Ottawa County Planning Commission

Understanding Hydraulic Fracturing
Educational Series

Session #1:
Hydraulic Fracturing – Panel Discussion

Hydraulic Fracturing Overview

Video on Hydraulic Fracturing Process

http://www.youtube.com/watch?v=VY34PQUiwOQ

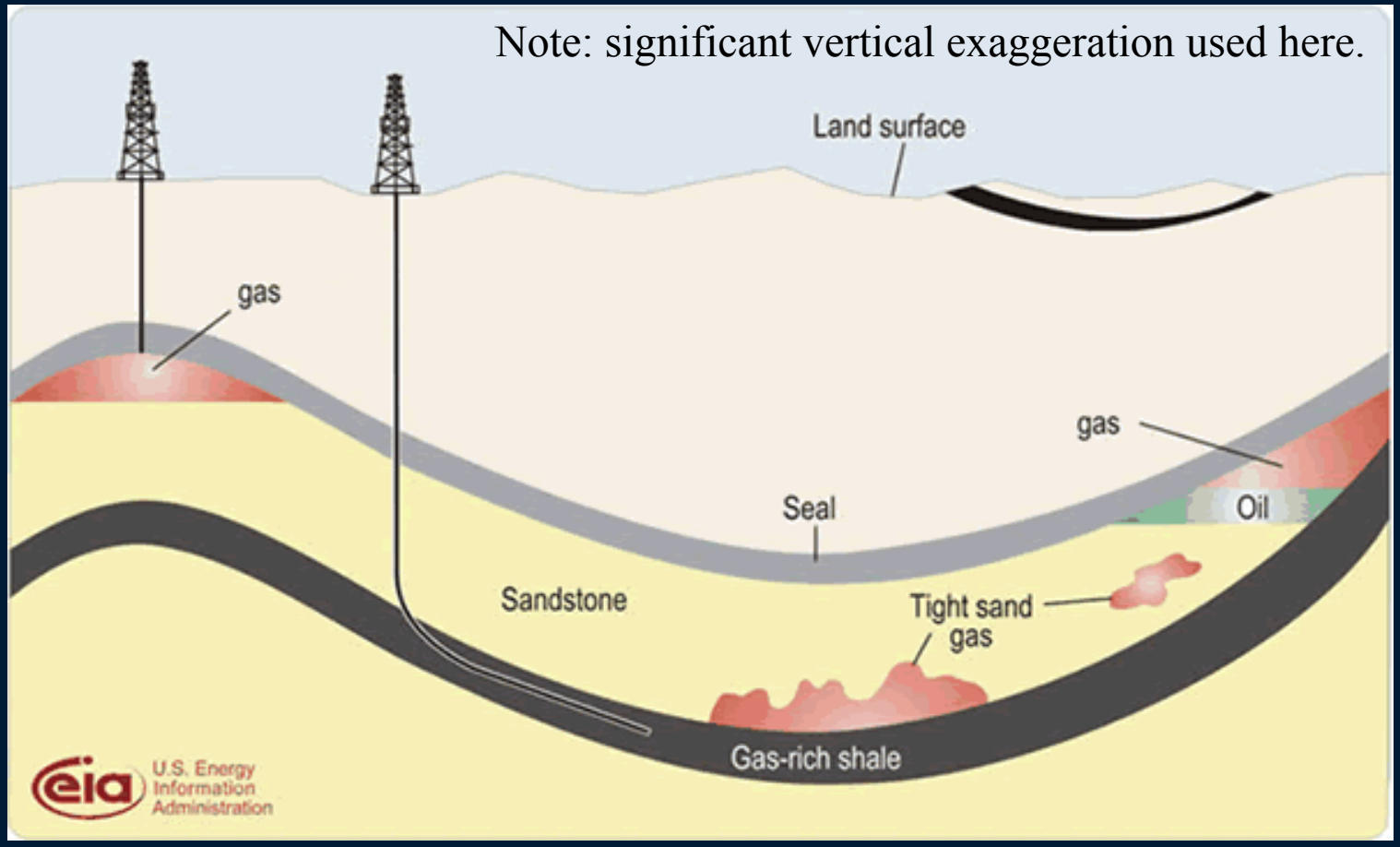
Geology and Hydraulic Fracturing

Basic principals of oil and gas development:

1. Sediments deposited over a very long period of time contain organic materials that decay
2. Sediments buried under more sediment and trapped, compacted and left to decay…become rocks.
3. Rocks bend, fold, break and erode over time.
4. As the organic materials decay, they create gas (methane, etc.) which is lighter than water and air…these migrate upwards. (Oil formation is the same but requires extra heat and pressure.)
5. Most gases escape into the atmosphere some is trapped by rocks above.

Basic principals of oil and gas development:

