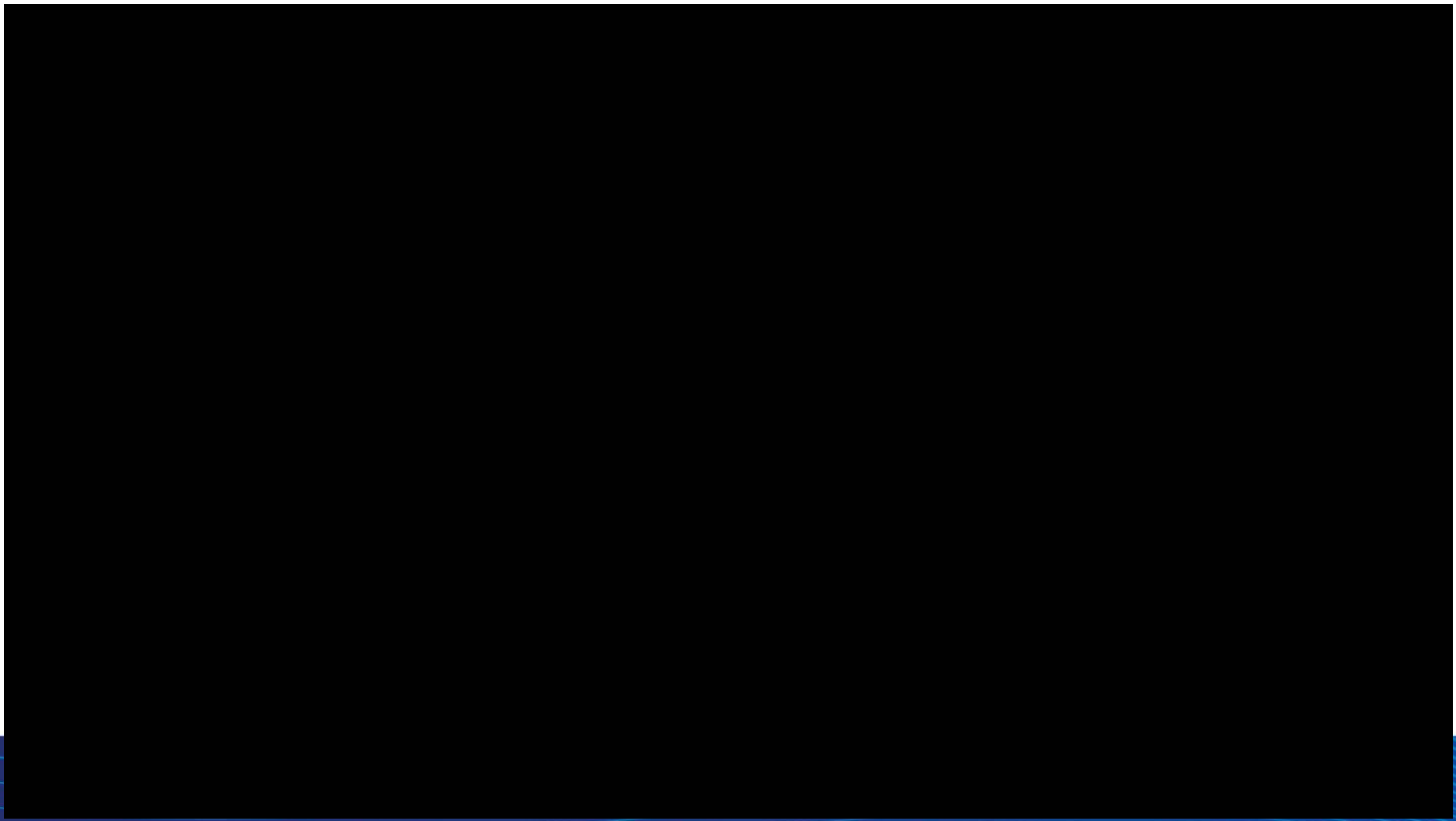
Site Preparation

- Site construction
Typically 4 to 6 weeks
- Typical pad site
300 x 400 feet
- E&S Controls installed
- Zero discharge sites
- Containment mechanisms
put into place



