

# Understanding the BLM's Role in Regards to Hydraulic Fracturing

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## Northeastern Great Basin Resource Advisory Council Meeting

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Elko, Nevada

- North American Shale Plays
- Economic Impacts
- Intro to Hydraulic Fracturing
- Concerns:
  - Protection of Ground & Surface Water
  - Common Chemicals & Additives Used
  - Water Volumes Used
  - Disposal of Used Fluids
  - Where are we?

# North American Shale Plays (as of March 2011)



Source: Energy Information Administration based on data from various published studies.  
Updated: March 21, 2011

# Unconventional Oil (& Gas) “Plays”

- ❖ Marcellus (Northern Appalachia – Pennsylvania, West Virginia, New York, Ohio)
  - ❖ Thickness - 900 feet
  - ❖ Estimated reserves – 500 trillion cubic feet.
  - ❖ **Natural gas**
- ❖ Barnett (Central Texas)
  - ❖ 70 % of all US gas production.
  - ❖ Estimated reserves – 30 trillion cubic feet
  - ❖ **Natural gas**
- ❖ Eagle Ford (South Texas)
  - ❖ Thickness - 475 feet
  - ❖ Estimated ultimate recovery – 168.000 barrels/well
  - ❖ **Both natural gas and oil**
- ❖ Bakken (North Dakota, Montana)
  - ❖ Thickness -
  - ❖ Estimated reserves – 3.65 billion barrels, 2.0 trillion cubic feet
  - ❖ **Both natural gas and oil - North Dakota output tops 1 million barrels/day**
- ❖ Piceance/Uinita (Colorado, Utah)
  - ❖ Thickness – 2000 -3000 feet
  - ❖ No measurable production yet
  - ❖ **Natural gas**
- ❖ Permian (Southeastern New Mexico, North Texas)
  - ❖ Estimated reserves -
  - ❖ Current production -19% of the US crude oil output
  - ❖ **Crude oil**
- ❖ Niobrara (Colorado, Wyoming)
  - ❖ An emerging play
  - ❖ **Both natural gas and oil**
- ❖ Elko (Northeastern Nevada)
  - ❖ Emerging shale play
  - ❖ **Crude oil**

# Economic Impacts

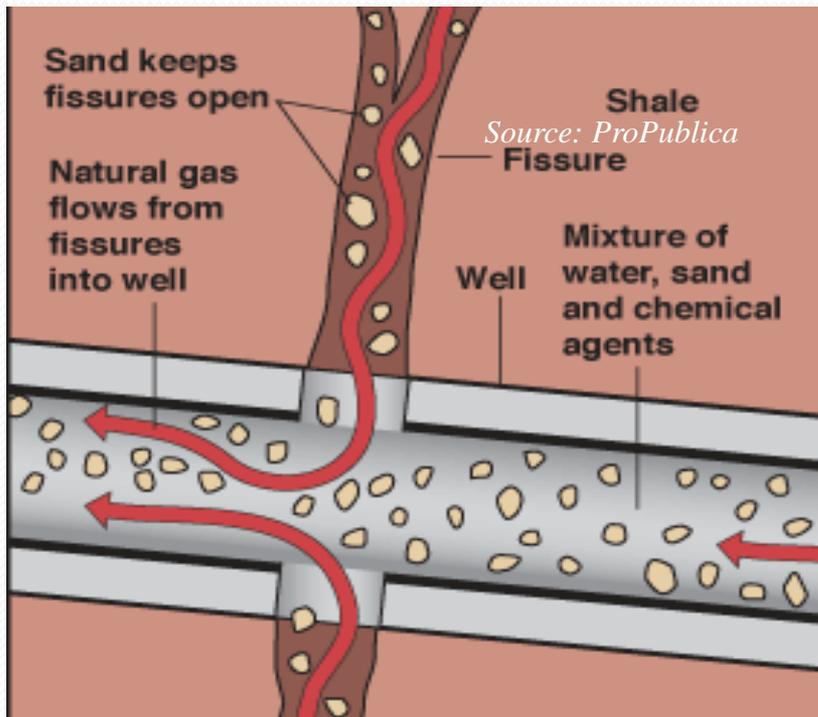
\*\*Sale receipts are equally divided between the State and the U.S. Treasury