…some is trapped by rocks above…RESERVOIR



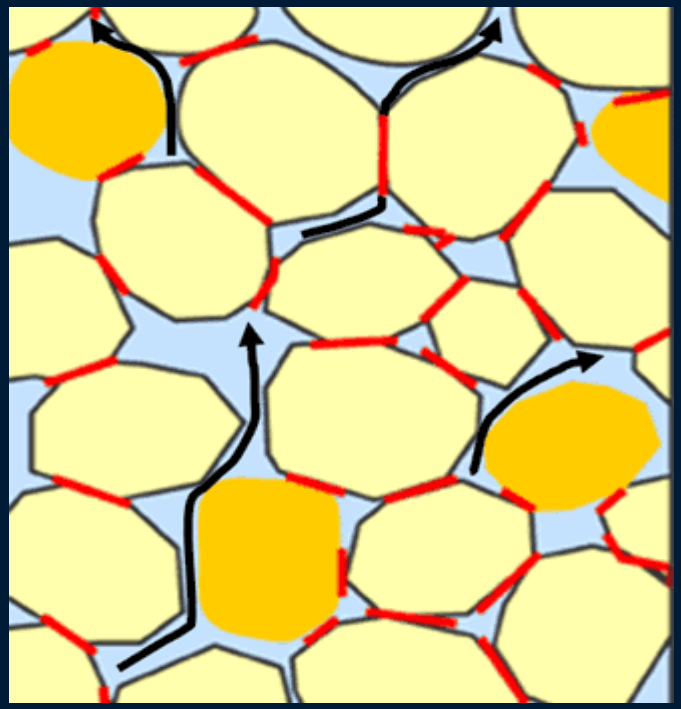
Reservoir:
A "**reservoir**" is actually solid rock that has ***microscopic*** pore spaces or fractures!

For comparison:
Gravel – 100,000 Darcy (273,000 ft/dy)
Sand – 1 Darcy (2.73 ft/day)
Limestone – 0.000001 Darcy (1 µD)
Granite – 0.0000001 Darcy (0.01 µD)

Porosity ≠ permeability

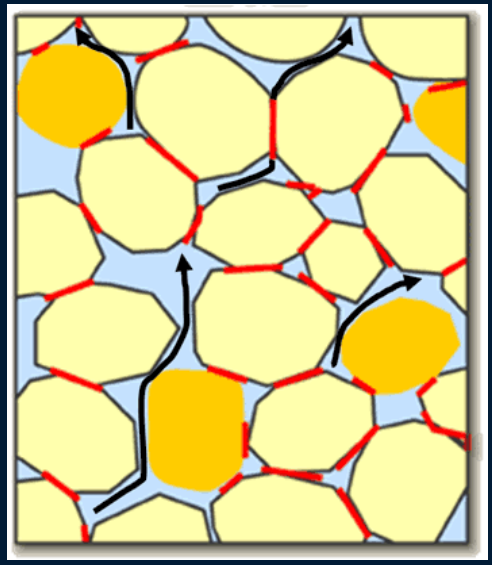
Let's see some MI reservoir rocks…

Example cherty dolomitic limestone

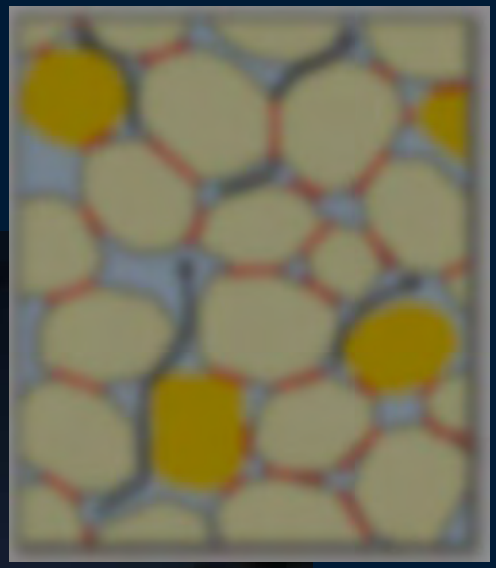


From GSA, Modified from Bureau of Economic Geology, The University of Texas. significant magnification used.