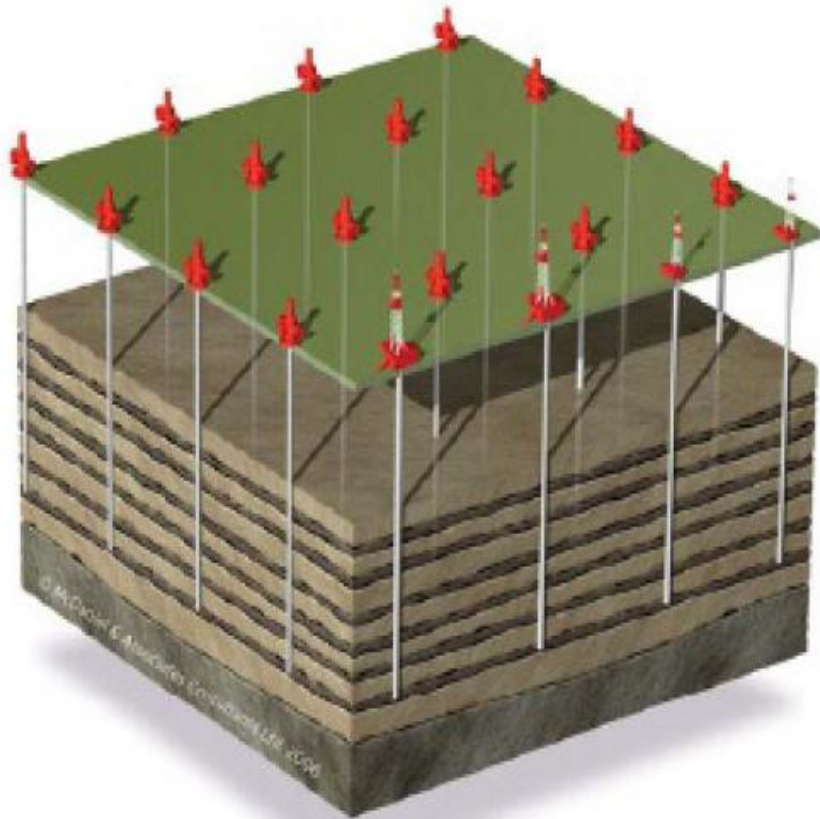
Then drilling rig moves onto location.

Rig Up

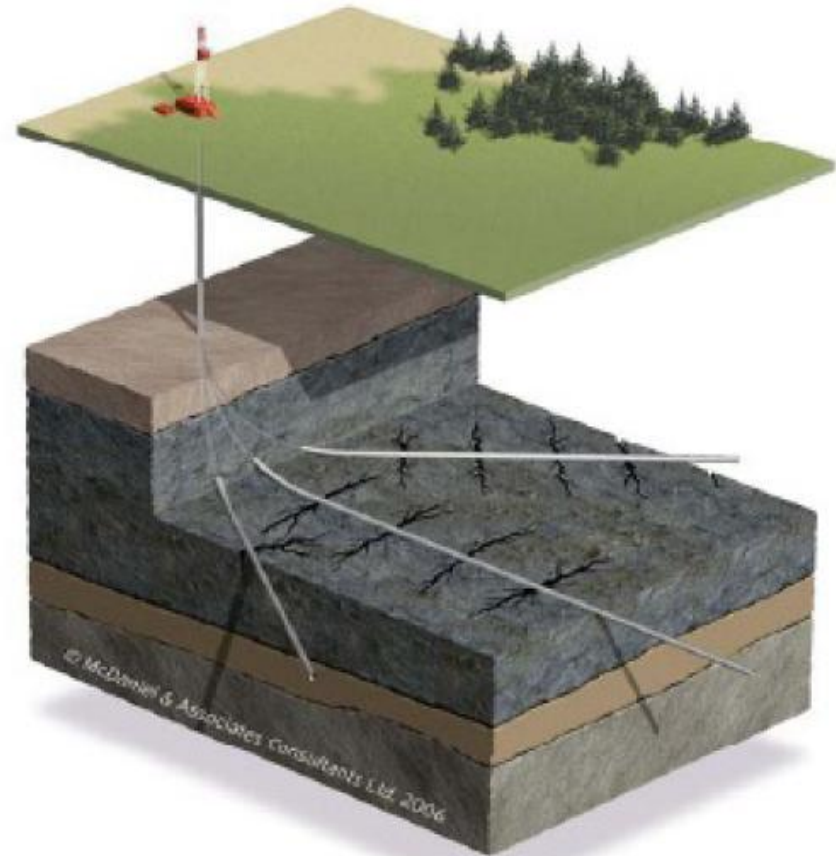


These Advanced Drilling & Completion Technologies Have Revolutionized Oil and Natural Gas Production

