

# **BLM Update - Proposed Hydraulic Fracturing Rule and Additional Environmental Data Requirements\***

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Search and Discovery Article #80382 (2014)\*\*

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## **Abstract**

BLM recognizes and understands the public's concerns related to hydraulic fracturing. In May 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. The BLM used the comments on that draft to make improvements, and in May 2013, published a revised proposed rule incorporating those comments. Key issues in the updated draft included: the use of an expanded set of cement evaluation tools to help ensure that usable water zones have been isolated and protected from contamination; and more detailed guidance on how trade secrets claims will be handled, modeled on the procedures promulgated by the State of Colorado. The revised proposed rule also provided opportunities for the BLM to coordinate standards and processes with individual States and tribes to reduce administrative costs and to improve efficiency. After receiving more than 1.35 million comments on that revised proposed rule, BLM is currently preparing a final rule that will consider the additional comments. A final rule is expected to be published January 2015.

In addition, to facilitate a more thorough analysis of effects of these activities on public lands, BLM California has begun asking oil and gas operators for additional data to be incorporated into Applications for Permits to Drill (APDs). These data include information related to water management (aquifers, volumes and source of fluids, along with disposal of flowback fluids) and air quality.

# BLM Update Proposed Hydraulic Fracturing Rule and Additional Environmental Data Requirements

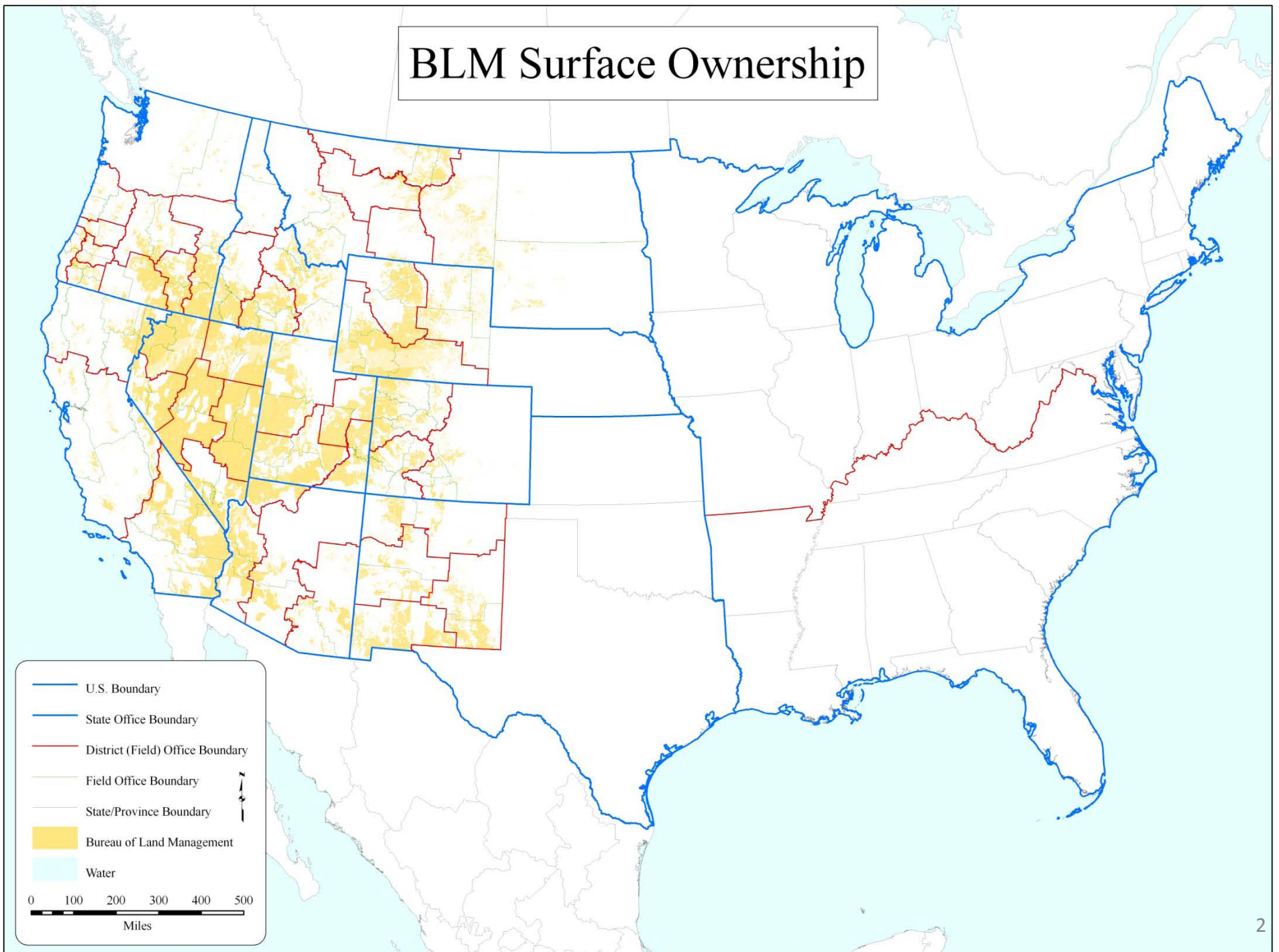
*2014 Pacific Section AAPG – Joint Annual Meeting*



U. S. Department of the Interior  
Bureau of Land Management – [www.blm.gov](http://www.blm.gov)  
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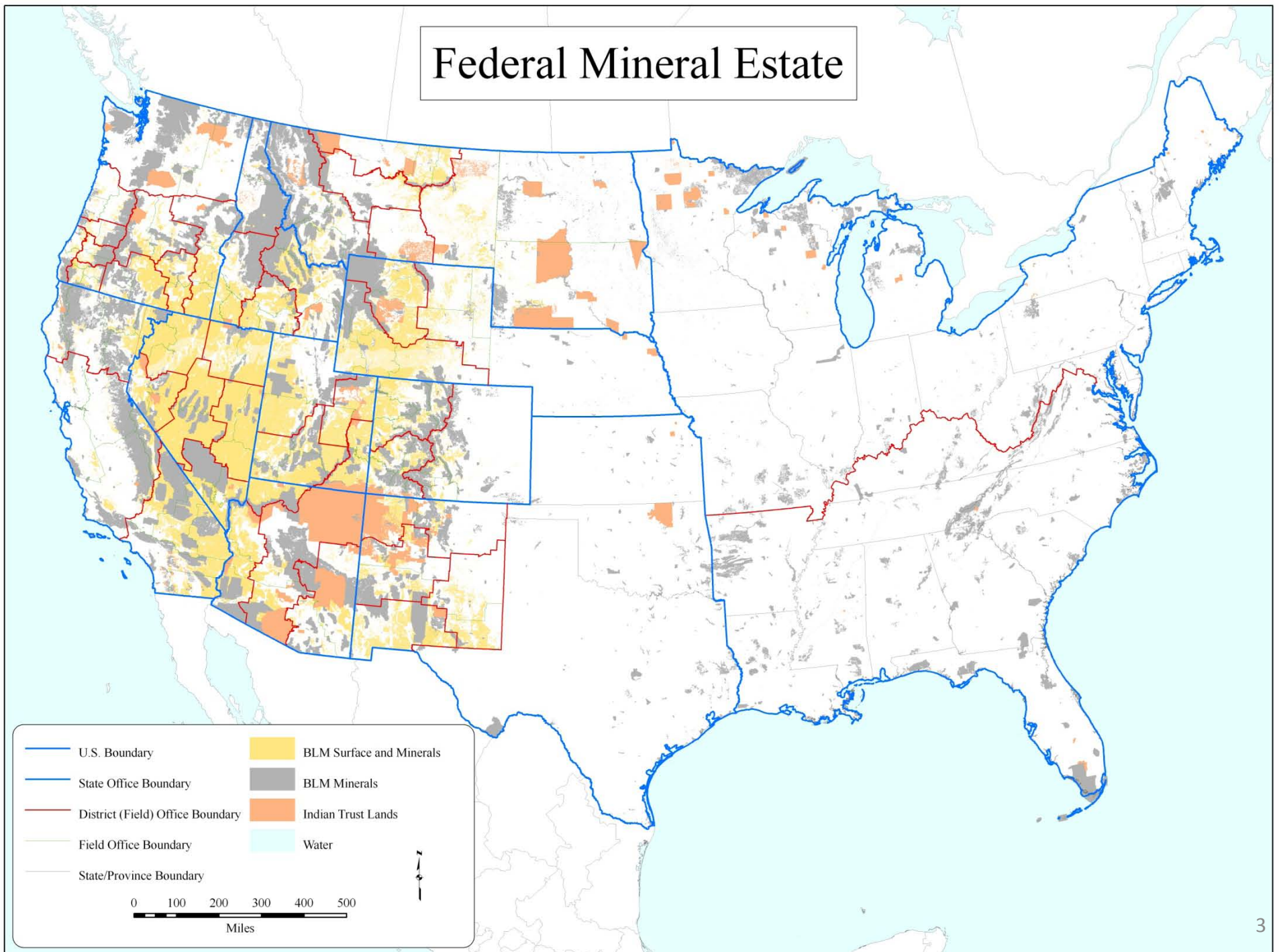


# BLM Surface Ownership





# Federal Mineral Estate



# Significant Management Issues

- Meeting the Nation's Energy Needs
- Stewardship of National Landscape Conservation System Lands
- Management of Special Areas
- Land Use Planning
- Management of T&E and Special Status Species
- Recreation and Transportation
- Fire Management

# Minerals Overview

- BLM Manages Mineral estate on 700 million acres of Public Land (47 million in CA)
- Largest Mineral owner in the U.S.
- Multiple Use Mandate
- Objective: Promote environmentally responsible energy development

# BLM Bakersfield Field Office

## Minerals Division

- Oil and gas operations statewide
  - Down hole Permitting, inspection and enforcement on all federal leases including leases on Forest Service lands
- 22 oil and gas employees- (Petroleum Engineers, Geologists, Realty Specialists, HazMat Specialists, Petroleum Engineering Technicians)

# California Operations

- 8% Federal – 92% Fee
- Oil and gas operations focused in California's Central Valley  
(Bakersfield Field Office)
- Largely mature oil fields
  - Very close well spacing
  - Very large % in tertiary (steam) recovery



# BLM Oil and Gas Properties in California

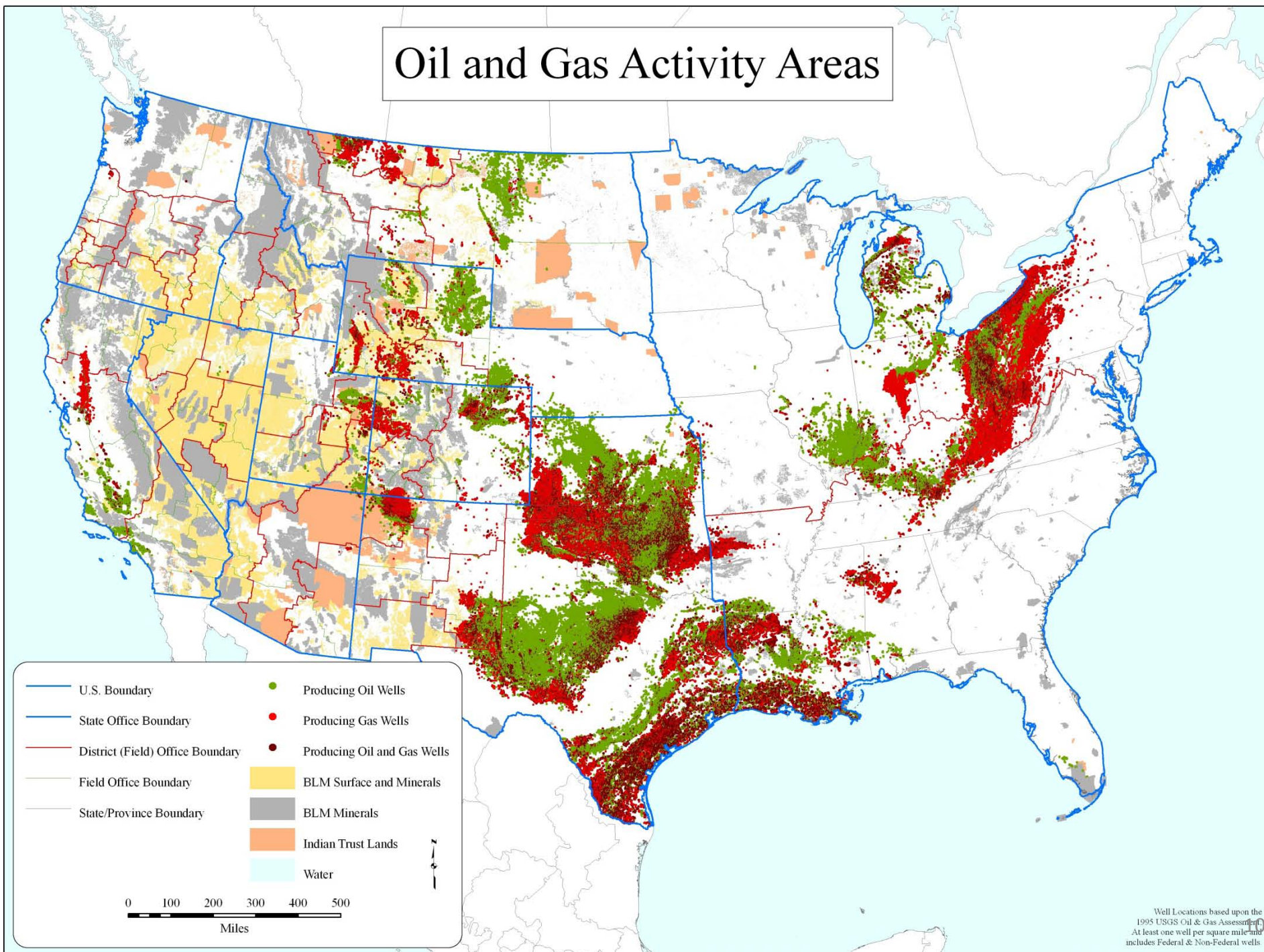
- 230 producing leases with nearly 9,000 wells
- This year federal leases in CA are averaging over 44,000 bbls of oil and 19 million cubic feet of natural gas per day.
- Several BLM leases in CA are among the the highest producing onshore federal leases in the lower 48