<b>OIL REPORTED PRODUCTION &amp; REVENUES for FEDERAL ONSHORE IN NEVADA</b>							
Revenue Type	Product	FY 2012			FY 2013		
		Sales Volume	Sales Value	Revenue	Sales Volume	Sales Value	Revenue
<b>Reported Royalties</b>	Oil (bbl)	374,826	\$33,588,879	\$4,194,434	331,014	\$28,890,713	\$3,661,957
<b>Rents</b>				\$6,510,989			\$6,483,485
<b>Bonus</b>				\$4,768,632			\$2,130,065
<b>TOTALS:</b>			\$33,588,879	\$15,474,054		\$28,890,713	\$12,275,507

<b>Disbursement Type</b>	<b>FY 2012</b>	<b>FY 2013</b>
<b>State of Nevada (50%) from Geothermal + Oil Revenues</b>	\$10,435,758	\$7,746,990

Information for tables obtained from the statistical information provided from the following Office of Natural Resources Revenue (ONRR) website: <http://statistics.onrr.gov/ReportTool.aspx>

# What is Hydraulic Fracturing?



- Well stimulation technique has been employed by the oil and gas industry since 1947. The technique is used to create spaces in the rock pores deep underground to release the oil and natural gas so that it can flow to the surface.
- Water and additives are pumped at high pressure into the formation, creating openings that allow oil and gas to move more freely from rock where it was trapped.
- Sand is also pumped with the water and it remains in the formation to hold open the rock. Most of the water and additives flow back to the surface and are disposed of safely.

# Why Hydraulic Fracturing?



- Hydraulic fracturing technologies have unlocked vast new supplies of oil and natural gas for America.
- The technology has also made production feasible in many areas that were previously considered too deep, too hard, and too expensive to access.
- The “fracture paths” created by hydraulic fracturing, increases the surface area exposed increasing production rates up to many hundreds of percent.
- Hydraulic fracturing, Multi-well pads and the possibility of Horizontal Drilling provides an environmental advantage, **in that they reduce the amount of wells needed to effectively produce an oil/gas reservoir. \*\*Less wells mean less roads, less pipeline, less surface disturbance, etc.**







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# How Do We Protect Groundwater and Surface Water from Contamination?

