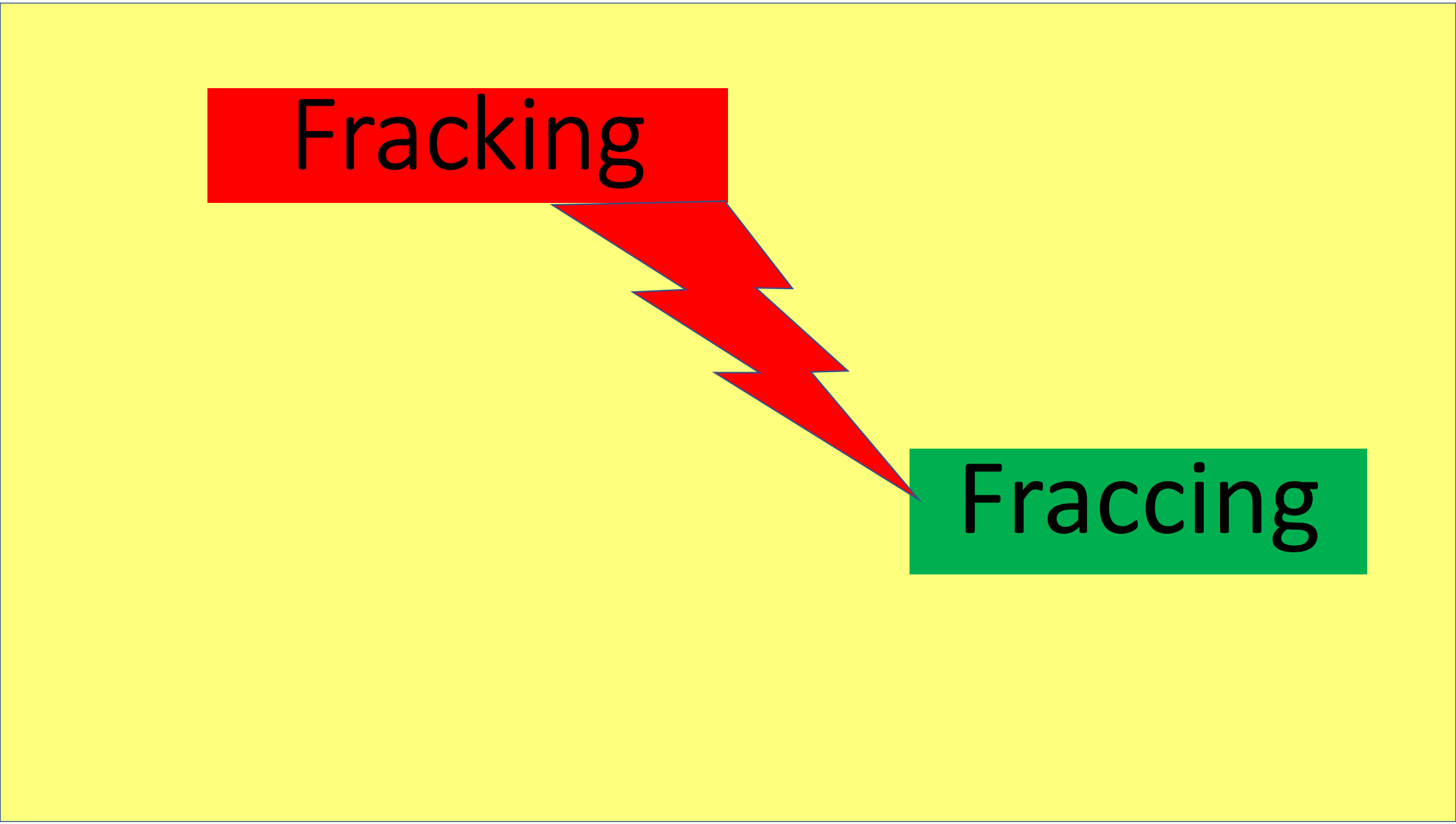

Fracking
Fraccing

Gecko Speaks

Prevent Gas Fracking in Western Queensland

The Queensland Government continues to ignore its commitment to protect the Channel Country. Unconventional gas fracking can still occur on fragile floodplains and wetlands.This will damage vast areas of natural habitat, threatening the survival of millions of birds.

It's time for Queenslanders to speak up.

Sign our petition and tell the Queensland Government we need urgent protection for the Channel Country.

Sign the Petition

https://ptba.net.au/our-work/channel-country/

Gecko (Lock the Gate Groupies) CLAIM:

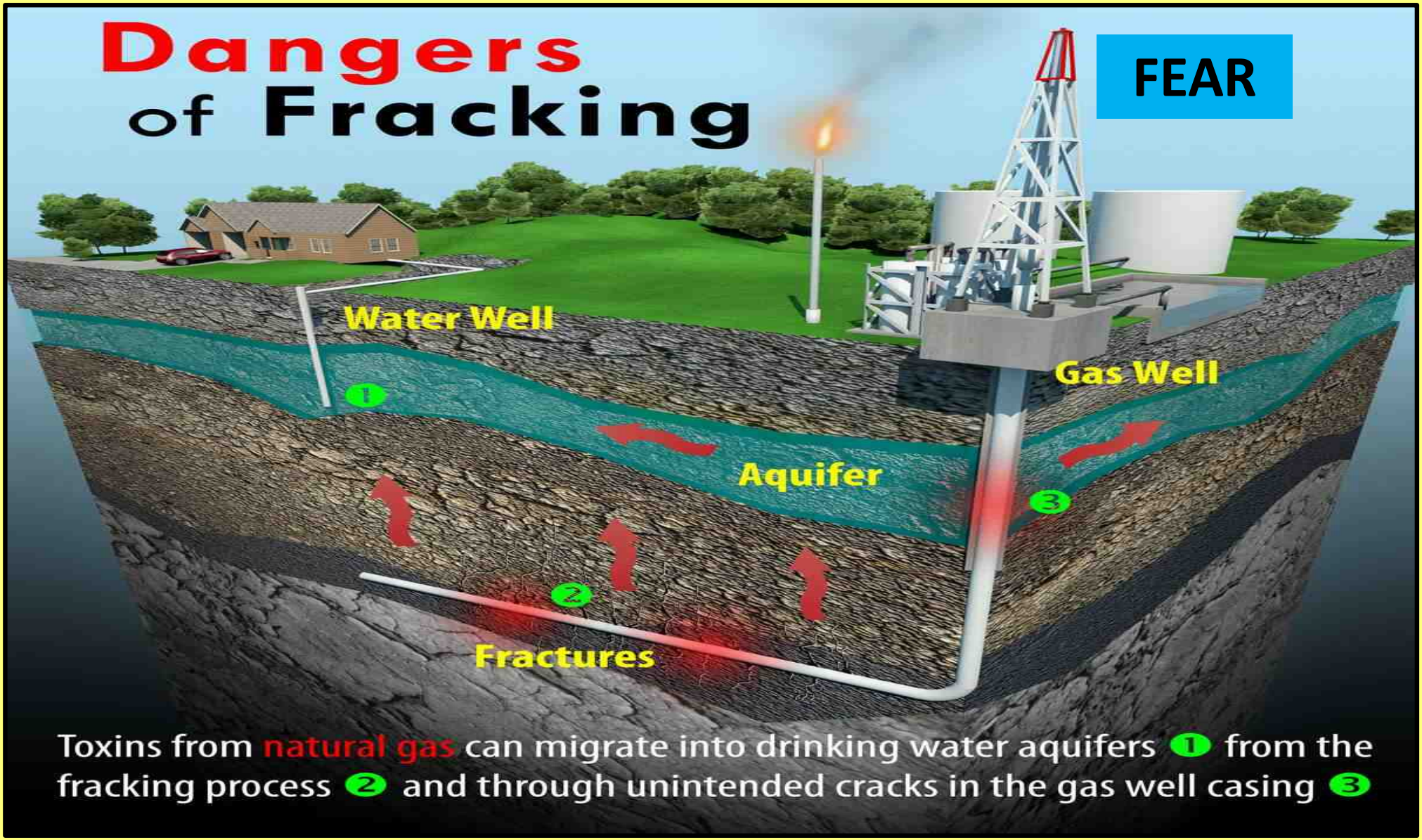
The Code Red report from the IPCC has stated we cannot proceed with any new extractions of gas. or other fossil fuels, if we are to leave the planet liveable for our children (Greta Speak).

Gas is just as bad as coal & oil in emissions of greenhouse gases
Fracking for gas destroys our water supplies
Birds and wildlife are already under severe threat

Unconventional gas fracking involves drilling into the earth and directing large volumes of high-pressure water and toxic chemicals at the rock to release the gas inside.

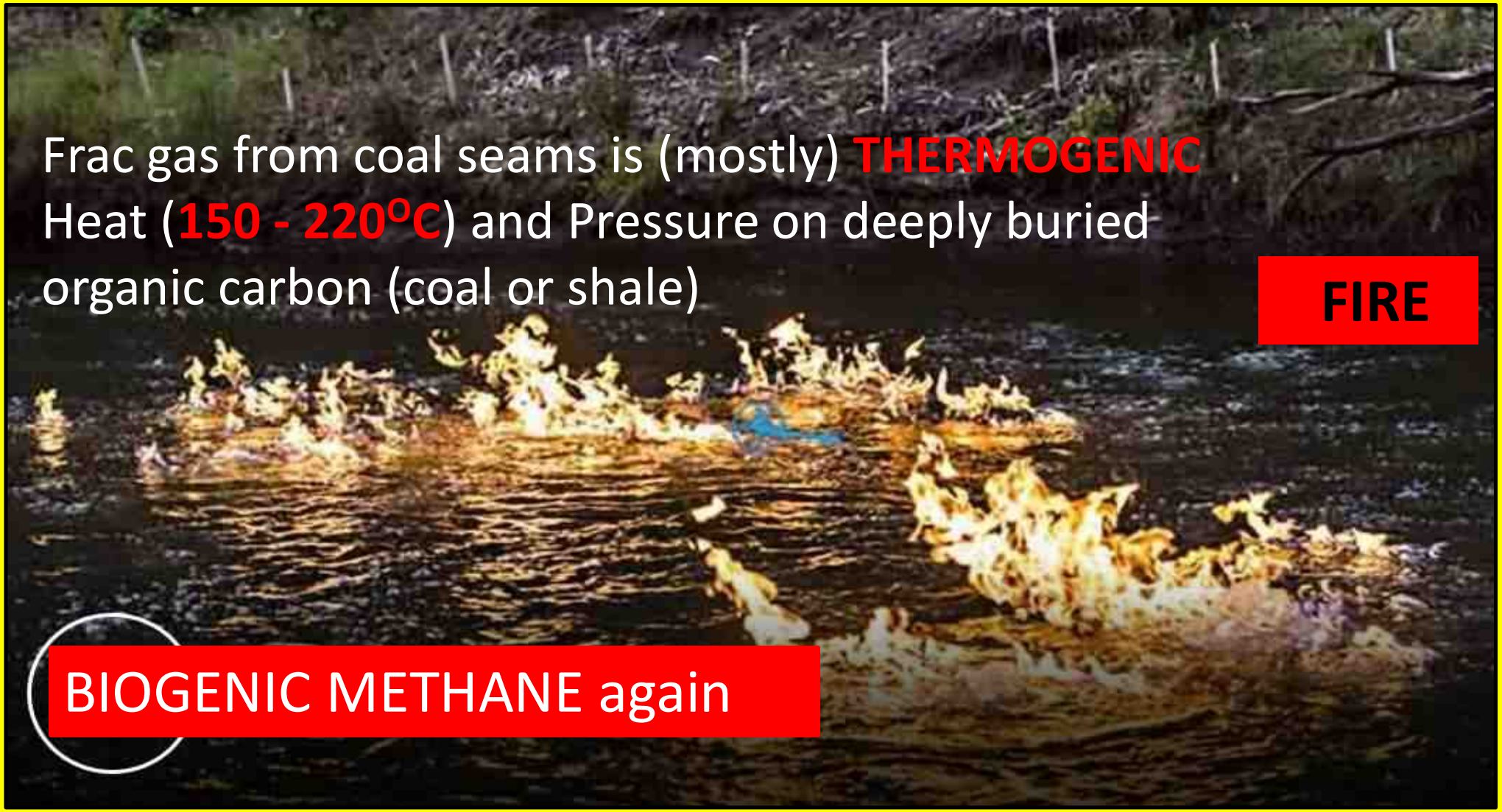
WRONG: **Not even Science 101**

https://ptba.net.au/our-work/channel-country/


Dangers
of Fracking
FEAR
Water Well
Gas Well
Aquifer
Fractures
1
2
3
Toxins from natural gas can migrate into drinking water aquifers 1 from the fracking process 2 and through unintended cracks in the gas well casing 3

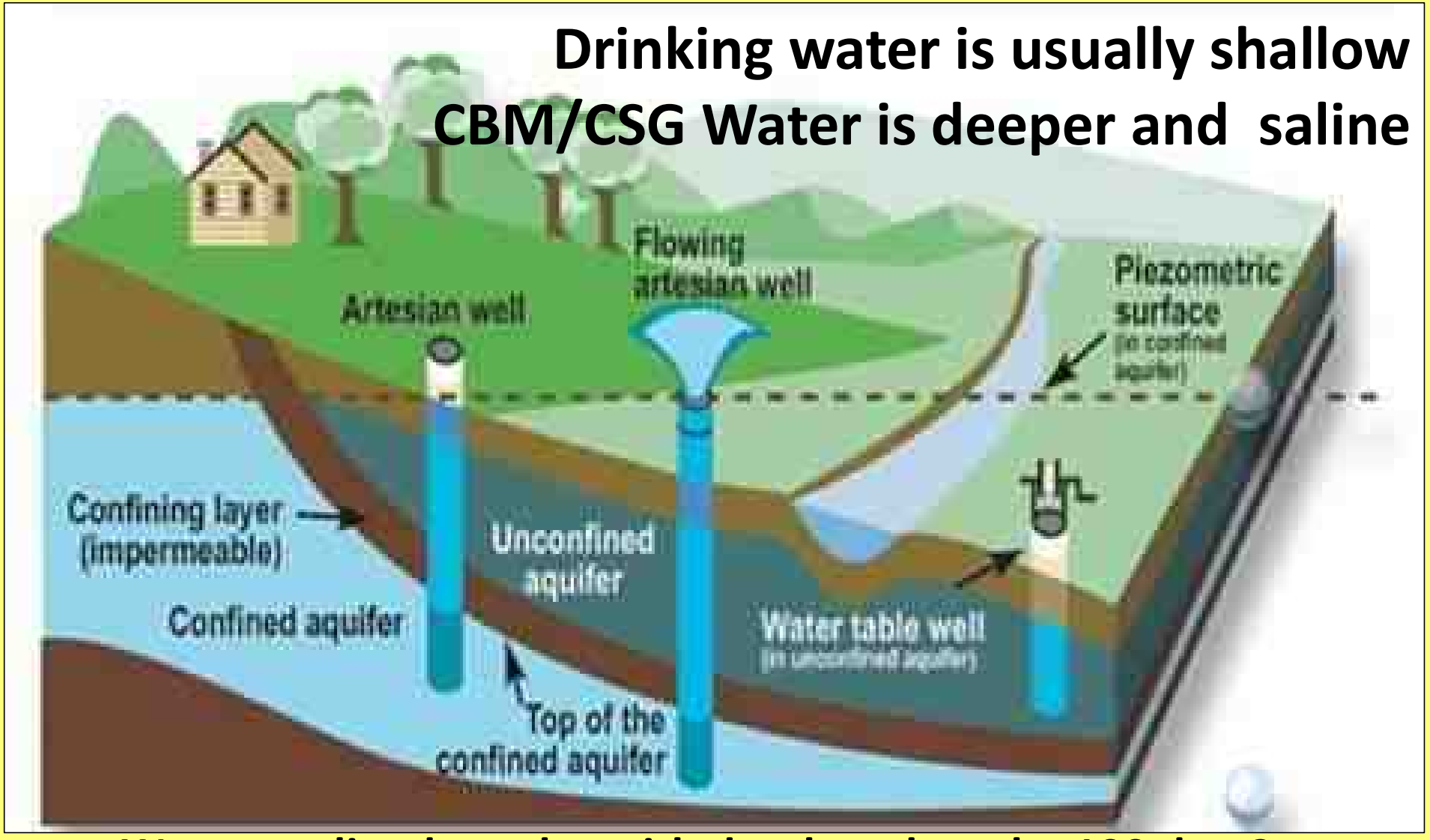
Gasland Film: Colorado 2010

Natural Methane Gas Fire in Condamine River 2016:



Drinking water is usually shallow

CBM/CSG Water is deeper and saline



Water quality degrades with depth and can be 100 deg C


FEAR


FEAR

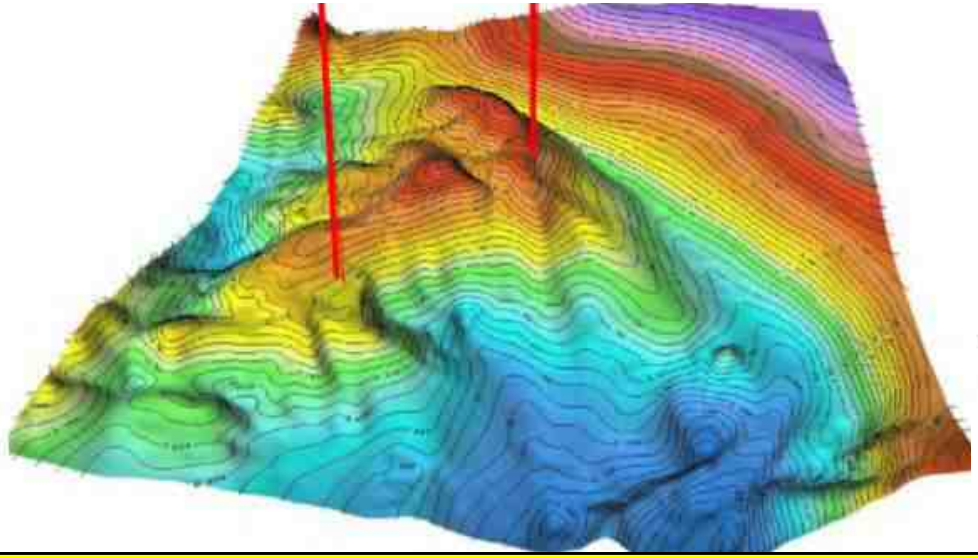

CHILDISH FEAR
THIS GATE IS LOCKED
TO COAL & GAS COMPANIES
It is all about
THE WATER
THIS GATE IS LOCKED
TO COAL & GAS COMPANIES
THIS GATE IS LOCKED

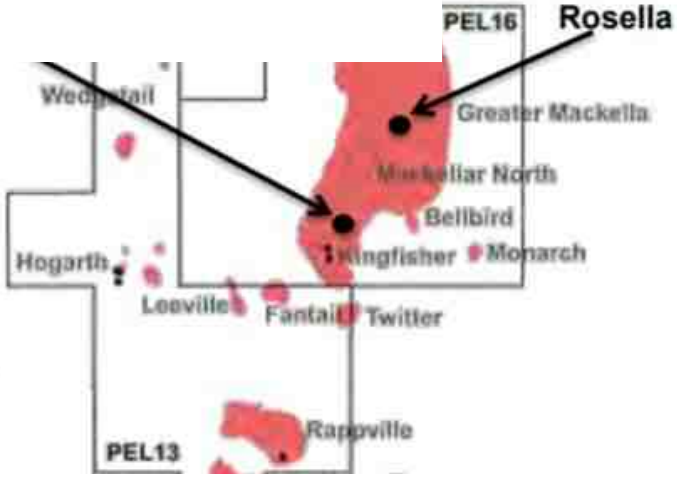

LOATHING
THE F WORD IS A DIRT WORD
BAN FRACKING
and support clean
GREEN ENERGY

Rosella to test Greater Mackellar structure

- 2009 Conventional Gas discovery near Casino NSW
- Greens said Rosella 1 was a polluting fracker. NSW Govt took license away - $25m comp for $75m spent
- **Never let fracts get in the way of a good story**
- **Metgasco moved to QLD**

EFFECTIVE LOATHING

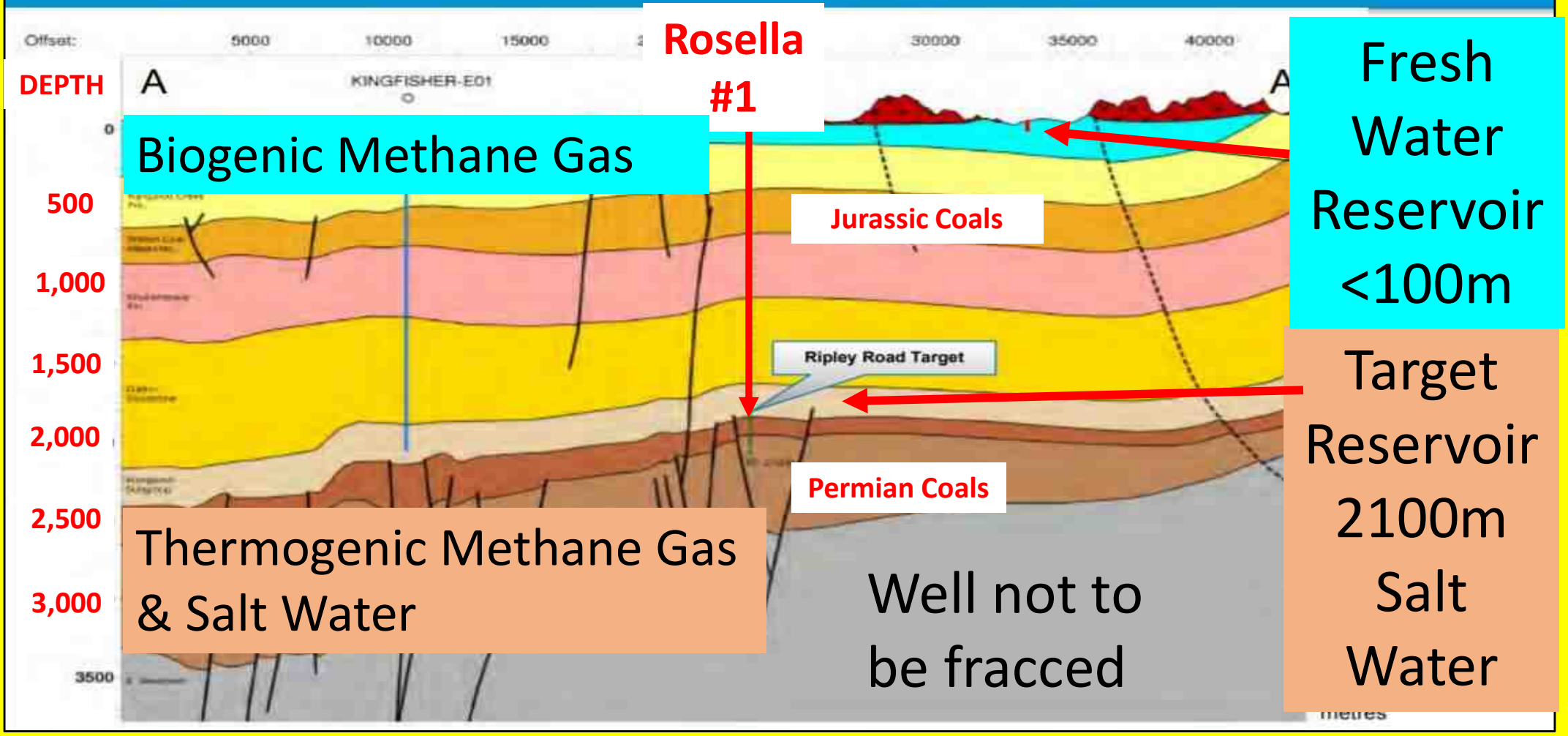




2013 Exploration

Rosella geology

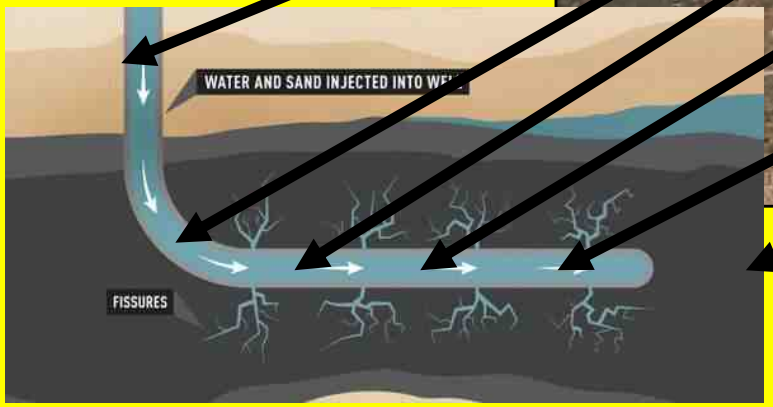
FOOLISH FEAR & LOATHING



Lock the Gate Hoorah: Future Gas Exploration and Fraccing Banned in NSW

So keep burning coal - till renewables take over

Early CBM/CSG Development too many wells



Early Solution Horizontal wells

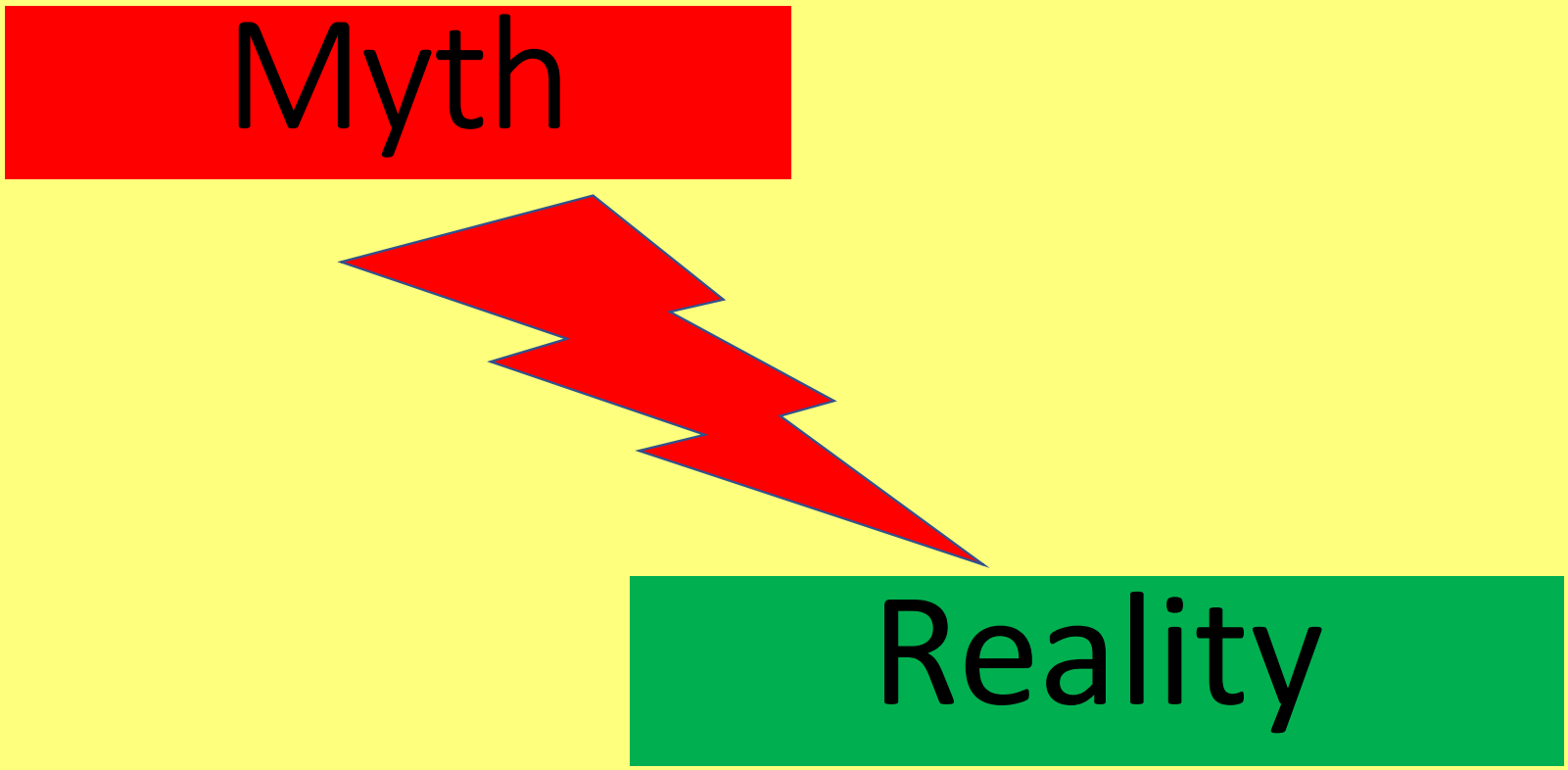
https://www.melaniephillips.com/real-western-civilisation-emergency/

Extinction Rebellion's Aim

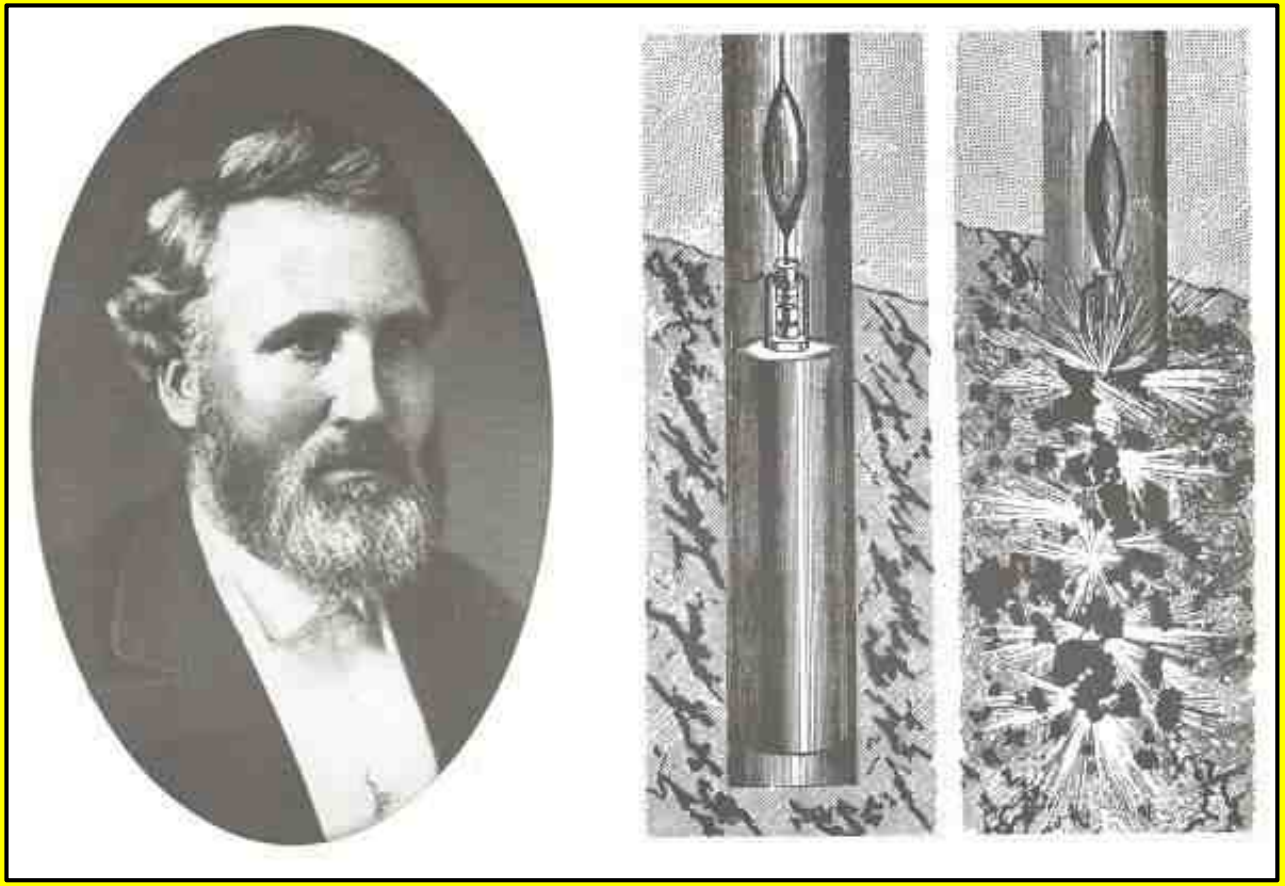
To build structure, community and test prototypes in preparation for the coming structural collapse of the regimes of western 'democracies'.