# Other Regulatory Guidance and Orders

- ❖ **Rules and Policy driven by**
  - Audits, primarily GAO and OIG plus internal reviews
  - Litigation
- ❖ **Updates underway – largely 1980's and 90's guidance**
  - Onshore Order 1 (Approval of Operations, 2007)
  - Onshore Order 2 (Drilling)
  - Onshore Orders 3 (Site Security),
  - Onshore Order 4 (Oil Measurement)
  - Onshore Order 5 (Gas Measurement)
  - Onshore Order 6 (Hydrogen Sulfide Operations)
  - Onshore Order 7 (Disposal of Produced Water)
  - Onshore Order 9 (Beneficial Use and Emission Reduction)

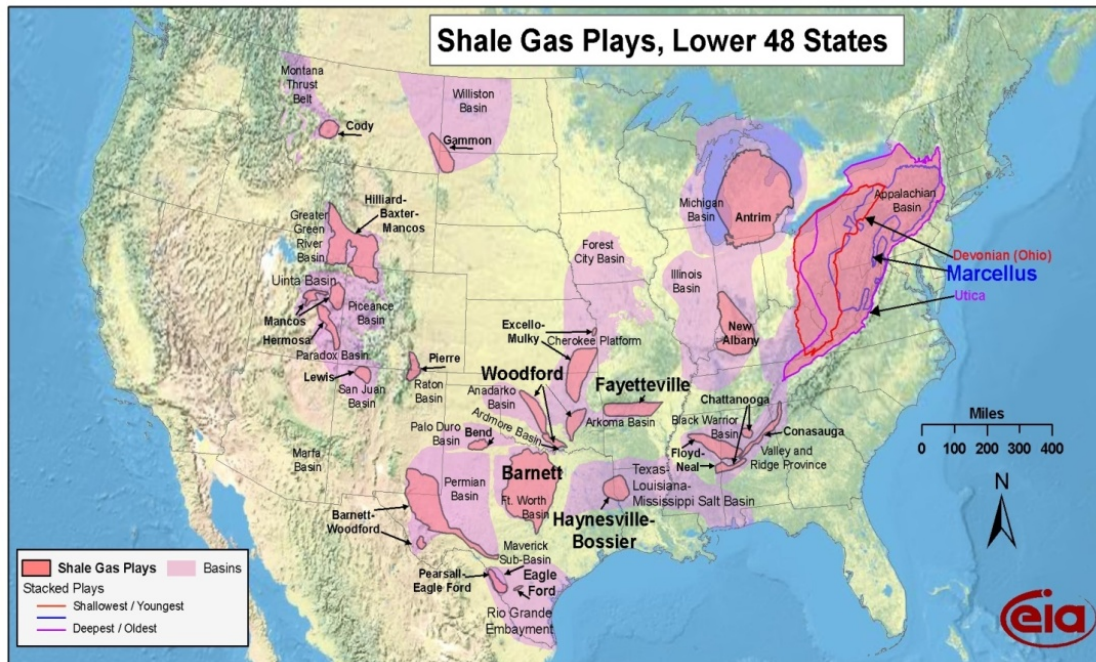
# Oil and Gas Activity Areas



Well Locations based upon the  
1995 USGS Oil & Gas Assessment  
At least one well per square mile/mi<sup>2</sup>  
includes Federal & Non-Federal wells



# A Game Changer for Domestic Energy



## ❖ World's major gas reserves:

- Qatar 1200 TCF
- Russia 400 TCF
- **US Marcellus 300 TCF**
- **US Haynesville 250 TCF**
- **US Eagle Ford (emerging)**
- **US Niobrara (emerging)**