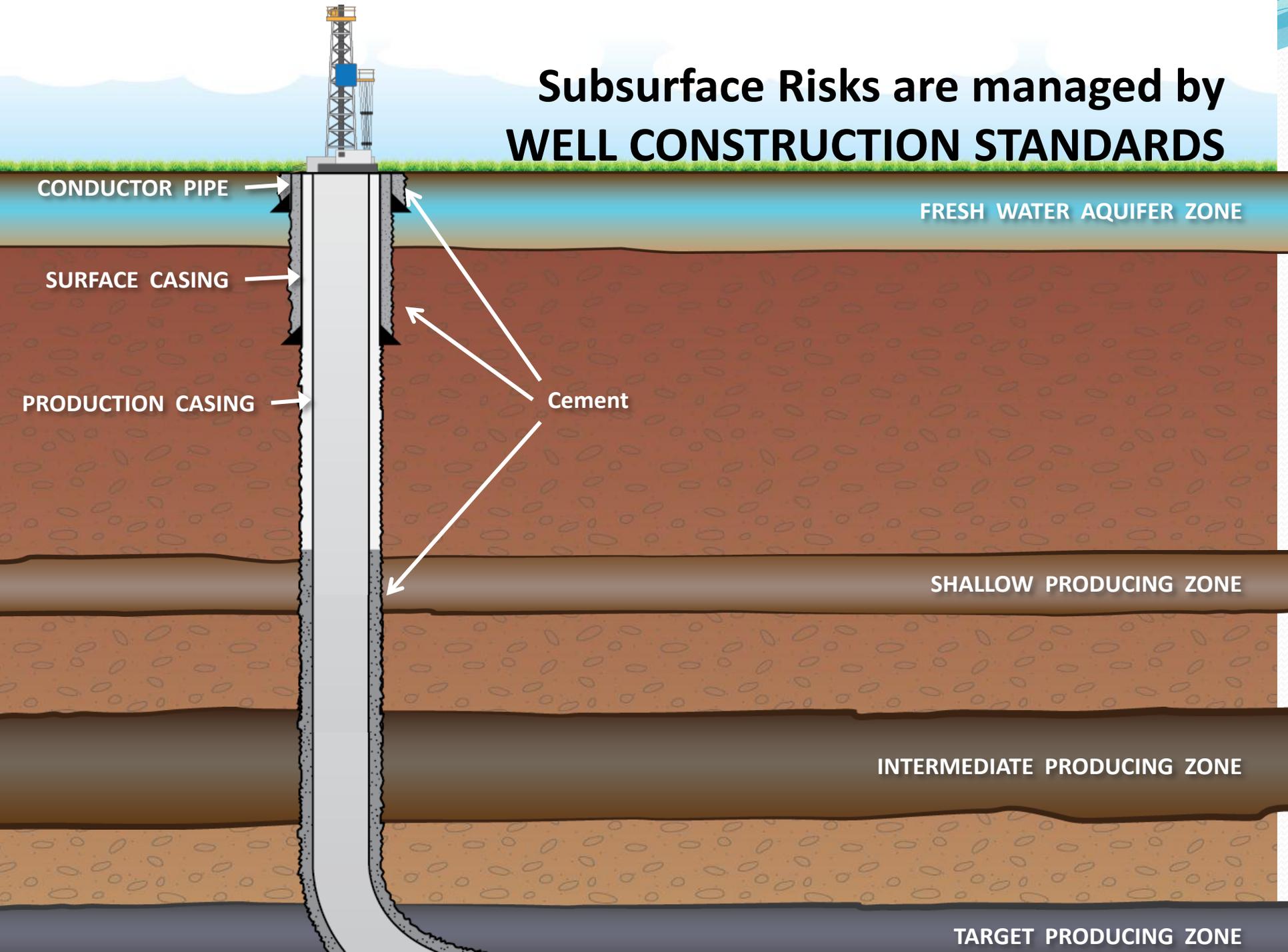


## Well Integrity:

BLM regulations require the operator to design and construct the well to ensure isolation in wellbore (The Hole).

- Surface casing is set below useable groundwater and cemented to surface.
- Intermediate and Production casing is cemented to isolate the zones in which there is Oil, providing further protection to groundwater.
- There are multiple layers of protective steel casing surrounded by cement.
- Cement Bond Logs, is similar to an X-ray; this will verify the quality of cement job.
- Centralizers placed on the casing assures uniform cementing (keeps the pipe in the center of the hole).

