

APRIL 23, 2011

## Libya's Civil War

A GRAVE SCANDAL AT ARLINGTON

People  
Power for  
Palestine  
BY JOE RIEHM

BATTER UP!  
YOUR GUIDE  
TO THE 2011  
BASEBALL  
SEASON

The last great  
work of David  
Foster Wallace  
BY LEV GROSSMAN

# TIME

ENVIRONMENT SPECIAL

# THIS ROCK COULD POWER THE WORLD

WHY SHALE CAN SOLVE  
THE ENERGY CRISIS

BY BRYAN WALSH

A century's  
worth of  
barrel in our  
back yards ...

... but drilling  
for it threatens  
our food

WWW.TIME.COM

# Economic Contribution

State	Employment *	Value Added ** (\$ millions)	Percent of State Total
Wyoming	71,000	\$ 8,432	29.4%
New Mexico	88,814	\$ 8,292	12.2%
Colorado	190,000	\$24,099	9.3%
North Dakota	27,914	\$ 2,773	9.6%
Montana	34,210	\$ 3,324	8.9%
Utah	76,188	\$ 7,822	7.6%
<b>Total</b>	<b>488,126</b>	<b>\$54,742</b>	<b>12.8% (Mean Avg.)</b>

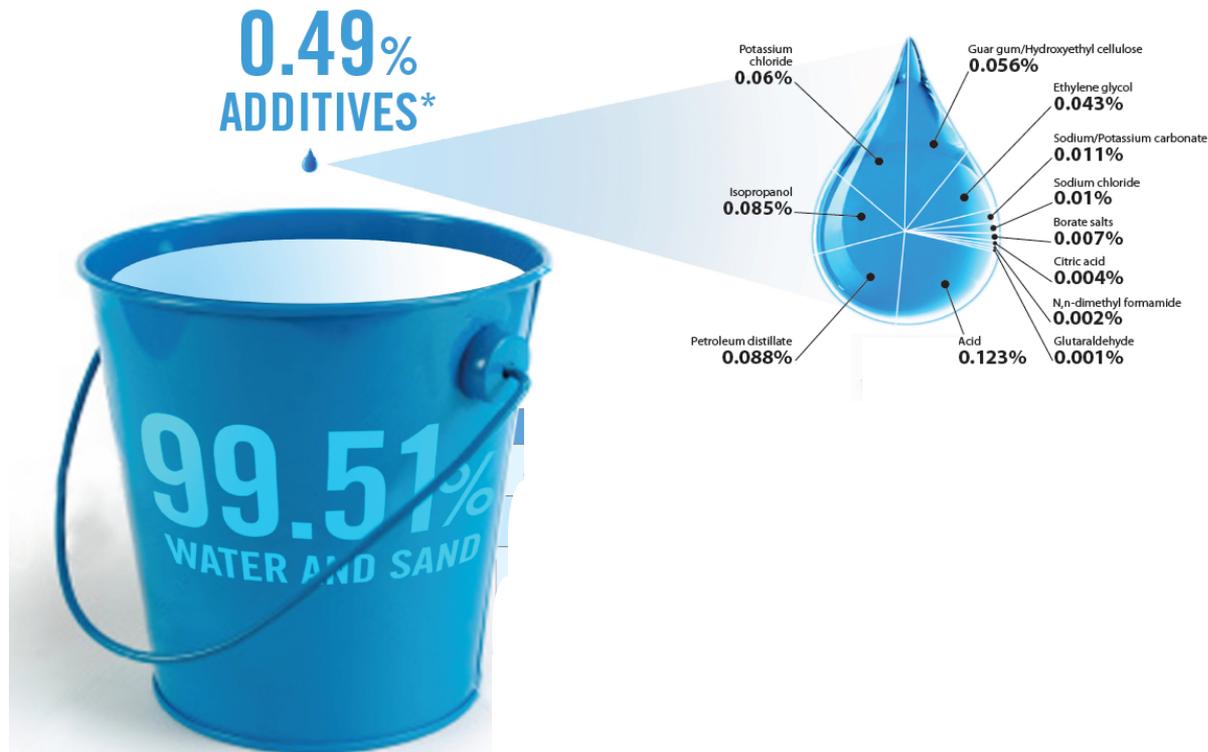
Source: *The Economic Impacts of the Oil and Natural Gas Industry on the US Economy: Employment, Labor Income and Value Added*, Price Waterhouse Coopers, September 8, 2009