## ❖ Bakken Shale (N.D.)

- **Largest US oil discovery since Alaska at 3.6B bbls**

## ❖ US is global leader in shale technology & development and in proven gas reserves!



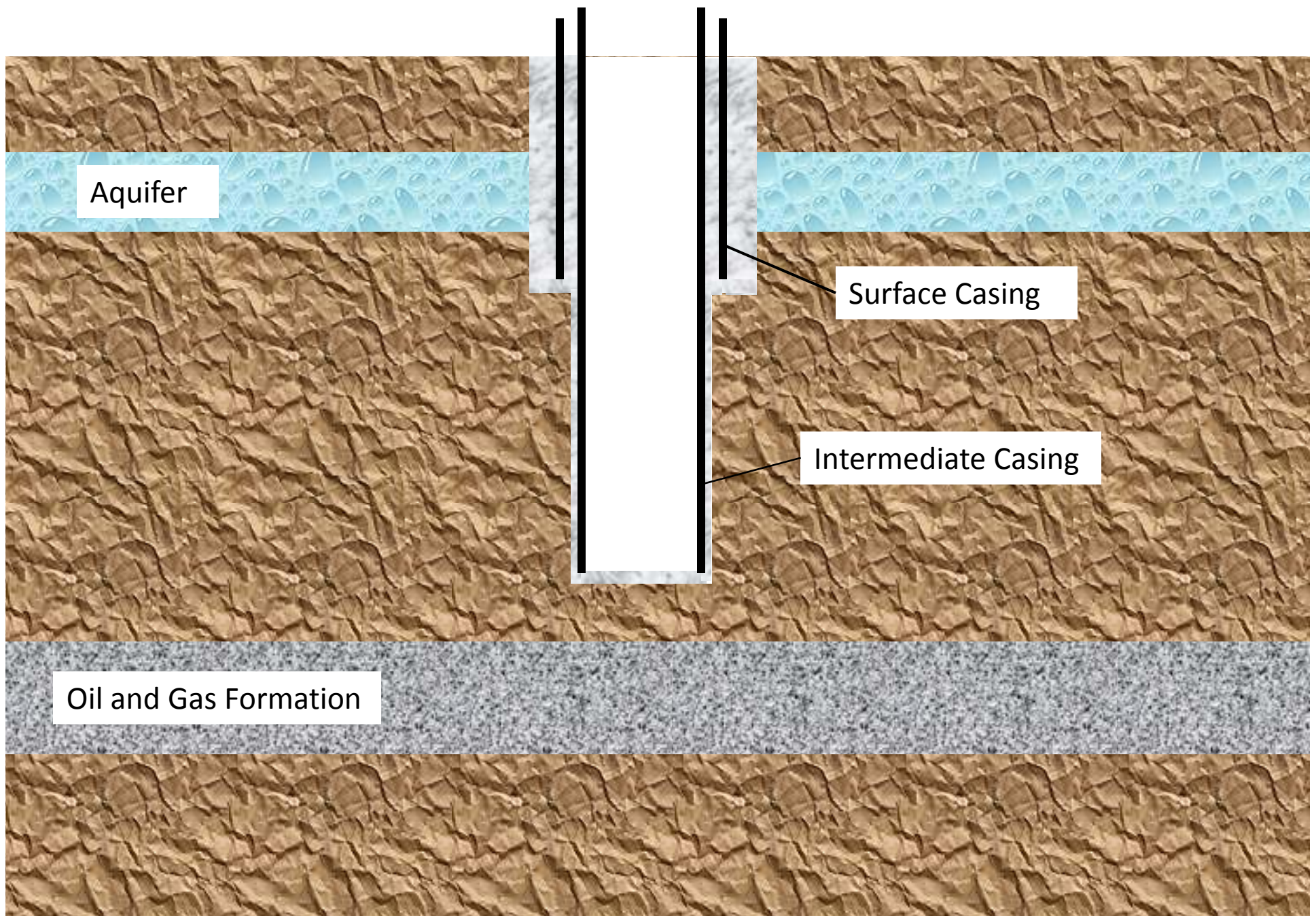


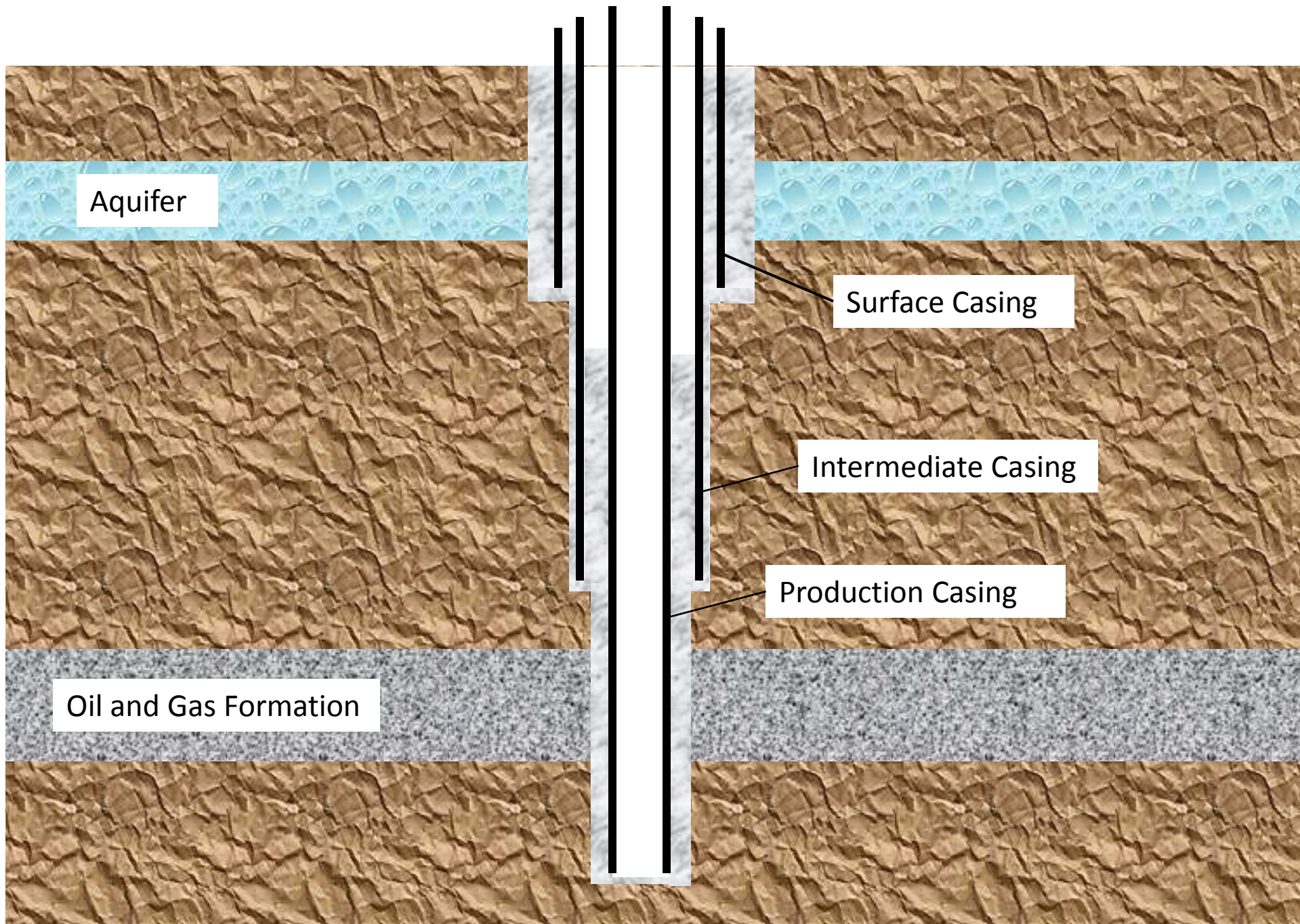
# Hydraulic Fracturing

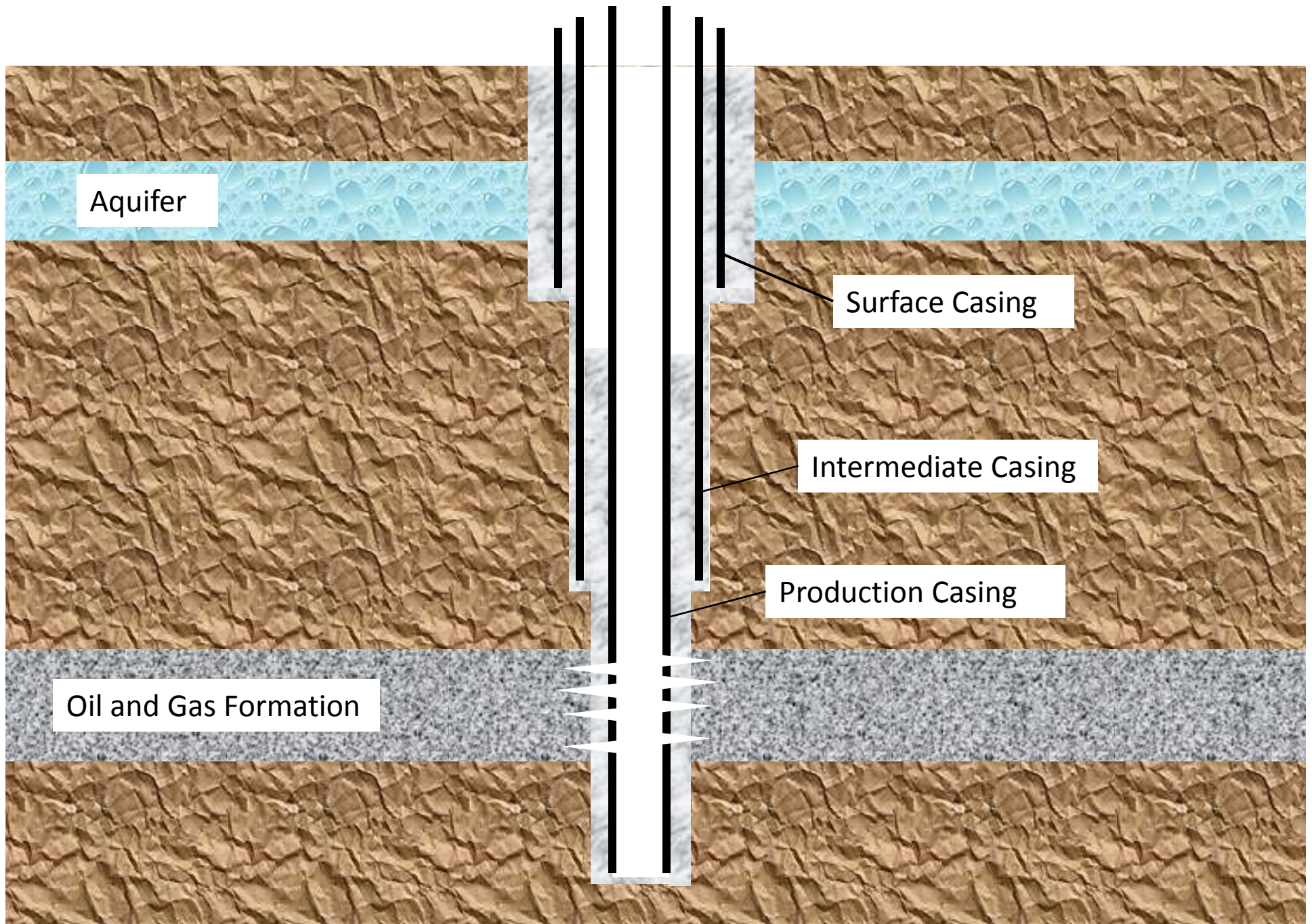
## Outline

- Basic wellbore construction
- Hydraulic fracturing – why and how
- Major areas of concern
- Federal regulations, current and proposed

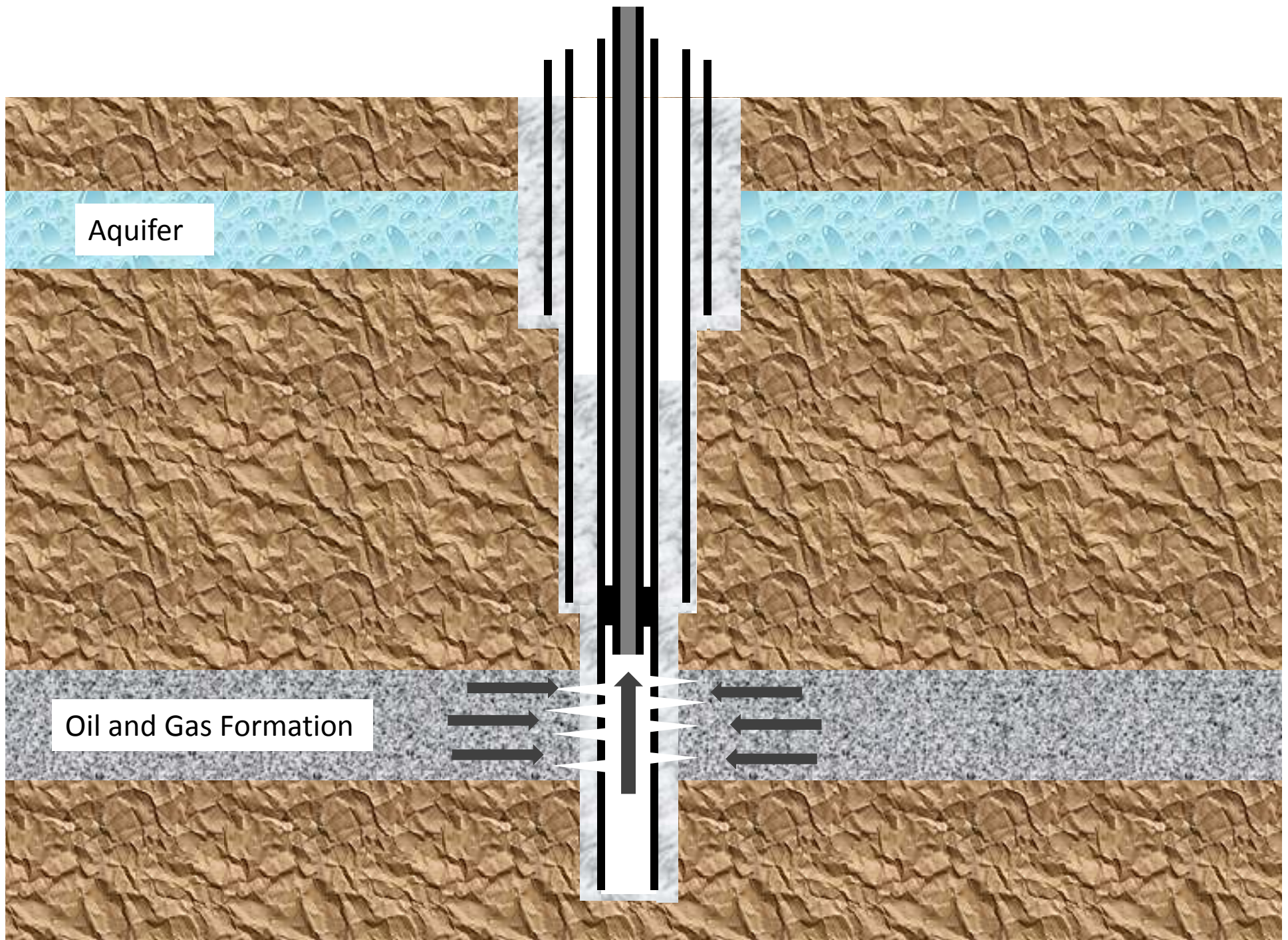
# Basic Wellbore Construction



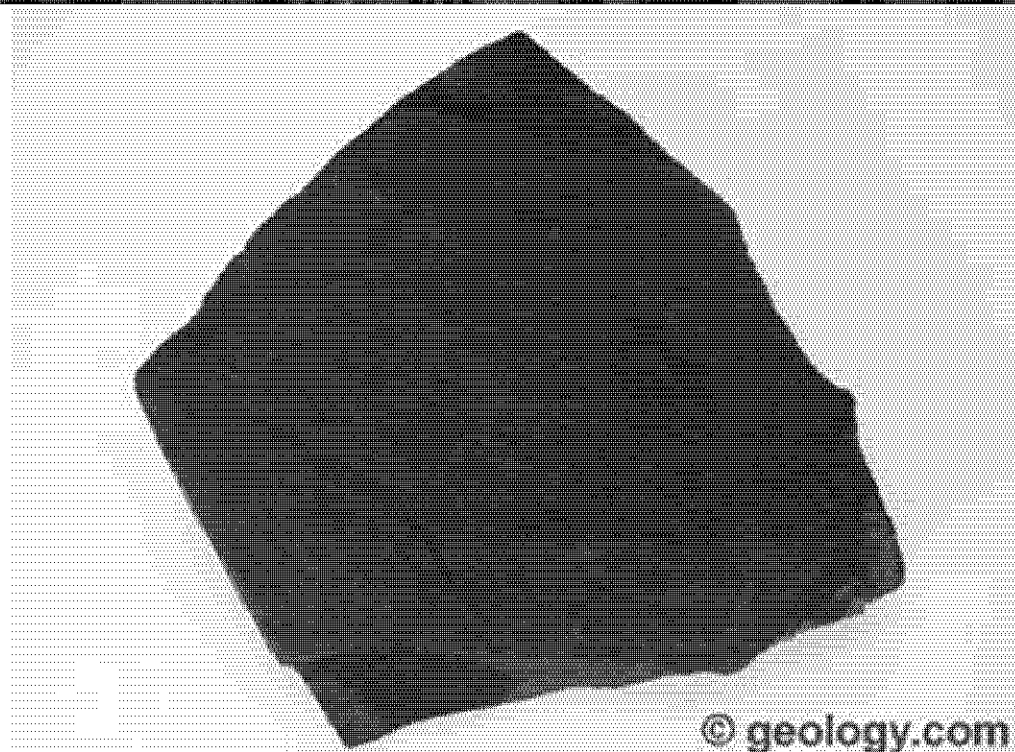
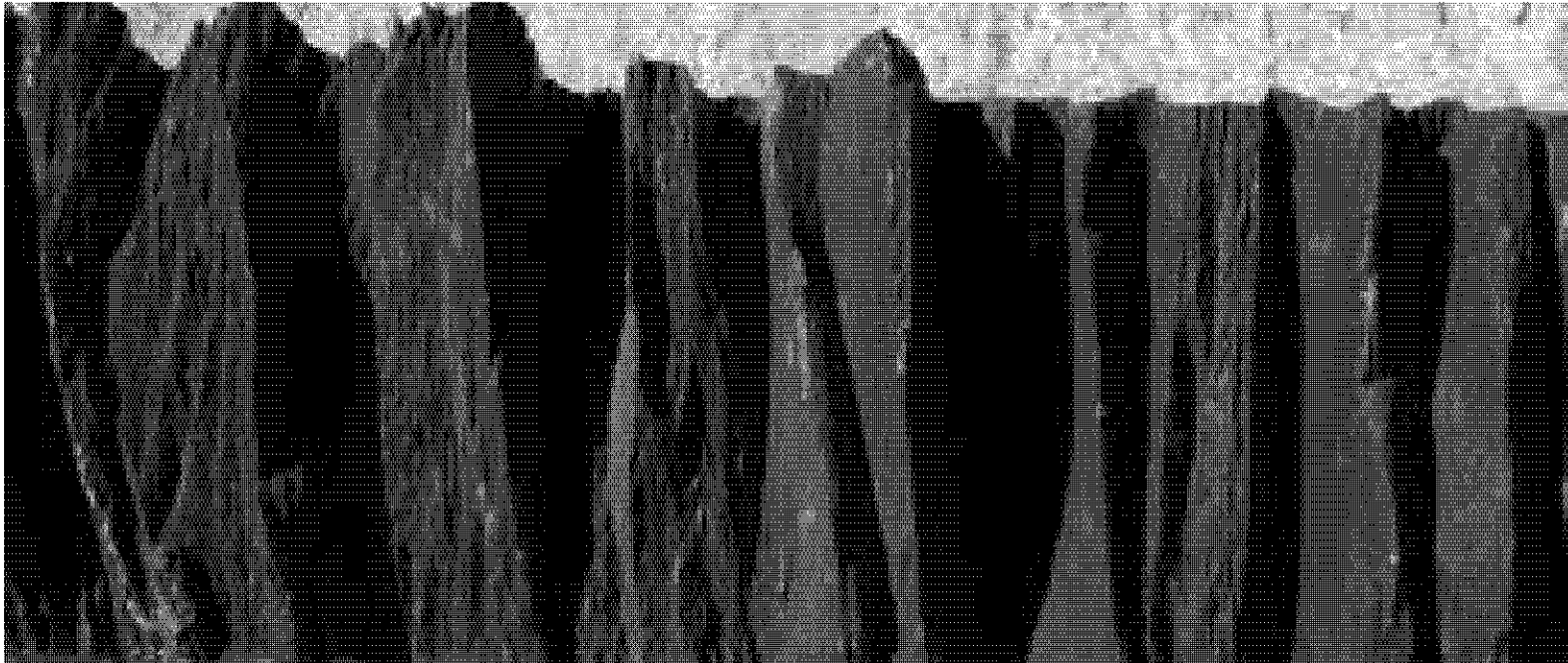