Traditional Wells



Horizontal Drilling



Multiple Layers of Protection

- **Knowing where fresh water is located**
 - ▶ Established by state water protection agencies
- **Protective well design**
 - ▶ Consist of multiple layers of steel casing

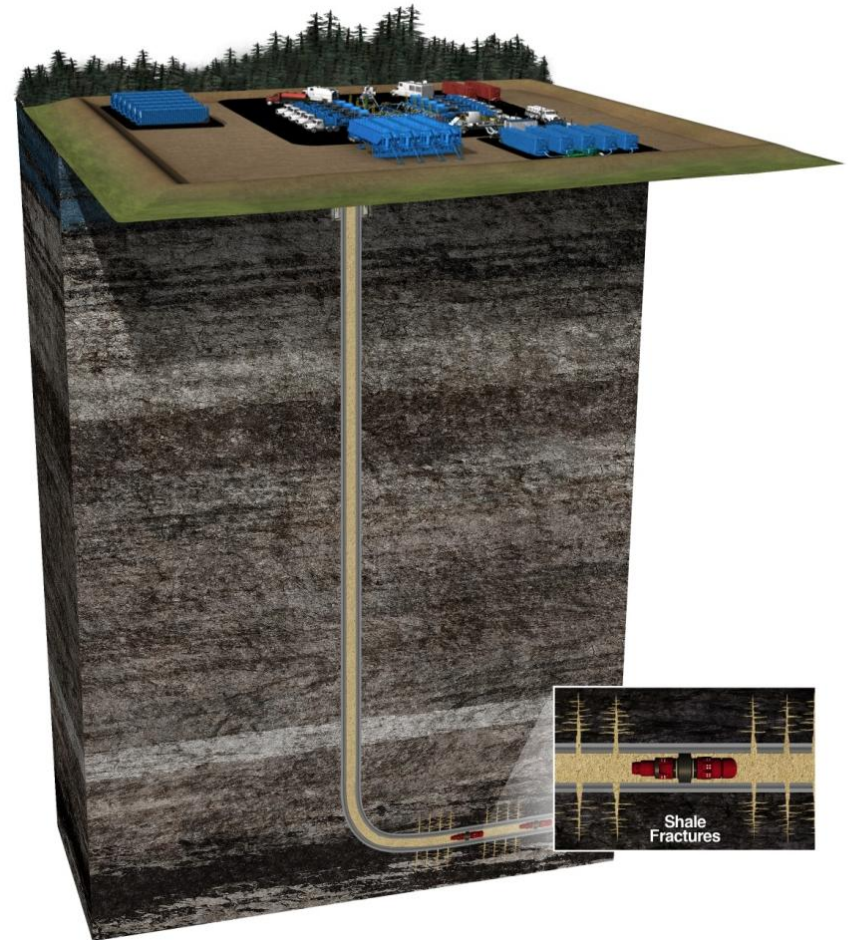


Drilling Animation

Hydraulic Fracturing

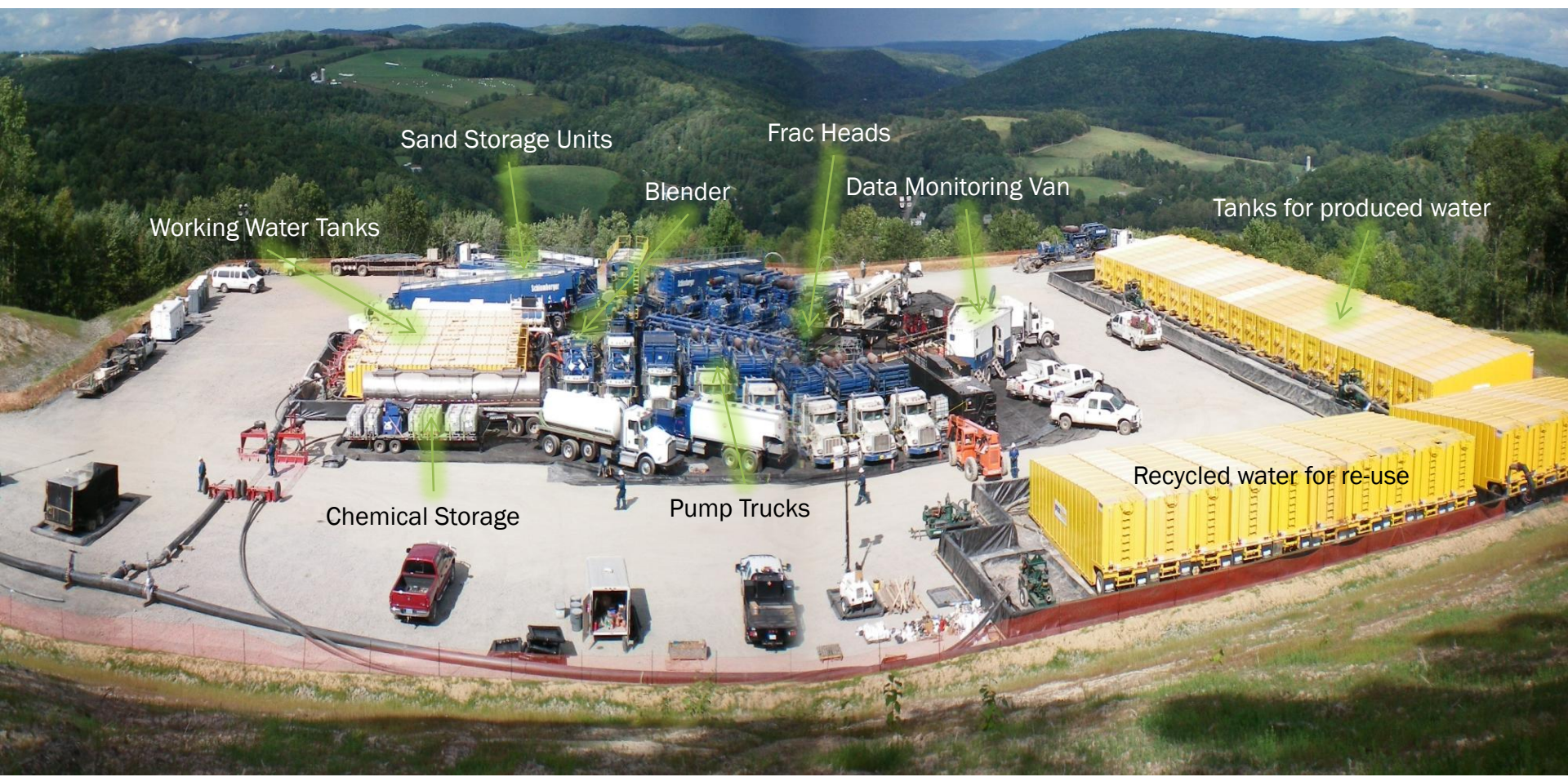
Once the drilling rig leaves,
hydraulic fracturing begins

- Hydraulic fracturing is an advanced technology that allows the safe and economic removal of natural gas and oil from the deep formations
- Hydraulic Fracturing has been used by the natural gas and oil industry since the 1940s



What does it look like?

Typical Site Layout – Cerca Pad, Wyalusing Township, PA



Sand Storage Units
Frac Heads
Blender
Data Monitoring Van
Tanks for produced water
Working Water Tanks
Chemical Storage
Pump Trucks
Recycled water for re-use

Completion Animation





HYDRAULIC FRACTURING
HOW IT WORKS

GROUNDWATER PROTECTION

CHEMICAL USE

REGULATIONS BY STATE

FIND A WELL BY STATE

FREQUENT QUESTIONS

WELCOME

Welcome to FracFocus, the hydraulic fracturing chemical registry website. This website is a joint project of the Ground Water Protection Council and the Interstate Oil and Gas Compact Commission.

On this site you can search for information about the chemicals used in the hydraulic fracturing of oil and gas wells. You will also find educational materials designed to help you put this information in perspective.

[LEARN MORE >](#)

- Welcome
- Hydraulic Fracturing
- Casing & Cement
- State Regulations
- Chemical Use

Looking for information about a well site near you?