FRIGHTENING

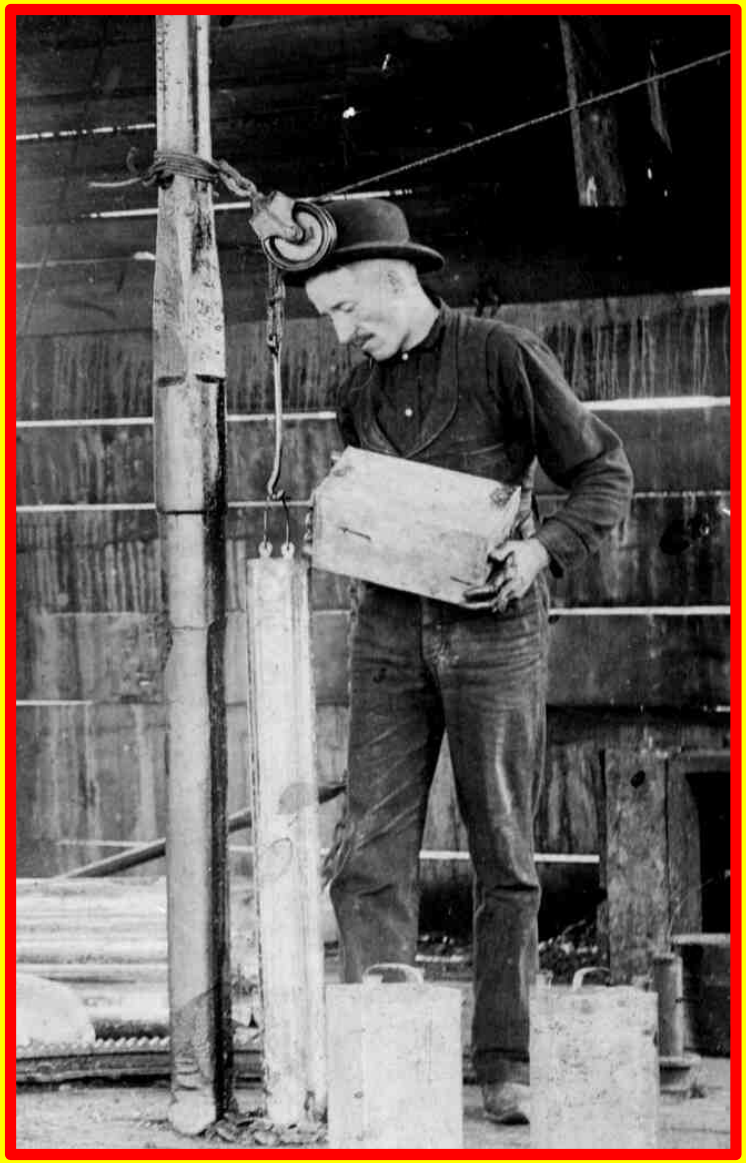
https://www.breitbart.com/europe/2019/08/03/delingpole-exposed-soros-on-list-of-mega-rich-extinction-rebellion-backers/


Myth
Reality

Fraccing is old technology



1862, E.A.L. Roberts Lt Col Union Army had "idea of opening the veins and crevices in oil-bearing rock by exploding an elongated shell or torpedo therein."



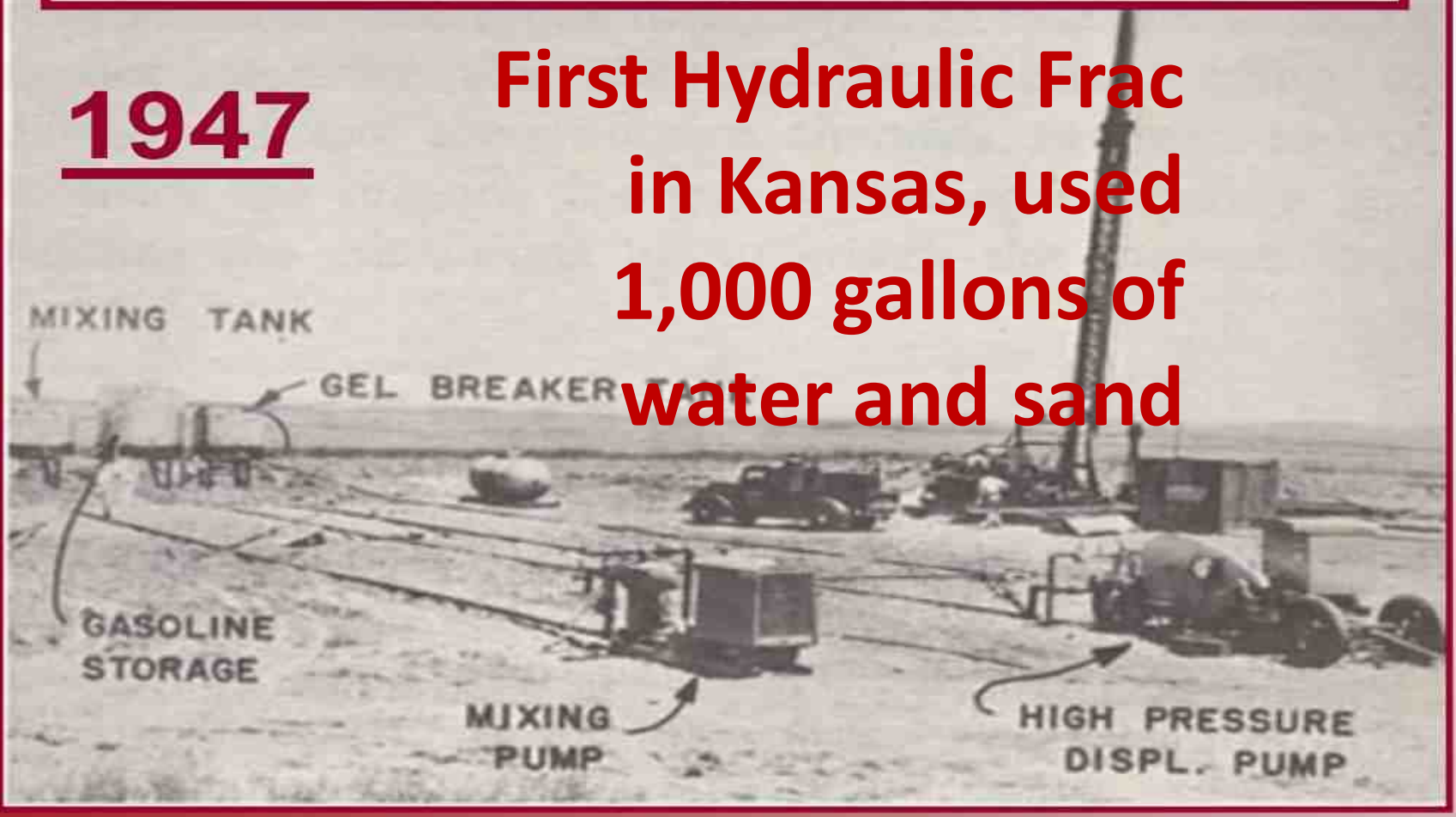
1868: Liquid nitroglycerine preferred to gunpowder, pouring nitro was risky and doing it for an illegal well "shoot" at night led to the term "**moonlighting**."

1875 More stable Gelignite or Jelly, invented by Alfred Nobel

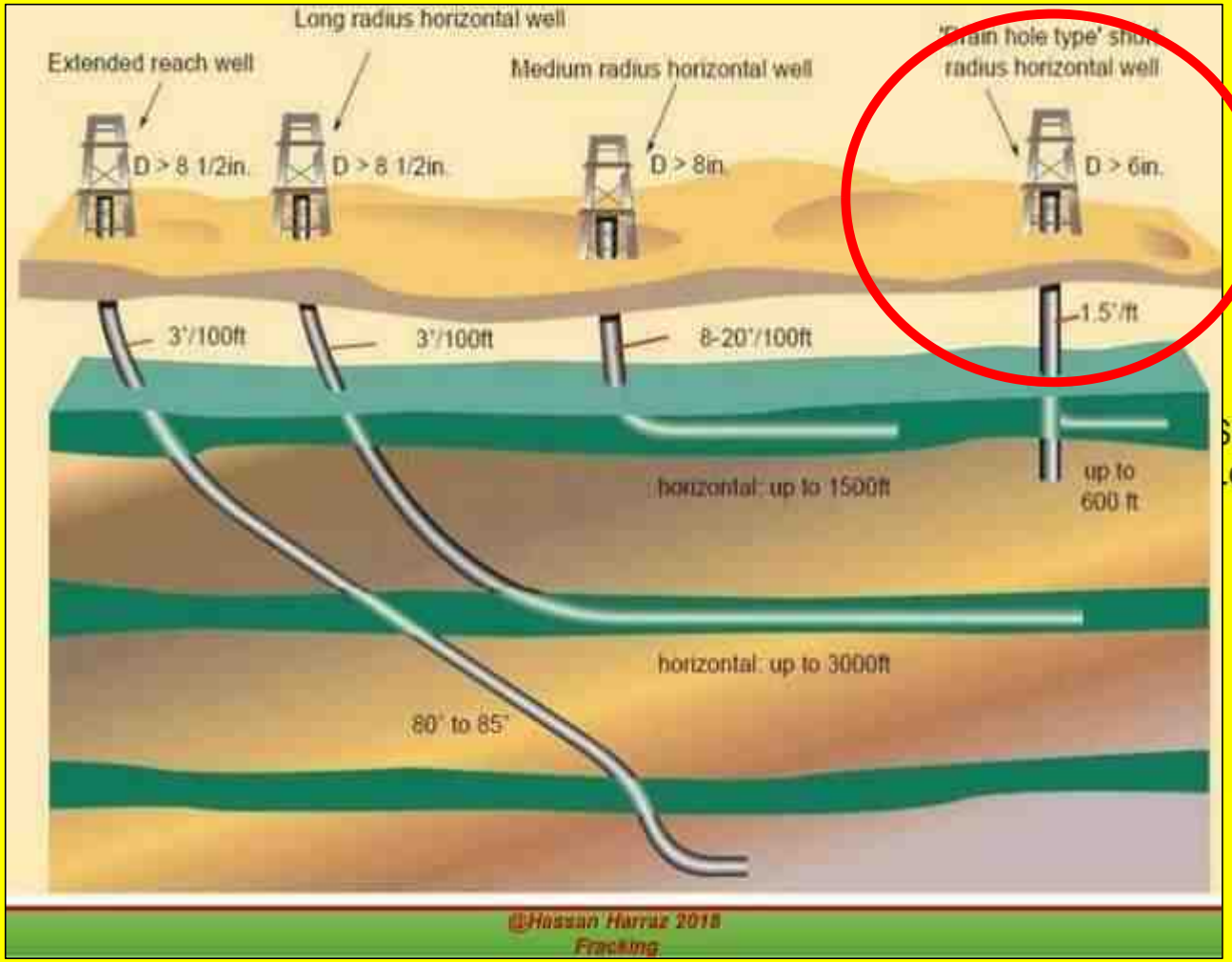
Klepper Gas Unit No. 1, Hugoton field, Kans. The first well to be hydraulically fractured to increase well productivity. (SPE Monograph Vol. 2)

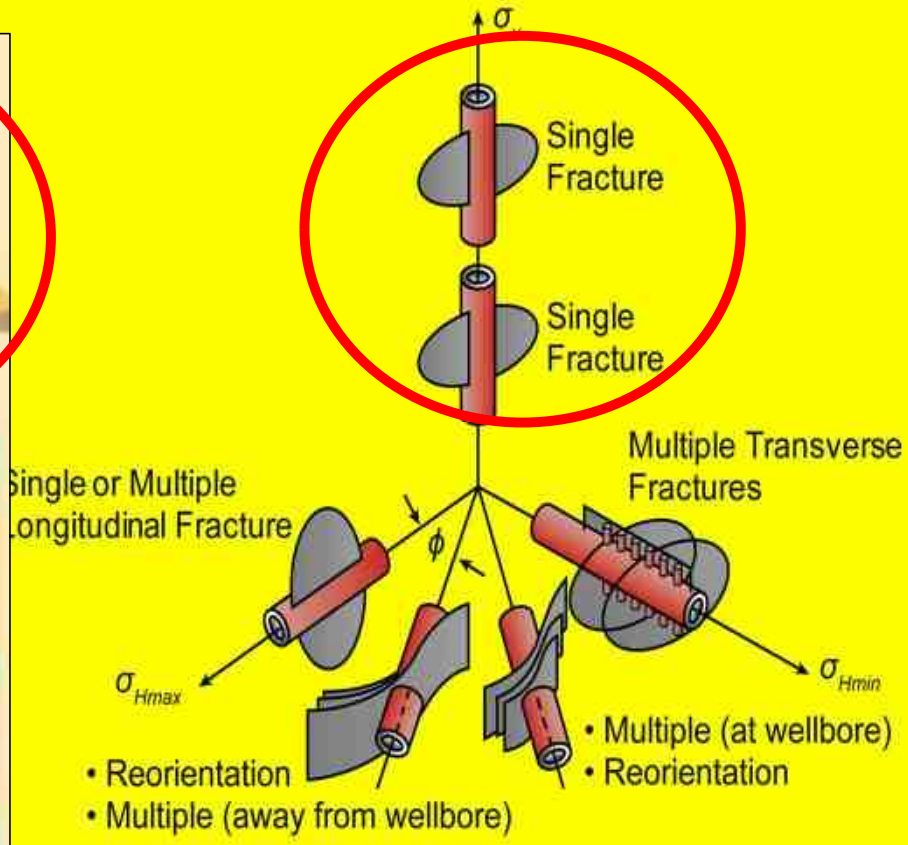
1947

First Hydraulic Frac in Kansas, used 1,000 gallons of water and sand

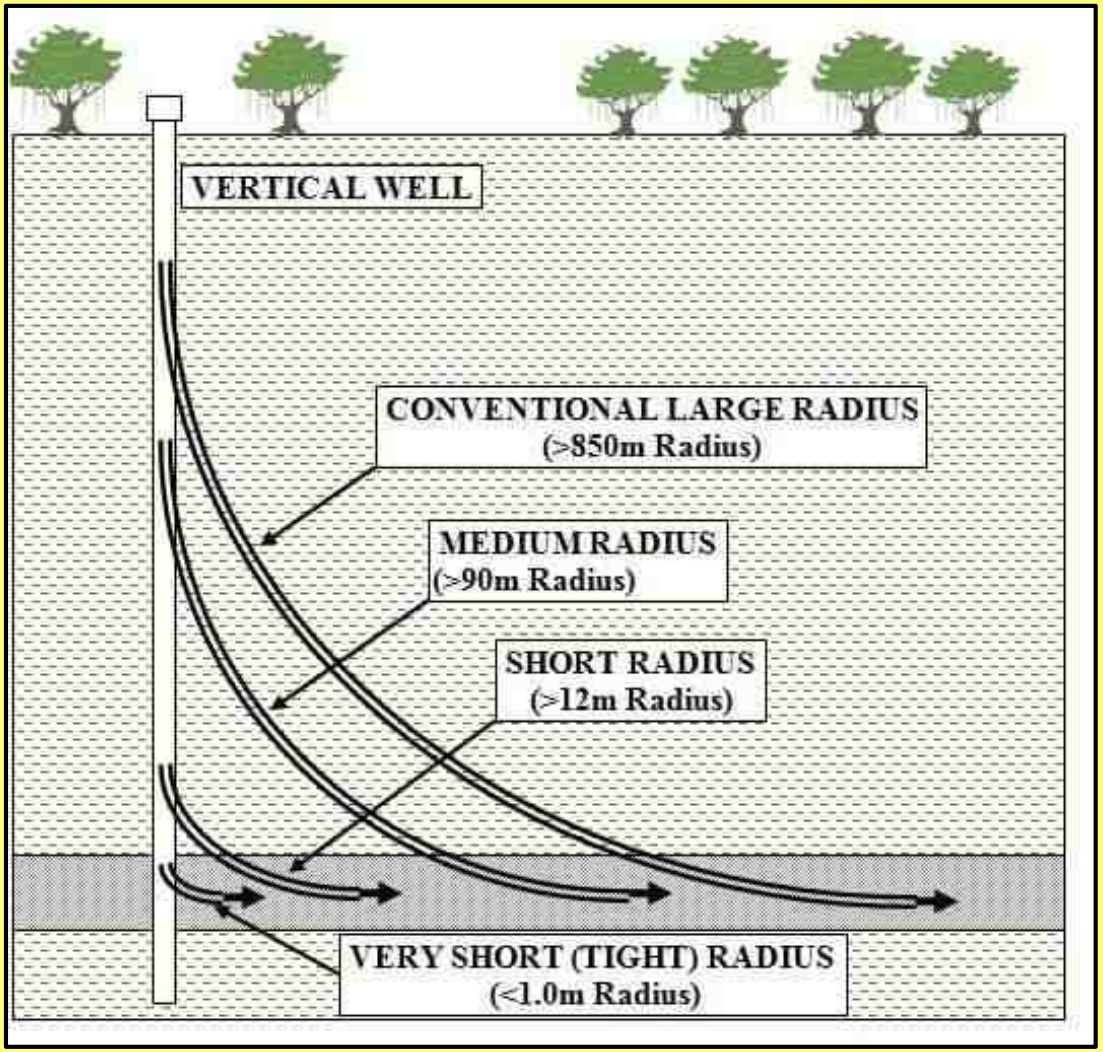


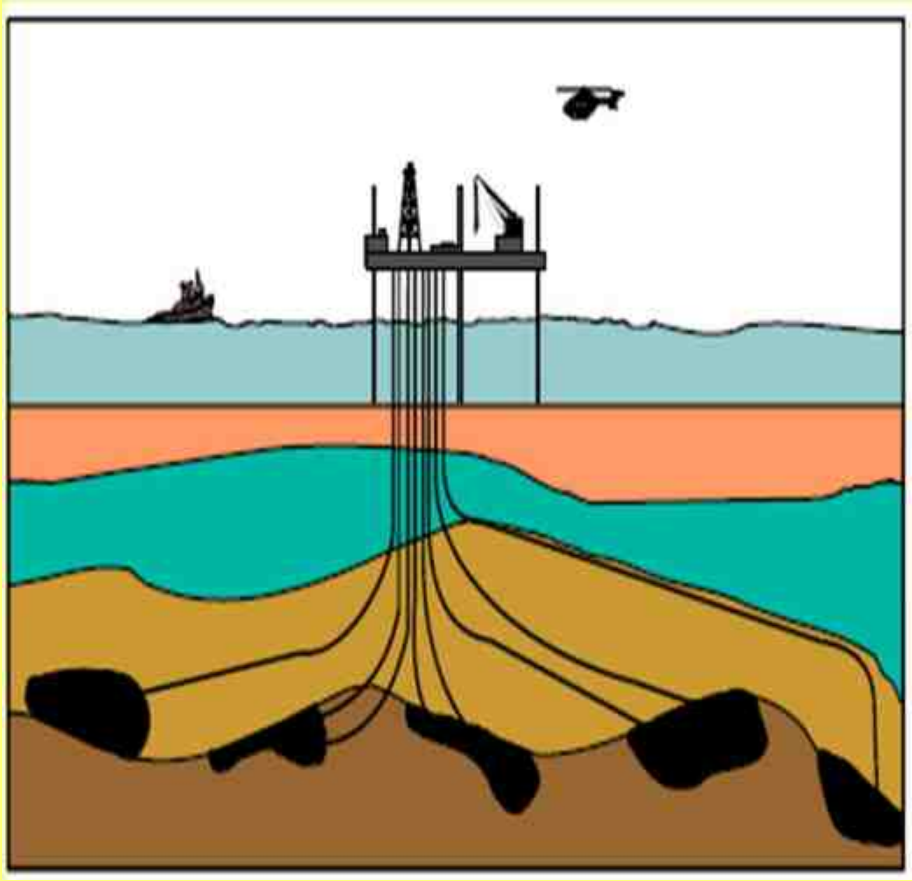
First Vertical then Horizontal Hydraulic Fraccing





Deviated wells

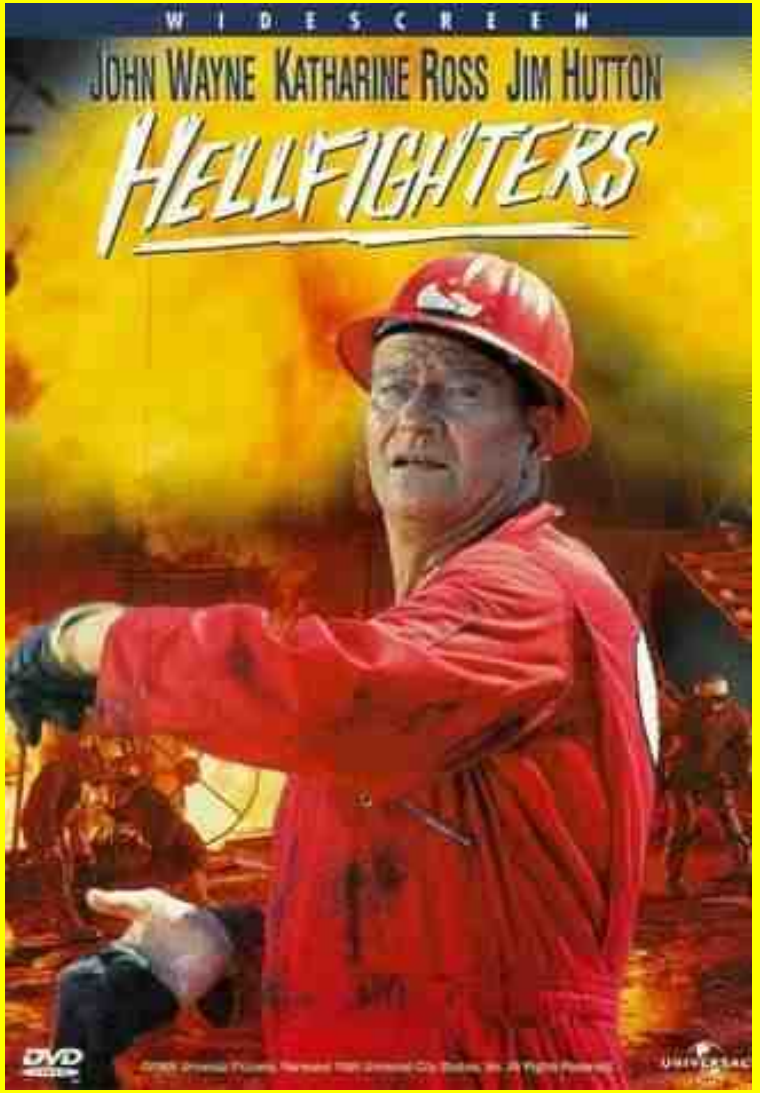




12km plus horizontally

1990 Last
nitro factory
burned down

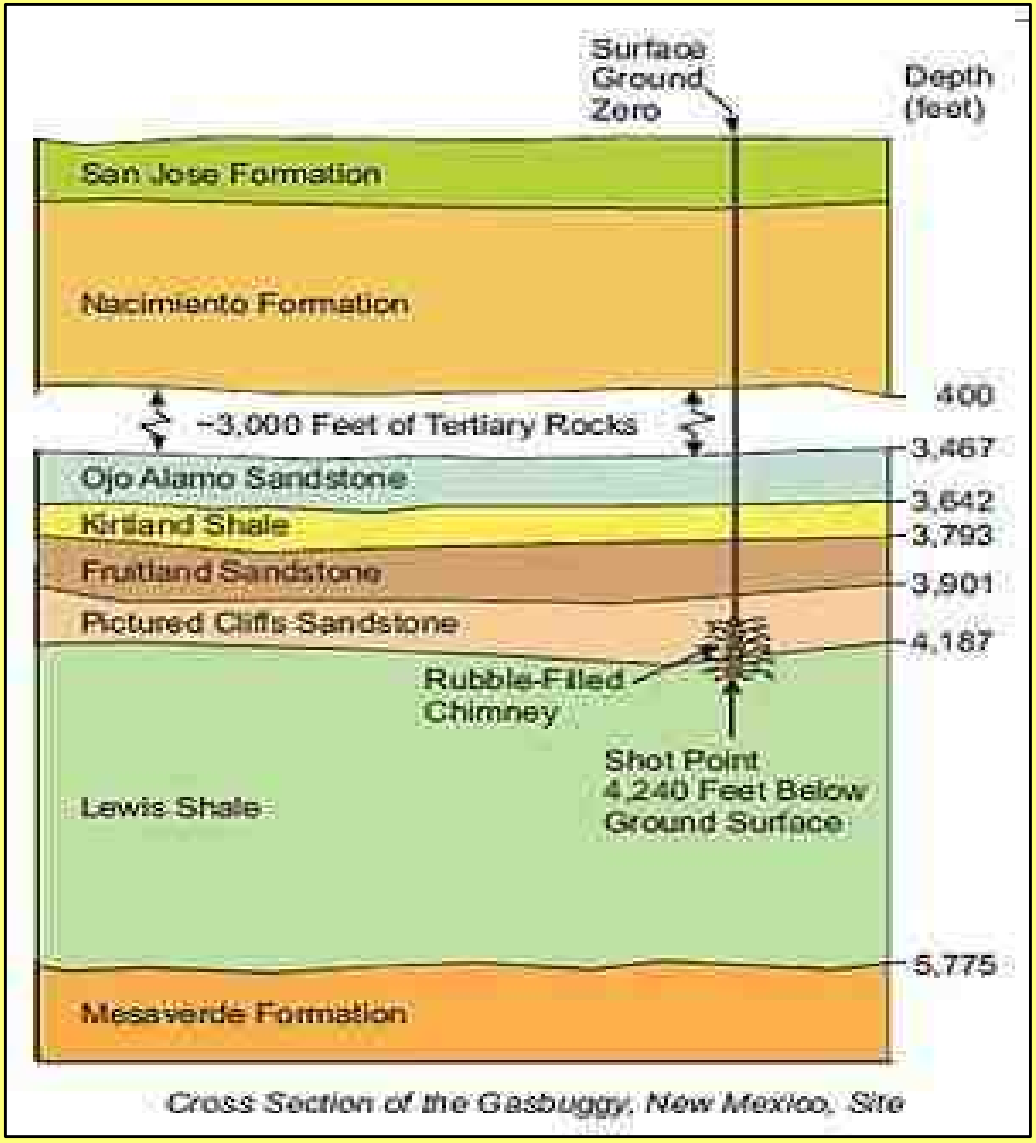
Fraccing now
by jelly



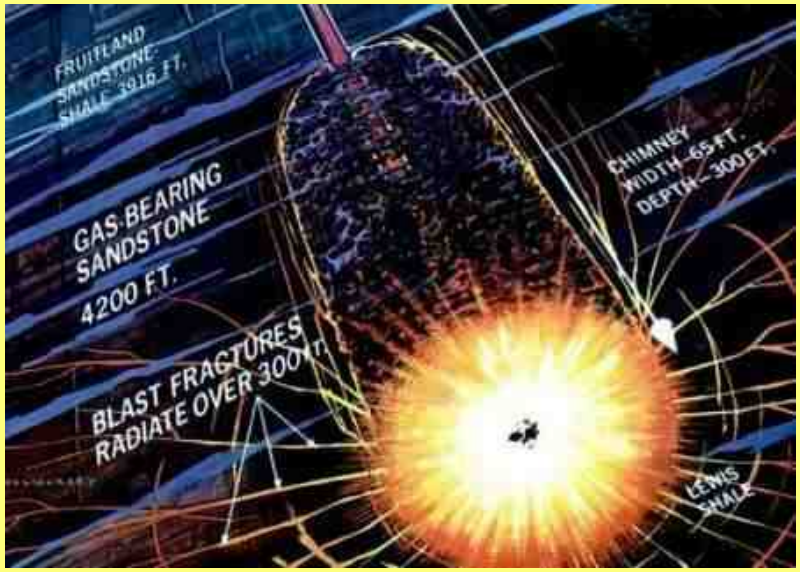
You ain't seen nuthin yet

1967
13-ft 18-in 29 kilo-ton nuclear device
GASBUGGY
lowered into a vertical shale gas well