SO…How does it work?
How do we efficiently get oil and gas out of the reservoir

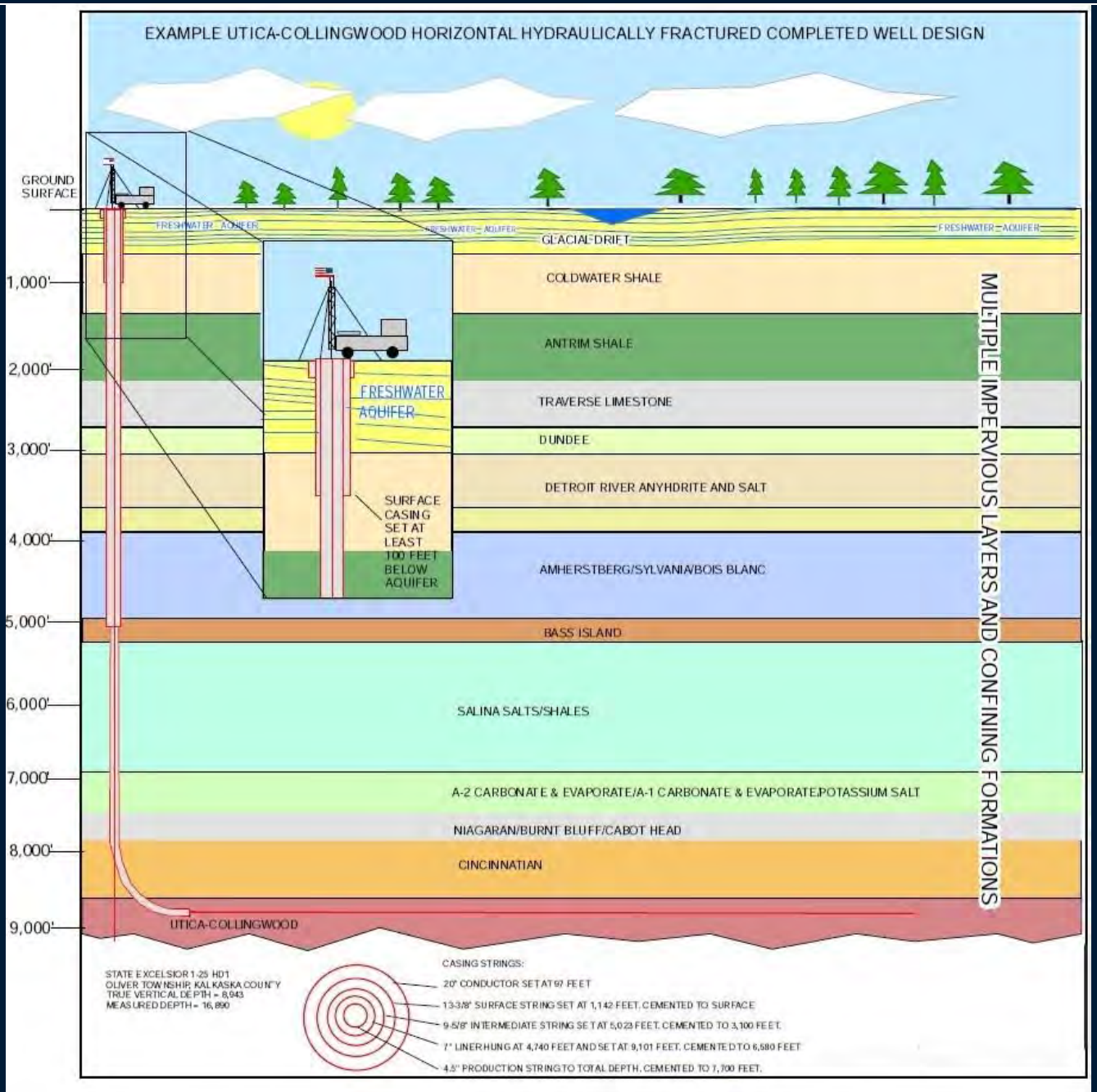


SO…How does it work?
How do we efficiently get oil and gas out of the reservoir?



1. Vertical & near-vertical drilling
   a) Smaller area of effect
   b) Requires closer spacing
2. Directional/horizontal drilling
   a) Larger area of effect, long horizontal portion
   b) Reduced surface expression, broad spacing
   c) Multiple wells on same drilling pad
3. Enhanced stimulation methods – Hydraulic Fracturing, acidization, steam, etc.
   a) Increases effectiveness of a single borehole through artificially increasing permeability
   b) Proper well construction, pad engineering, and waste disposal is essential