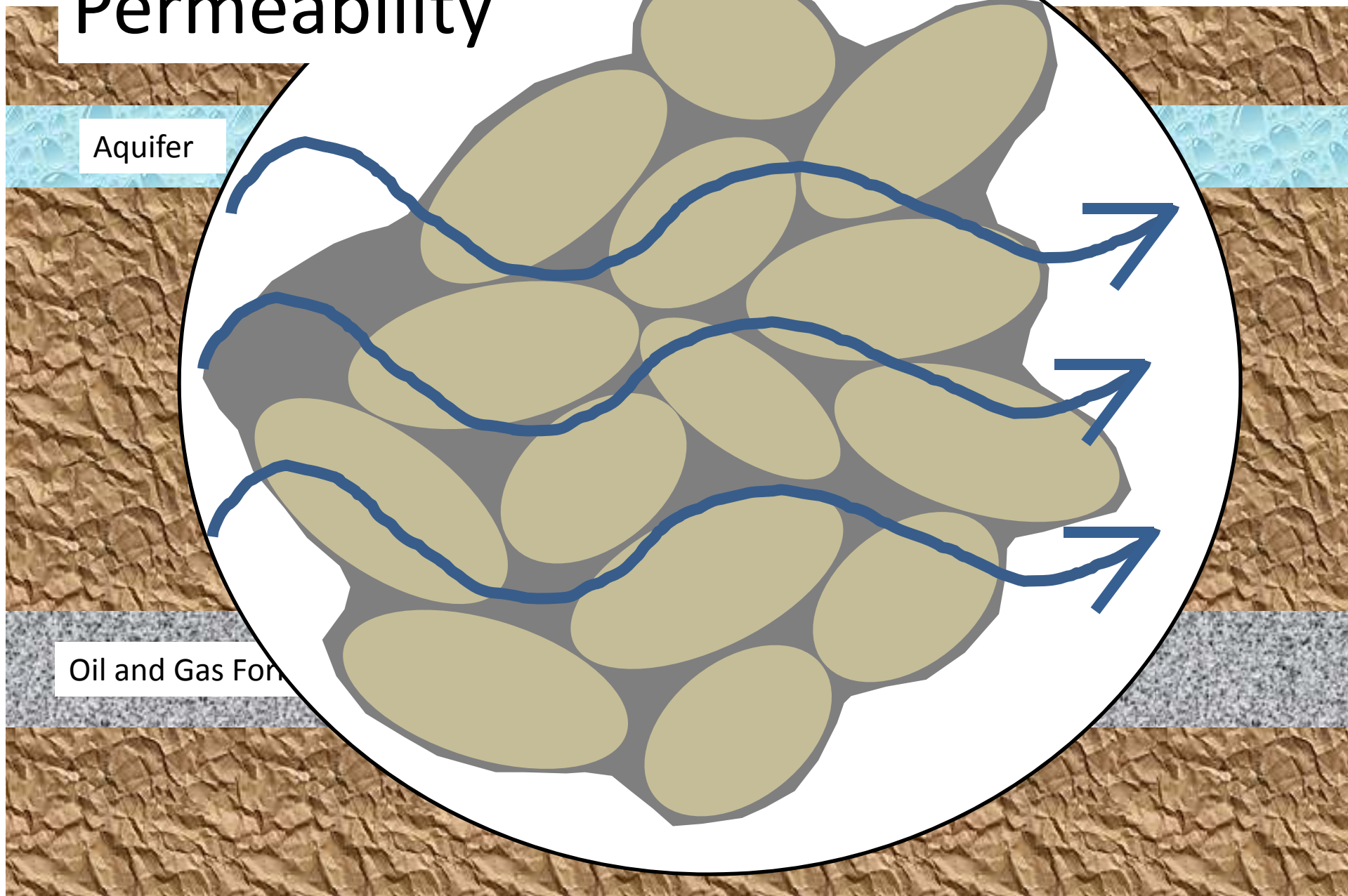
# Shale and Hydraulic Fracturing







# Permeability

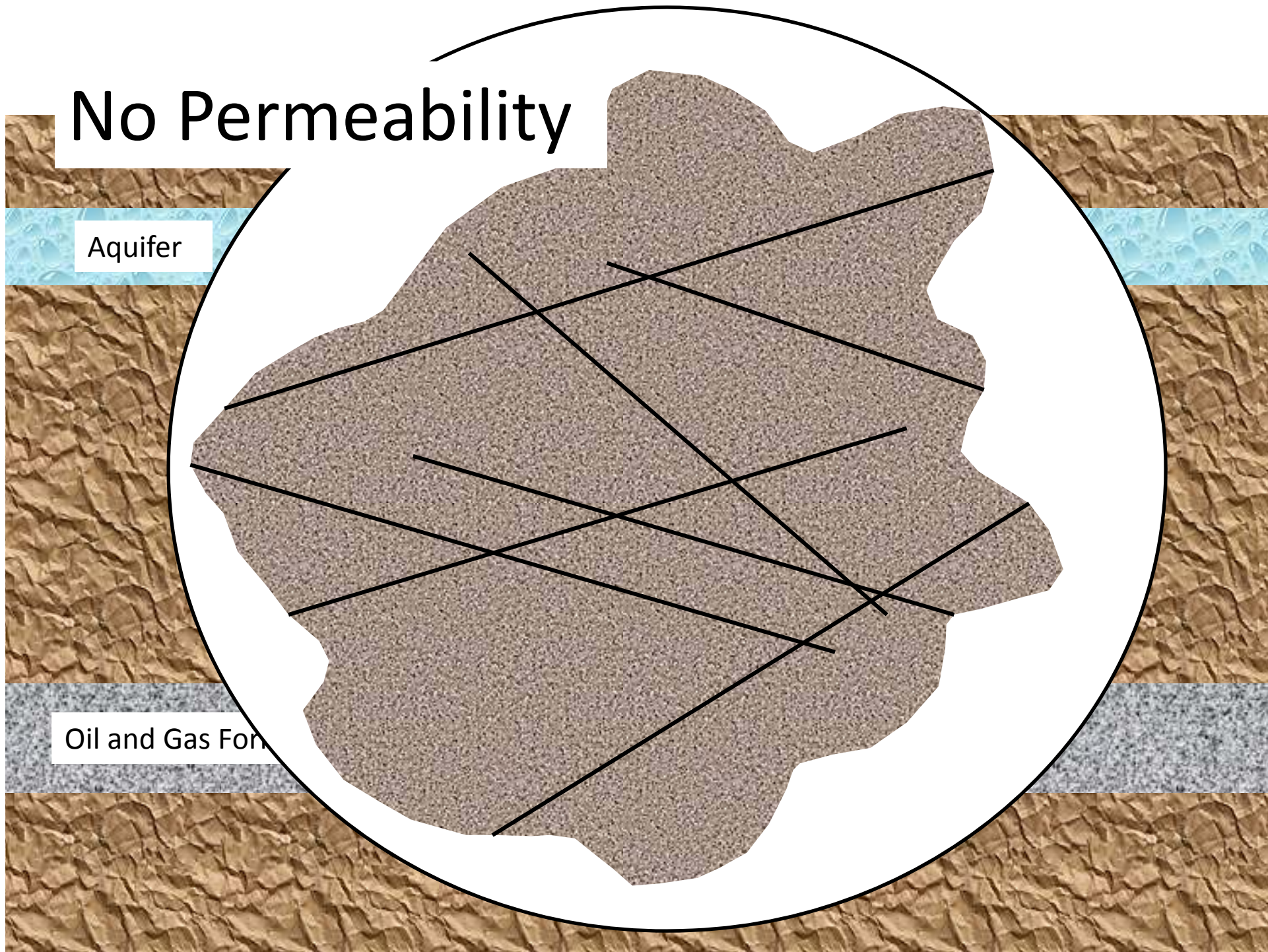




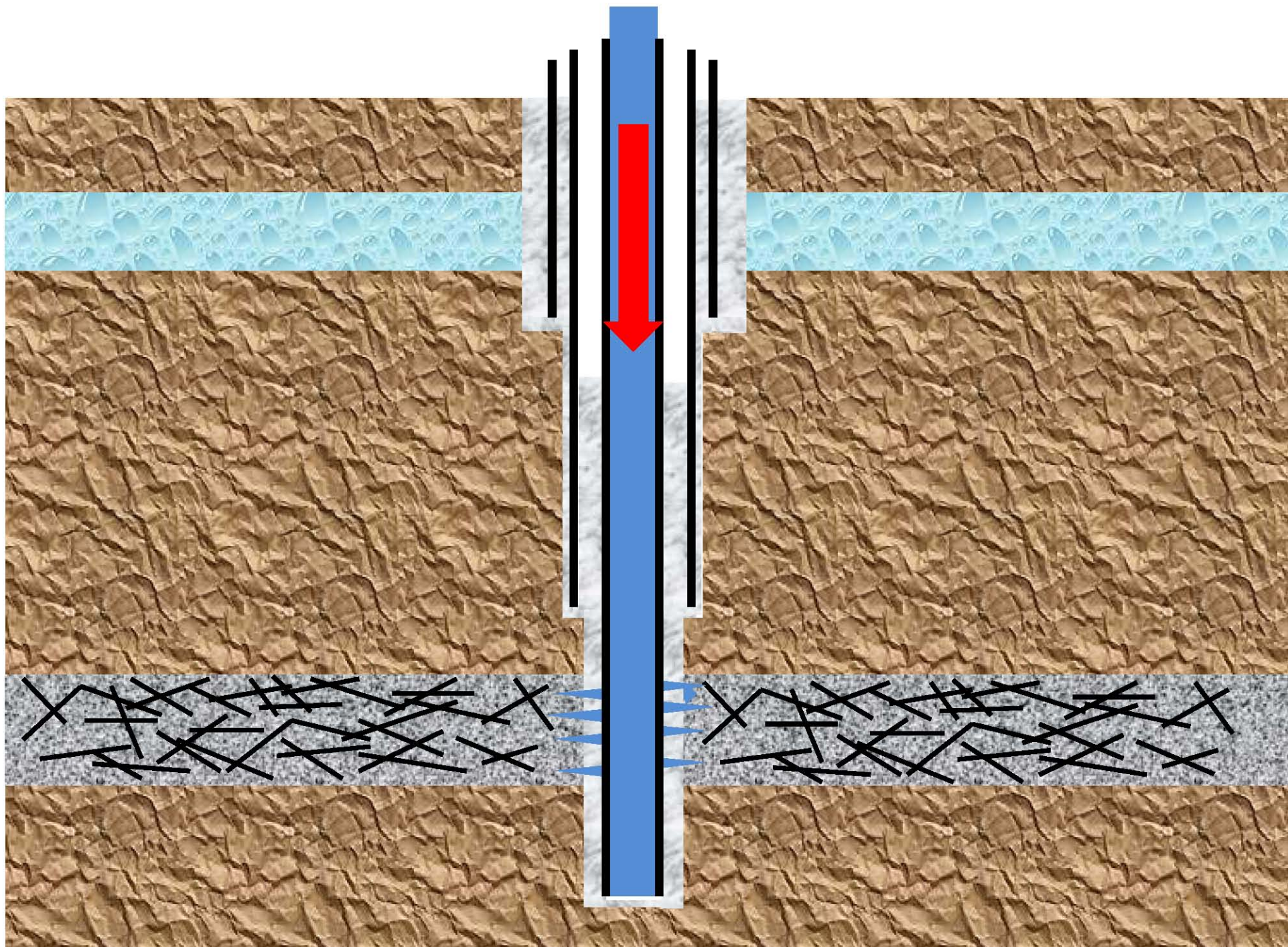
# No Permeability

Aquifer

Oil and Gas Form









# Typical Layout in Fracturing Operation



Roughly 200 tanker trucks deliver water for the fracturing process.

A pumper truck injects a mix of sand, water and chemicals into the well.

Natural gas flows out of well.

Recovered water is stored in open pits, then taken to a treatment plant.

Storage tanks

Natural gas is piped to market.

0 Feet

Water table

Well

1,000

### Hydraulic Fracturing

Hydraulic fracturing, or "fracing," involves the injection of more than a million gallons of water, sand and chemicals at high pressure down and across into horizontally drilled wells as far as 10,000 feet below the surface. The pressurized mixture causes the rock layer, in this case the Marcellus Shale, to crack. These fissures are held open by the sand particles so that natural gas from the shale can flow up the well.