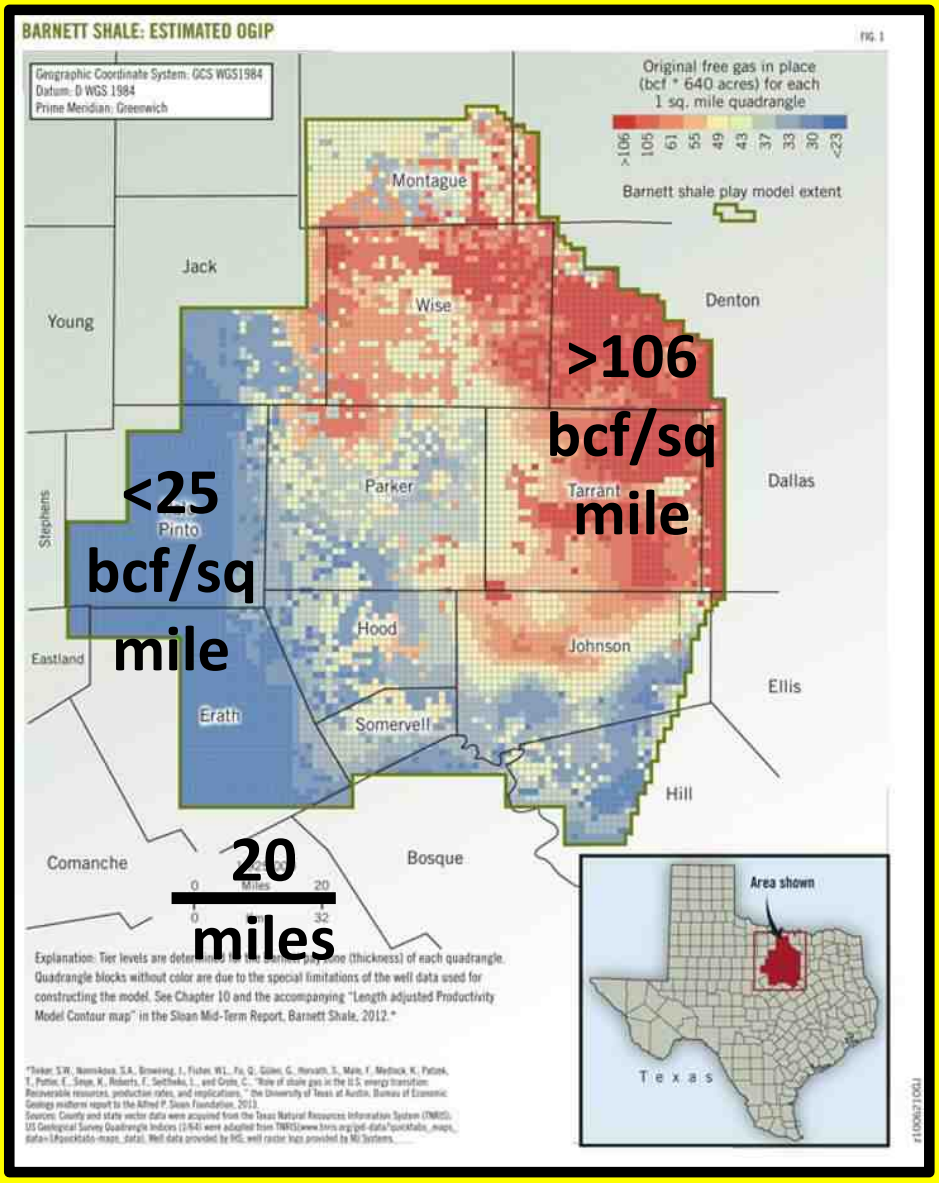
and detonated at 4,240 ft



Cross Section of the Gasbuggy, New Mexico, Site

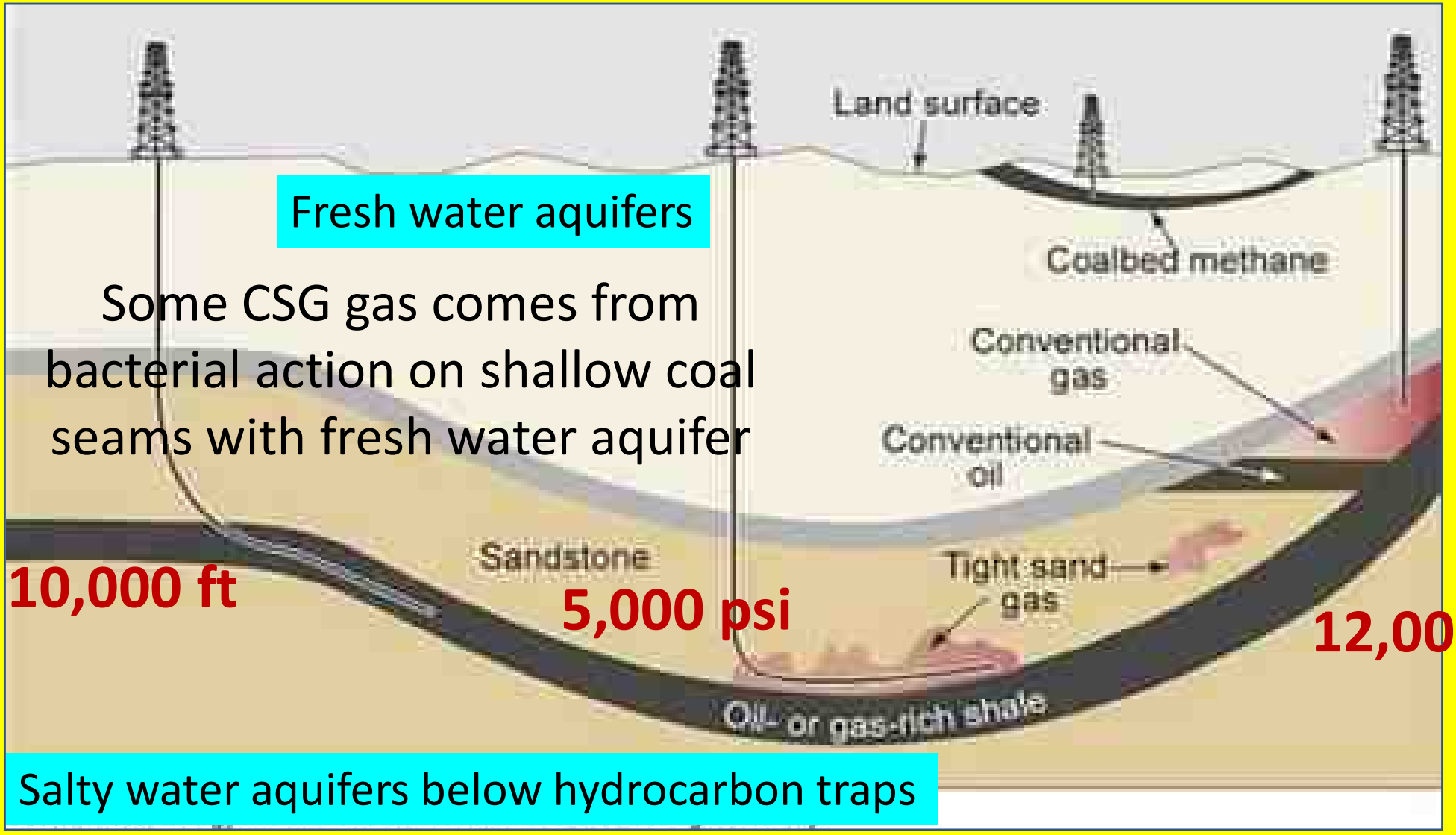


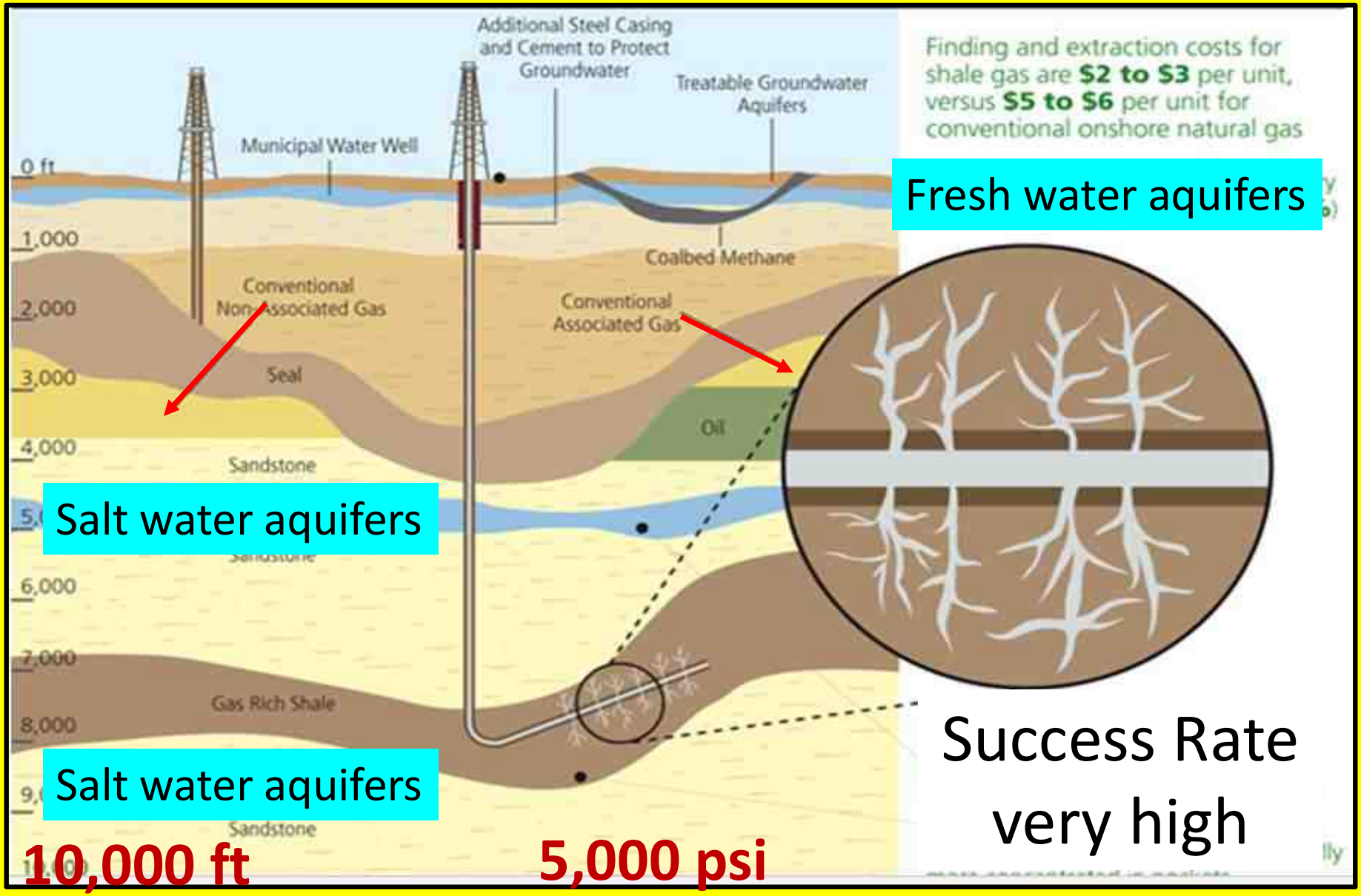
Oops!
Big glass lined cavity and a handful of tritium contaminated gas



1997 Mitchel Energy carried out first ‘slick water’ frac in the Barnet Shale directly below Fort Worth Texas

800,000 gallons and 200,000 tons sand

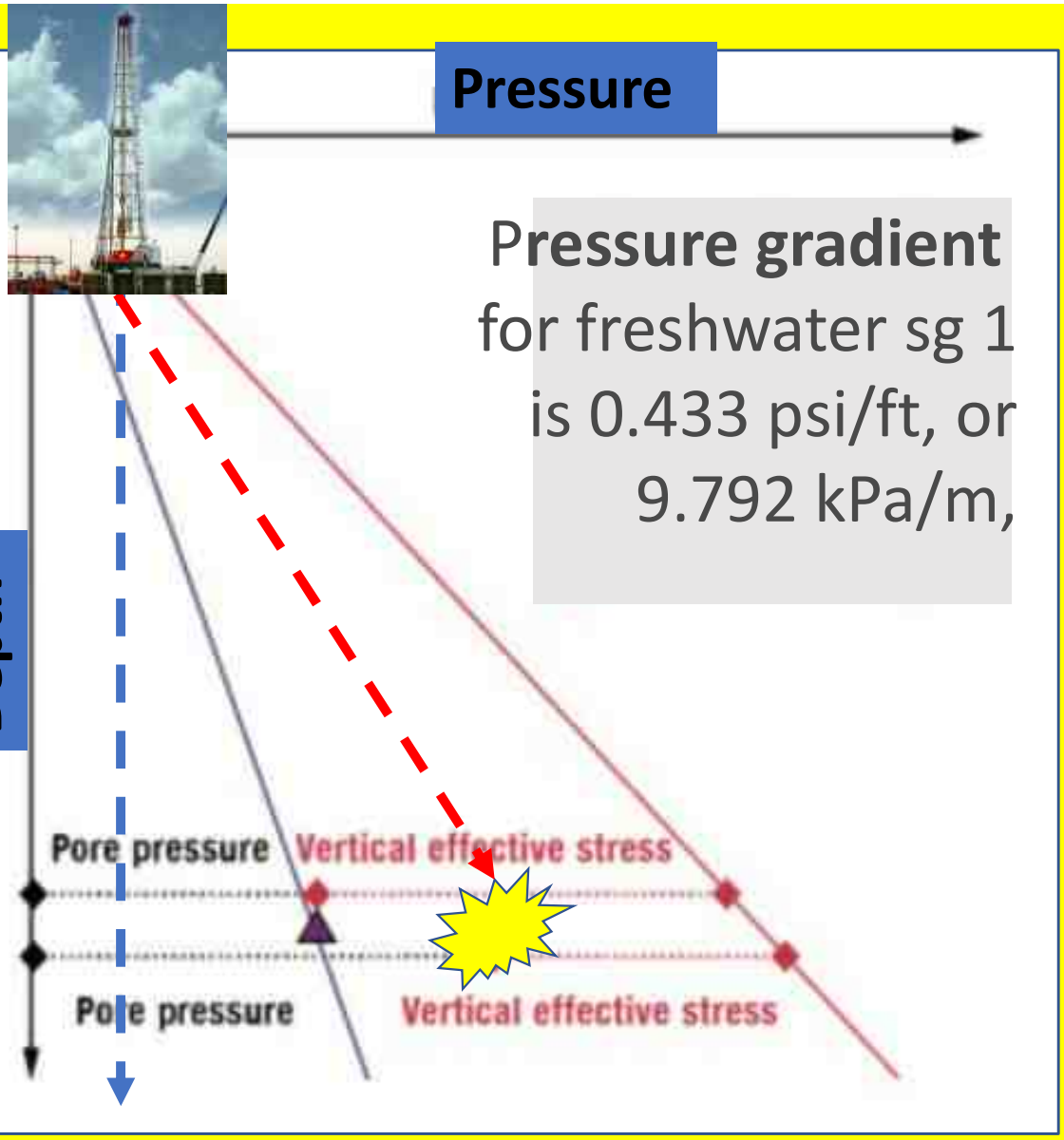

Land surface
Fresh water aquifers
Coalbed methane
Some CSG gas comes from bacterial action on shallow coal seams with fresh water aquifer
Conventional gas
Conventional oil
Sandstone
Tight sand gas
10,000 ft
5,000 psi
12,000 psi
Oil- or gas-rich shale
Salty water aquifers below hydrocarbon traps


Additional Steel Casing and Cement to Protect Groundwater
Treatable Groundwater Aquifers
Municipal Water Well
Finding and extraction costs for shale gas are $2 to $3 per unit, versus $5 to $6 per unit for conventional onshore natural gas
Fresh water aquifers
0 ft
1,000
2,000
3,000
4,000
6,000
7,000
8,000
Coalbed Methane
Conventional Non-Associated Gas
Conventional Associated Gas
Seal
Oil
Sandstone
Salt water aquifers
Gas Rich Shale
Salt water aquifers
Sandstone
10,000 ft
5,000 psi
Success Rate very high

Water not compressible

GAS is 1 cc bubble of gas will double volume as pressure halves

BLOWOUT



Drilling fluid can be water diesel, gas or air

Weight of fluid stops formation fluid flow into the borehole and losses into the formation