# Subsurface Risks are managed by WELL CONSTRUCTION STANDARDS



CONDUCTOR PIPE

FRESH WATER AQUIFER ZONE

SURFACE CASING

Cement

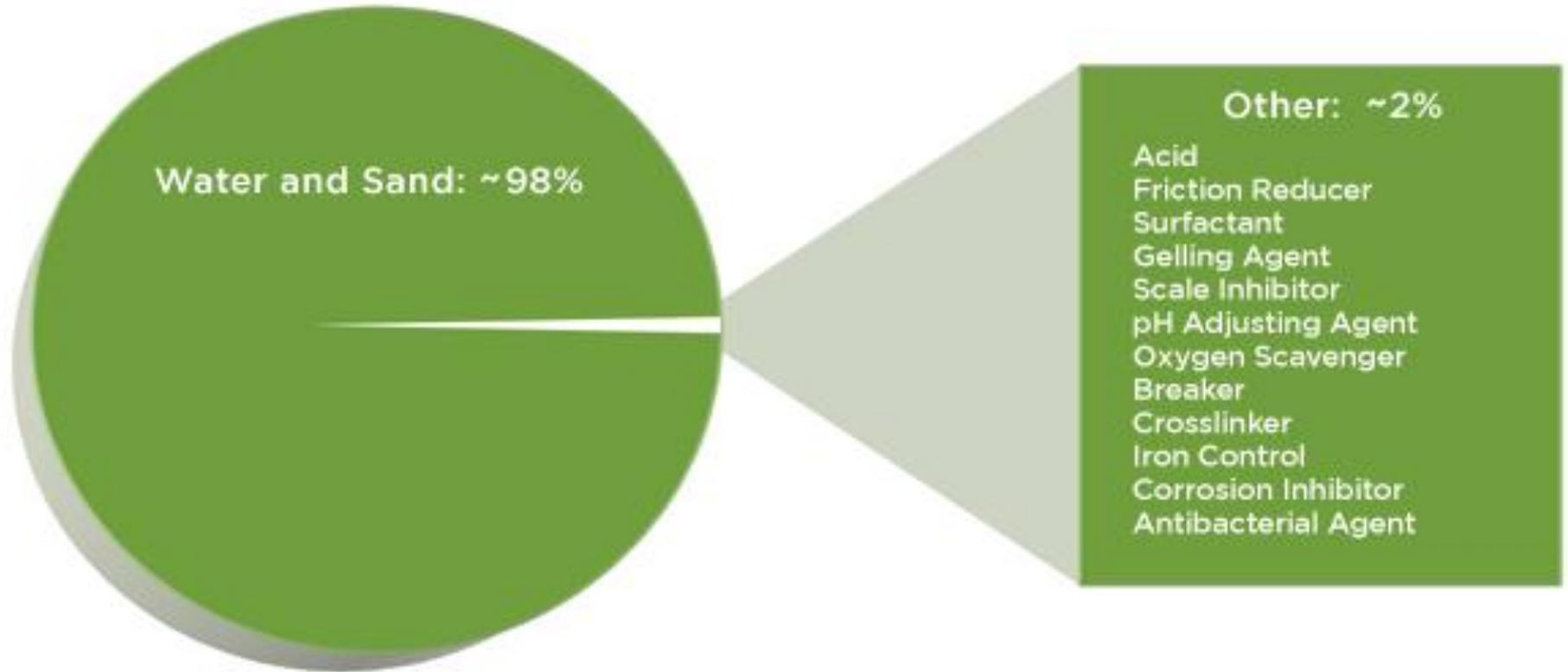
PRODUCTION CASING

SHALLOW PRODUCING ZONE

INTERMEDIATE PRODUCING ZONE

TARGET PRODUCING ZONE

# What are the Chemicals and Additives Used in the Fracturing Fluid? (www.FracFocus.org)



# Chemicals and Additives

Product	Main Ingredient	Purpose	Other Common Uses
Water		Expand fracture and deliver sand.	<b>Municipal, agricultural, manufacturing, etc.</b>
Sand		Props the fractures open so that oil/gas can escape.	<b>Drinking water filtration, play sand, concrete and brick mortar.</b>
Acid	Hydrochloric acid or muriatic acid.	Helps dissolve minerals and initiate cracks in the rock.	<b>Swimming pool chemical, cleaner and eye drops.</b>
Antibacterial agent	Glutaraldehyde	Eliminates bacteria in the water that produces corrosive by-products.	<b>Disinfectant; Sterilizer for medical and dental equipment.</b>
Breaker	Ammonium persulfate	Allows a delayed breakdown of the gel.	<b>Used in hair coloring, as a disinfectant, and in the manufacture of common household plastics.</b>
Crosslinker	Borate salts	Maintains fluid viscosity as temperature increases.	<b>Used in laundry detergents, hand soaps and cosmetics.</b>
Gel	Guar gum or hydroxyethyl cellulose	Thickens the water in order to suspend the sand.	<b>Thickener used in cosmetics, baked goods, ice cream, toothpaste, sauces and salad dressings.</b>
Clay stabilizer	Potassium chloride	Creates a brine carrier fluid.	<b>Used in low-sodium table salt substitute, medicines and IV fluids.</b>
pH adjusting agent	Sodium or potassium carbonate	Maintains the effectiveness of other components, such as crosslinkers.	<b>Used in laundry detergents, soap, water softener and dishwasher detergents.</b>
Scale inhibitor	Ethylene glycol	Prevents scale deposits in the pipe.	<b>Used in household cleaners, de-icer, paints and caulk.</b>
Surfactant	Isopropanol	Used to increase the viscosity of the fracture fluid.	<b>Used in glass cleaner, multi-surface cleaners, antiperspirant, deodorants and hair color.</b>

# Chemicals and Additives



Wellbore integrity isolates fracture fluids.

- Fluid that is returned to the surface is adequately stored in lined pits or steel tanks until proper disposal.
- Material handling on the surface is in accordance with requirements and long-standing industry practices.
- All chemicals used have Material Safety Data Sheets (MSDS) available for review on well site.