2,000

3,000

4,000

5,000

6,000

7,000

Marcellus Shale

Well turns horizontal

Sand keeps fissures open

Natural gas flows from fissures into well

Shale

Fissure

Well

Mixture of water, sand and chemical agents

Fissures

The shale is fractured by the pressure inside the well.

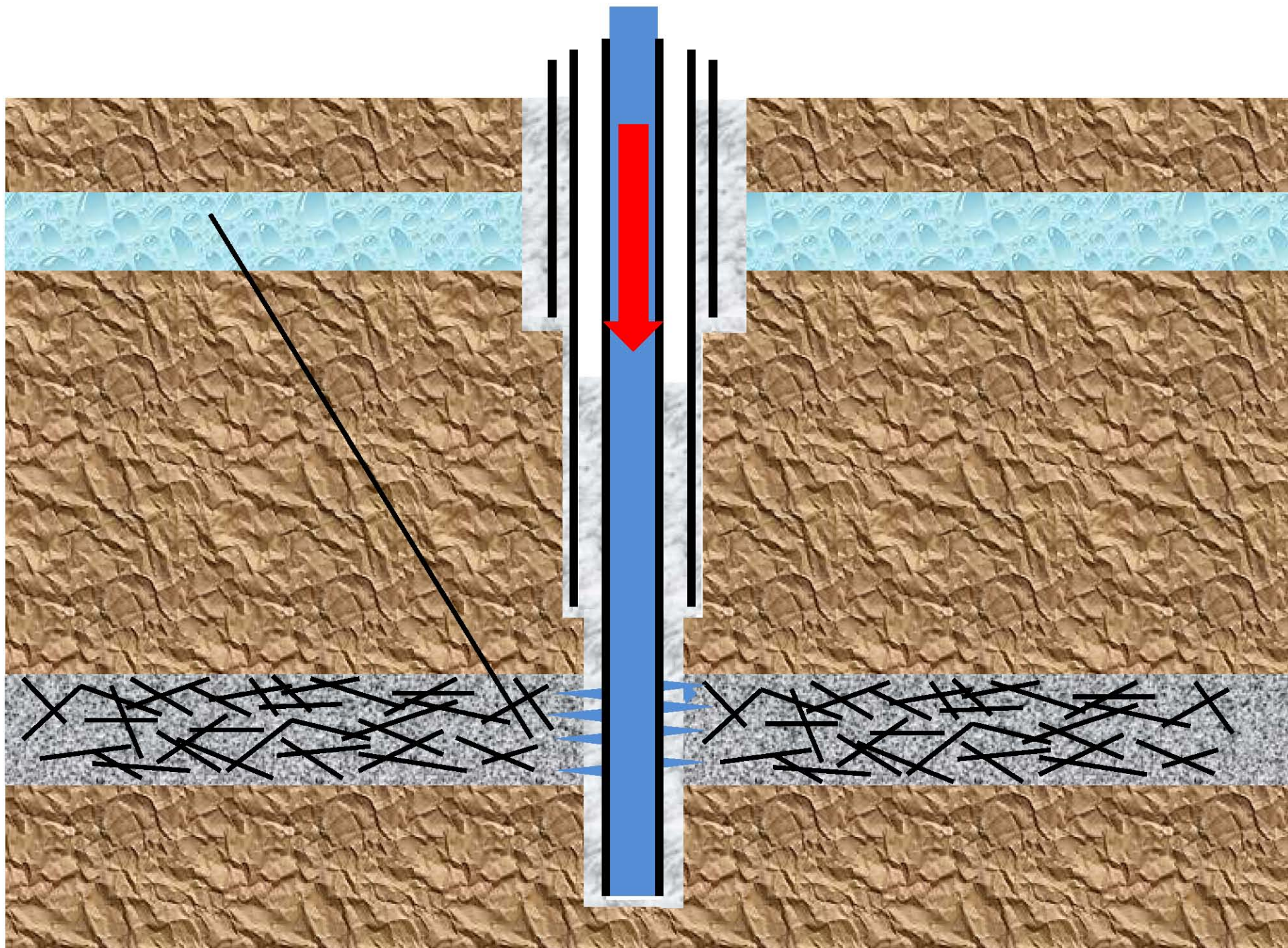


# Common Concerns

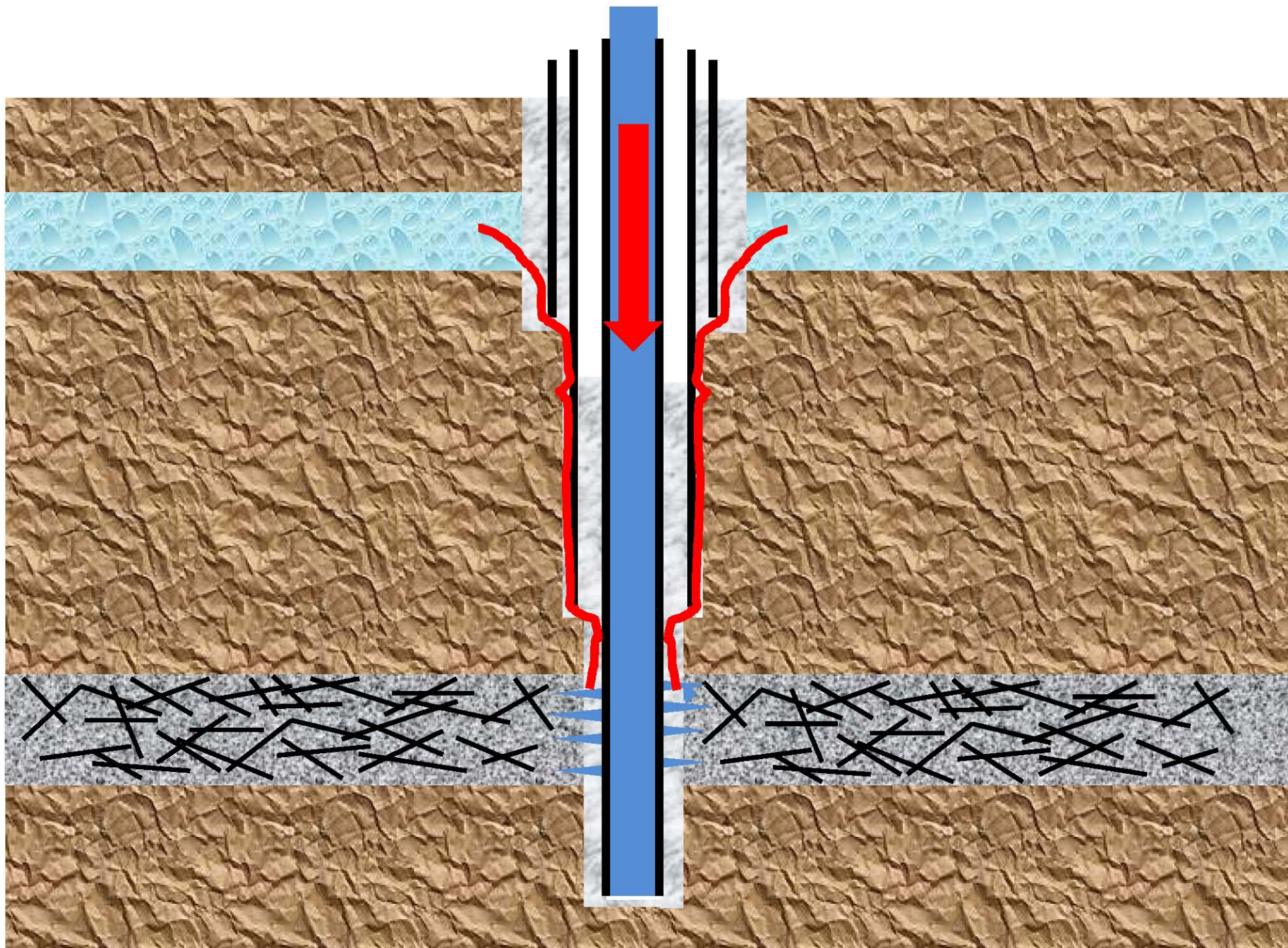


- Aquifer contamination
- Surface contamination
- Disclosure

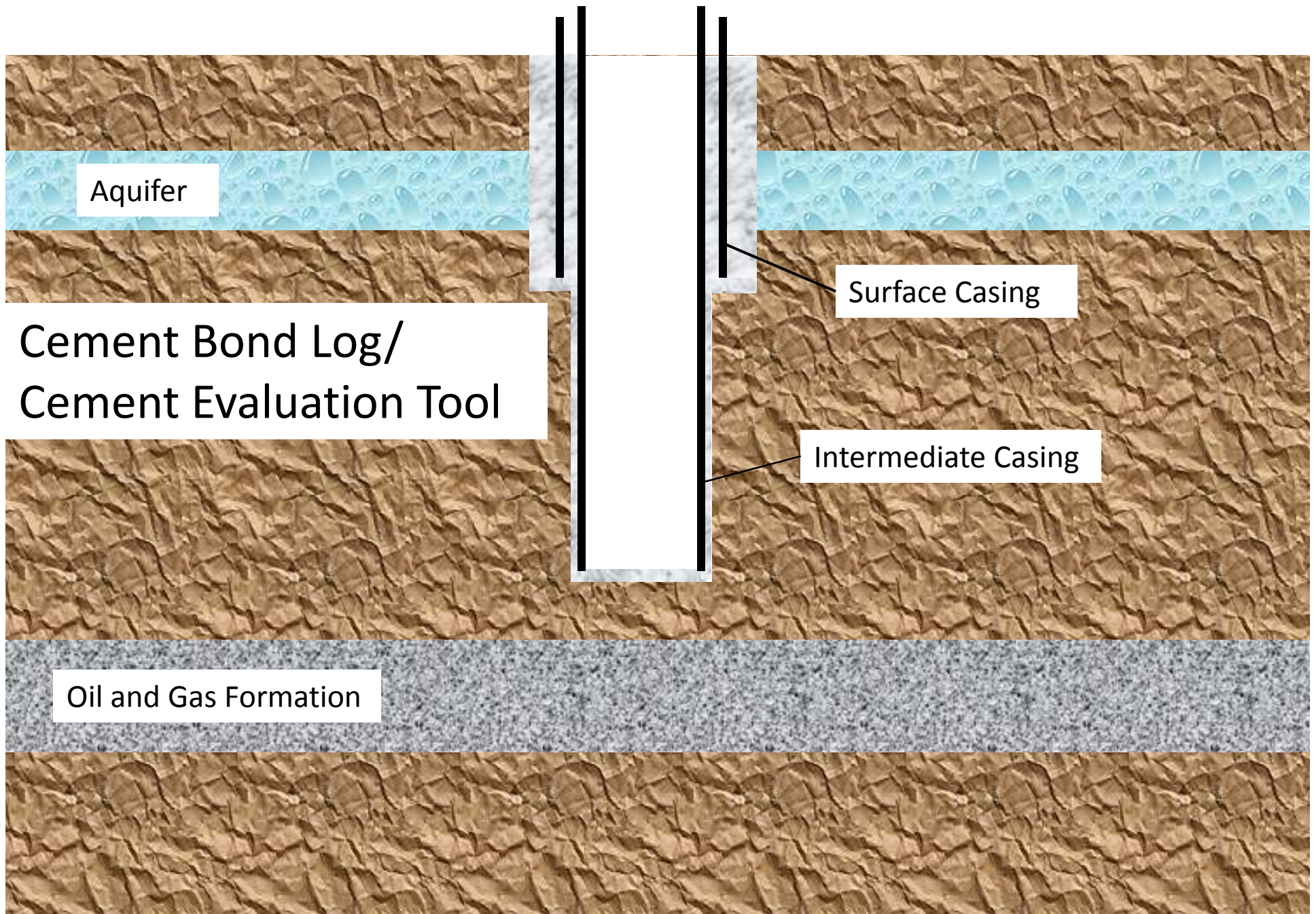


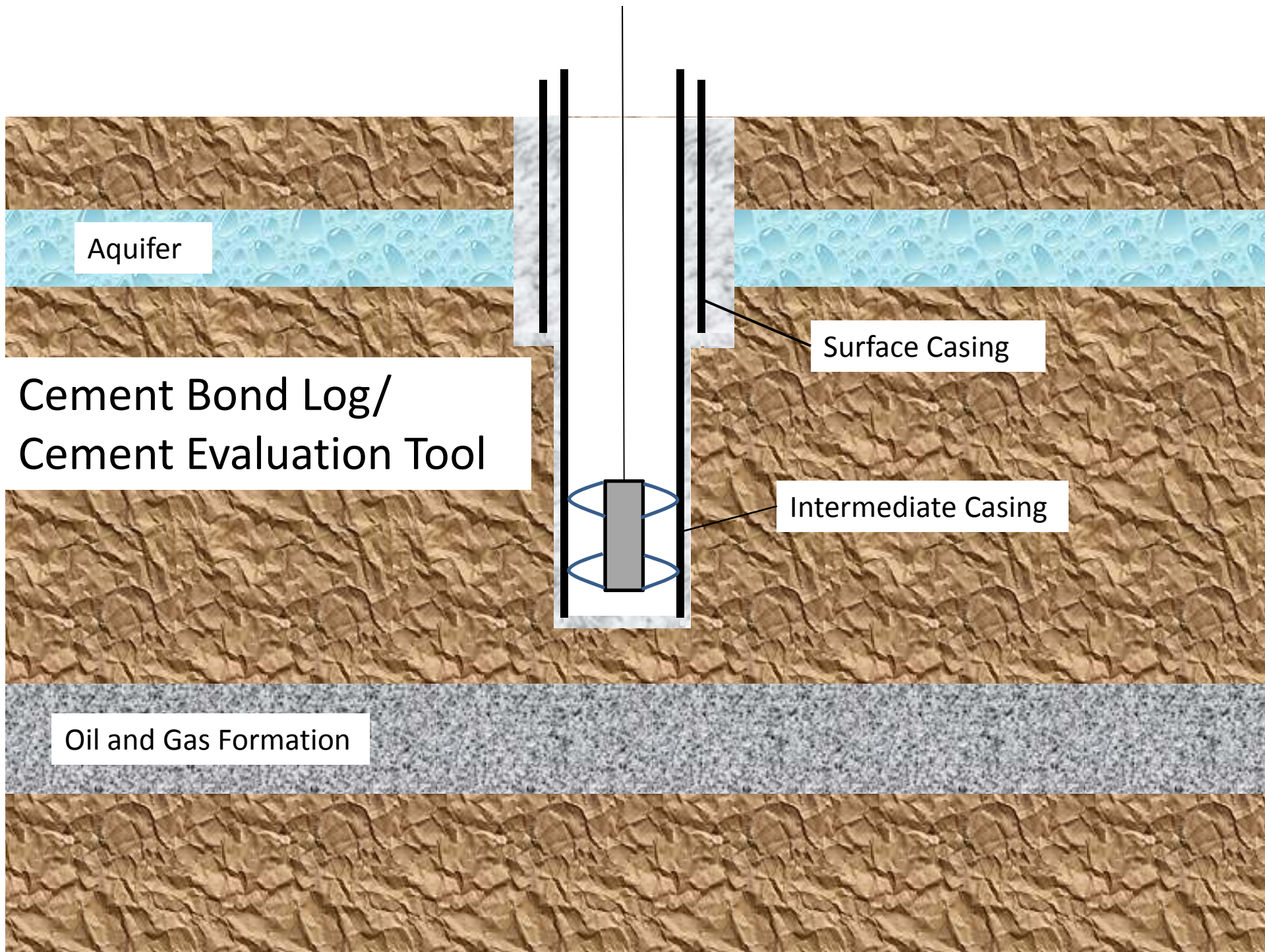




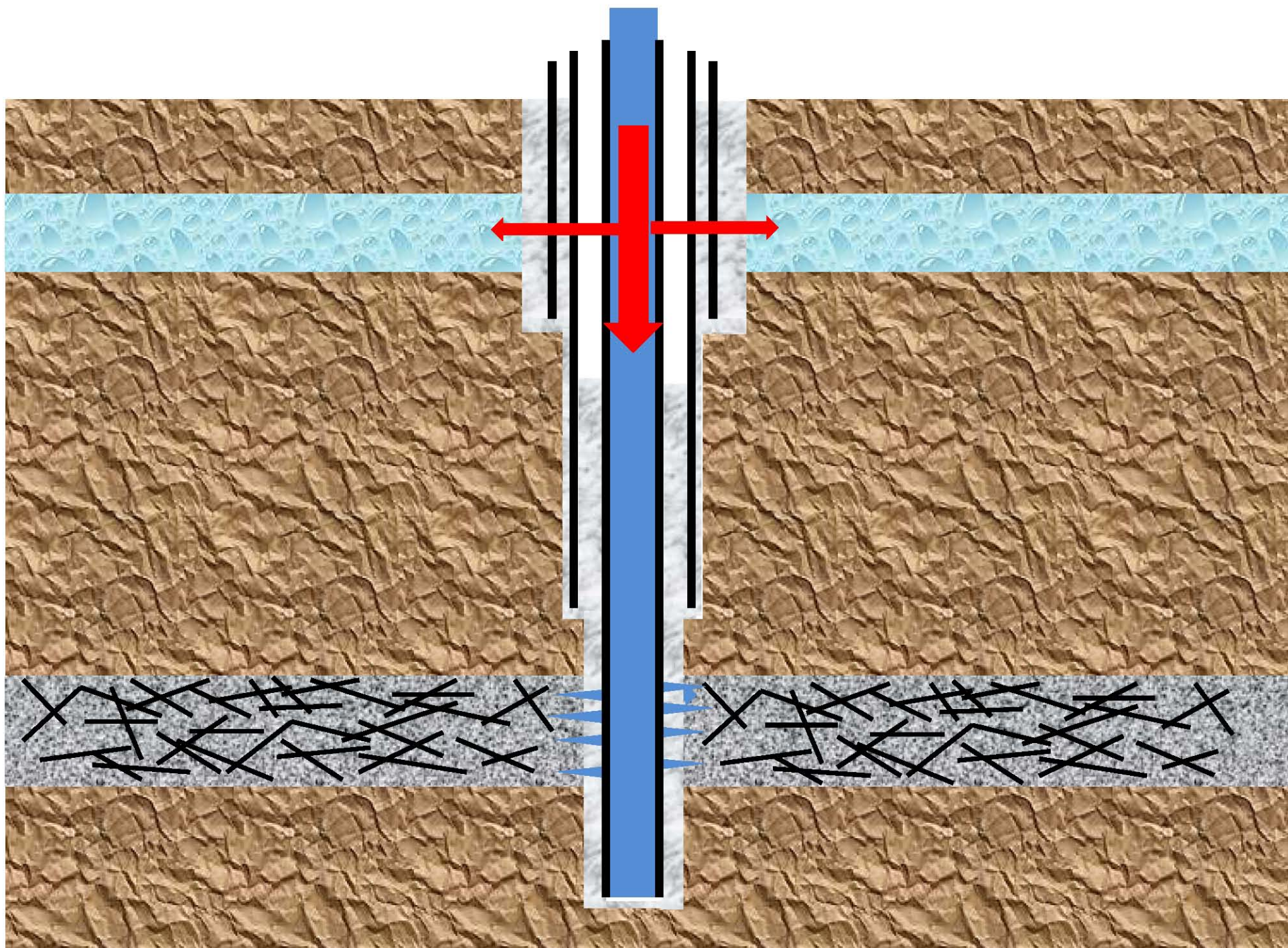










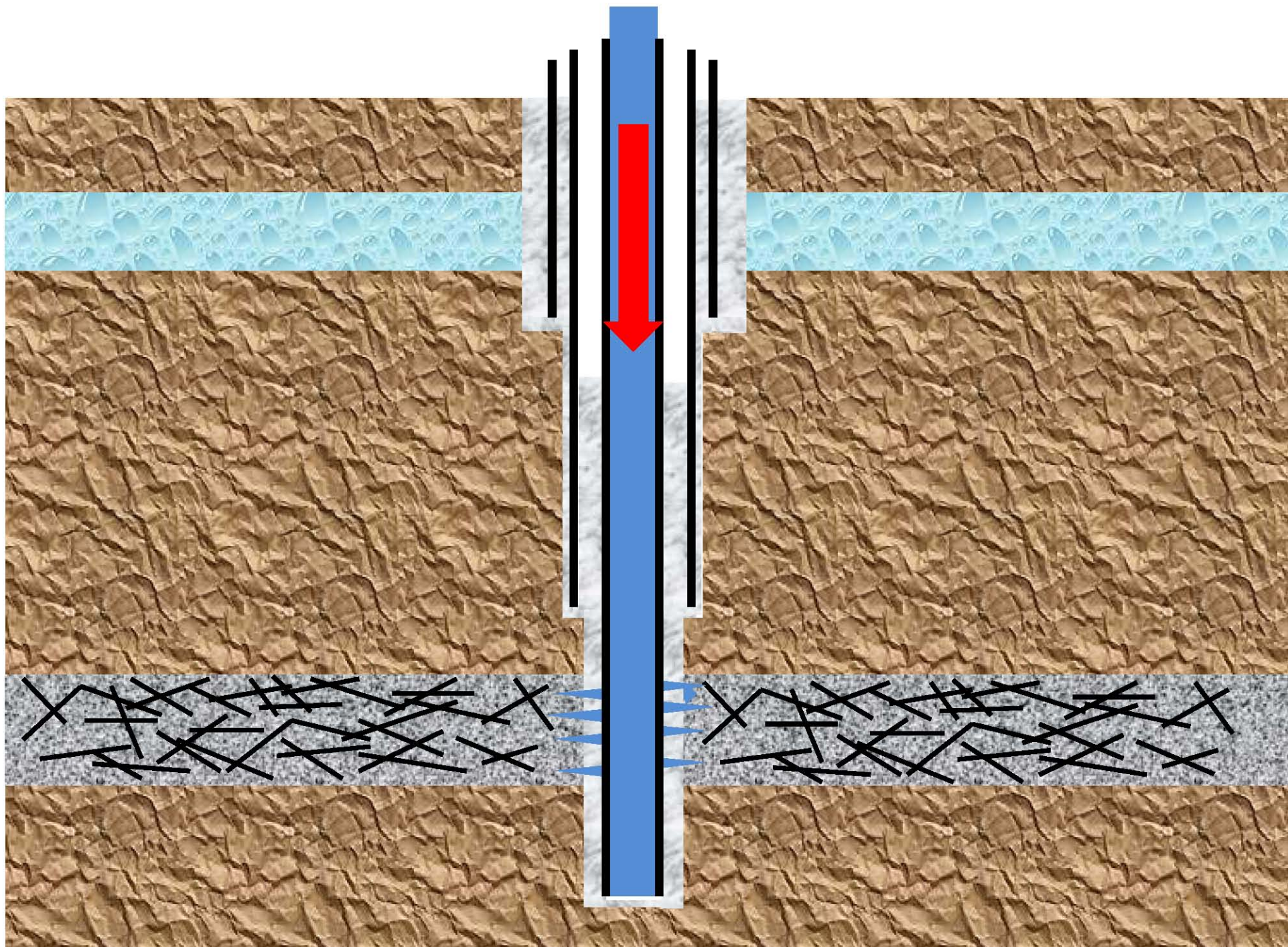


# Common Concerns

- Aquifer contamination
- Surface contamination
- Disclosure

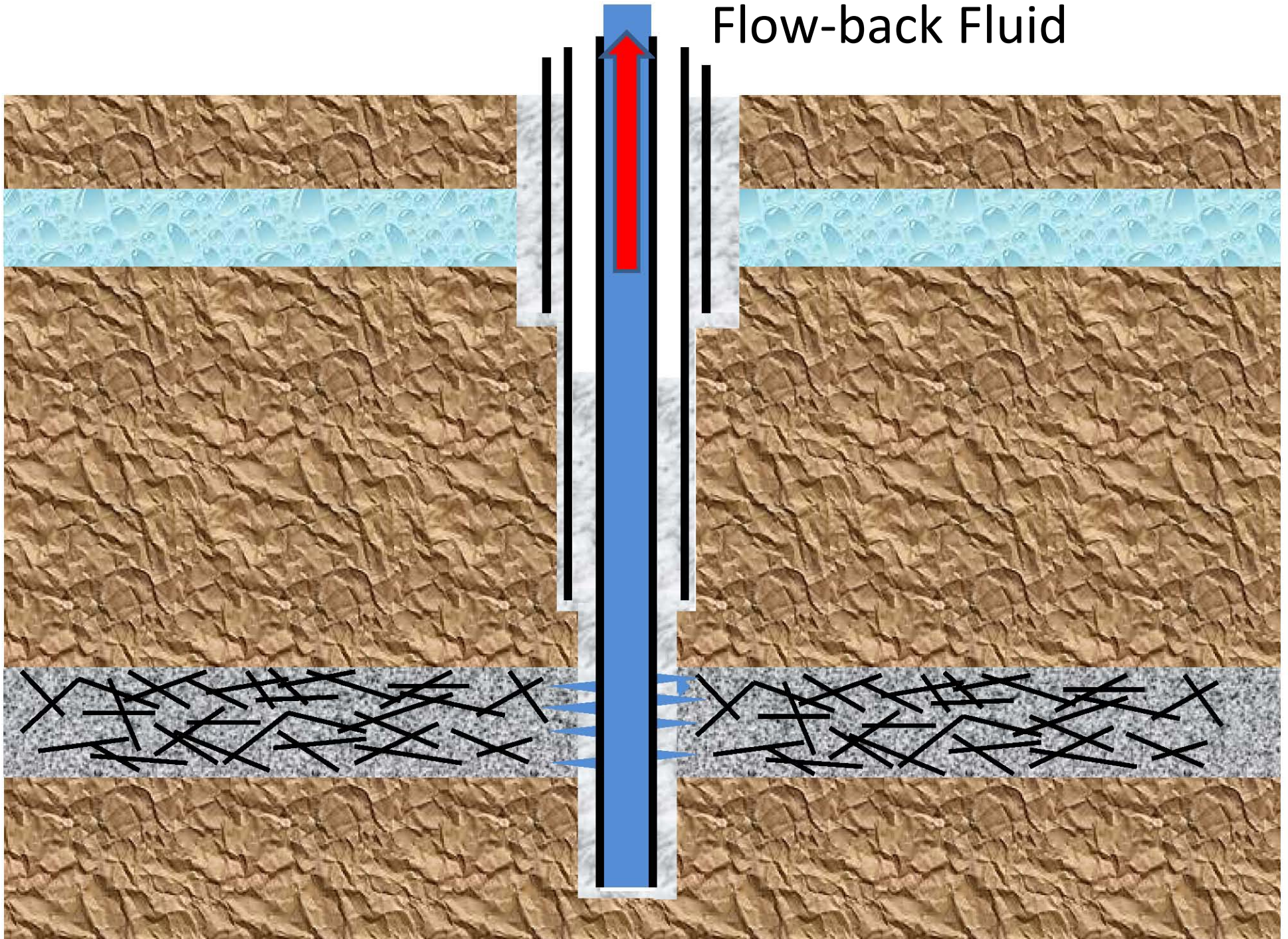








Flow-back Fluid





# Typical Layout in Fracturing Operation



Hydrochloric Acid

Glutaraldehyde

Quaternary Ammonium  
Chloride

Quaternary Ammonium  
Chloride

Tetrakis Hydroxymethyl-  
Phosphonium Sulfate

Ammonium Persulfate

Sodium Chloride

Magnesium Peroxide

Magnesium Oxide

Calcium Chloride

Choline Chloride

Tetramethyl ammonium  
chloride

Sodium Chloride

Isopropanol

Methanol

Formic Acid

Acetaldehyde

Petroleum Distillate

Hydrotreated Light Petroleum  
Distillate

Potassium Metaborate

Triethanolamine Zirconate

Sodium Tetraborate

Boric Acid

Zirconium Complex

Borate Salts

Ethylene Glycol

Methanol

Polyacrylamide

Petroleum Distillate

Hydrotreated Light  
Petroleum Distillate

Methanol

Ethylene Glycol

Guar Gum

Petroleum Distillate

Hydrotreated Light  
Petroleum Distillate

Methanol

Polysaccharide Blend

Ethylene Glycol

Citric Acid

Acetic Acid

Thioglycolic Acid

Sodium Erythorbate

Lauryl Sulfate

Isopropanol

Ethylene Glycol

Sodium Hydroxide

Potassium Hydroxide

Acetic Acid

Sodium Carbonate

Potassium Carbonate

Copolymer of Acrylamide and  
Sodium Acrylate

Sodium Polycarboxylate

Phosphonic Acid Salt

Lauryl Sulfate

Ethanol

Naphthalene

Methanol

Isopropyl Alcohol

2-Butoxyethanol

# Purpose of Chemical Additives

- Dissolve scale
- Eliminate bacteria
- Delay breakdown of fluid
- Prevent clays from swelling or shifting
- Inhibit corrosion
- Maintain viscosity under high temperature
- Reduce friction
- Thicken the water
- Prevent precipitation of metals
- Prevent formation of emulsions
- pH control
- Inhibit scale buildup
- Stabilize other chemicals