10,000 ft **5,000 psi** **12,000 psi**

Blowout 1971: Darvaza, Turkmenistan, Gates of Hell

Blow Out Preventer **BOP**

Stops fluid escaping from well

Annular Preventer

Rubber seal closes on drill pipe

Pipe Rams

Metal seal closes on drill pipe

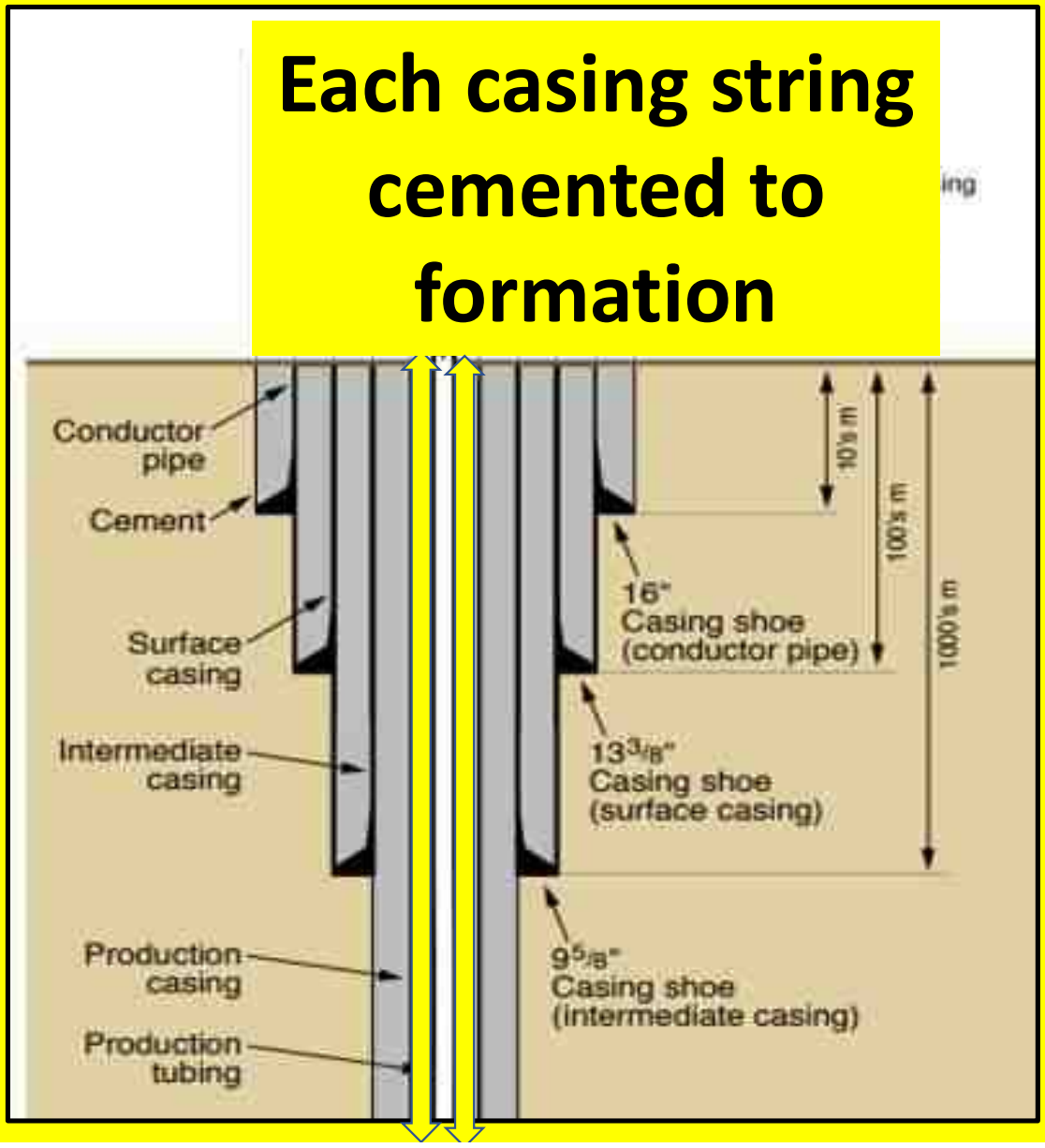
Shear Rams

Metal blades cut drill pipe

Blind Rams

Seals when no drill pipe or cable

Each casing string cemented to formation



20” Top Hole

16” Conductor Csg

13 3/8” Surface Csg

9 5/8” Intermediate

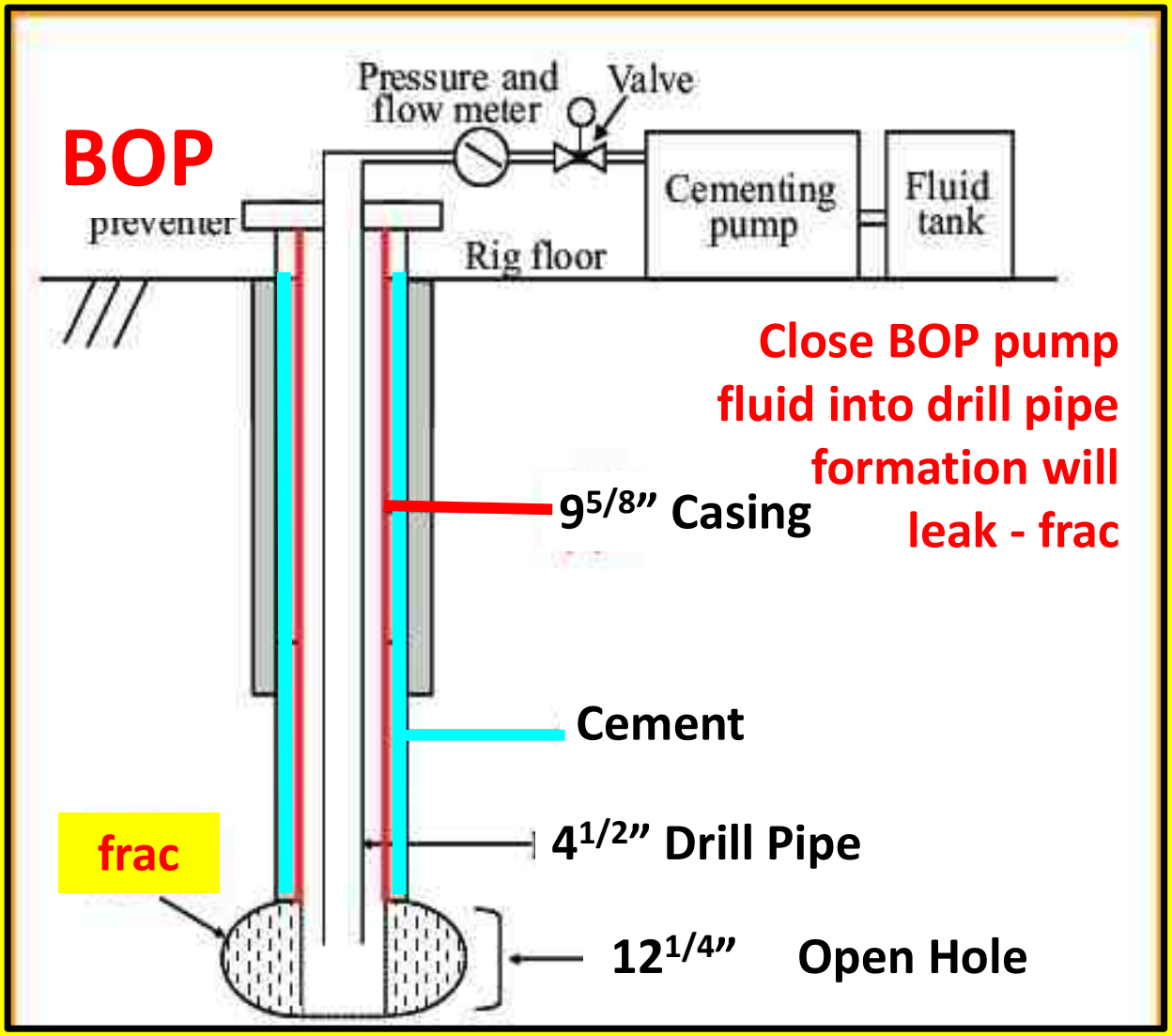
7” Production Csg

4” Production Tubing

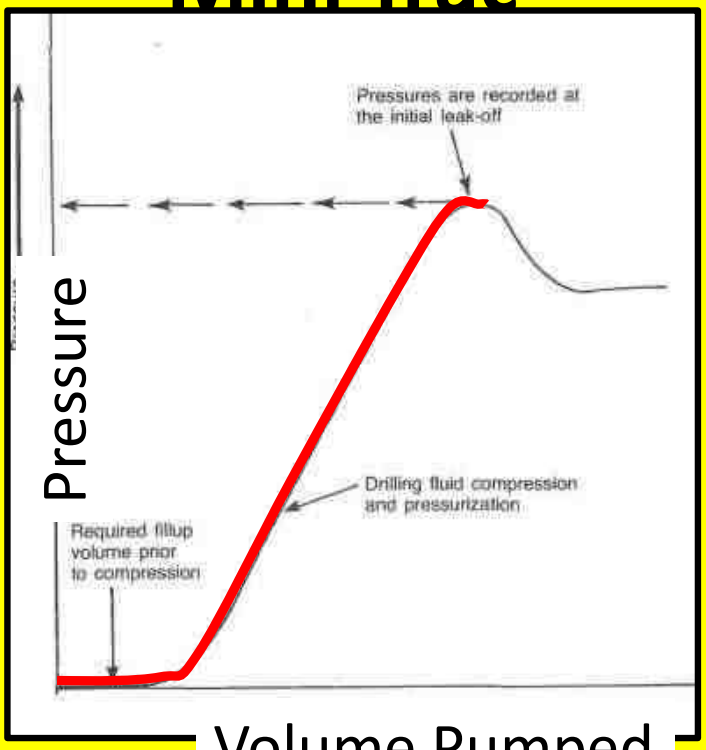
Annulus filled with cement

Fraccing is through Production Casing

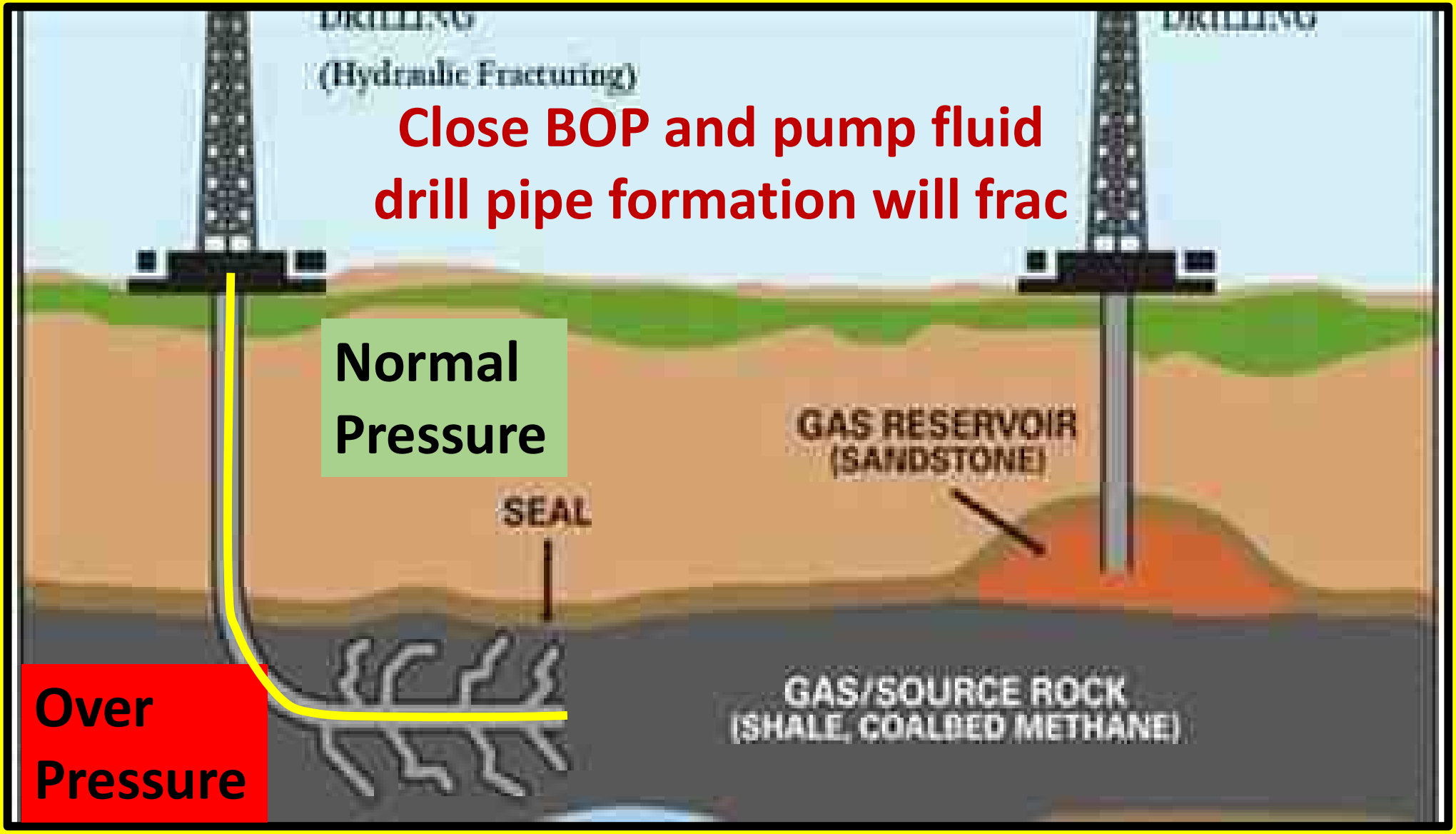
Casing integrity



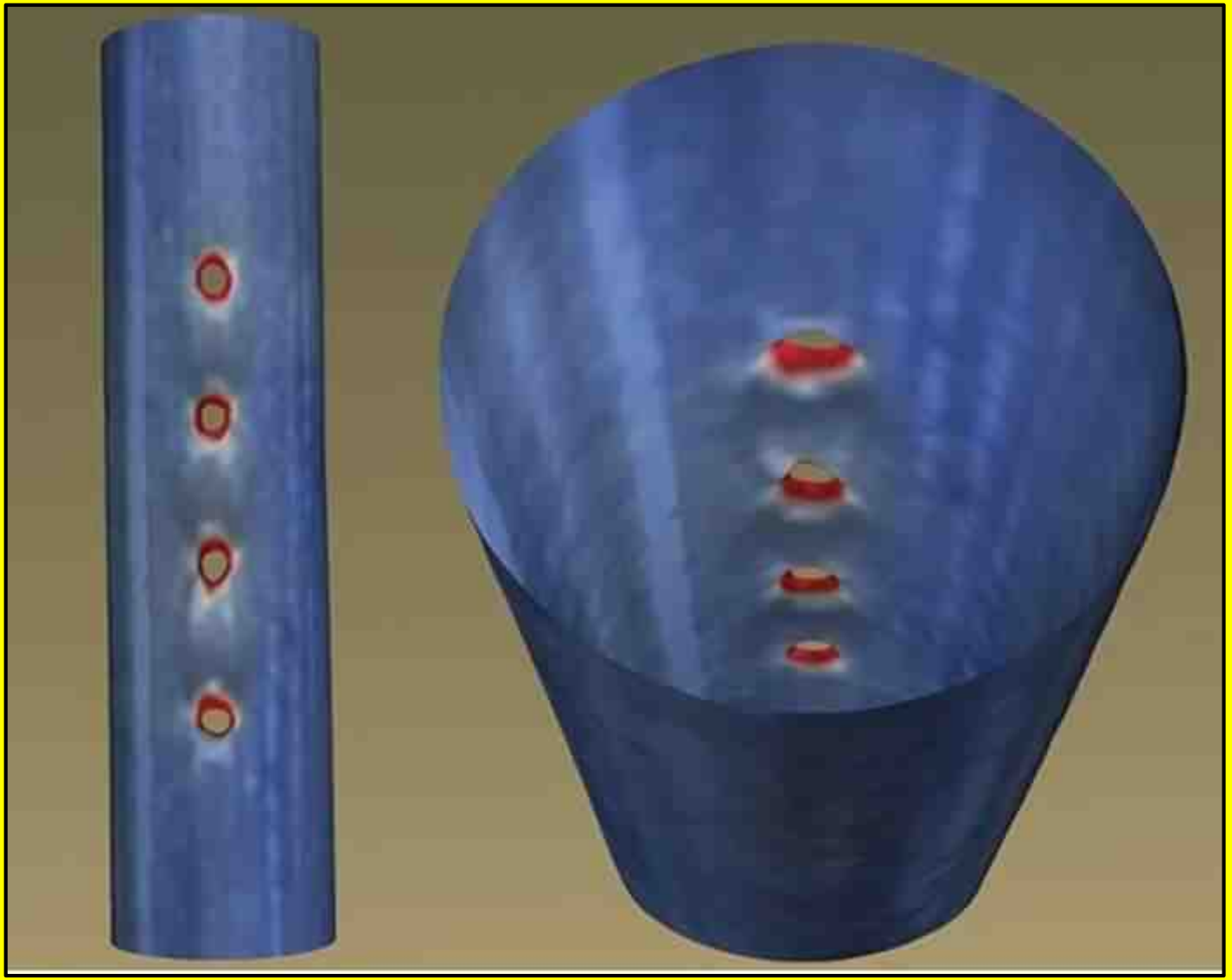
Leak-off test
Mini-frac



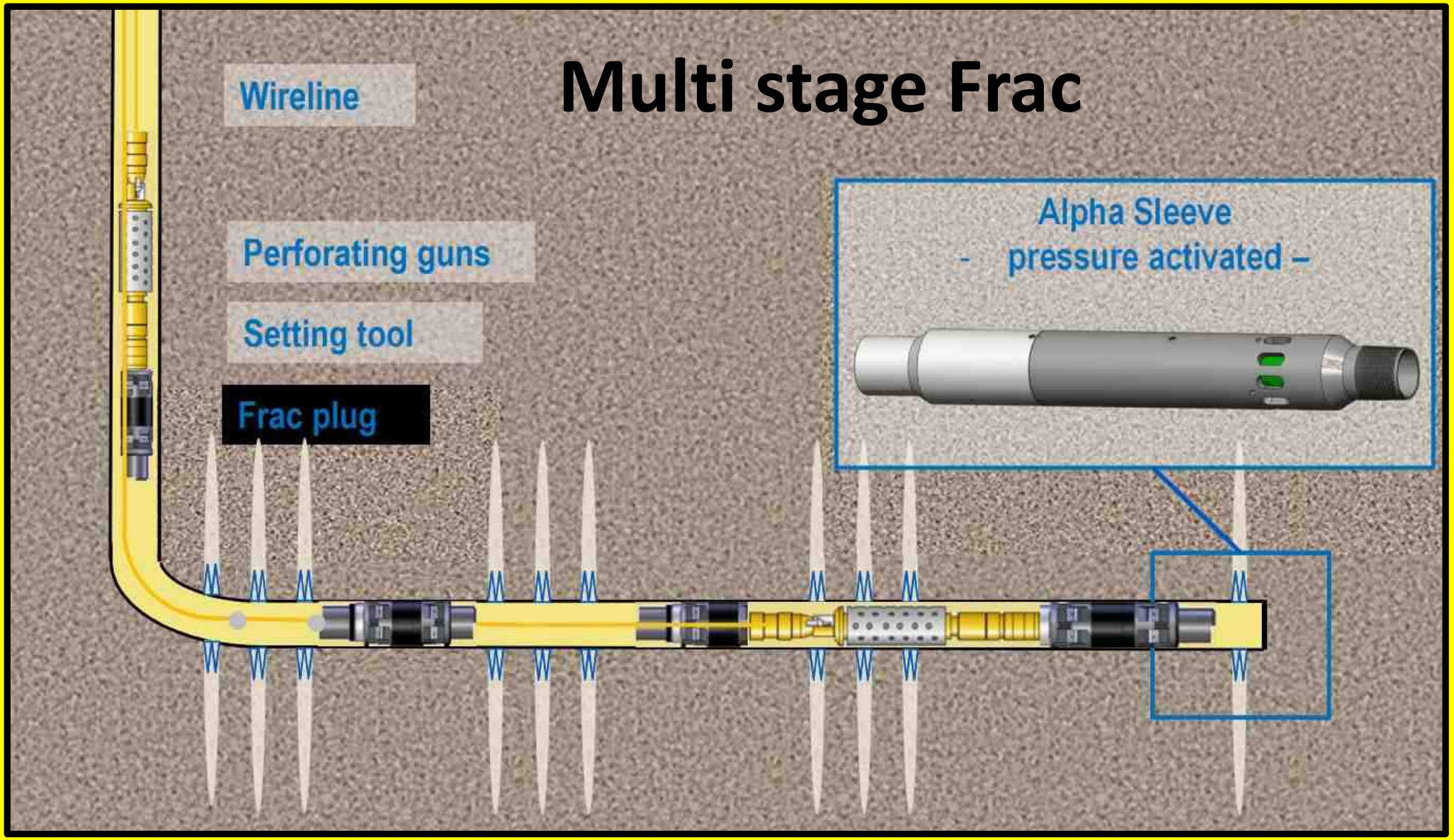
Tests cement to casing bond


(Hydraulic Fracturing)
Close BOP and pump fluid
drill pipe formation will frac
Normal
Pressure
GAS RESERVOIR
(SANDSTONE)
SEAL
Over
Pressure
GAS/SOURCE ROCK
(SHALE, COALBED METHANE)

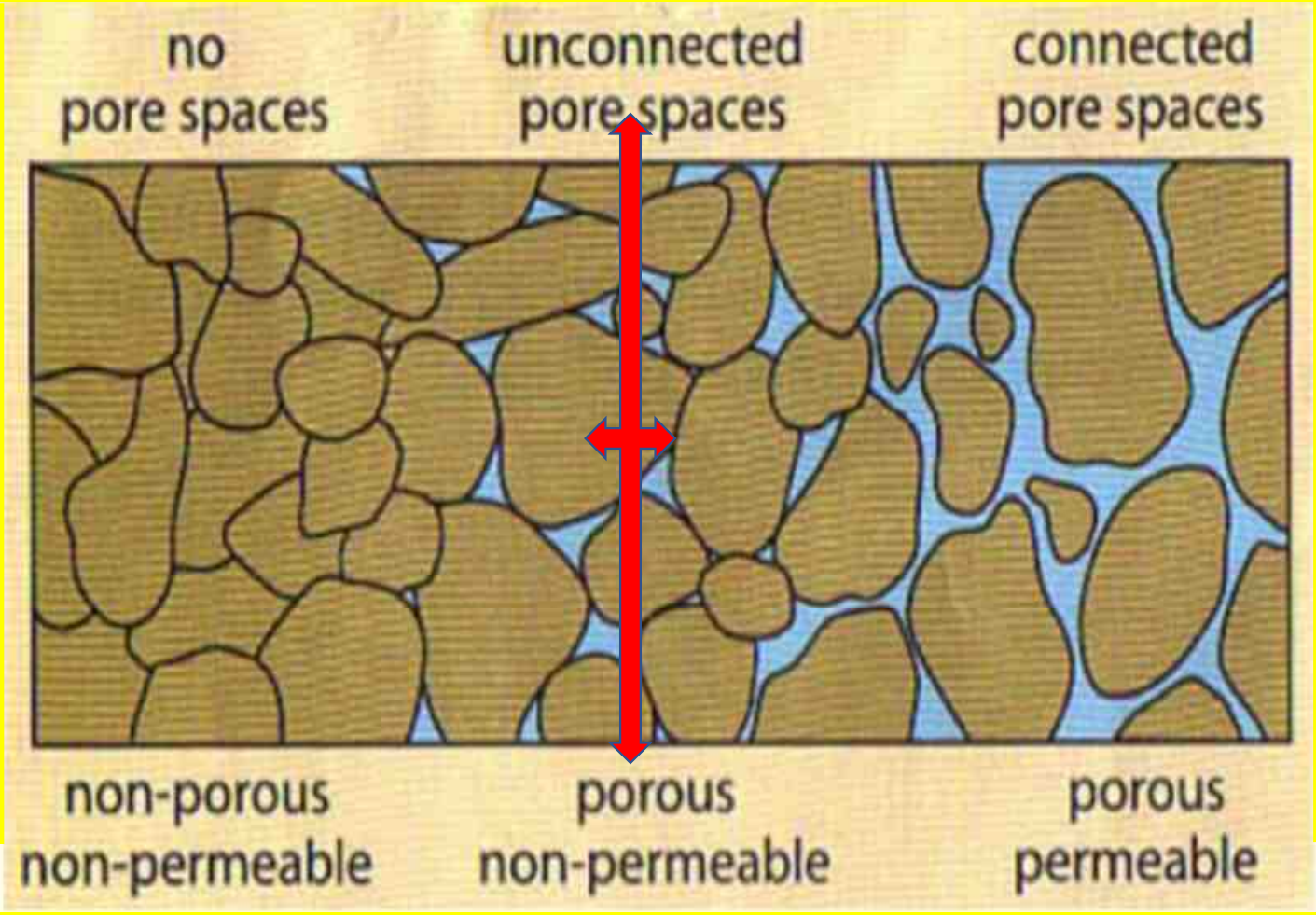
Perforated casing



Multi stage Frac



0% - 5% **5% - 20%** **25% - 40%**



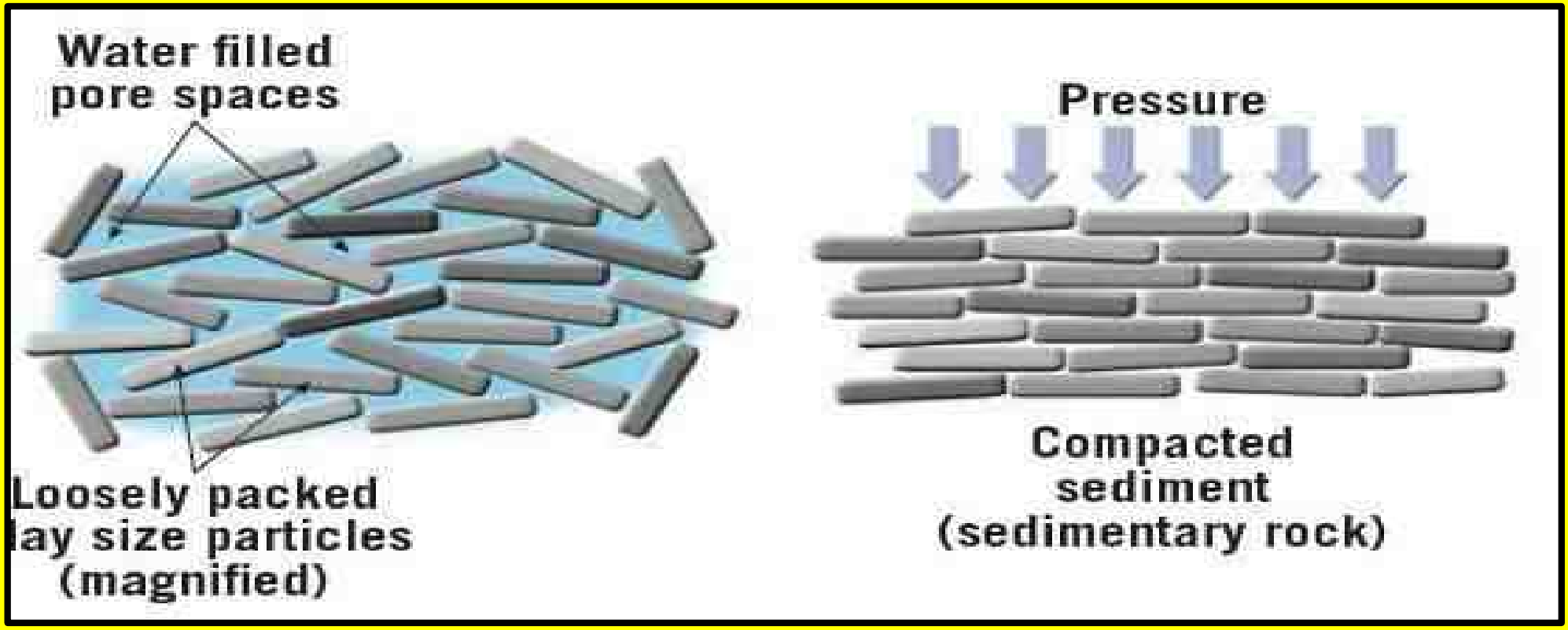
Hydraulic Fraccing, inject water and sand

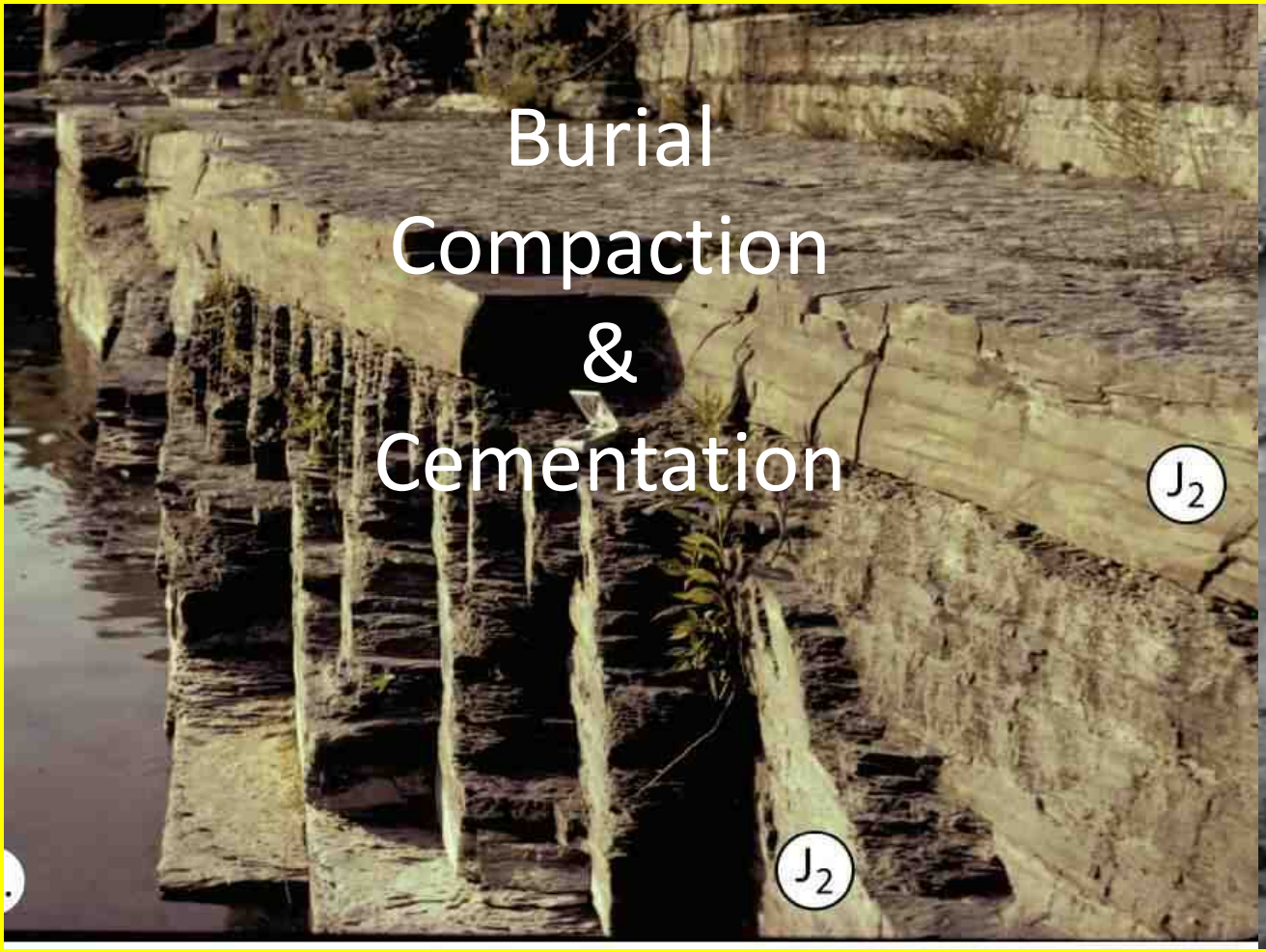
45%
Porosity
High
Permeable

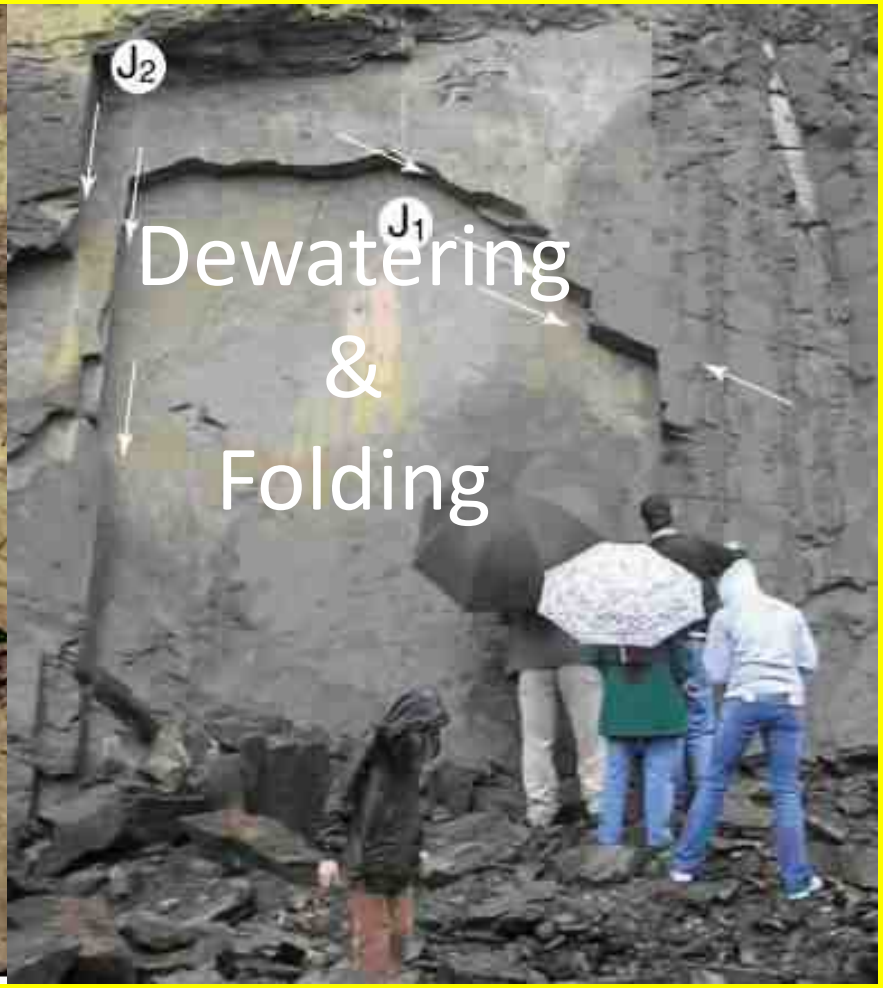
Low Porosity
Low Perms
Shale & Coal
Frac

0% Porosity
Nil Perm

Seal







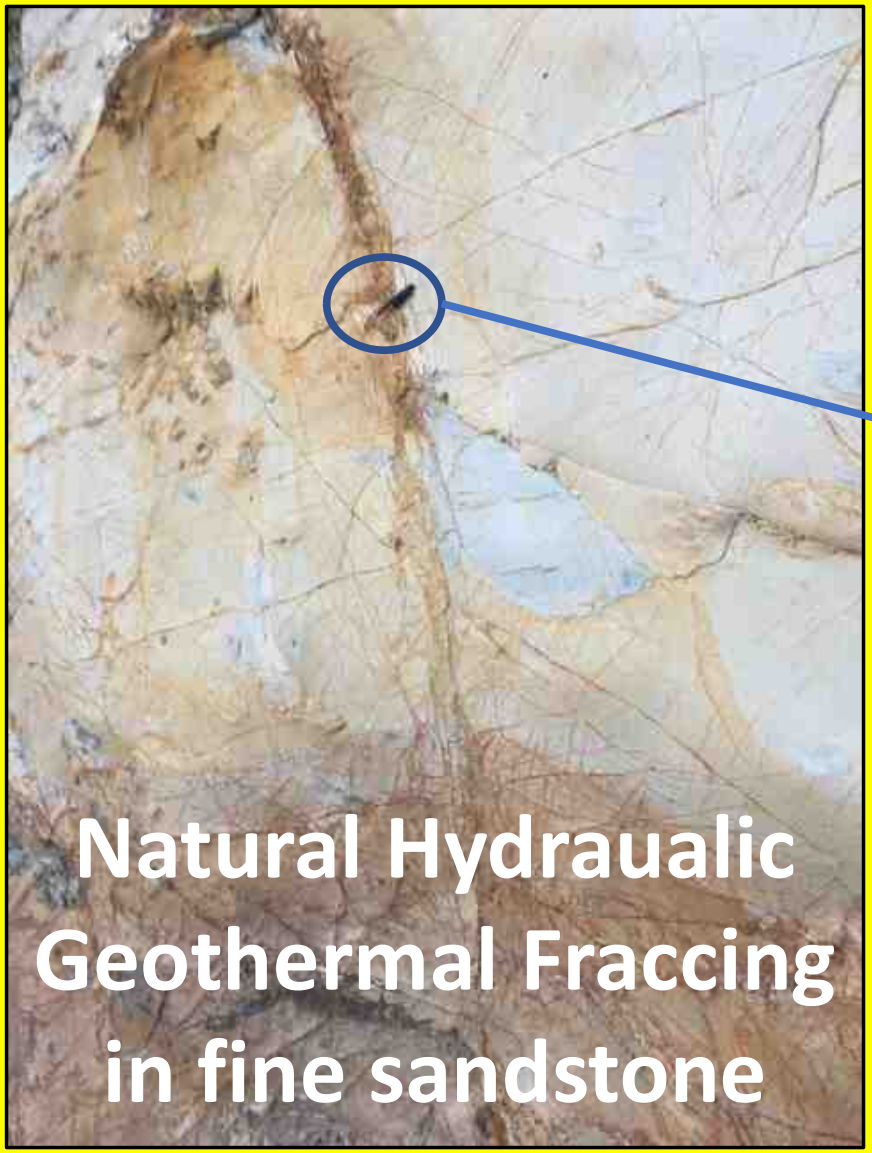
Fraccing is natural and happens all the time