Search for nearby well sites that have been hydraulically fractured to see what chemicals were used in the process.

FAQs

◀ 1 / 3 ▶

- Q.** A term in the website is unfamiliar to me. Where can I go to get more information?
- A.** One of the best glossaries of oil and gas terms is available on the web through Schlumberger Inc. You can use the alphabetical listing to select the first letter of the term you are looking for and scroll through the list of terms to find it. This site contains over 4600 oil and gas related terms.

[All FAQs >>](#)



Groundwater Protection: Priority Number One

Oil and natural gas producers have stringent requirements for how wells must be completed. The genesis of these requirements is water safety.

Casing is the first line of defense used to protect freshwater aquifers.

[More About Groundwater Protection >](#)

West Virginia issues emergency horizontal

Find a Well

Map Search **Standard Search**

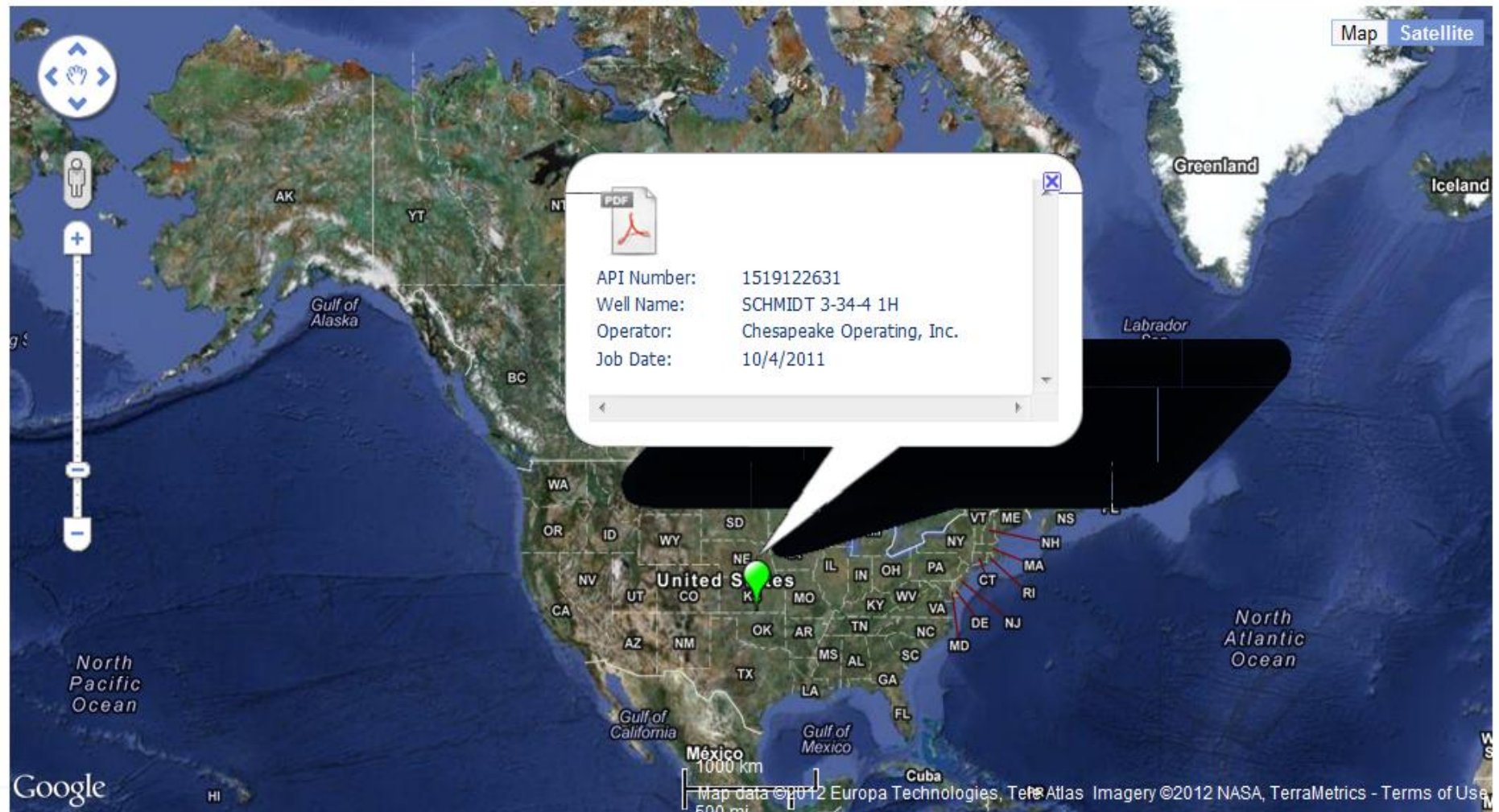
STATE: Kansas COUNTY: Sumner WELLS IN COUNTY: SCHMIDT 3-34-4 1H OPERATOR: Chesapeake Operating, Inc.