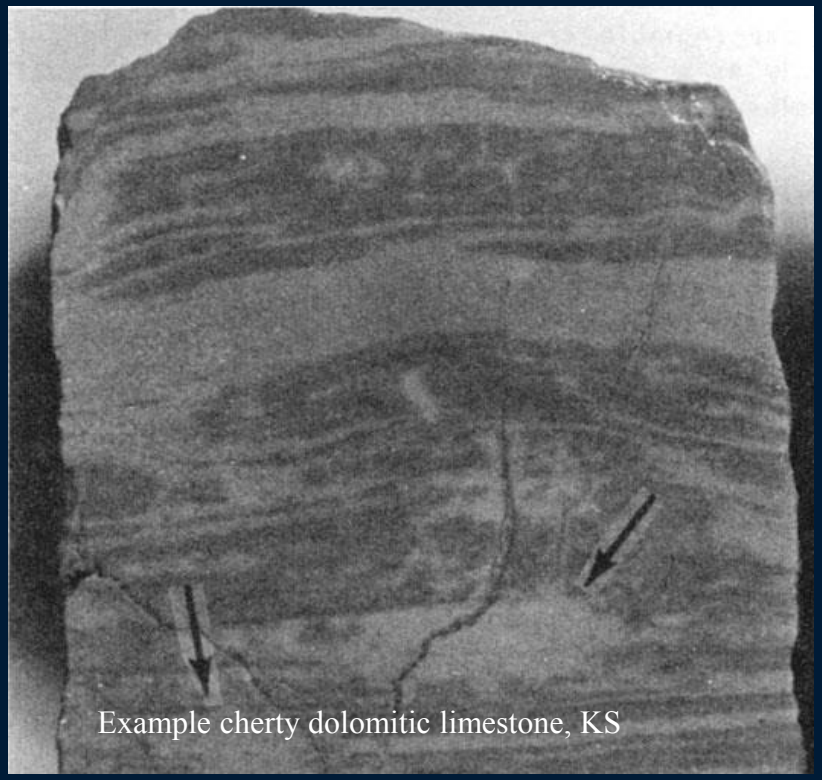
Geology and Hydraulic Fracturing



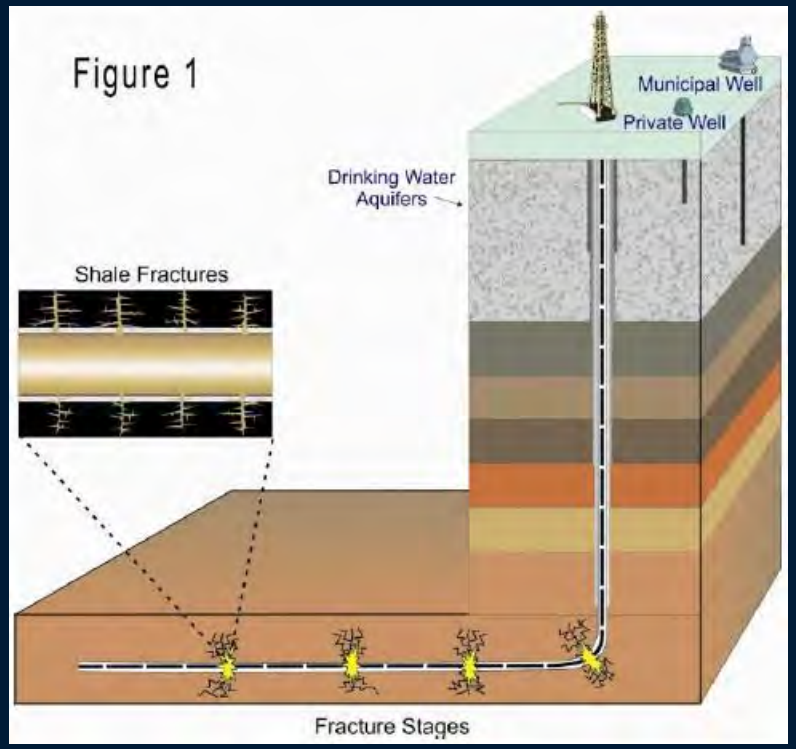
Stimulation Fluids and Flowback Water

So what is Hydraulic Fracturing?

The "stimulation" of rock formations through the "pumping of water at high pressure to create fractures in RESERVOIR rock that allow the oil or natural gas to flow more freely to the well bore."



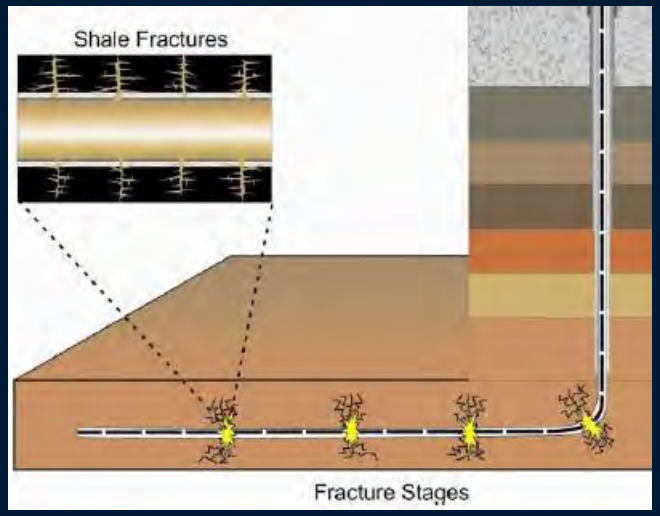
Example cherty dolomitic limestone, KS



Stimulation Fluids

So what is Hydraulic Fracturing?

The "stimulation" of rock formations through the "pumping of water at high pressure to create fractures in RESERVOIR rock that allow the oil or natural gas to flow more freely to the well bore."



Water volumes:

- Function of well depth
- Antrim: 50,000 gallons
- 'High volume' >100,000 gallon
- Needs ARI evaluation if 'high'
- Typ. up to 7 million gallons

What is in Hydraulic Fracturing fluids:

- Water (80.5%)
- 'Proppant' (10-20%)
  - Sand, ceramic, coffee grinds, etc.

"99.5%"

- Additives:
  - Acids
  - Lubricants
  - Surfactants (soap)
  - Antifreeze
  - Biocides
  - Light distillate VOCs & alcohol
  - Etc.

Stimulation Fluids

So what is Hydraulic Fracturing?

The "stimulation" of rock formations through the "pumping of water at high pressure to create fractures in RESERVOIR rock that allow the oil or natural gas to flow more freely to the well bore."

Stimulation Fluids

So what is Hydraulic Fracturing?

The “stimulation” of rock formations through the “pumping of water at high pressure to create fractures in RESERVOIR rock that allow the oil or natural gas to flow more freely to the well bore.”

Flowback Water

So what can we expect to find in Hydraulic Fracturing Flowback water?