\*Employment is defined as the number of payroll and self-employed jobs, including part-time jobs

\*\* Valued added measures the overall importance of an industry and consists of employees compensation, proprietors' income, income to capital owners from property taxes, and indirect business taxes.

# A FLUID SITUATION:

## TYPICAL SOLUTION\* USED IN HYDRAULIC FRACTURING



**Source:** Energy-In-Depth  
([www.energyindepth.org](http://www.energyindepth.org))

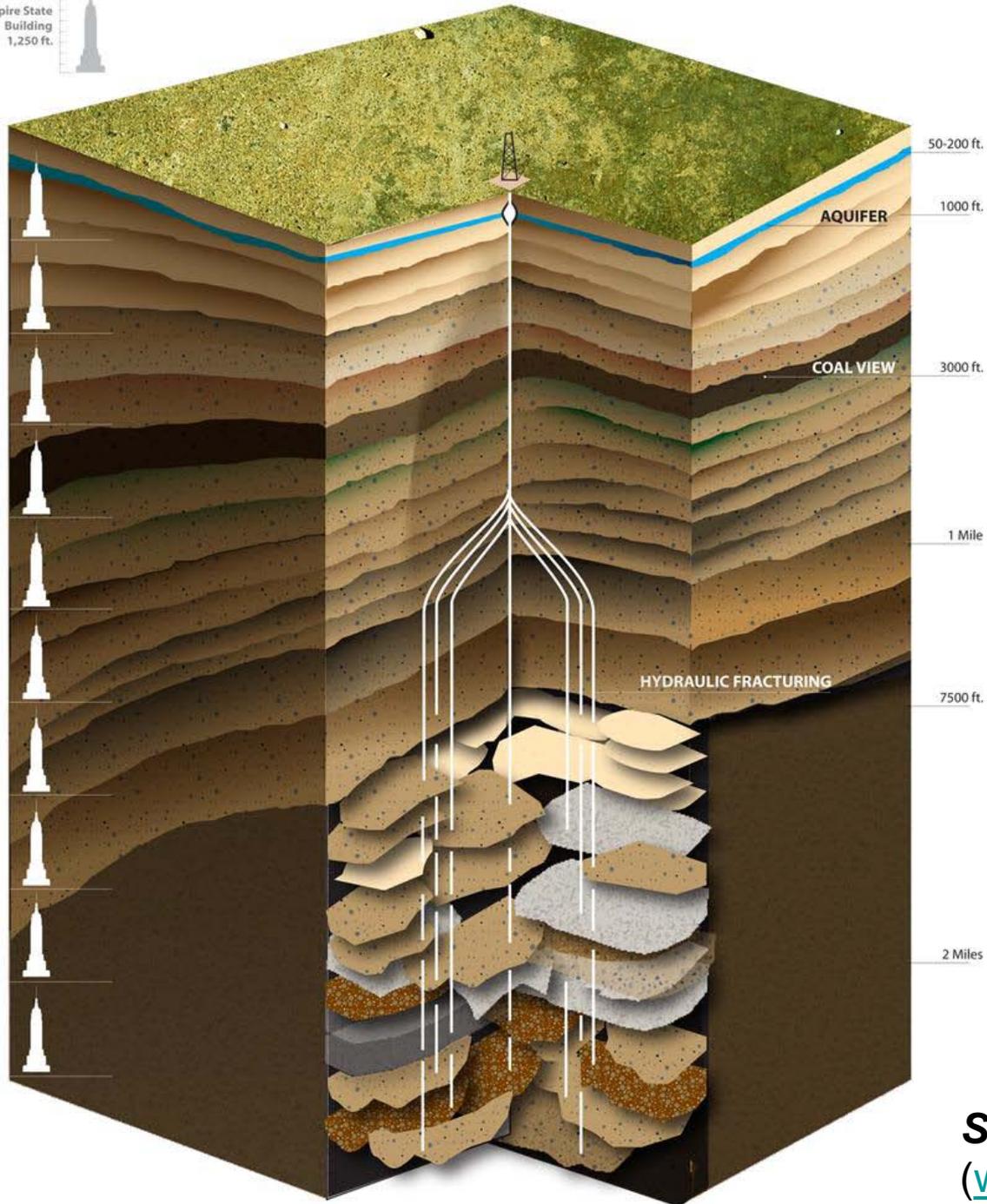




<b>FRACTURING INGREDIENTS</b>			
<b>Product Category</b>	<b>Main Ingredient</b>	<b>Purpose</b>	<b>Other Common Uses</b>
Water	<b>99.5%</b>	Expand fracture and deliver sand	Landscaping and manufacturing
Sand		Allows the fractures to remain open so the gas can escape	Drinking water filtration, play sand, concrete and brick mortar
<b>OTHER Approximately 0.5%</b>			
Diluted Acid	Hydrochloric acid or muriatic acid	Helps dissolve minerals and initiate cracks in the rock	Swimming pool chemical and cleaner
Antibacterial agent	Glutaraldehyde	Eliminates bacteria in the water that produces corrosive by-products	Disinfectant; Sterilizer for medical and dental equipment
Breaker	Ammonium persulfate	Allows a delayed break down of the gel	Used in hair coloring, as a disinfectant, and in the manufacture of common household plastics
Corrosion inhibitor	n,n-dimethyl formamide	Prevents the corrosion of the pipe	Used in pharmaceuticals, acrylic fibers and plastics