# Common Concerns

- Aquifer contamination
- Surface contamination
- Disclosure



# FracFocus 2.0

HUNDREDS OF COMPANIES. THOUSANDS OF WELLS.

**Welcome to FracFocus 2.0!** We're excited about our latest upgrades designed to dramatically enhance the site's functionality for the public, state regulatory agencies and industry users. Our user-friendly 'Find A Well' chemical disclosure registry now includes more extensive search options.

FracFocus continues to evolve and expand, adding more participating companies and reported wells from across the country. Our continued success is the result of nationally recognized organizations working with state governments and the oil and natural gas industry to provide public transparency.

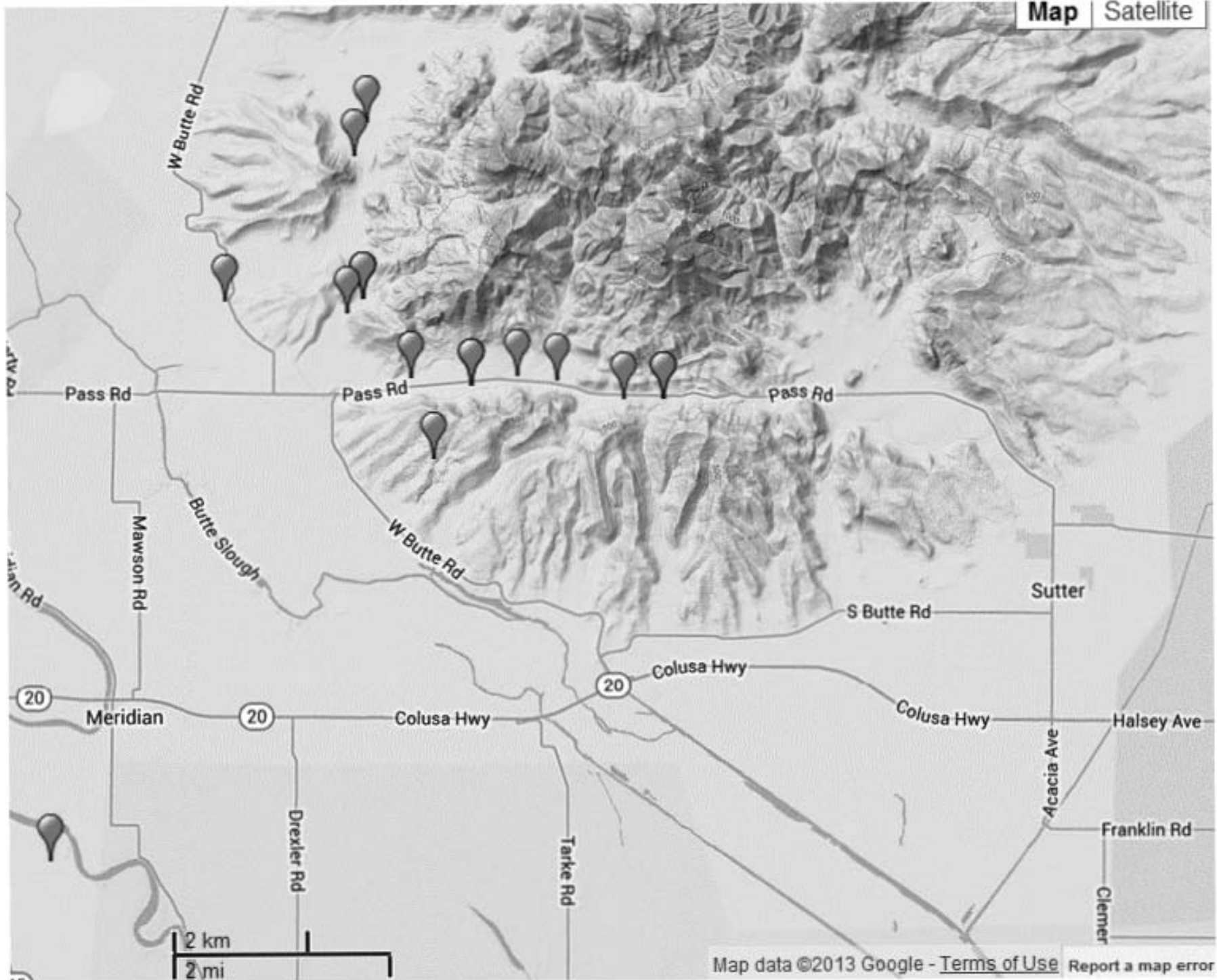
**FIND OUT MORE** >

**Looking for  
wells**



Search for nearby wells  
fractured to see who

**TOTAL WELL SITES  
REGISTERED**





# Hydraulic Fracturing Fluid Product Component Information Disclosure

Fracture Date:	1/30/2011
State:	California
County:	Kern
API Number:	04-030-41629
Operator Name:	ExxonMobil Corporation
Well Name and Number:	Hill 631D
Longitude:	-119.755625
Latitude:	35.483473
Long/Lat Projection:	WGS84
Production Type:	Oil
True Vertical Depth (TVD):	2,917
Total Water Volume (gal)*:	252,840

	Petroleum Distillate Blend	Proprietary
	Guar Gum	009000-30-0

					(% by mass)**	(% by mass)**	
Water				7732-18-5	100.00%	80.98587%	Density = 8.3
Sand	BJ Services	Proppant	Crystalline Silica (quartz)	14808-80-7	99.90%	17.95998%	
GW3-LDF	BJ Services	Gellant - Water					
			Petroleum Distillate Blend	Proprietary	70.00%	0.30036%	
			Guar Gum	009000-30-0	40.00%	0.17164%	
XLW-32	BJ Services	Cross Linker					
			Methanol	67-56-1	90.00%	0.04235%	
			Boric Oxide	68951-67-7	20.00%	0.00941%	
BF-7L	Baker Hughes	Special Buffer Solution	Potassium Carbonate	584-08-7	60.00%	0.08873%	
ENZYME G Conc (GBW-12 CD)	BJ Services	Breaker - Water	Hemicellulase Enzyme	N.A.	100.00%	0.05197%	
KCL	BJ Services	Base Fluid/Salt	Potassium Chloride	7447-40-7	100.00%	0.05197%	
GBW-5	BJ Services	Breaker - Water	Ammonium Persulfate	7727-54-0	99.00%	0.01483%	
XCIDE-207	Baker Hughes	Bacteria Control					
			5-chloro-2methyl-4-isothiazolin-3-one	26172-55-4	10.00%	0.00021%	
			2-Methyl-4-isothiazoline-3-one	2682-20-4	5.00%	0.00010%	
			Magnesium nitrate	10377-80-3	10.00%	0.00021%	
			Magnesium chloride	7786-30-3	5.00%	0.00010%	