API WELL NUMBER:

WELL NAME:

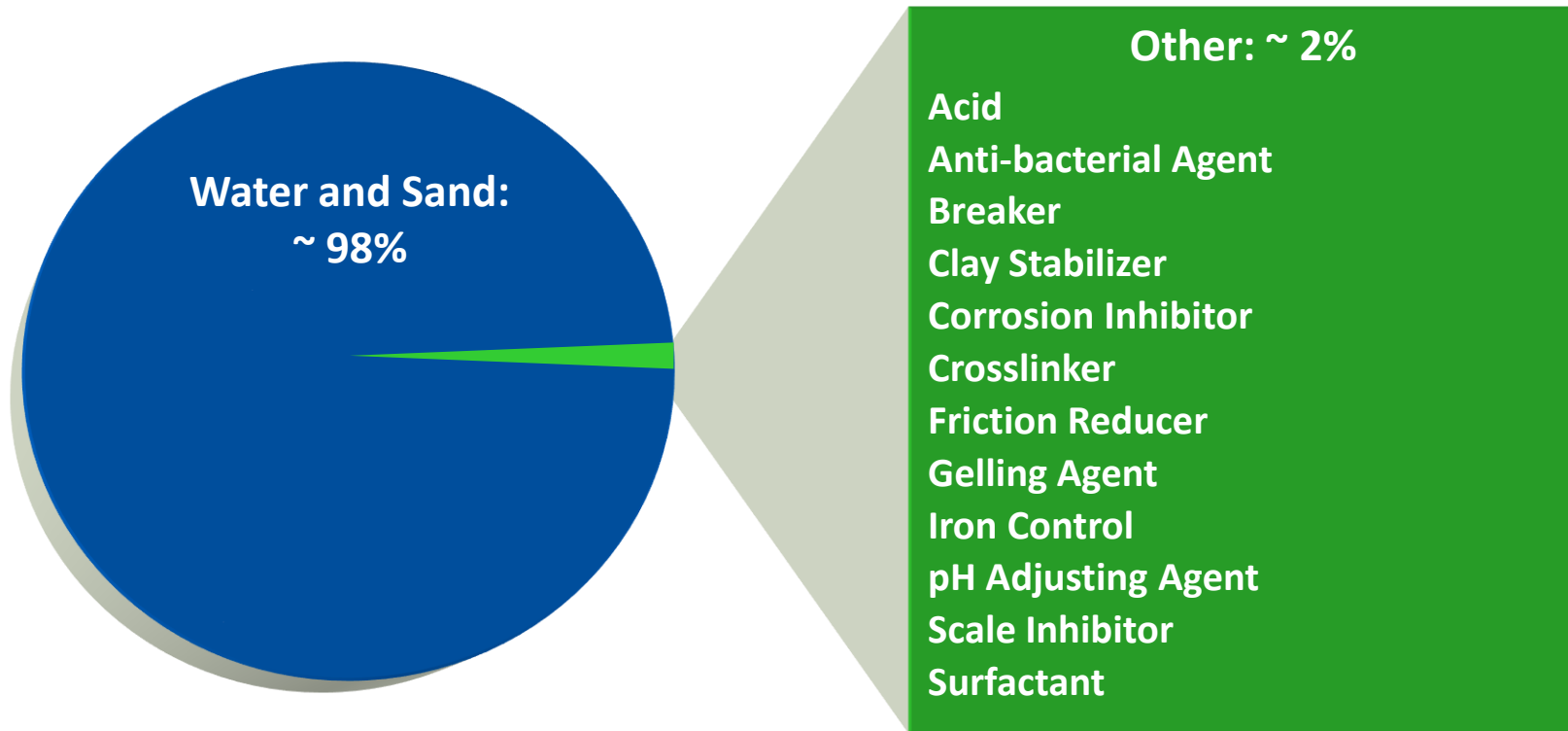
Search **Reset**

Not Seeing Map Markers? Please Click The "Reset" Button (left).