# What are the Water Volumes Used?

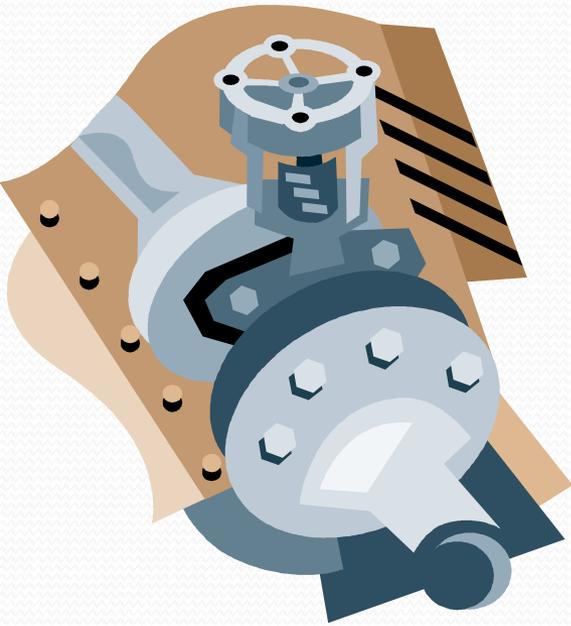
Typically in Nevada, 150,000–450,000 gallons is needed for fracture stimulation. 30-40% of this will return to surface.

- Use is temporary, not a long term commitment.
- The amount of new water can be reduced when fracture fluids are recycled.
- Other water use should be considered with respect to current water uses (i.e. agricultural, municipal, power generation, etc.).

*NOTE: A typical “Hydraulic Fracture Job” uses roughly the same amount of water as watering a golf course for two days.*



# What is Done with The Fluid that comes back to the Surface?



## **Disposal:**

- Treatment/Reuse
- Underground injection well
- Commercial disposal facilities
- Surface evaporation pits or ponds

# Federal Regulations – Where are we?

## **Round 1:**

**On May 11, 2012 the Bureau of Land Management (BLM) published in the Federal Register a proposed rule entitled “Oil and Gas, Well Stimulation, Including Hydraulic Fracturing, on Federal and Indian Lands”.**

- September 2012: Public Comment Period Closed
- October-May 2012: Over 177,000 Comments were received and reviewed; resulting in a revision to the Proposed Ruling.

## **Round 2:**

**On May 16, 2013, the U.S. Interior Department’s Bureau of Land Management (BLM) issued a Draft Proposal for regulating hydraulic fracturing activities on Federal and Indian Lands.**

- August 2013: Public Comment Period Closed
- September 2013 to July 2014: 1.35M comments received and reviewed.
- The proposed rule is currently under the DOI Office of the Secretary review, it will then go to the Office of Management and Budget (OMB) for final review (OMB has 60 – 90 days to make a decision; either accept it OR send it back to the BLM for further revisions / clarification).

# State of Nevada, Division of Minerals

**In the 2013 Legislative session, NRS 522.119 (SB390) required the Division of Minerals and the Division of Environmental Protection to jointly develop a hydraulic fracturing program to:**

- Assess the effects of hydraulic fracturing on the waters of the state of Nevada;
- Require a person who engages in hydraulic fracturing to disclose each chemical used to engage in hydraulic fracturing (FracFocus.org); and
- Provide for notice to members of the general public concerning activities relating to hydraulic fracturing in this state.

**\*\*Just this morning, there was a public hearing, right here in Elko, hosted by the State of Nevada, Division of Minerals regarding the Amendment of Regulations addressing Hydraulic Fracturing in Nevada.**

# Summary

- The Federal Bureau of Land Management in coordination with the State of Nevada, Division of Minerals place great emphasis on protecting groundwater.
- Current well construction requirements consist of installing **multiple layers of protective steel casing surrounded by cement**. These elements are specifically designed and installed to **protect freshwater aquifers**.
- The measures required by both State and Federal regulatory agencies in the exploration and production of “unconventional plays” or “deep shale formations” have been very effective in protecting drinking water aquifers from contamination attributable to hydraulic fracturing, or “fracing”.
- Based on scientific available data of State and Federal agencies, **there is not a documented case of drinking water contamination related to hydraulic fracturing**.
- Furthermore, the Ground Water Protection Council (GWPC) issued a report in April of 2009 stating that the potential for fracing deep shale wells to impact groundwater is extremely remote, **as low as one in 200 million**.

# Questions?