Crosslinker	Borate salts	Maintains fluid viscosity as temperature increases	Used in laundry detergents, hand soaps and cosmetics
Friction reducer	Polyacrylamide	"Slicks" the water to minimize friction	Water treatment, soil conditioner
	Mineral Oils		Used in cosmetics including hair, make-up remover, nail and skin products
Gel	Guar gum or hydroxyethyl cellulose	Thickens the water in order to suspend the sand	Thickener used in cosmetics, baked goods, ice cream, toothpaste, sauces and salad dressings
Iron control	Citric acid	Prevents precipitation of metal oxides	Food additive; food and beverages; lemon juice ~7% citric acid
Clay stabilizer	Potassium chloride	Creates a brine carrier fluid	Used in low-sodium table salt substitute, medicines and IV fluids
pH adjusting agent	Sodium or potassium carbonate	Maintains the effectiveness of other components, such as crosslinkers	Used in laundry detergents, soap, water softener and dishwasher detergents
Scale inhibitor	Ethylene glycol	Prevents scale deposits in the pipe	Used in household cleansers, de-icer, paints and caulk
Surfactant	Isopropanol	Used to increase the viscosity of the fracture fluid	Used in glass cleaner, multi-surface cleansers, antiperspirant, deodorants and hair color

Table 1- "Modern Shale Gas Development in the United States: A Primer" U.S. Department of Energy Office of Fossil Energy and National Energy Technology Laboratory. April 2009 and Chesapeake Energy