Typical Deep Fracturing Products

Products are rarely all used in one play



For more information, visit HydraulicFracturing.com and FracFocus.org or see our fact sheet on Hydraulic Fracturing

Hydraulic Fracturing Fluid Product Component Information Disclosure

Fracture Date:	10/4/2011
State:	KANSAS
County:	SUMNER
API Number:	1519122631
Operator Name:	CHESAPEAKE
Well Name and Number:	SCHMIDT 3-34-4 1H
Longitude:	-97.731288
Latitude:	37.124971
Long/Lat Projection:	NAD27
Production Type:	OIL
True Vertical Depth (TVD):	4,374
Total Water Volume (gal)*:	455,532

Hydraulic Fracturing Fluid Composition:

Trade Name	Supplier	Purpose	Ingredients	Chemical Abstract Service Number (CAS #)	Maximum Ingredient Concentration in Additive (% by Mass)**	Maximum Ingredient Concentration in HF Fluid (% by Mass)**	Comments
Fresh Water		Carrier/Base Fluid				87.49185%	
Ottawa Sand		Proppant	Crystalline Silica (Quartz Sand, Silicon Dioxide)	014808-60-7	100.00%	5.23533%	
White Sand		Proppant	Crystalline Silica (Quartz Sand, Silicon Dioxide)	014808-60-7	100.00%	3.70007%	
15% HCl Acid	BASIC ENERGY SERVICES	Acid	Water	007732-18-5	85.00%	2.64474%	
			Hydrochloric Acid	007647-01-0	15.00%	0.46672%	
I-6L	BASIC ENERGY SERVICES	Iron Control Agent	Acetic acid	000064-19-7	85.00%	0.01558%	
			Methanol (Methyl Alcohol)	000067-56-1	5.00%	0.00092%	
CIA- LT166	BASIC ENERGY SERVICES	Corrosion Inhibitor	Methanol (Methyl Alcohol)	000067-56-1	50.00%	0.00239%	
			Propargyl Alcohol (2-Propynol)	000107-19-7	4.00%	0.00019%	
ALPHA 1427	BAKER HUGHES	Anti-Bacterial Agent	Water	007732-18-5	60.00%	0.00591%	
			Glutaraldehyde (Pentanediol)	000111-30-8	30.00%	0.00295%	
			Didecyl Dimethyl Ammonium Chloride	007173-51-5	10.00%	0.00098%	
			Quaternary Ammonium Compound	068424-85-1	7.00%	0.00069%	
			Ethanol	000064-17-5	5.00%	0.00049%	
WGA-1E SLR	BASIC ENERGY SERVICES	Gelling Agent	Petroleum Distillate Hydrotreated Light	064742-47-8	70.00%	0.11012%	
CC - 11 KCl	BASIC ENERGY	Clay Stabilizer	Methanol (Methyl Alcohol)	000067-56-1	100.00%	0.07717%	

Production Animation



CHK's Commitment to the Environment

- **Spill Prevention, Control and Countermeasure (SPCC) plans**
 - Secondary containment for chemicals, oils and produced fluids
 - CHK utilizes a site management system to generate SPCC plans
- **Water management practices**
 - Improved sourcing methods
 - Recycling/reuse
- **Air Quality**
 - Robust compliance system
 - Technical support team to implement regional solutions
- **Promoting the use of natural gas in America**
 - NGV's
 - Natural Gas powered rigs
 - Natural Gas for Power Generation



● Horizontal Drilling Spacing Units

- 640 acres for under 6,000 ft. laterals
- 1280 acres for over 6,000 ft. laterals

● Hydraulic Fracturing Disclosure

- Supportive of HB 2526 and the KCC ability to promulgate rules for fluid disclosure.

Contact Information

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www.CNGnow.com

www.hydraulicfracturing.com

www.fracfocus.org

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American Clean Skies Foundation
www.cleanskies.org
www.cleanskies.tv



America's Natural Gas Alliance
www.anga.us