			Diatomaceous earth, calcined	91053-39-3	60.00%	0.00125%	
			Crystalline silica: cristobalite	14484-48-1	1.00%	0.00002%	
			Crystalline silica: Quartz (SiO2)	14808-80-7	1.00%	0.00002%	
ENZYME G-1	Baker Hughes	Special Breaker	N.A.	N.A.	100.00%	0.07079%	

## Current Regulations (43 CFR 3162.3-2)

Approval only required for “non-routine”  
fracturing jobs

# Proposed Regulations

## Round 1

- May 2012: Proposed regulations published for Tribal and Federal Land
- September 2012: Close of public comment period
- October 2012 – May 2013: Respond to 177,000 comments received; Revise proposed rule

## Round 2

- June - August 2013: Public comment period
- Sept. 2013 to present: Review 1.35 million comments received



# Proposed Regulations (Round 1)

- All stimulation must be approved
- Cement bond log required on every well
- Aquifers  $< 10,000$  TDS must be protected
- Mechanical integrity test required
- Monitor during HF
- Flow-back fluid stored in tanks or lined pits
- Application must disclose chemical compositions, water management, fracture lengths...

## Proposed Regulations (Round 2)

- All ~~stimulation~~ must be approved
- Cement bond log required on every well
- Aquifers < 10,000 TDS must be protected
- Mechanical integrity test required
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## Proposed Regulations (Round 2)

- All fracturing must be approved
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## Proposed Regulations (Round 2)

- All fracturing must be approved
- Cement bond log required on “type wells”
- Aquifers < 10,000 TDS must be protected
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## Proposed Regulations (Round 2)

- All fracturing must be approved
- Cement bond log required on “type wells”
- Aquifers < 10,000 TDS must be protected (with exceptions)
- Mechanical integrity test required
- Monitor during HF
- Flow-back fluid stored in tanks or lined pits
- Application must ~~disclose chemical compositions~~, water management, fracture lengths...



## Proposed Regulations (Round 2)

- All fracturing must be approved
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- Aquifers  $< 10,000$  TDS must be protected (with exceptions)
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- Flow-back fluid stored in tanks or lined pits
- Application must include water management, fracture lengths...