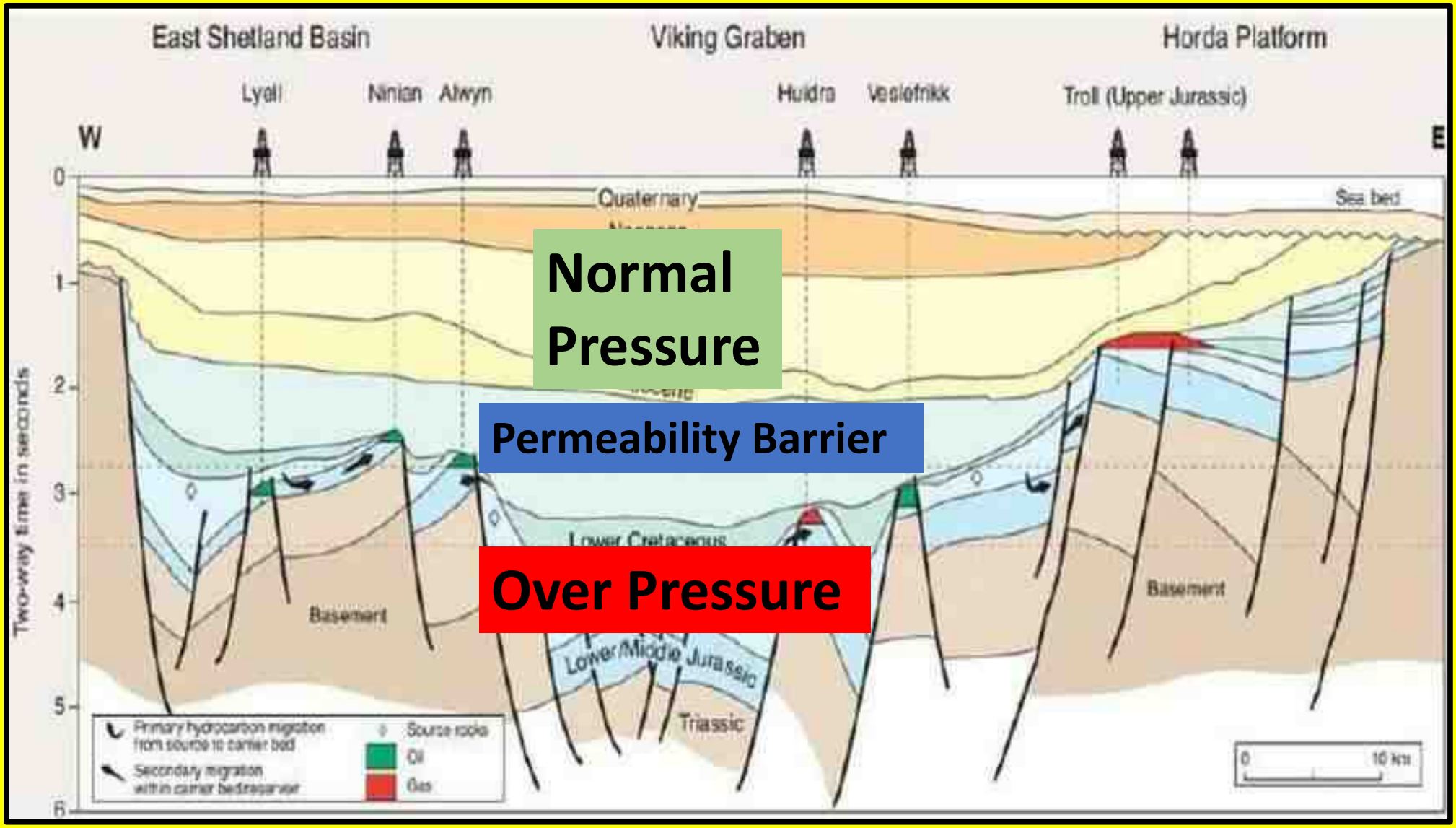
Figure 9: Polished section of HQ (61 mm) core showing structure. Vertical dots at 2.5 mm spacing, horizontal dots at 5 mm spacing

Fraccing is natural and happens all the time

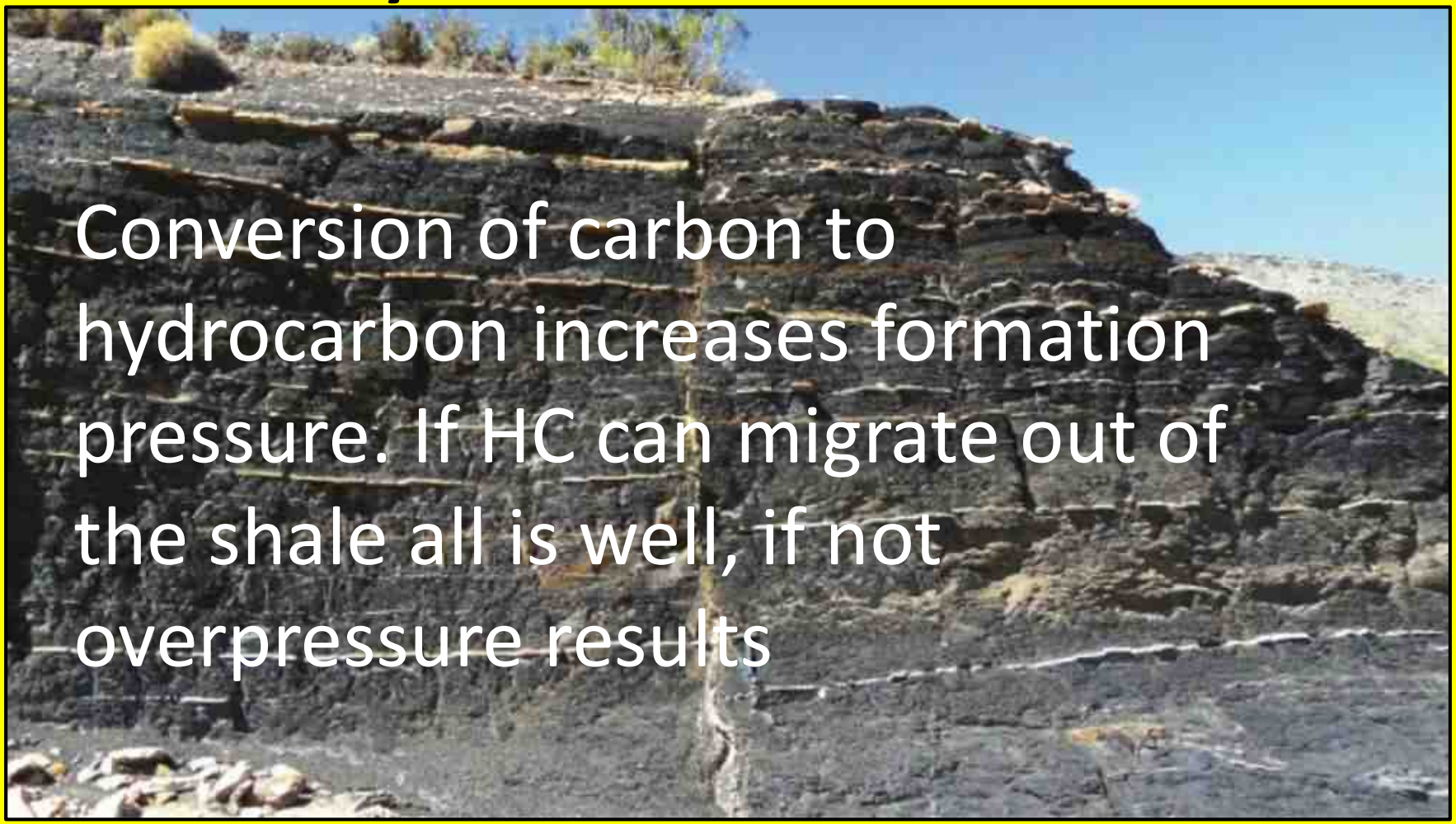
Coal

Spasmodic Fraccing
Burleigh Heads

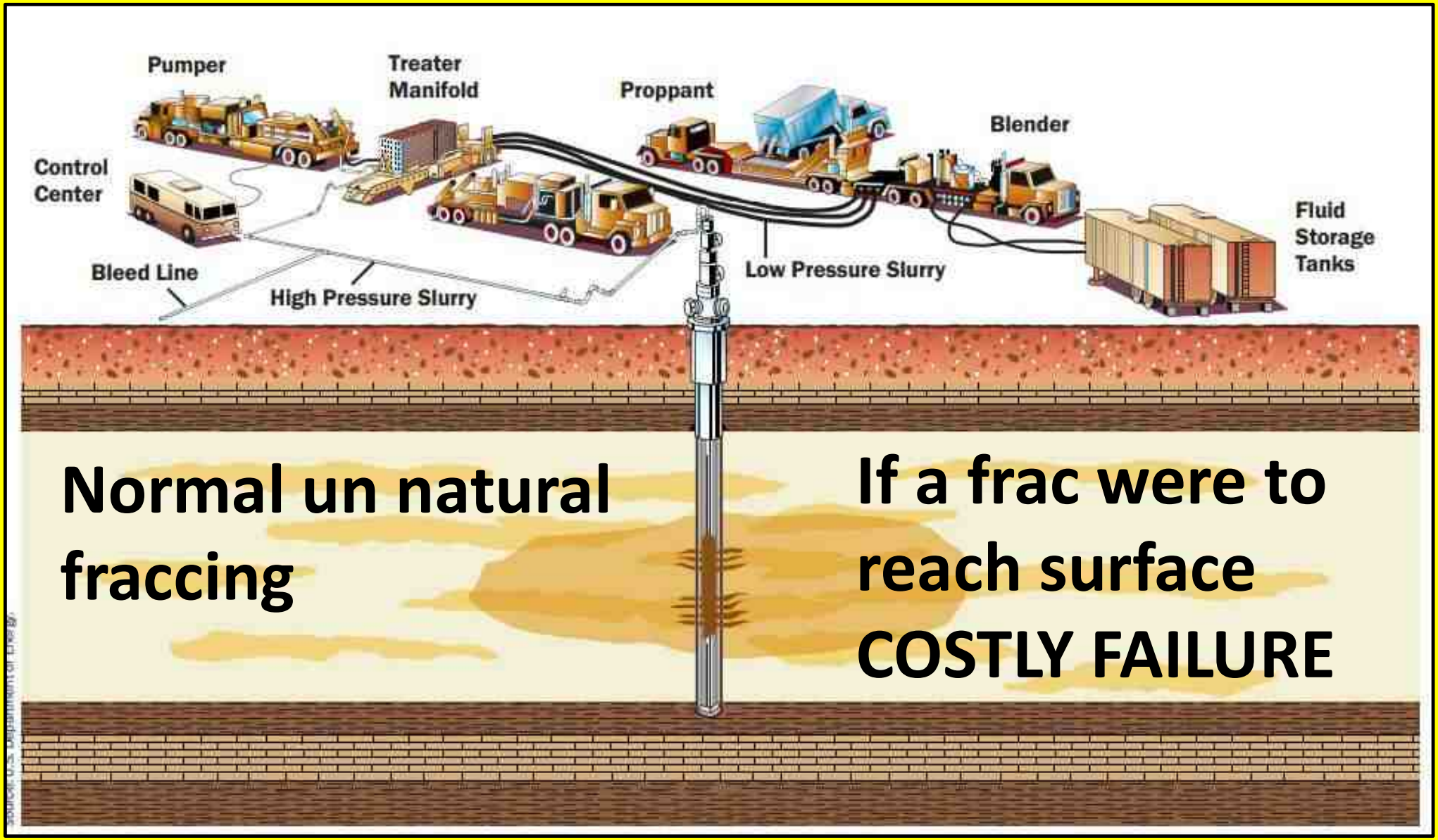



East Shetland Basin
Viking Graben
Horda Platform
Lyell
Ninian
Alwyn
Huldra
Veslefrikk
Troll (Upper Jurassic)
W
E
Two-way time in seconds
Quaternary
Sea bed
Normal Pressure
Permeability Barrier
Over Pressure
Basement
Basement
Lower Cretaceous
Lower/Middle Jurassic
Triassic
Primary hydrocarbon migration from source to carrier bed
Secondary migration within carrier bed/reservoir
Source rocks
Oil
Gas
0
10 km

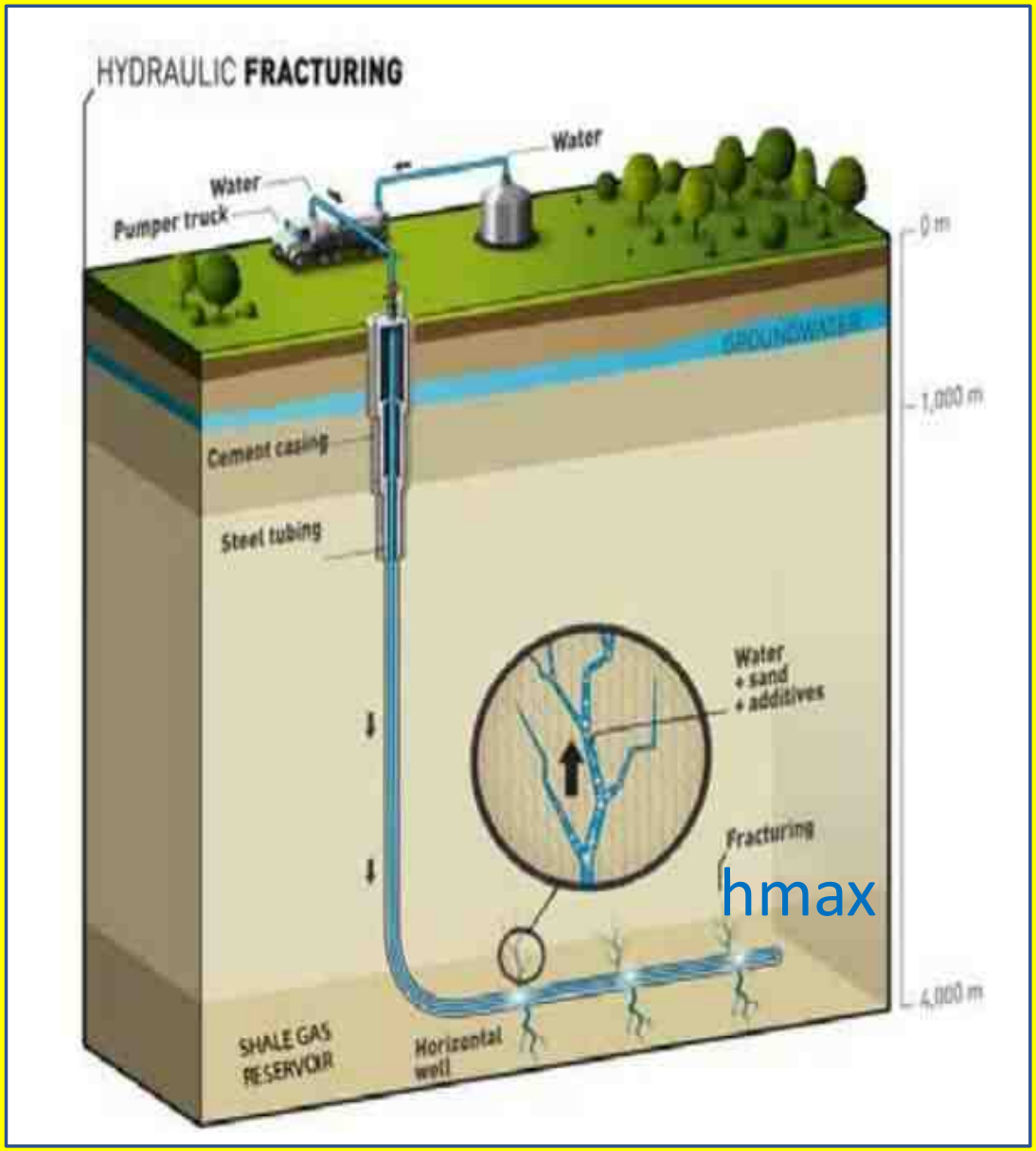
Natural Hydraulic Frac in shale source rock



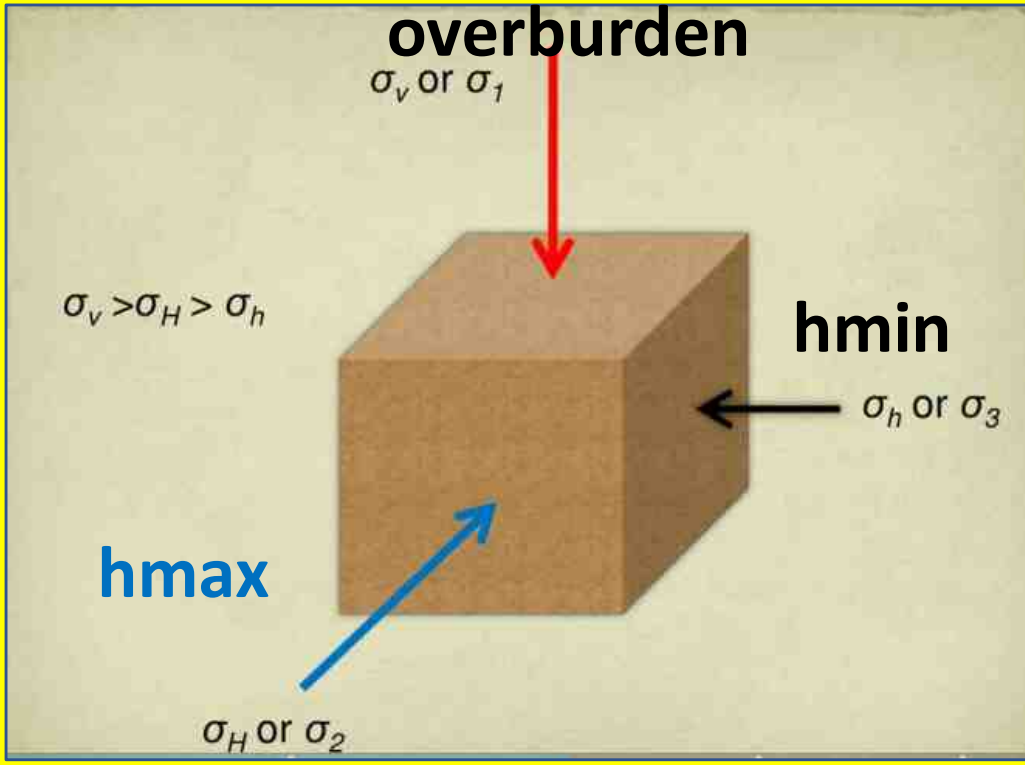
Once deeply buried and over-pressured shale source rock


Pumper
Treater Manifold
Proppant
Blender
Control Center
Fluid Storage Tanks
Bleed Line
High Pressure Slurry
Low Pressure Slurry
Normal un natural fraccing
If a frac were to reach surface COSTLY FAILURE


A BIG
FRAC
BOP



Principal (Vertical) Stress

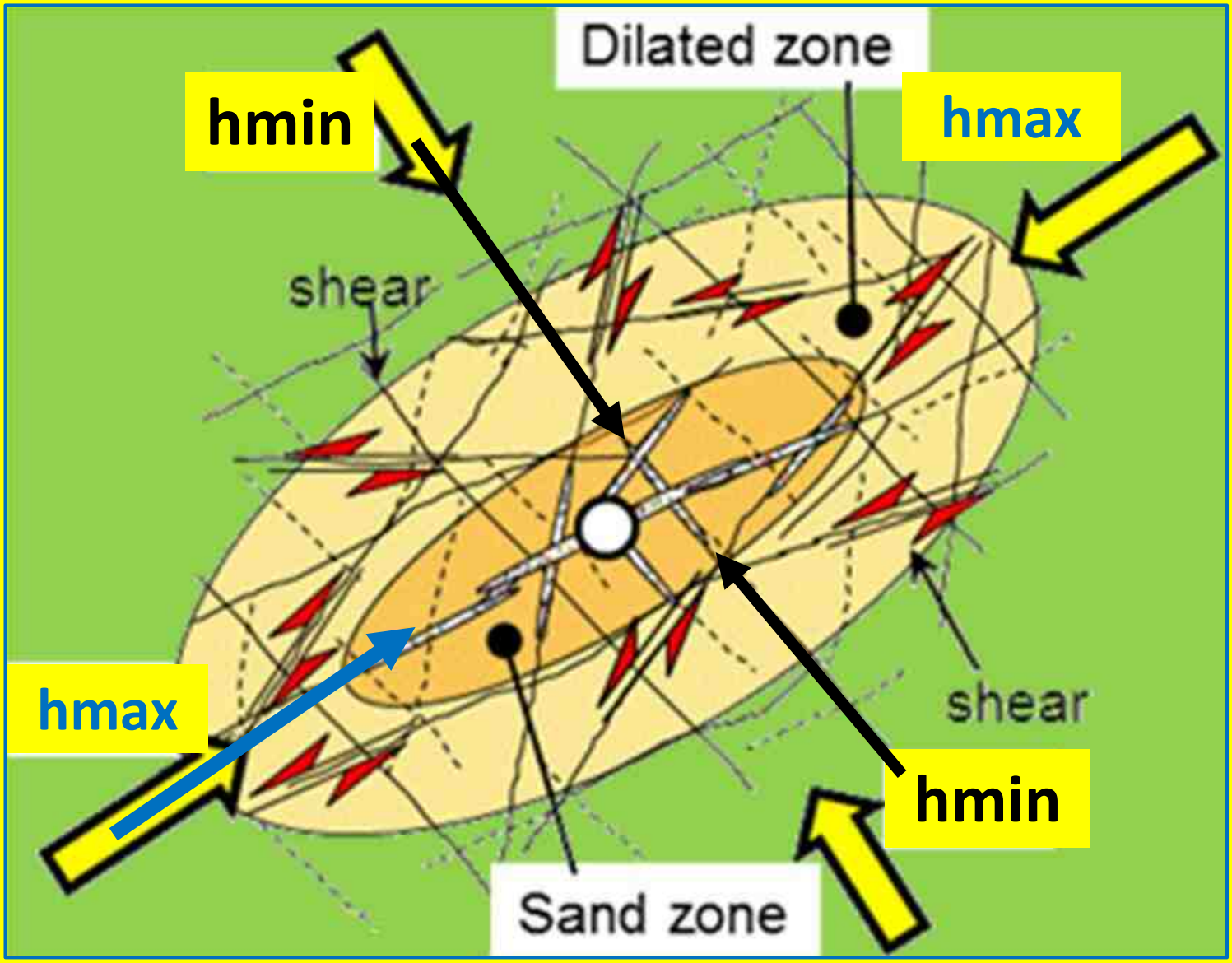


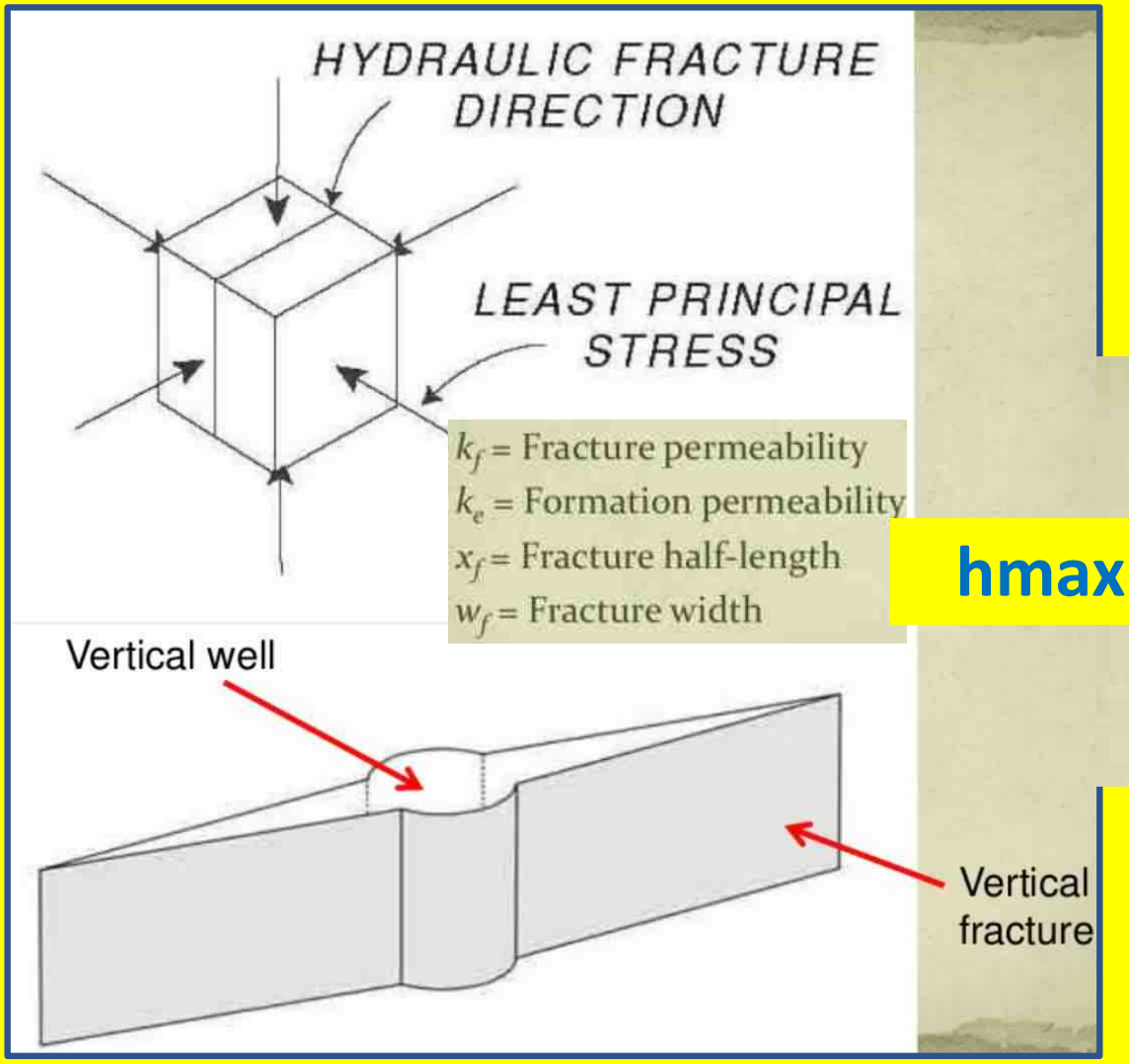
Horizontal Stress

In linear elastic, homogeneous, isotropic, and intact rock, the hydraulic fracture is expected to be vertical and **perpendicular to** the minimum horizontal stress (**hmin**).