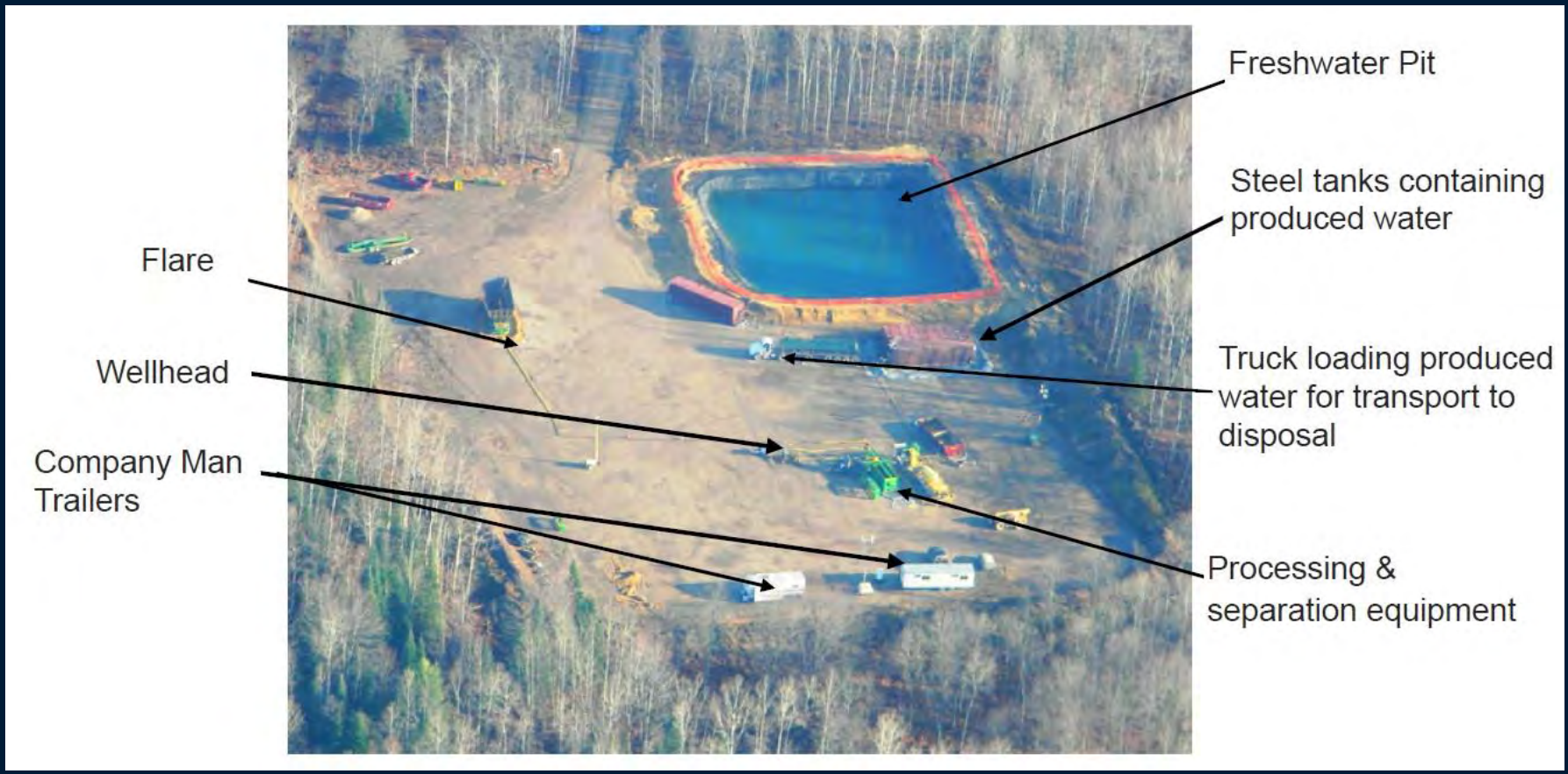
- Water
  (10-70% of what was injected plus some from within the rock)
- Brine
- Methane (and other natural gasses)
- VOCs/SVOCs
- Leftover additives (<1%wt)
- Rock debris/drilling mud
- Trace "NORM" (naturally-occurring radioactive material from source rocks shown to be at safe levels.)

Flowback water disposal in Michigan:

- Deep injection/disposal wells, typically in the same rock formations (Dundee/Traverse)
- Quantity carefully tracked and reported
- Chemically balanced to ensure life of disposal well and safety.

Flowback Water

Flowback process…



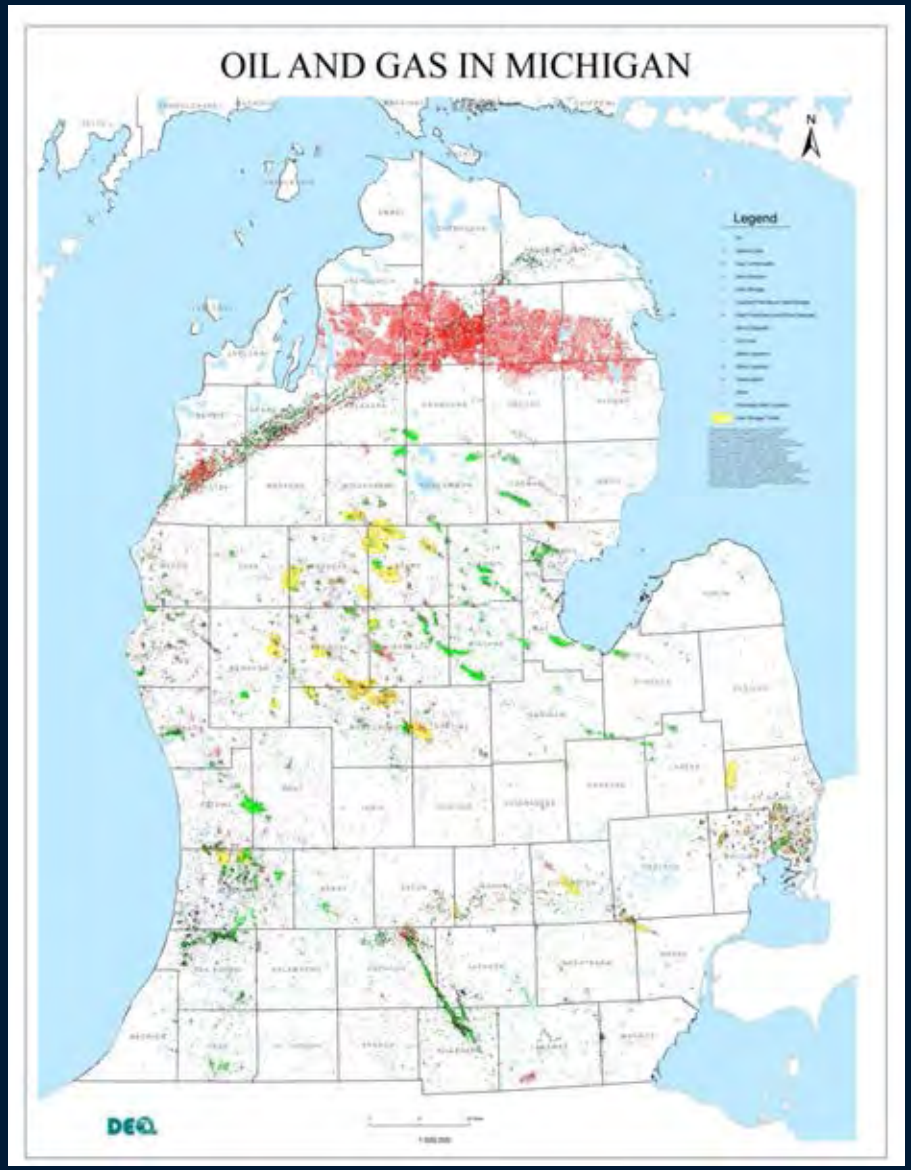
From "Hydraulic Fracturing in Michigan"
http://www.michigan.gov/documents/deq/Hydraulic_Fracturing_In_Michigan_423431_7.pdf

Questions:
Oil and Gas Industry in Michigan

Question #1

How many high-volume hydraulic fracturing wells are active in Michigan? How many permits are pending?