## Proposed Regulations (Round 2)

- Waivers may be granted to allow acceptance of individual State or Tribal regulations

# Best Management Practices (BMP)

**It is the BLM's policy to require state-of-the-art mitigation measures.**

**Reduce Contrast**



[www.blm.gov/bmp](http://www.blm.gov/bmp)

**Minimize Footprint**



**Improve Reclamation**





California is different

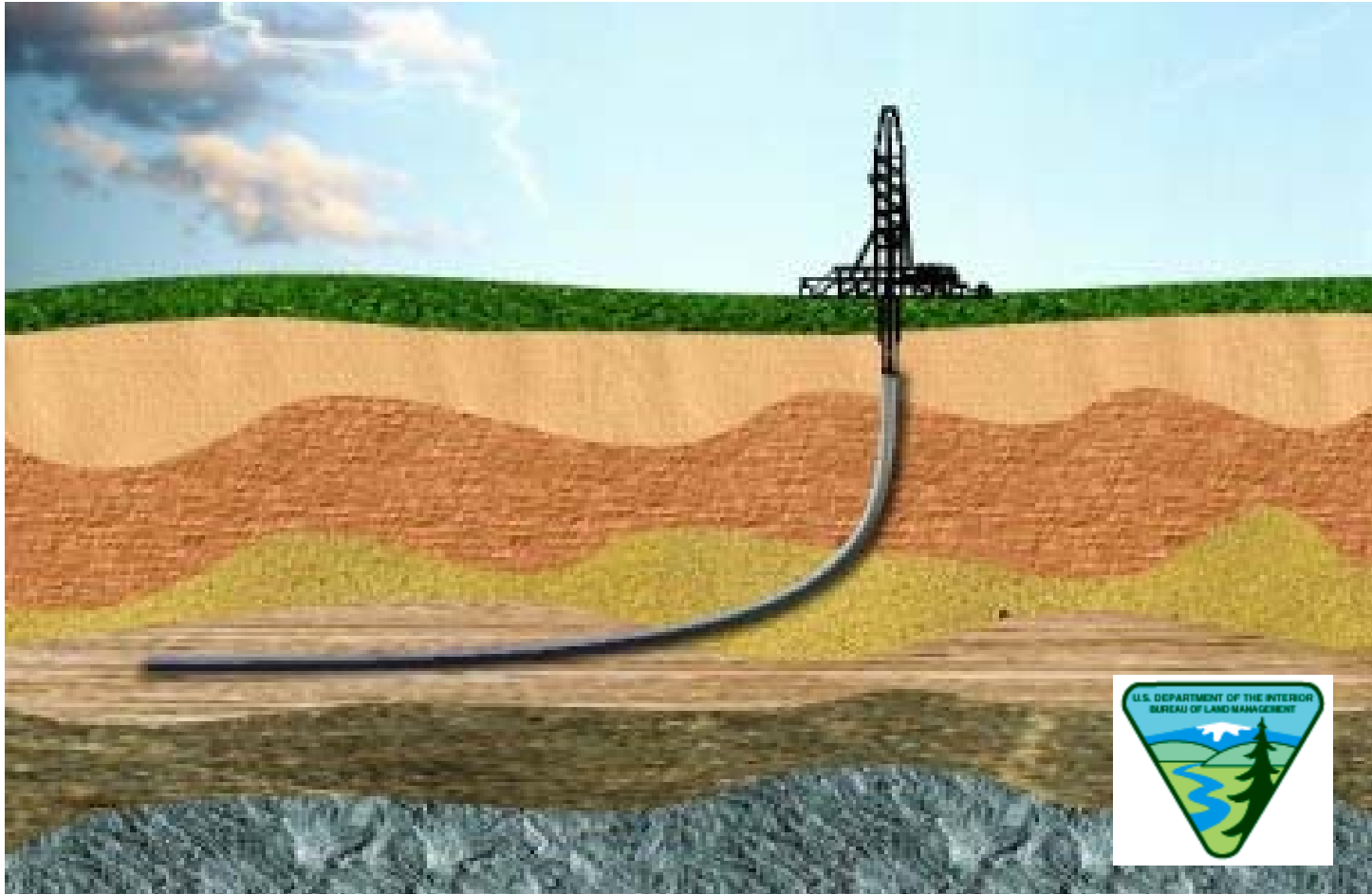




## Current Status of Proposed Hydraulic Fracturing Rule

- If you would like to help us sort through 1.35 million comments . . .
- Estimated completion date January 2015

# Questions? Comments?





# APD and Sundry Notice Procedures

Jeff Prude  
Field Office O&G Program Lead  
[jprude@blm.gov](mailto:jprude@blm.gov)  
661-391-6140

Applications For Permit To Drill (APD)

Sundry Notices

# Knowledge of Federal Regulations



- Code of Federal Regulations (43CFR)
- Onshore Oil and Gas Orders (1-7)



# Onshore Order 1

Provides the requirements for approval of Applications for Permit to Drill (APD) wells on federal lands.

# Application for Permit to Drill

An APD Package must include the following :

1. A Completed Form 3160-3
2. Well Plat with location in:
  - a. Feet along section/property lines
  - b. NAD83 format (lat/long in decimal degrees)
3. 9-Point Drilling Program
4. 12-Point Surface Use Program
5. Bonding (Lease bond and Surface Bond)
6. \$6500 APD Fee (current as of 4-29-2014)
7. Operator Certification

# Application for Permit to Drill (APD)

FORM 3160-3



# Application for Permit to Drill (APD)

Form 3160-3 (August 1999)		FORM APPROVED OMB No. 1014-0116 Expires November 30, 2000	
UNITED STATES DEPARTMENT OF THE INTERIOR BUREAU OF LAND MANAGEMENT <b>APPLICATION FOR PERMIT TO DRILL OR REENTER</b>		5. Lease Serial No. _____ 6. If Indian, Alutian or Tribe Name _____ 7. If Unit or CA Agreement, Name and No. _____ 8. Lease Name and Well No. _____ 9. API Well No. _____ 10. Field and Pool, or Exploratory _____ 11. Sec., T., R., M., or Bld. and Survey or Area _____ 12. County or Parish _____ 13. State _____	
1a. Type of Work: <input type="checkbox"/> DRILL <input type="checkbox"/> REENTER 1b. Type of Well: <input type="checkbox"/> Oil Well <input type="checkbox"/> Gas Well <input type="checkbox"/> Other <input type="checkbox"/> Single Zone <input type="checkbox"/> Multiple Zone 2. Name of Operator _____ 3a. Address _____ 3b. Phone No. (include area code) _____ 4. Location of Well (Report location clearly and in accordance with any State requirements *) At surface _____ At proposed prod. area _____ 14. Distance in miles and direction from nearest town or post office* _____		15. Distance from proposed* location to nearest property or lease line, ft. (Also to nearest deep unit line, if any) _____ 16. No. of Acres in lease _____ 17. Spacing Unit dedicated to this well _____ 18. Distance from proposed location* to nearest well, drilling, completed, applied for, on this lease, ft. _____ 19. Proposed Depth _____ 20. BLM/BIA Bond No. on file _____ 21. Elevations (Show whether DF, RDB, RT, GL, etc.) _____ 22. Approximate date work will start* _____ 23. Estimated duration _____	
<b>24. Attachments</b>			
The following, completed in accordance with the requirements of Oudom Oil and Gas Order No. 1, shall be attached to this form:			
1. Well plat certified by a registered surveyor. 2. A Drilling Plan. 3. A Surface Use Plan (if the location is on National Forest System Lands, the SUPO shall be filed with the appropriate Forest Service Office).		4. Bond to cover the operations unless covered by an existing bond on file (see item 20 above). 5. Operator notification. 6. Such other site specific information and/or plans as may be required by the authorized officer.	
25. Signature _____ Title _____ Approved by (Signature) _____ Title _____		Name (Printed/Typed) _____ Date _____ Name (Printed/Typed) _____ Date _____ Office _____	
Application approval does not warrant or certify the applicant holds legal or equitable title to those rights in the subject lease which would entitle the applicant to conduct operations thereon. Conditions of approval, if any, are attached.			
Title 18 U.S.C. Section 1001 and Title 43 U.S.C. Section 1202, make it a crime for any person knowingly and willfully to make to any department or agency of the United States any false, fictitious or fraudulent statements or representations or to any matter within its jurisdiction.			
*(Instructions on reverse)			

# Guidelines for Preparing the APD

- 12-Point Surface Use Program
- 9-Point Drilling Plan

# 12-Point Surface Use Program

1. Existing roads to the well.
2. Access roads to be constructed.
3. Location of existing wells (within 1 mile)
4. Location of facilities if well is productive.
5. Location and type of water supply.
6. Construction materials.
7. Methods for handling waste.



# 12-Point Surface Use Program (Cont'd)

- 8. Ancillary facilities.
- 9. Well site layout.
- 10. Plans for surface reclamation.
- 11. Surface ownership.
- 12. Other information.

# Additional Information now Required

- Recent requests from environmental groups to become more involved at the individual well level
- BLM CA realized there were probably some areas that were not adequately addressed in APD EAs
- Met with Industry organizations and individual operators to outline these draft requirements
- Permits will take a bit longer, but extra time can be minimized if the pkg is complete when we receive it

# Additional Information, cont'd

- Identify fresh water zone if applicable and provide info to BLM
- Detailed info on drilling fluid additives
  - “ “ frac fluid additives
  - “ “ acid
- Produced water analysis
- Volumes, sources of water, and composition
- Flowback fluid disposal – composition, volume, destination
- Drill cuttings disposition

# Additional Information, cont'd

- Emissions inventory
- Statement of likelihood of wellbore failures, e.g. collapsed csg at a certain depth, parted csg, etc.
- History of Surface Expressions in area?
- Other data?
- Much of this data is already in DOGGR's SB4 requirements – BLM will coordinate w/ them
- Maybe copies of permits from other agencies – RWQCB, CARB, DOGGR
- DRAFT for now – it's a work in progress



# 9-Point Drilling Plan

1. Tops of important geologic markers.
2. Depths and thickness of:
  - fresh water,
  - oil, gas, or
  - other mineral-bearing formations
3. Blowout Prevention Equipment (BOPE)
  - diagram showing size, pressure ratings

## 9-Point Drilling Plan (cont'd)

4. Casing program.
5. Cement (amount and type).
6. Drilling Mud (amount, type, weighting material, and monitoring equipment)
7. Testing, logging, and coring.
8. Expected bottom hole pressure and temperatures.
9. Additional information.

# Application for Permit to Drill (cont'd)

- Submit APD in triplicate.
- BLM posts the APD for 30 days for public comment.
- Within 10 days, the operator is notified as to whether or not the application is complete.

# APD/NOS Processing Timeframe

- BLM posts the APD/NOS for 30 days for public comments.
- Unless there are surface issues or waiting for additional information from the operator, APDs can often be processed within 30 days.



# Master Development Plan (MDP)

- The Order also establishes a new approval process for MDP where an operator can submit plans for field development of a multiple well program.
- MDP can be addressed in a single NEPA analysis.

# Master Development Plan (MDP)

- Approval of MDP serves as approvals of all of the APDs submitted with the Plan.
- After the MDP is approved, subsequent APDs can reference the MDP and be approved using the NEPA analysis for the MDP.
- Need to submit only APD Form 3160-3 and well survey Plat for each well.

# Sundry Notices

- Many downhole operations
- Production measurement methods
- Commingling proposals
- Surface disturbance
- Rights-Of-Way
- Gas flaring and venting
- Sump closure
- Road mix
- Idle well issues
- Other

# No Sundry Notices Required

- No change in downhole schematic
- Frac'ing/acidizing the well

**(NOTE: PROPOSED RULEMAKING IN PROGRESS  
THAT CHANGES THIS)**

- Running /pulling tubing
- Well cleanout
- Removing scale from pipe



# Sundry Notice Processing Timeframe

- There is no time requirement in the regulations for Sundry Notices.
- Most are processed within 10 days.
- Some may take as long as one month.
- Urgent/emergency situations: verbal approvals may be granted.

# APD and Sundry Notices

	Total <u>APD's</u>	Total <u>SN's</u>
FY00	136	595
FY01	85	905
FY02	94	1223
FY03	118	1505
FY04	221	898
FY 05	289	1057
FY 06	200	1692
FY 07	277	1864
FY 08	260	2135
FY09	162	2486
FY10	363	1995
FY11	426	2450
FY12	292	
FY 13	210	

# Final Quiz, Part 1

Arrange the following sources in terms of how much water is needed to generate 1 MMBTU of energy

Nuclear

Soy Biodiesel

Coal

Deep-Shale Fracked Natural Gas Well

Corn Ethanol

# Part 1 Answers

- Gas well 3 gals
- Nuclear Energy 11 gals
- Coal 23 gals
- Corn Ethanol 15,800 gals
- Soy Biodiesel 44,500 gals

Source – U.S. DOE and Ground Water Protection Council



# Final Quiz, Part 2

What is the Surface area required to generate a yrs supply of electricity to 1000 homes?

- Wind farm
- Coal
- Solar panels
- Nuclear
- Gas Well

## Part 2 Answers

- Gas well 0.4 acres
- Nuclear 0.7 acres
- Coal 0.75 acres
- Wind farms 6 acres
- Solar Panels 8.4 acres

Source – U.S. DOE and Ground Water Protection Council

# Questions? Comments?