Vertical well Frac

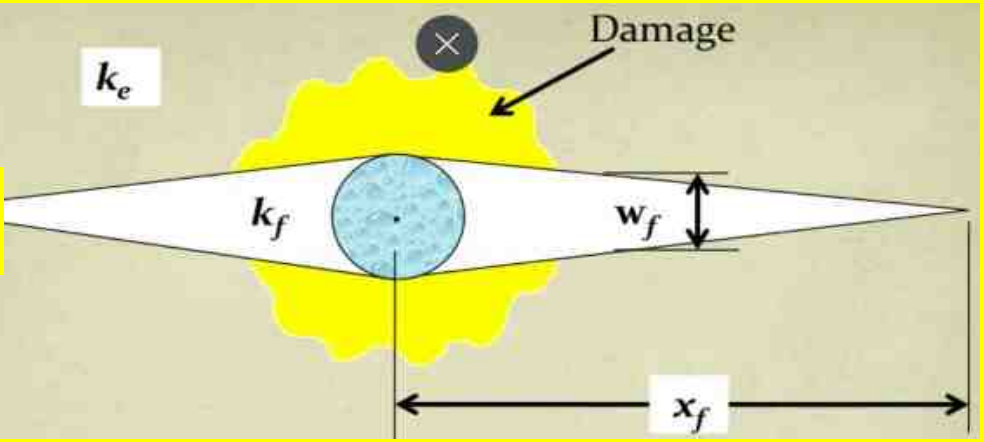
Develop at right angles to hmin





hmax

hmin



hmin

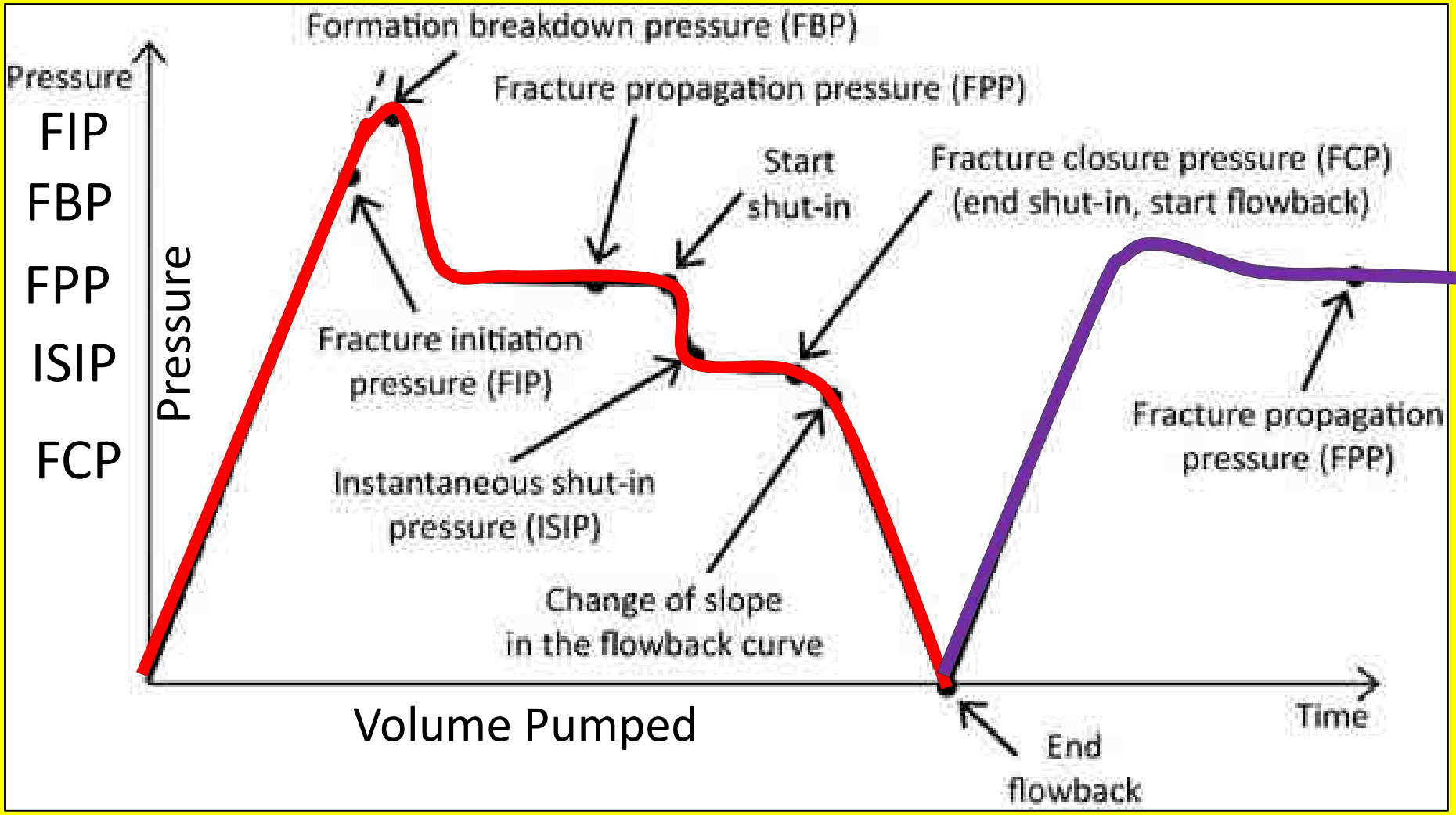
Proppant

Frac Sands

A geological and industry overview

Frac sand added to fraccing fluids to keep fractures open to allow production

Hydraulic Fraccing Initial Leak-off then FRAC



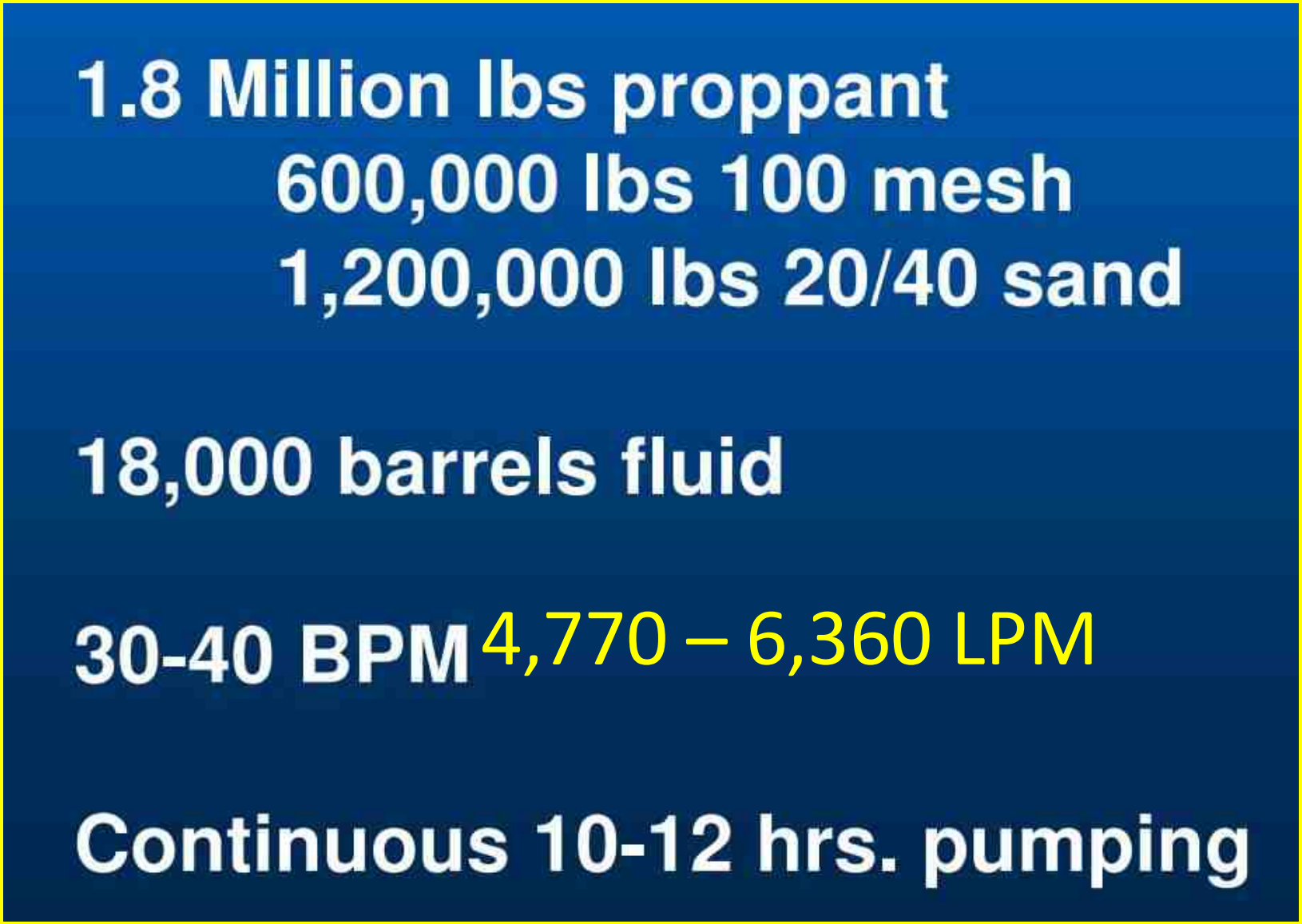
Typical

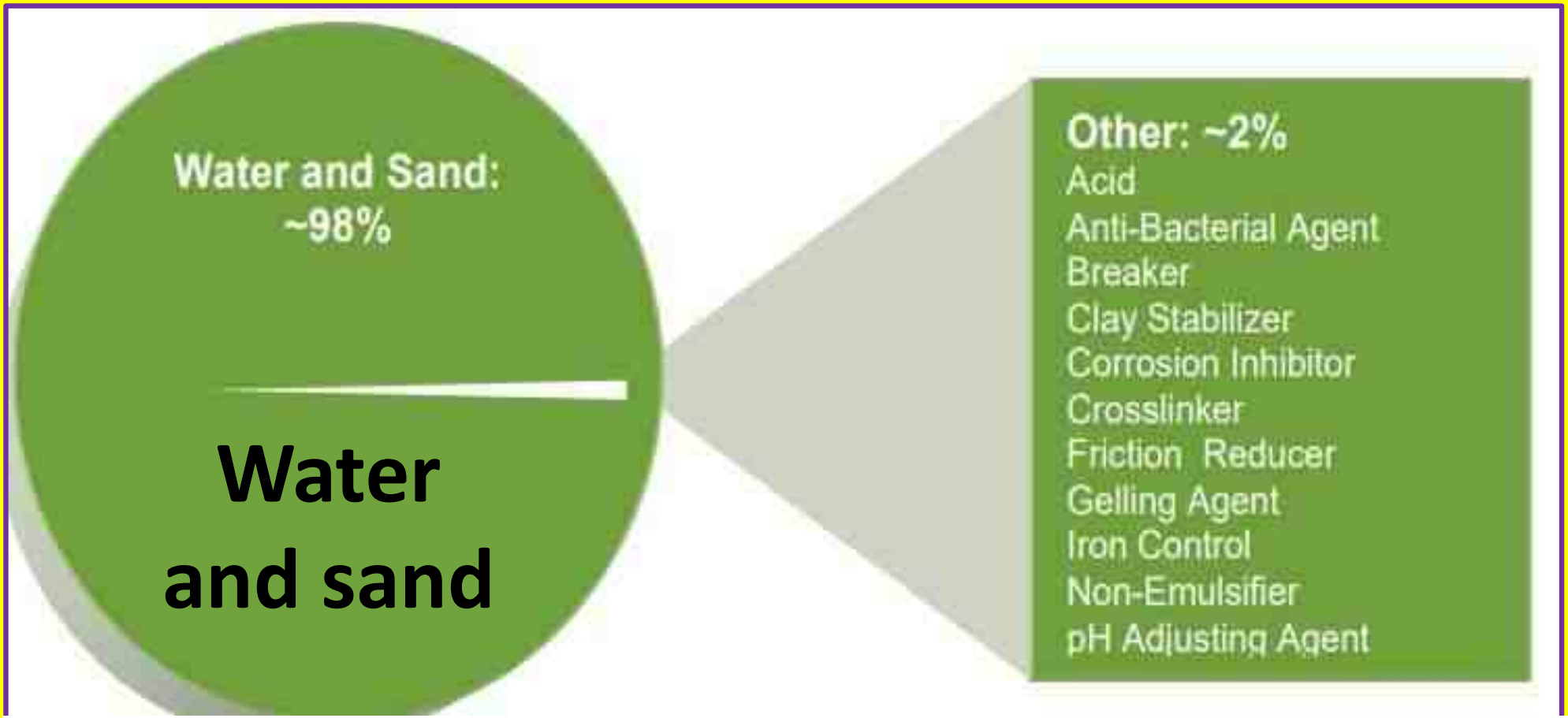
Proppant Squeeze

Volumes

900 tons sand

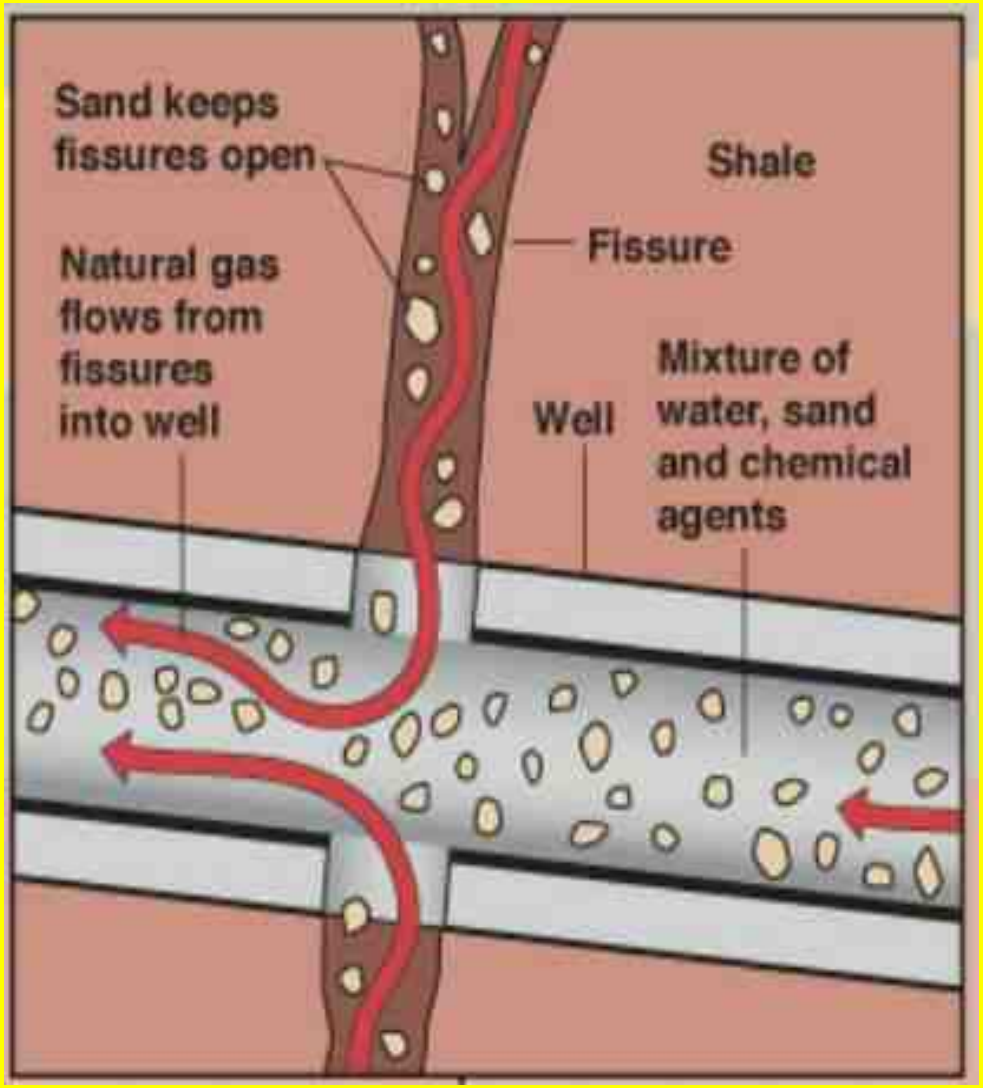
2.8 million litres H2O





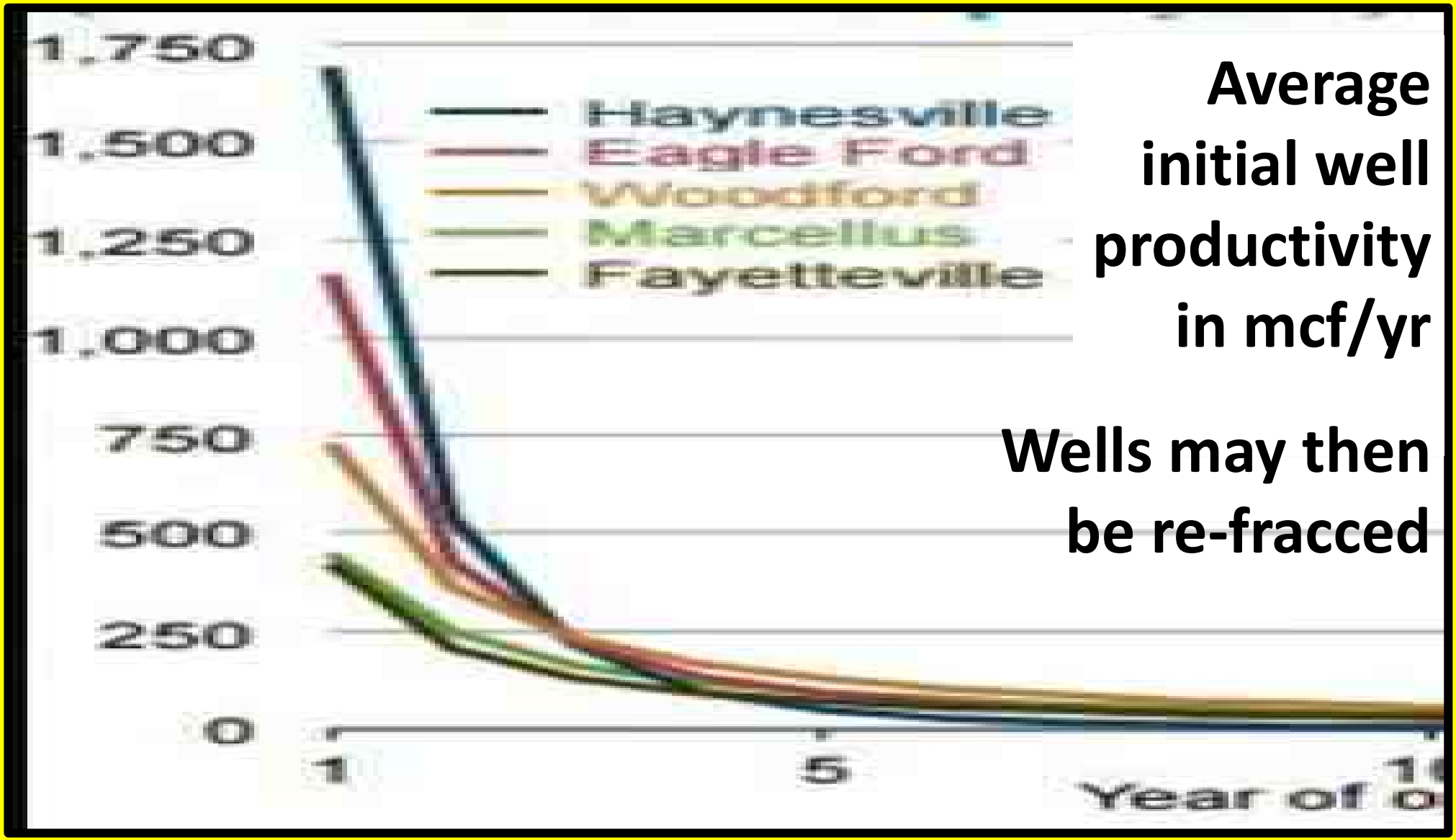
FEAR Claims > 40,000 chemicals per frac, 600 carcinogens, 30-50% of fluid recoverable and reused, rest goes into ground water which we drink.

Proppant Perm



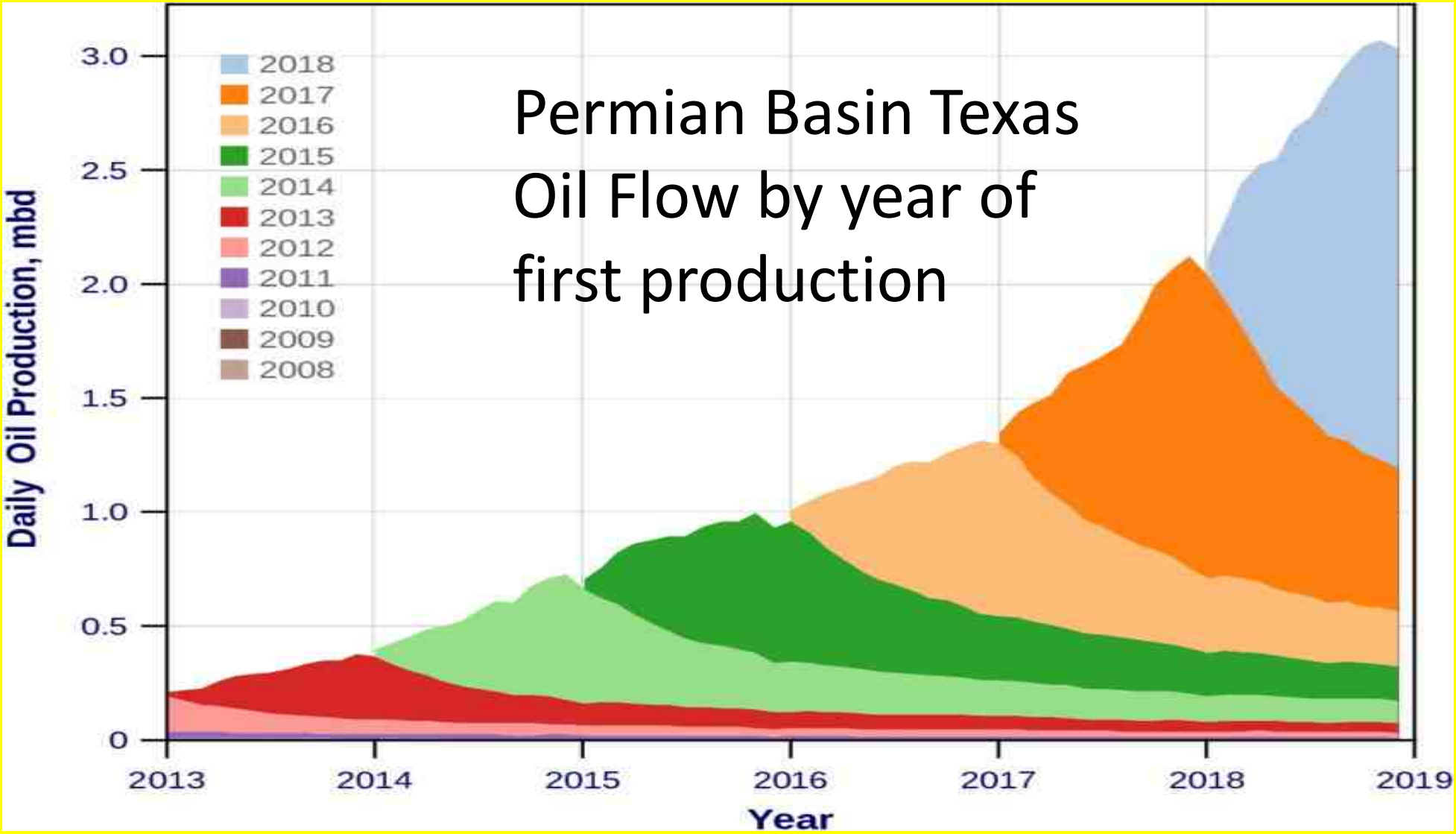
100% Non-Toxic

Guar	Ice Cream
Bentonite	Cat Litter
Borate	Hand Soap
Ammonium Persulfate	Oxidiser
Enzyme Breaker	Meat Tenderiser
Surfactant	Dishwashing soap
Acetic Acid	Vinegar
Triethanomaline	Fabric Softener
EDT Acid	Food Preservative

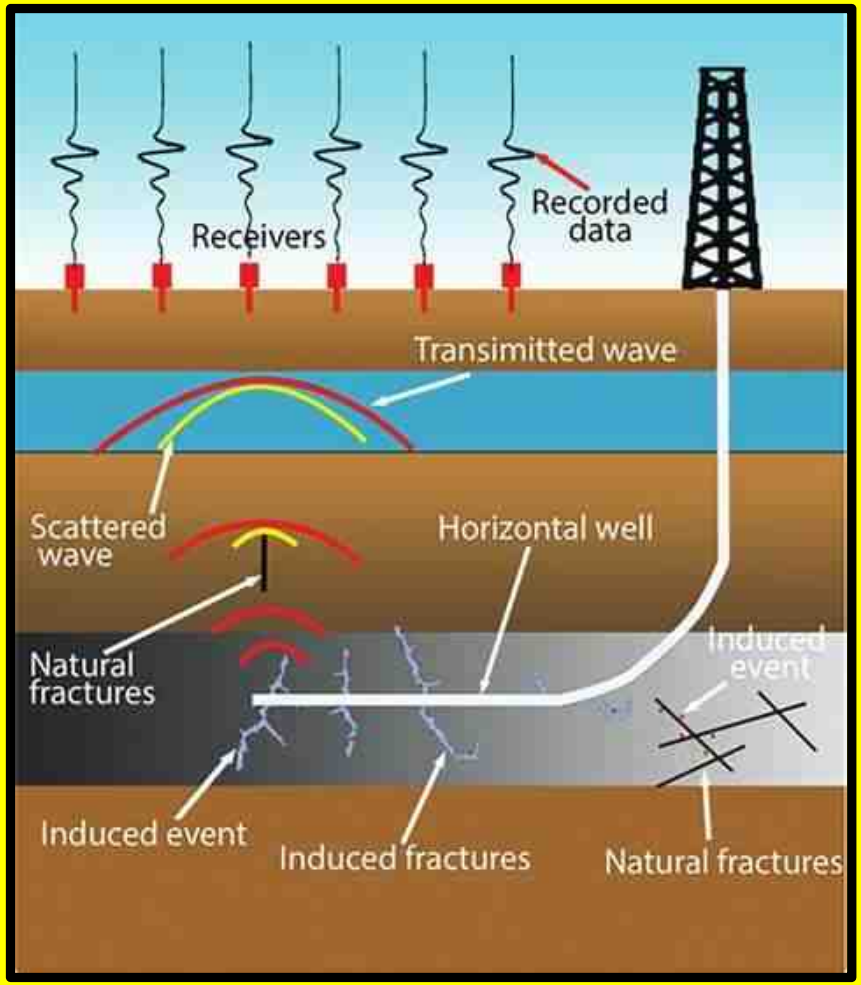


Average initial well productivity in mcf/yr

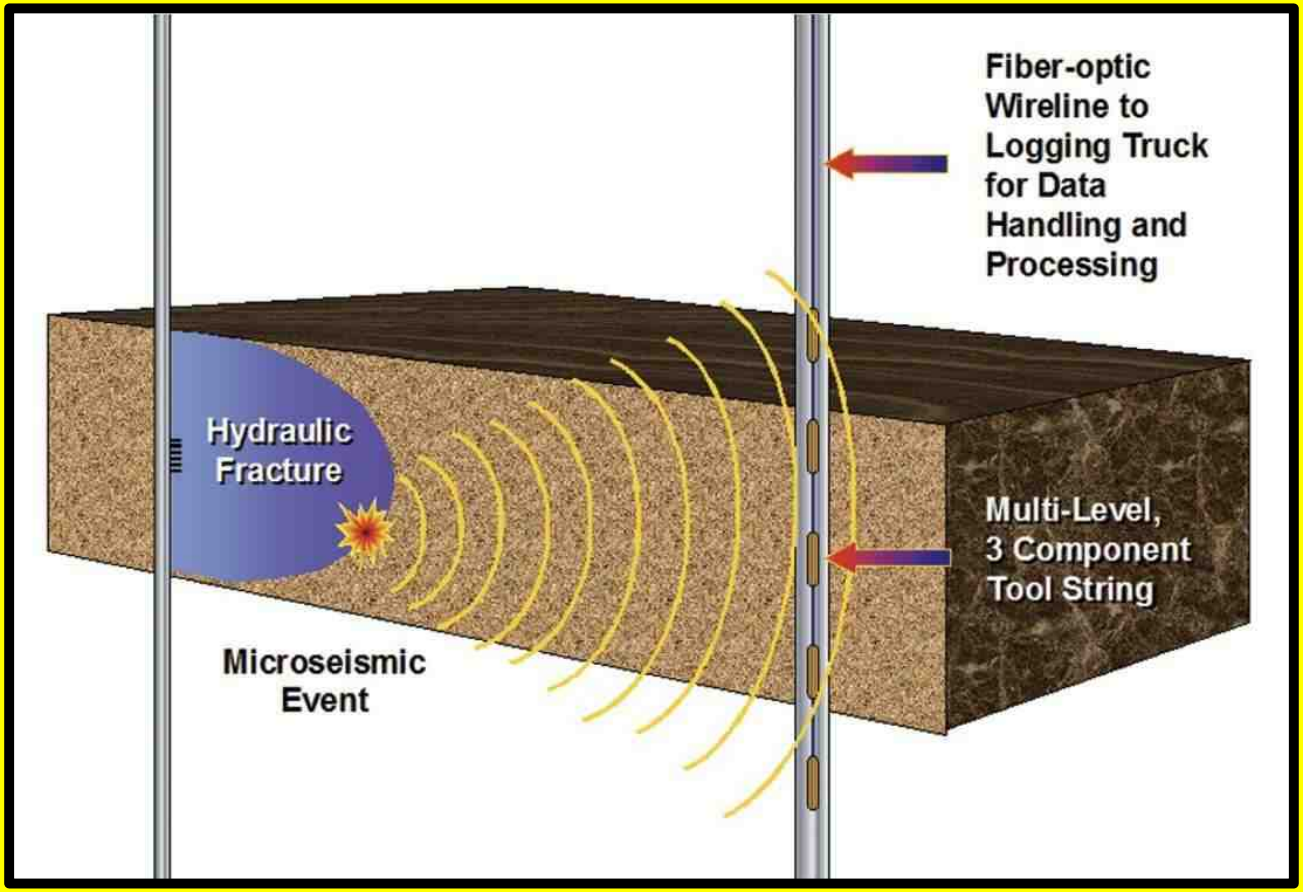
Wells may then be re-fracced


Permian Basin Texas
Oil Flow by year of
first production
2018
2017
2016
2015
2014
2013
2012
2011
2010
2009
2008
Daily Oil Production, mbd
3.0
2.5
2.0
1.5
1.0
0.5
0
2013
2014
2015
2016
2017
2018
2019
Year