Michigan Oil and Gas Wells



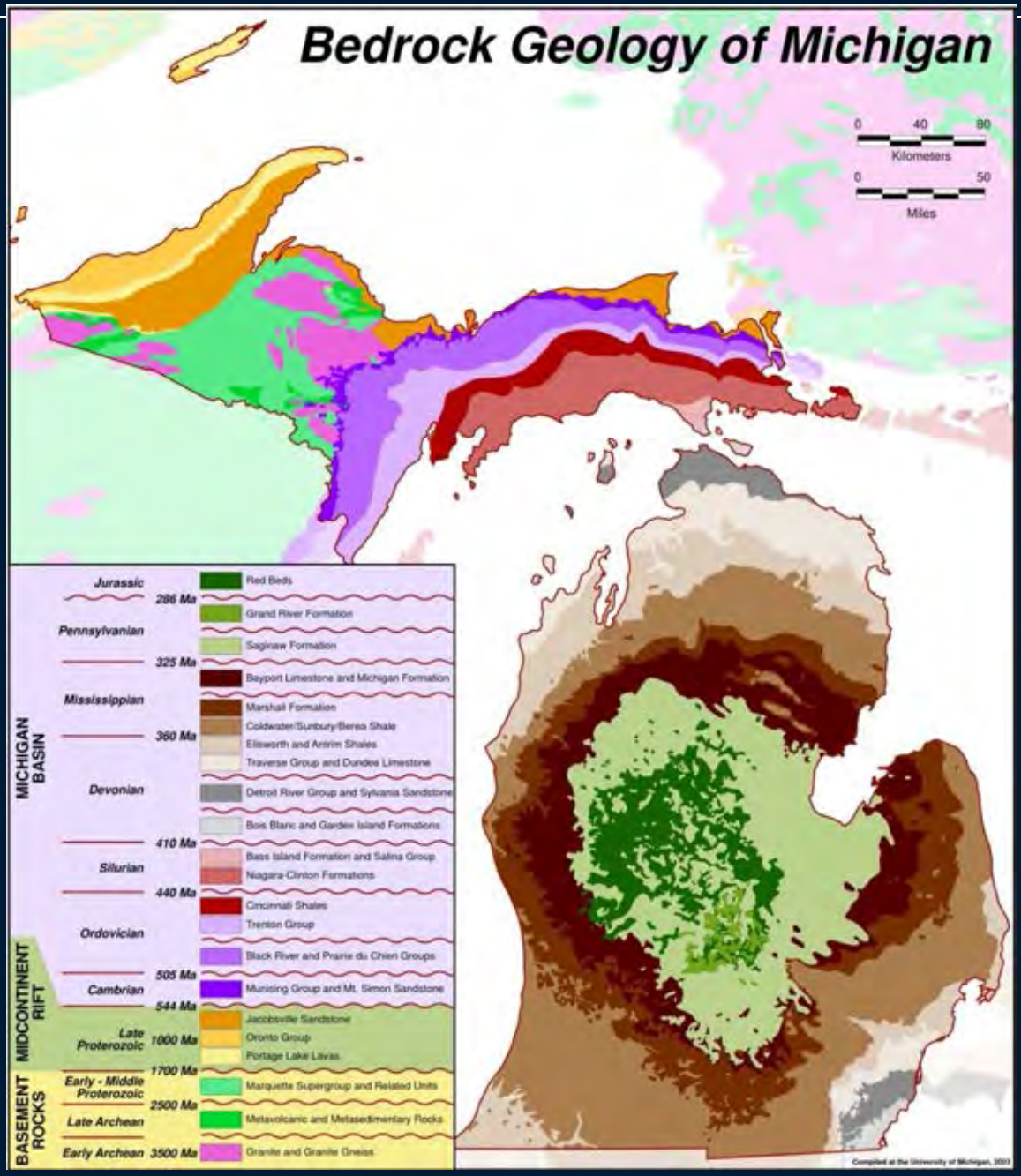
High Volume Completions
21 Since 2008
14 Other Permits Issued
About 80 prior to 2008