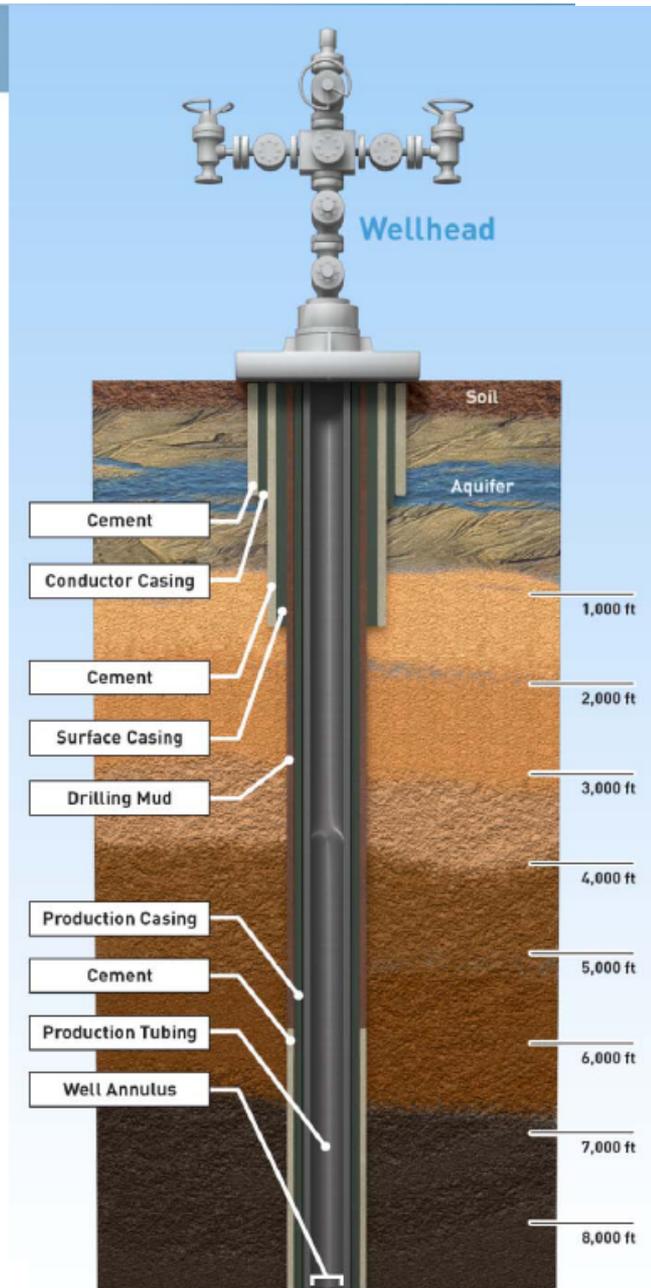
Empire State Building  
1,250 ft.



**Source:** Energy-In-Depth  
([www.energyindepth.org](http://www.energyindepth.org))

# ▶▶▶ Casing

- Multiple layers surrounding the aquifer
  - Cement
  - Conductor Casing
  - Cement
  - Surface Casing
  - Drilling Mud
  - Production Casing
  - Cement
  - Production Tubing
  - Well Annulus



*“There is no evidence that the hydraulic fracturing at issue has resulted in any contamination or endangerment of underground sources of drinking water.”*

Carol Browner, President Clinton's EPA Administrator

May 5, 1995

*“Hydraulic fracturing...is a valuable tool in reducing our dependence on foreign energy supplies. During both the Clinton administration, and the current administration, the EPA has maintained that federal regulation of hydraulic fracturing is not required”*

Sen. Jeff Bingaman (D-NM), Chairman, Senate Energy Committee

March 7, 2002

Testifying before the Senate Environment and Public Works Committee,  
EPA officials Peter Silva, Assistant Administrator for Water; and  
Cynthia Giles, Assistant Administrator for Enforcement & Compliance **confirmed that  
they know of no cases of ground water  
contamination from hydraulic fracturing.**

December 8, 2009

*“Having an outside look at Colorado's practices would be of benefit to this state.  
In the meantime, we would hope federal lawmakers would hold off on applying  
additional regulations to the industry unless and until problems caused by fracking  
are clearly articulated.”*

Denver Post Editorial

April 24, 2011

# WHY IS BLM CONTEMPLATING FEDERAL REGULATIONS?

- EPA has found no evidence that water quality degradation has resulted from frac'ing, but is conducting another study to be completed next year.
- State-level regulation is strong

# Summary

- US O&G companies epitomize American ingenuity and are constantly working to improve environmental practices and safety
- Affordable and reliable energy is the basic cornerstone of prosperity
- All energy sources have environmental impacts, and we need to balance the risks with the energy benefits