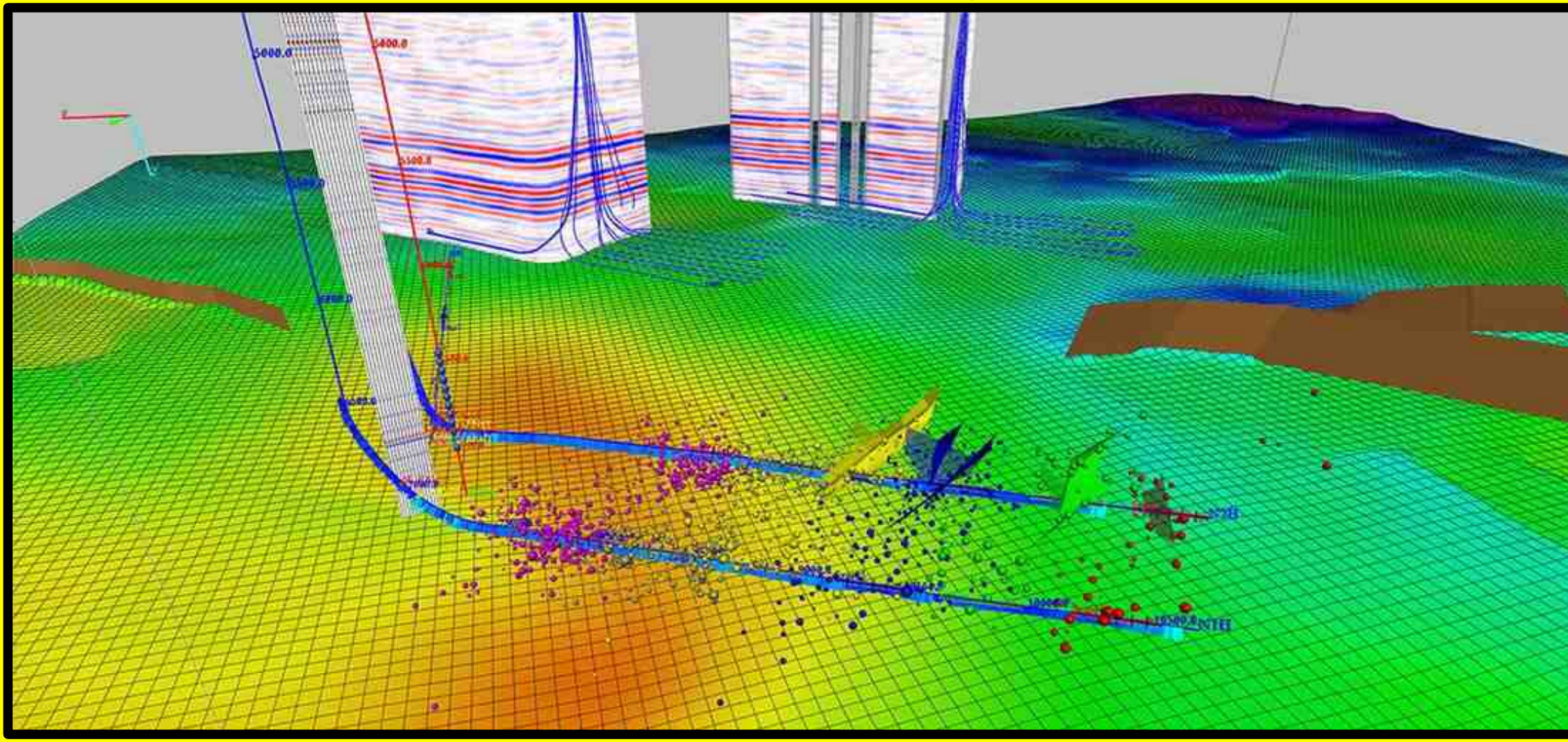
Horizontal Monitoring



Vertica Well Frac Monitoring

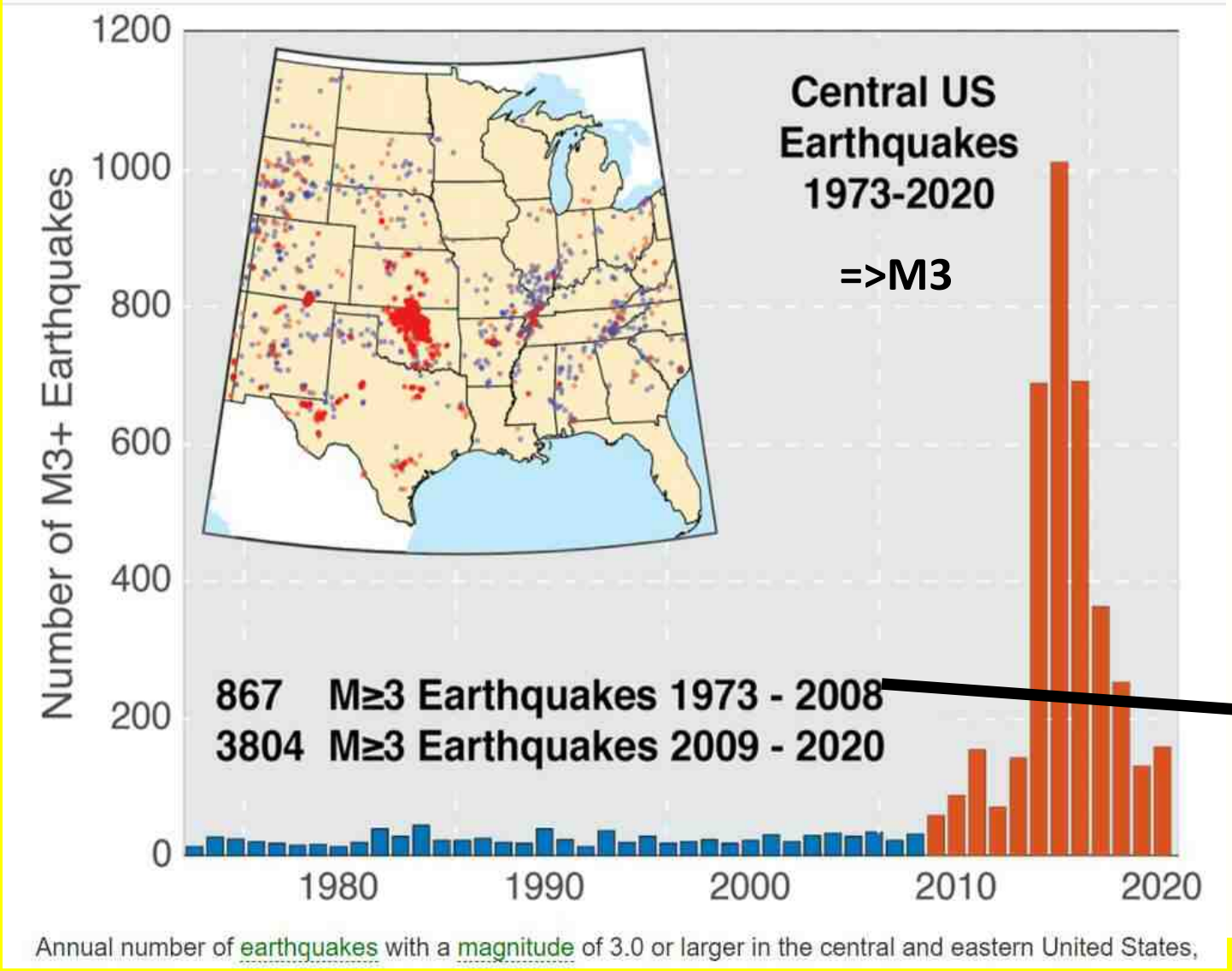


3D & 4D Horizontal Monitoring



Earthquake Myth - Due to water disposal wells not fraccing

Fraccing does not cause earthquakes. Disposal/injection of waste fluids does



1993 World Trade Center Bombing,

1993

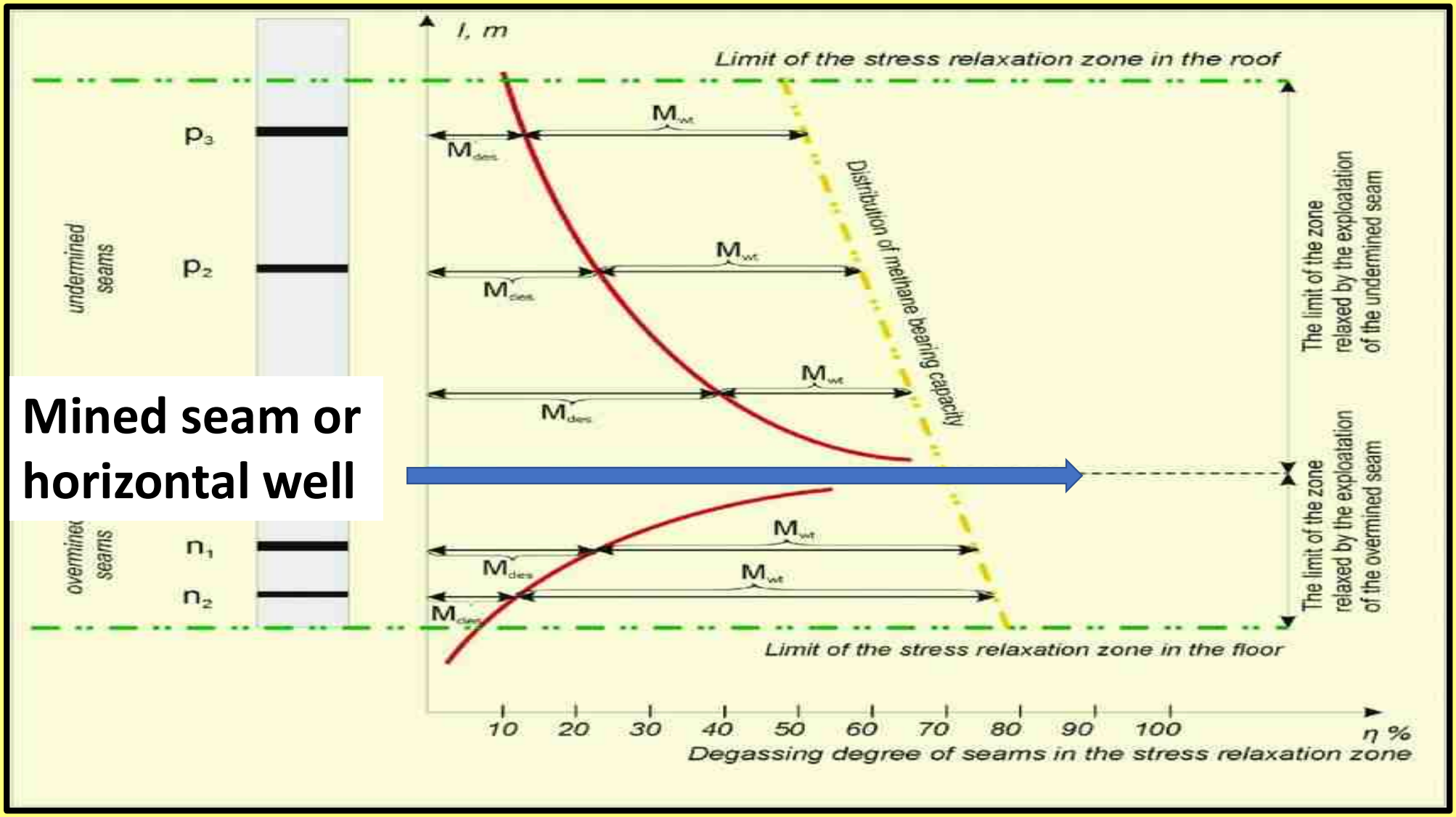
1200-pound bomb in parking garage created hole 200 by 100 ft several stories deep

But did not fracture the building

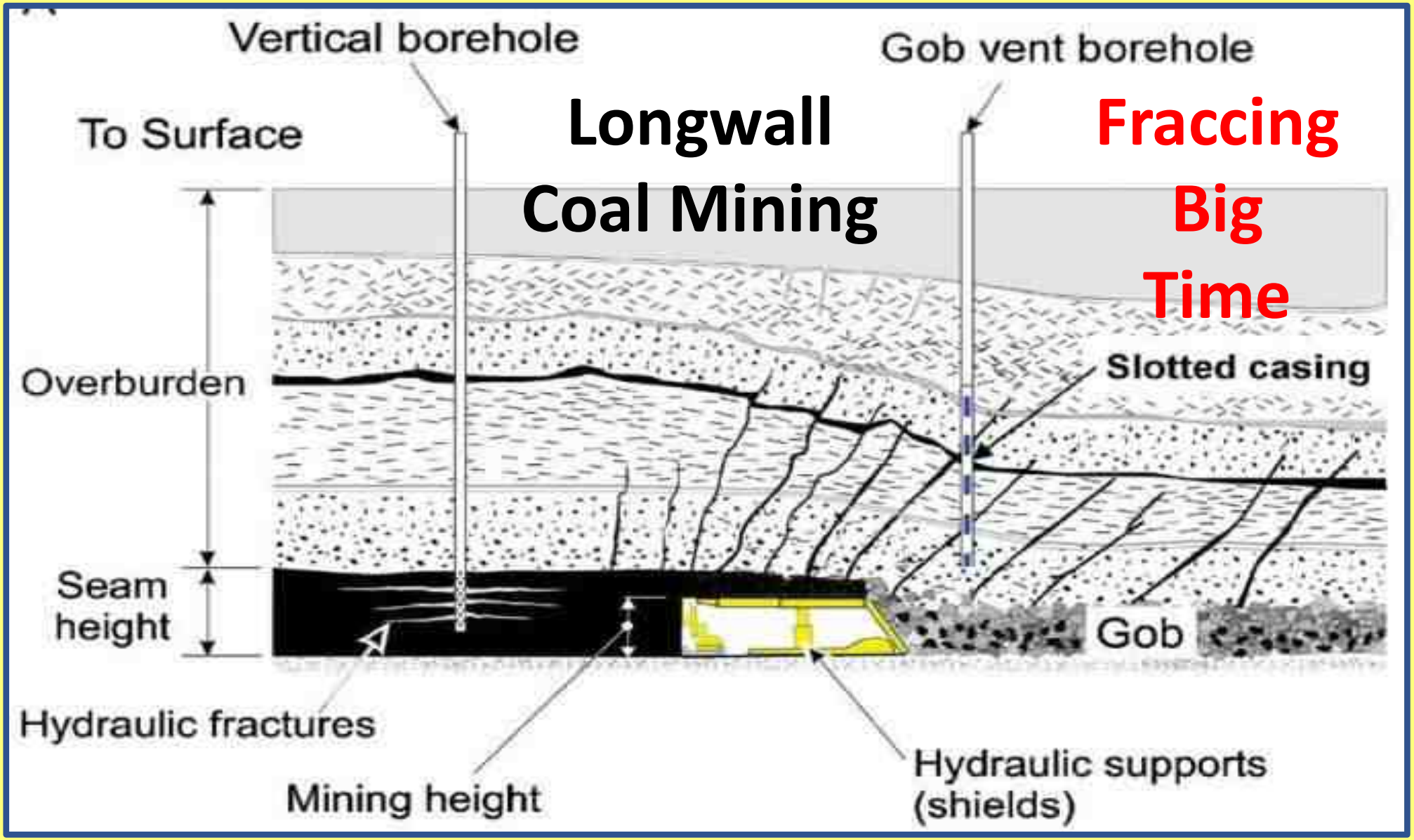
Fraccing isn't always violent

Hydrocarbon production from fraccing
Lowers formation pressure

Stress relaxation Pressure drop and gas production



Mined seam or horizontal well


Vertical borehole
Gob vent borehole
To Surface
Longwall
Coal Mining
Fraccing
Big
Time
Slotted casing
Overburden
Seam
height
Gob
Hydraulic fractures
Mining height
Hydraulic supports
(shields)

Wind Farm Footprint

Horse Hollow Wind Farm in Texas, is a 735.5MW facility from an area of 47,000 acres

Kwinana WA gas-fired co-gen **power station**

Capacity **320 MW**

Half of Horse Hollow

Footprint ~4 ha
or 10 acres

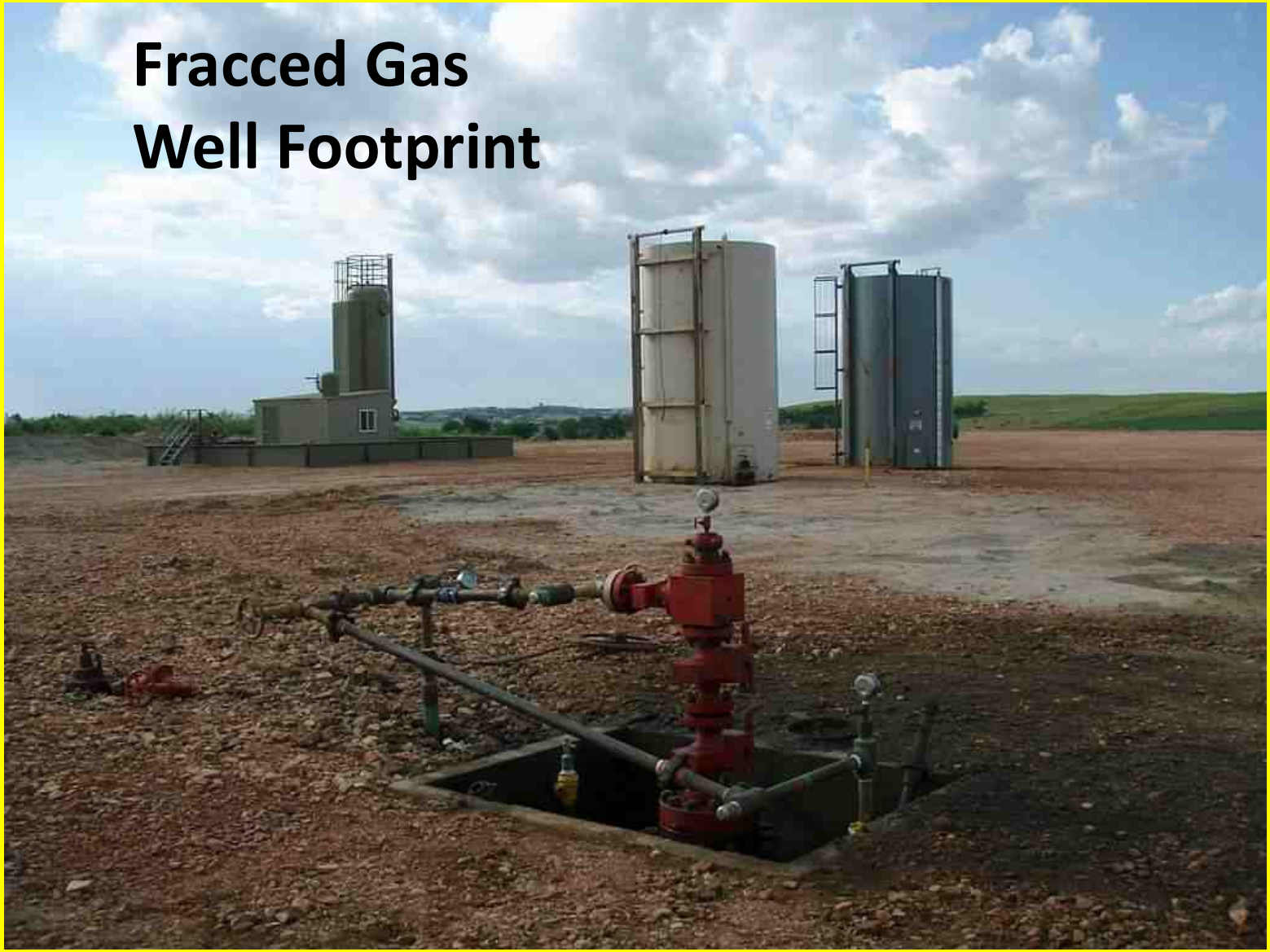
compred to 47,000

Compared to 7 Kwinanas 70 acres

Solar Farm
170,000
acres
Footprint

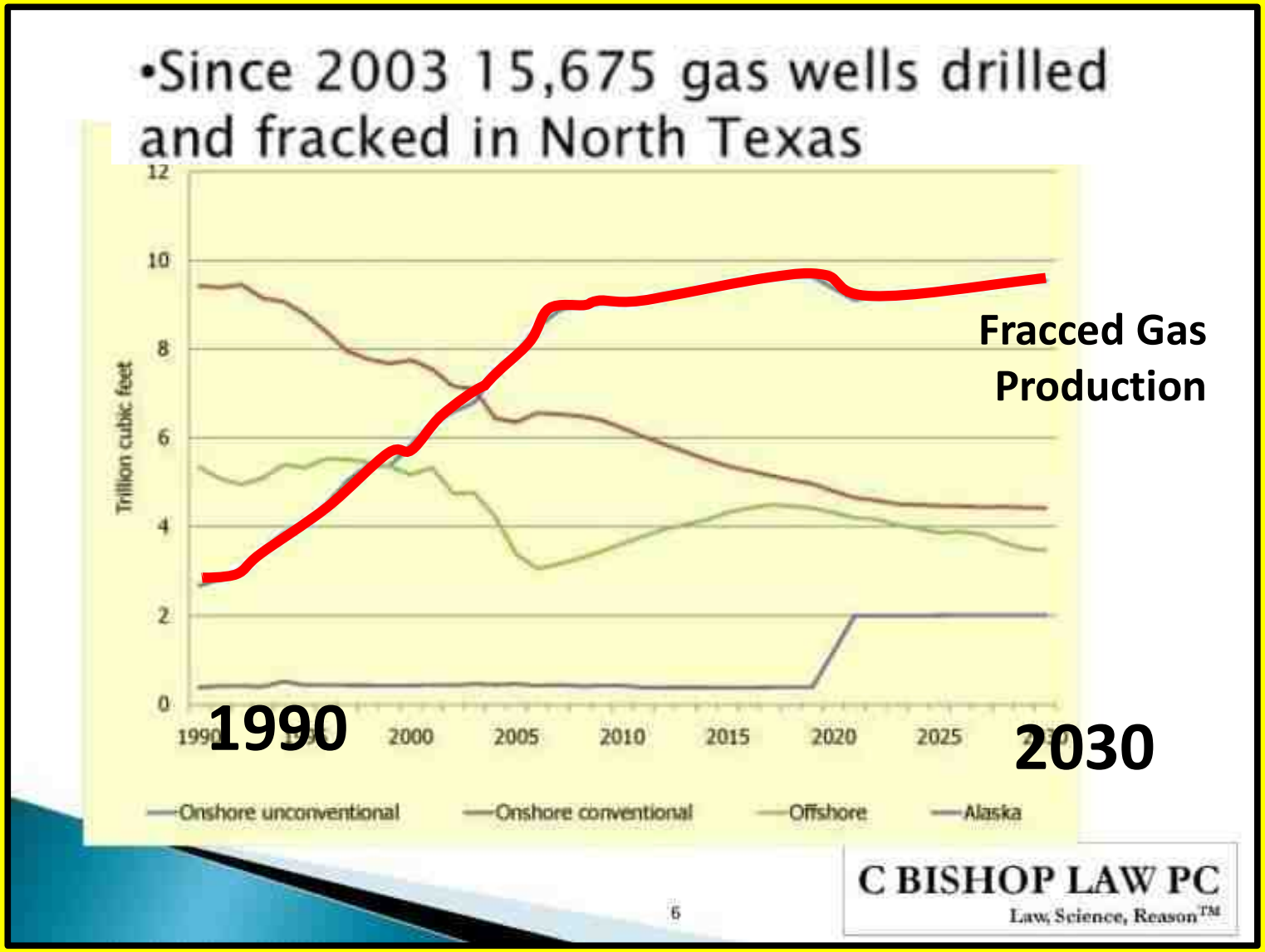
Pavagode
India

Fracced Gas Well Footprint



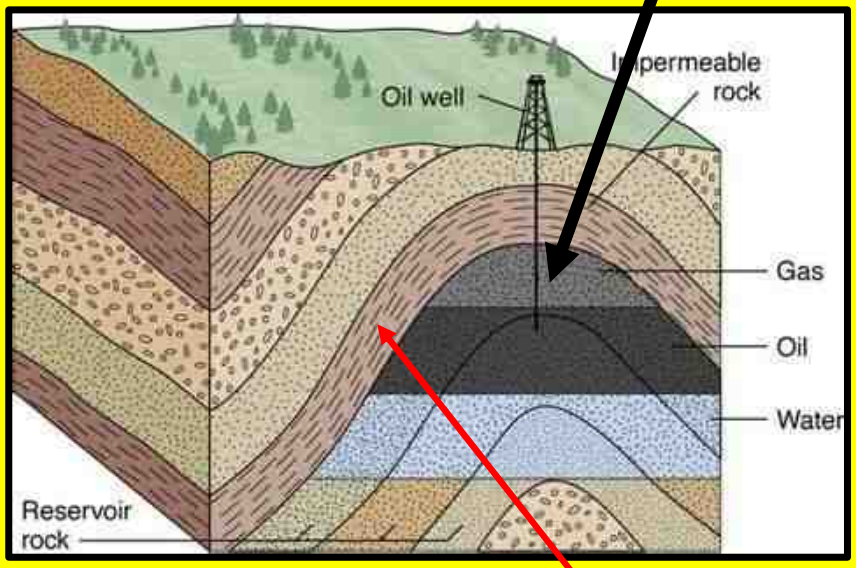
1990 USA a net importer of hydrocarbons Now the world's biggest oil & gas producer

Thanks to Fraccing



How is this possible?

Conventional Oil/Gas only in Anticline Small Volume



Shale Reservoir

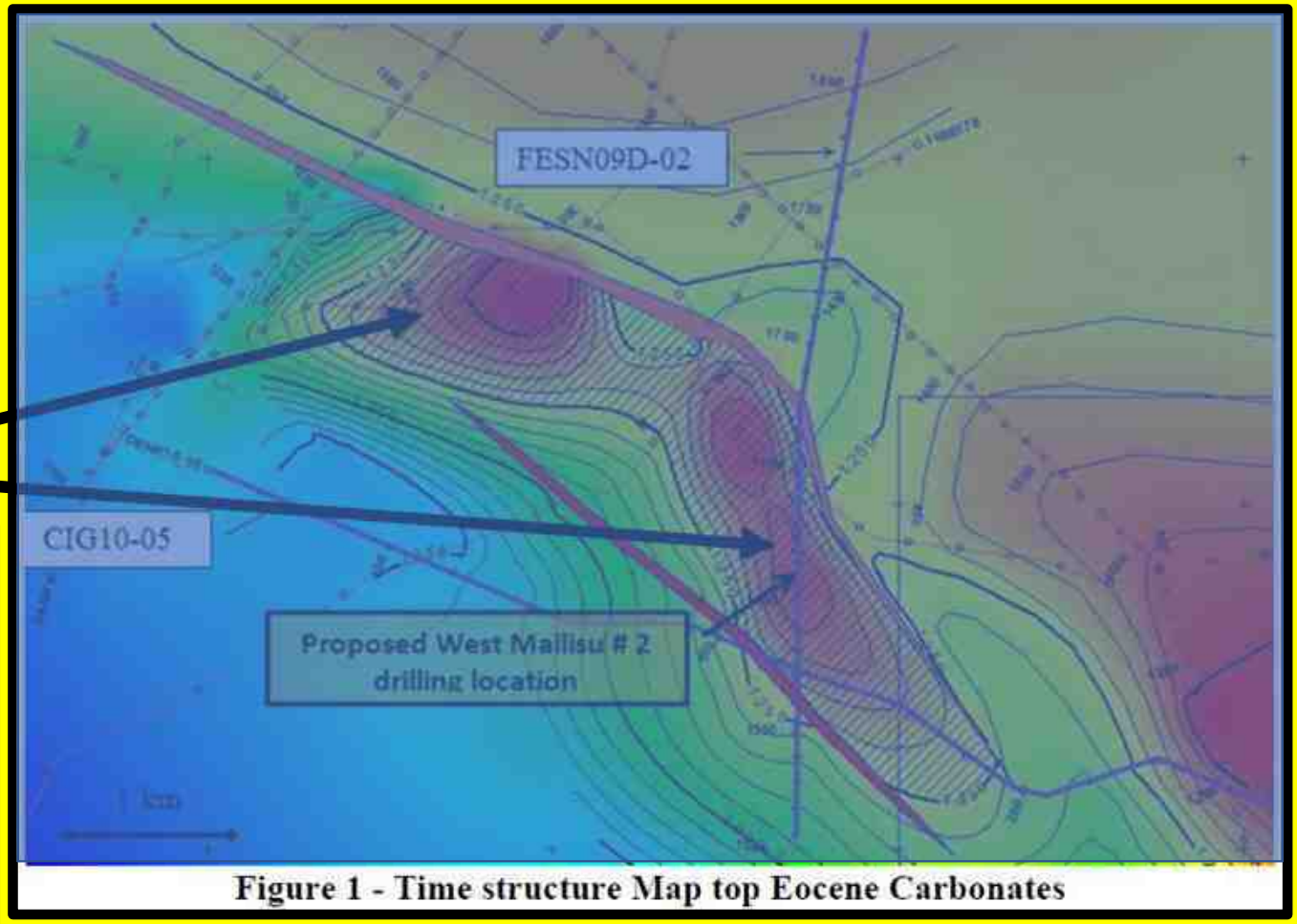
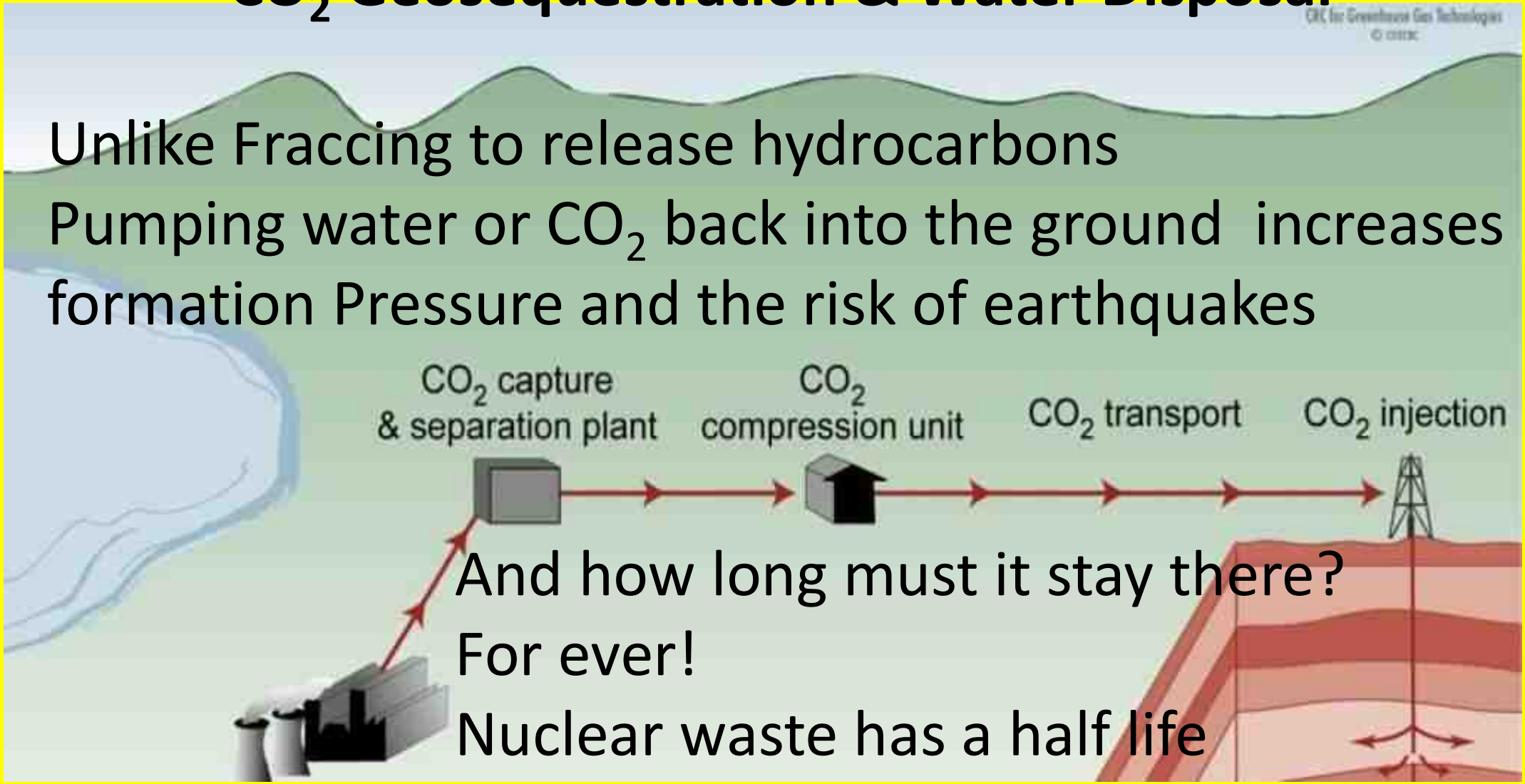


Figure 1 - Time structure Map top Eocene Carbonates

Shale Reservoir oil and or gas present everywhere

CO_2 Geosequestration & Water Disposal

Unlike Fraccing to release hydrocarbons Pumping water or CO_2 back into the ground increases formation Pressure and the risk of earthquakes



And how long must it stay there?

For ever!

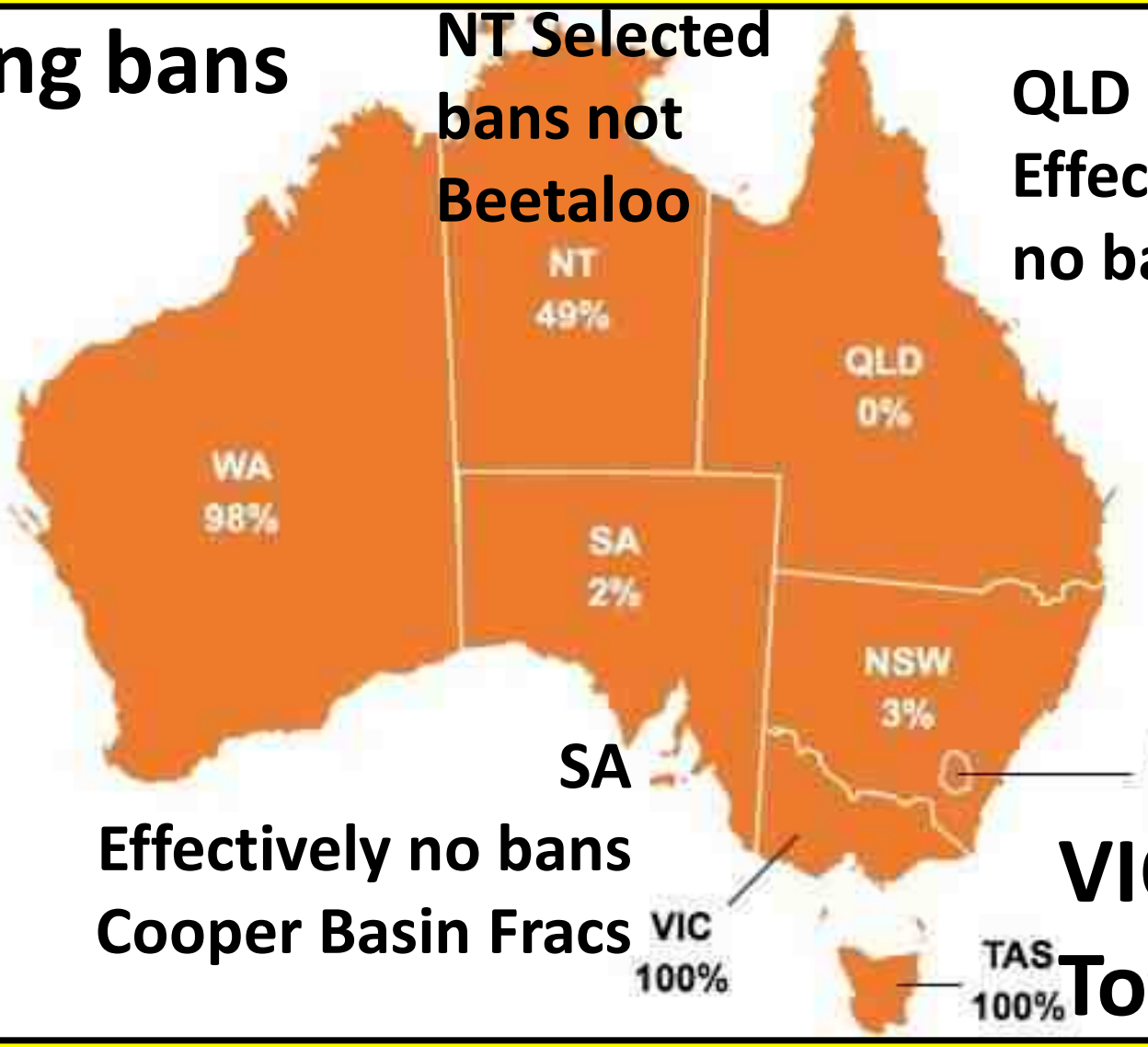
Nuclear waste has a half life

Fraccing bans

NT Selected bans not Beetaloo

QLD Effectively no bans

WA allowed on existing Permits ONLY

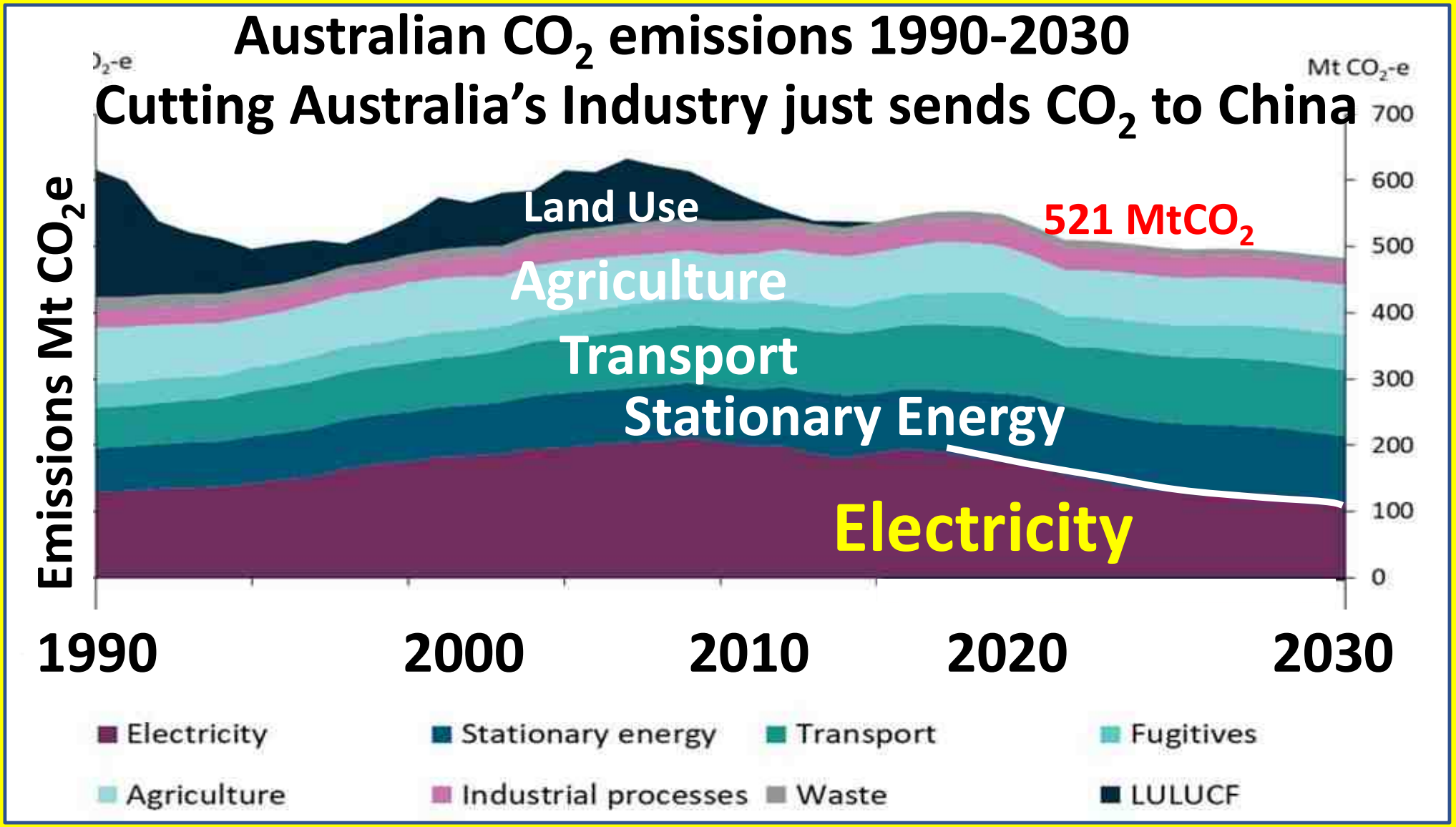


NSW Metgasco $25 million comp after spending $75 million

SA Effectively no bans Cooper Basin Fracs

VIC TAS Total Ban

Banning Fraccing and all fossil fuels may reduce atmospheric CO_2 <u>but ONLY</u> IF renewables & batteries can replace them


Australian CO_2 emissions 1990-2030
Cutting Australia's Industry just sends CO_2 to China
Emissions Mt CO_2e
Mt CO_2-e
700
600
500
400
300
200
100
0
Land Use
521 MtCO_2
Agriculture
Transport
Stationary Energy
Electricity
1990
2000
2010
2020
2030
Electricity
Stationary energy
Transport
Fugitives
Agriculture
Industrial processes
Waste
LULUCF

Replacing and Reducing Fossil Fuel Energy will only reduce Global CO_2 emissions

IF &

ONLY IF

1: The following retailers close down or cease importing:

Bunnings, Big W, K Mart, JB HiFi,

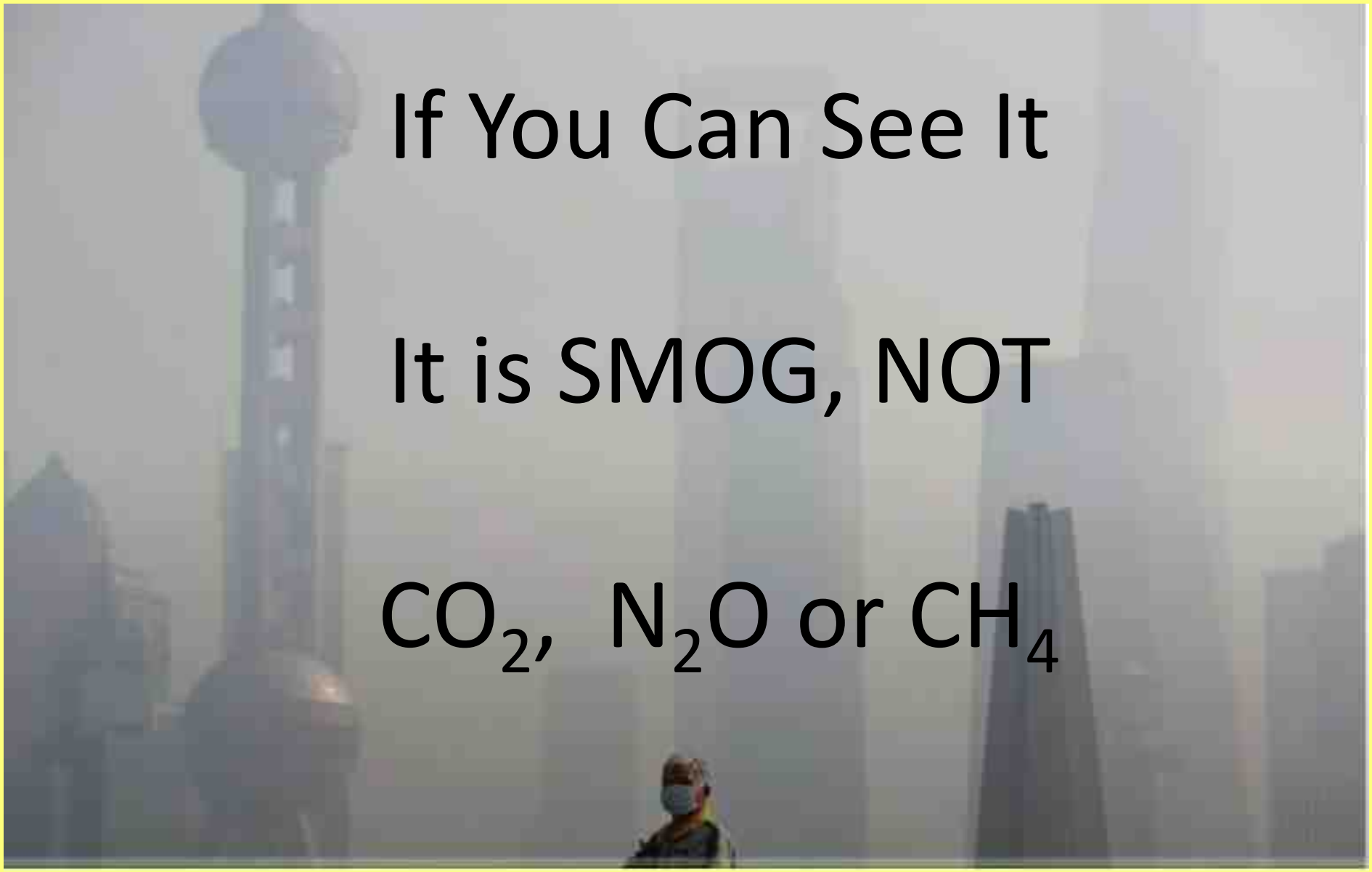
Harvey Norman, IKEA

2: All imported Motor Vehicles are banned

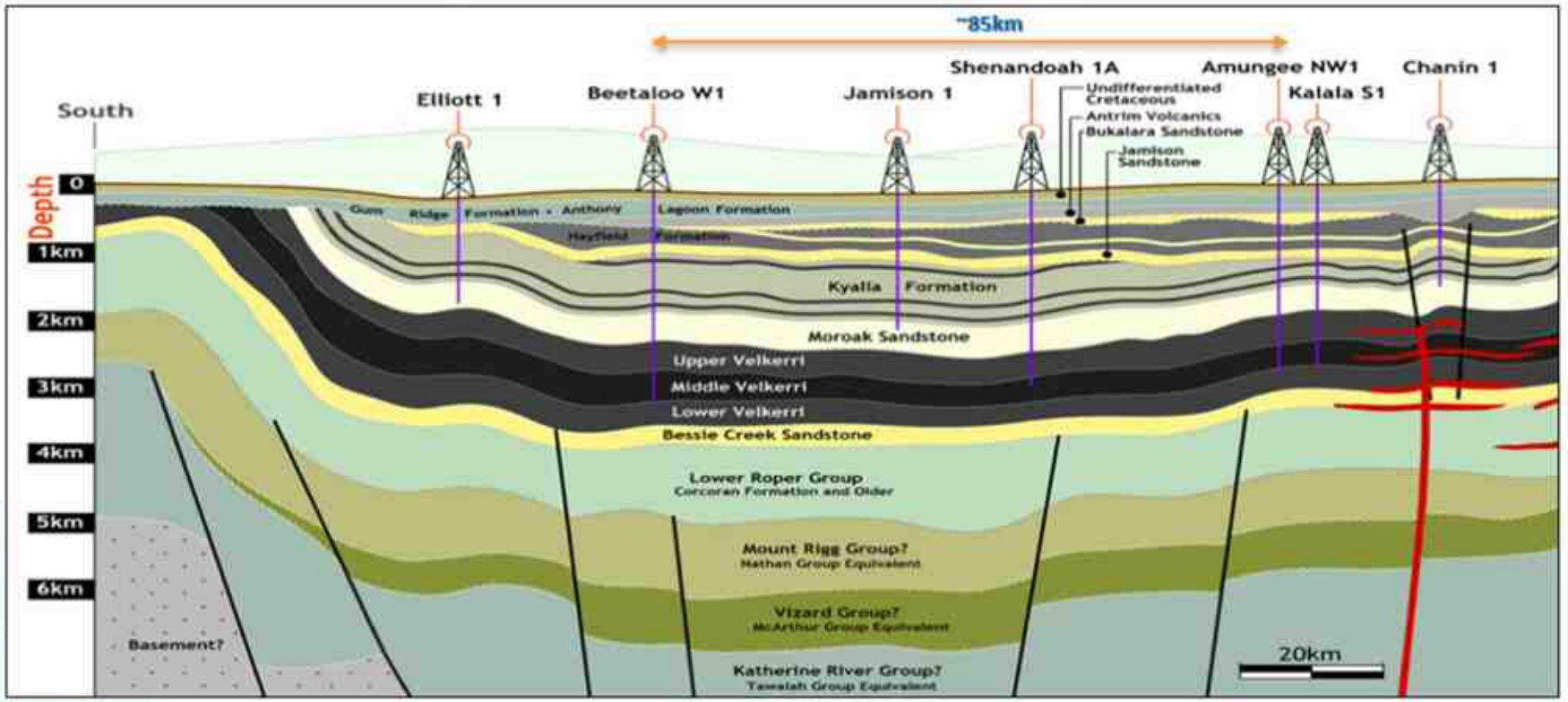
A fire at a bus depot in Hanover, Germany, destroyed five e-buses and four other vehicles along with the building and charging station. Similar event in the Chinese city of Baise,

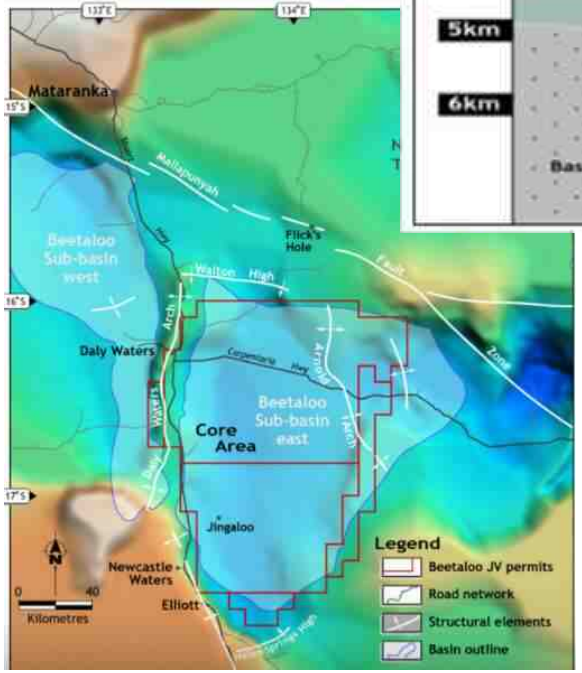
The Geelong Victoria Tesla battery fire burned for longer than it operated for

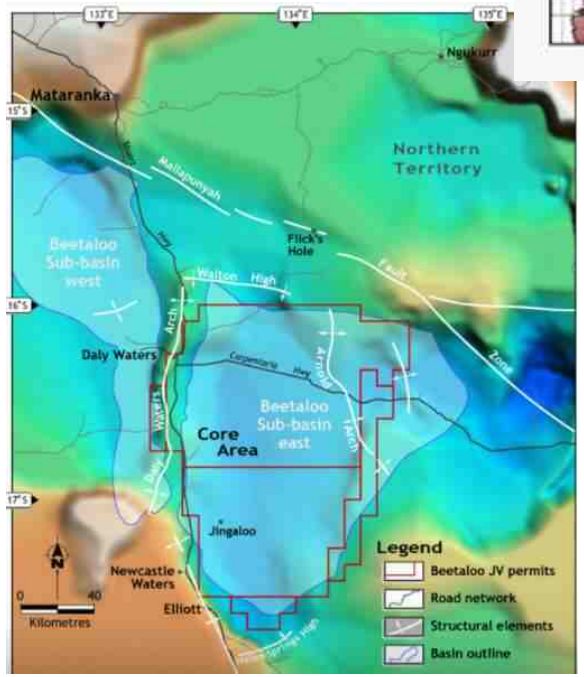
The Tesla battery fire burned for longer than it operated for « JoNova (joannenova.com.au)


If You Can See It
It is SMOG, NOT
CO_2, N_2O or CH_4

Old Reliables or Unreliable Renewables


~85km
South
Elliott 1
Beetaloo W1
Jamison 1
Shenandoah 1A
Amungee NW1
Kalala S1
Chanin 1
Undifferentiated Cretaceous
Antrim Volcanics
Bukalara Sandstone
Jamison Sandstone
Depth
0
1km
2km
3km
4km
5km
6km
Gum Ridge Formation - Anthony Lagoon Formation
Hayfield Formation
Kyalla Formation
Moroak Sandstone
Upper Velkerri
Middle Velkerri
Lower Velkerri
Bessie Creek Sandstone
Lower Roper Group
Corcoran Formation and Older
Mount Rigg Group?
Nathan Group Equivalent
Vizard Group?
McArthur Group Equivalent
Basement?
Katherine River Group?
Tawallah Group Equivalent
20km


137°E
134°E
15°S
16°S
17°S
Mataranka
Mallapunyah
Flick's Hole
Beetaloo Sub-basin west
Walton High
Daly Waters
Beetaloo Sub-basin east
Core Area
Jingaloo
Newcastle Waters
Elliott
N
0
40
Kilometres
Legend
Beetaloo JV permits
Road network
Structural elements
Basin outline


137°E
134°E
135°E
15°S
16°S
17°S
Mataranka
Ngukurr
Northern Territory
Mallapunyah
Flick's Hole
Beetaloo Sub-basin west
Walton High
Fault
Daly Waters
Arch
Carpentaria Hwy
Armstrong
Zone
Beetaloo Sub-basin east
Core Area
Warrego
Hwy
Tarch
Jingaloo
Newcastle Waters
Elliott
N
0
40
Kilometres
Legend
Beetaloo JV permits
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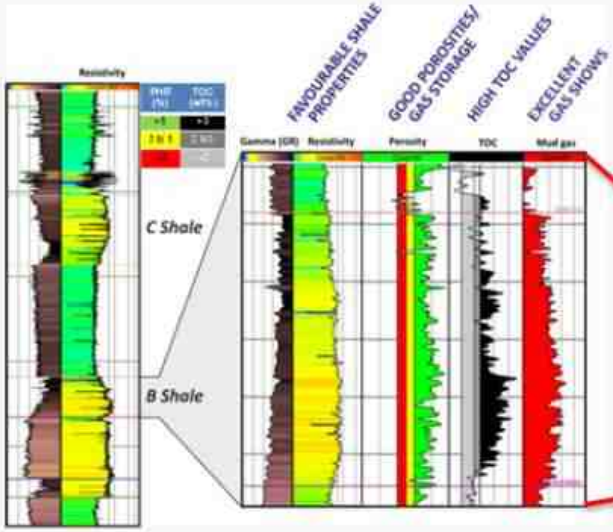
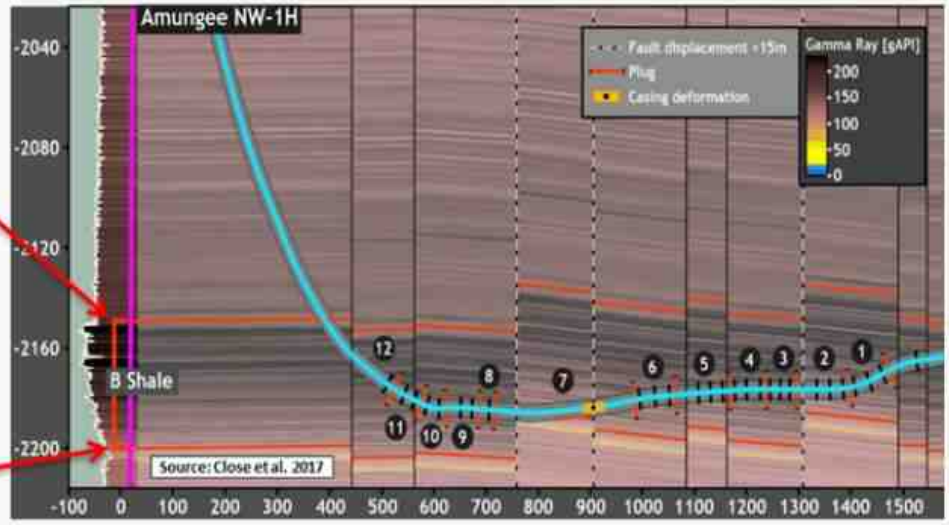

Resistivity
PHIE (%)
TOC (wt%)
C Shale
B Shale
FAVOURABLE SHALE PROPERTIES
GOOD POROSITIES/ GAS STORAGE
HIGH TOC VALUES
EXCELLENT GAS SHOWS
Gamma (GR)
Resistivity
Porosity
TOC
Mud gas


Amungee NW-1H
Fault displacement >15m
Plug
Casing deformation
Gamma Ray [sAPI]
200
150
100
50
0
-2040
-2080
-2120
-2160
-2200
B Shale
Source: Close et al. 2017
-100
0
100
200
300
400
500
600
700
800
900
1000
1100
1200
1300
1400
1500