Question #2

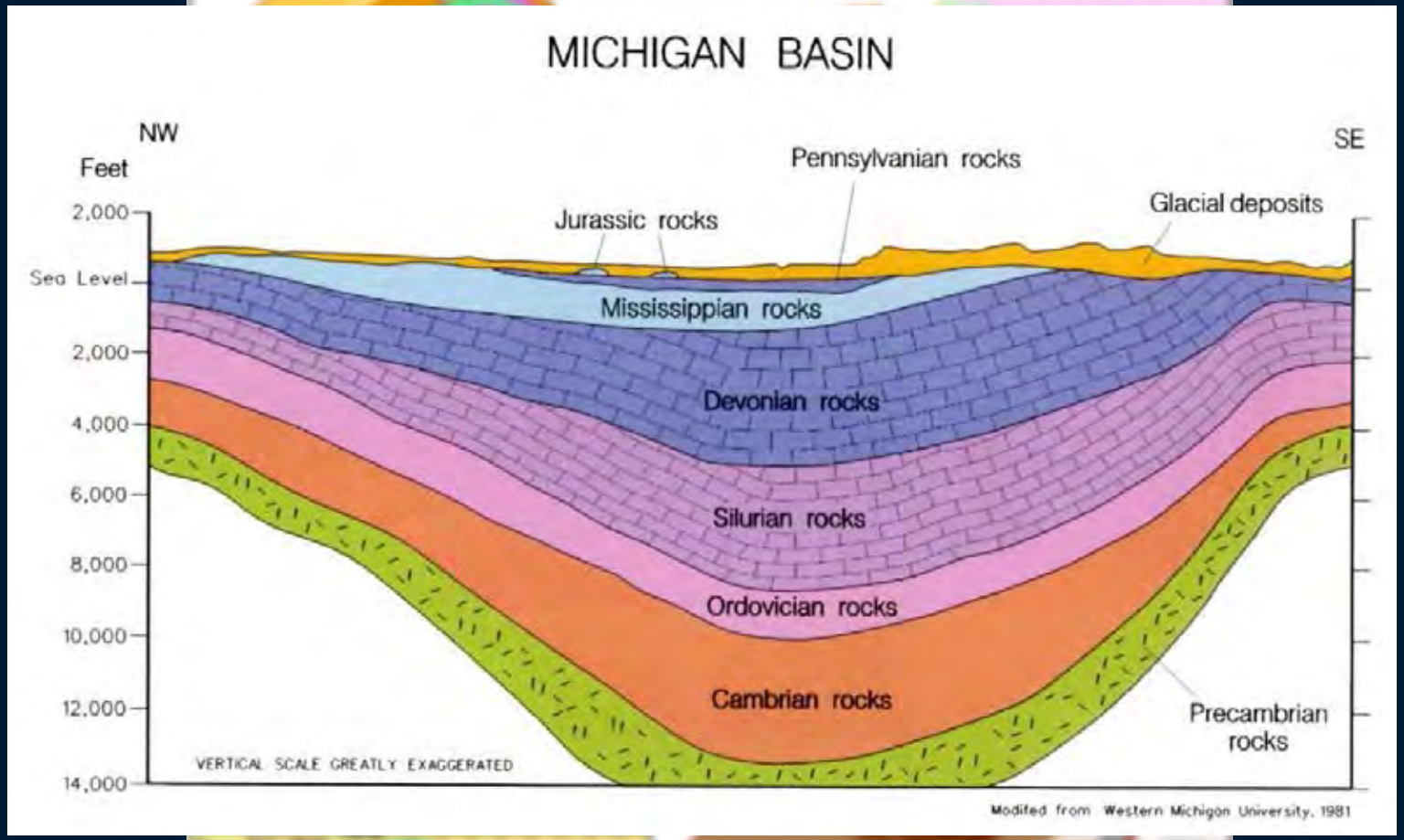
What are the prospects for an expansion of hydraulic fracturing in Michigan? What are the prospects for an expansion of hydraulic fracturing in Ottawa County via new wells and/or abandoned wells?

Major (current and historical) gas plays in the **USA**:

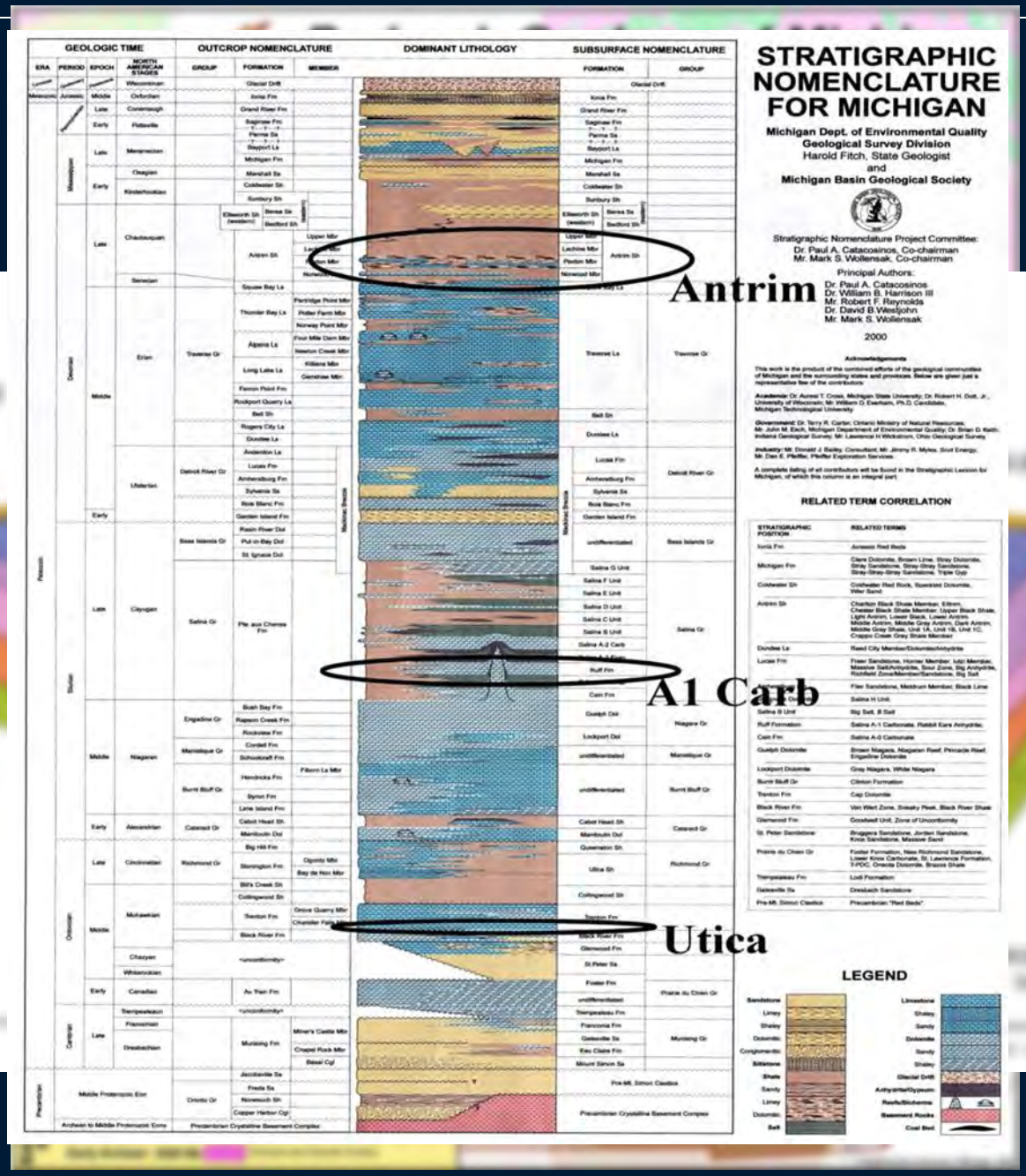
Response #2 - Jay



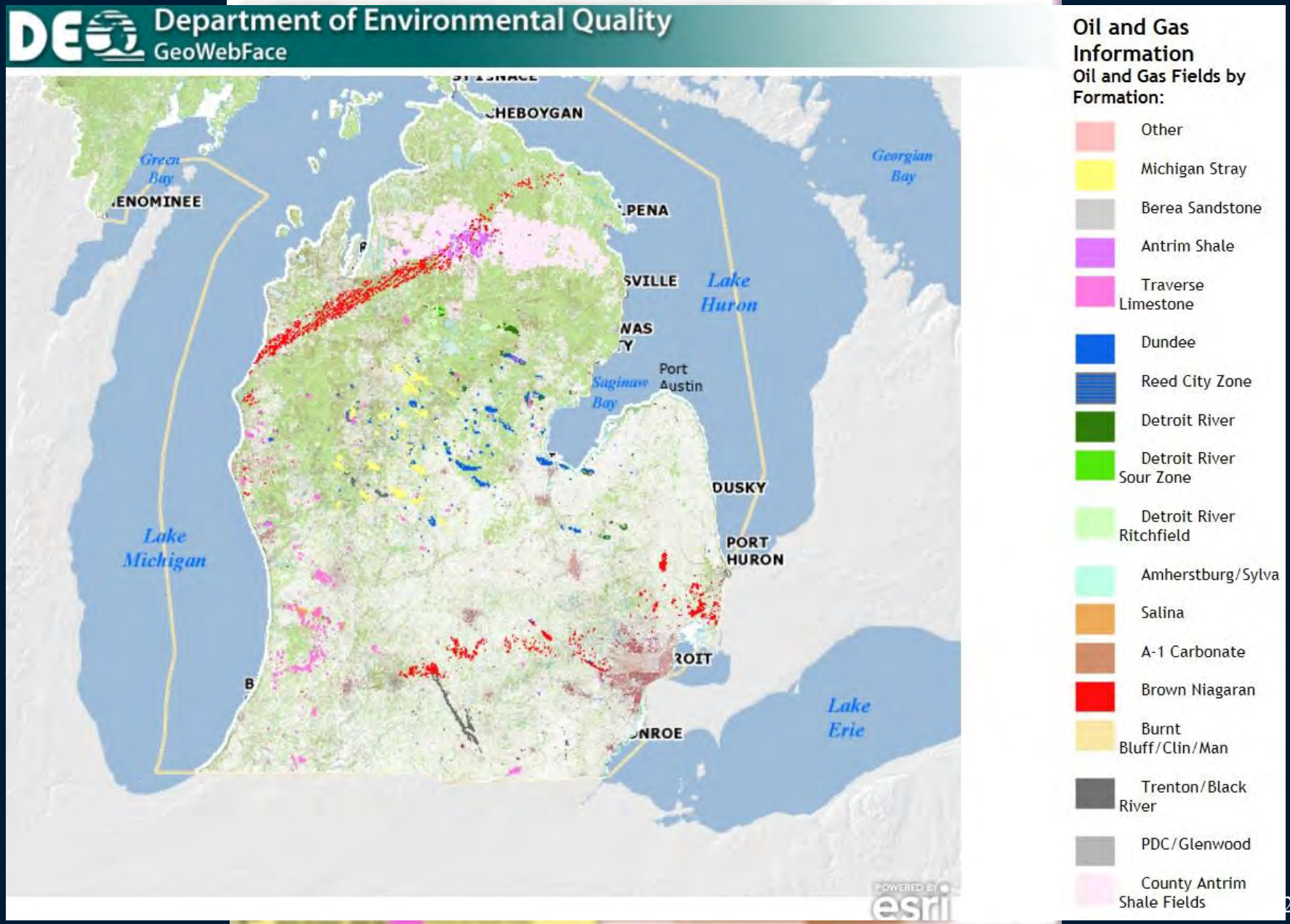
Response #2 - Jay



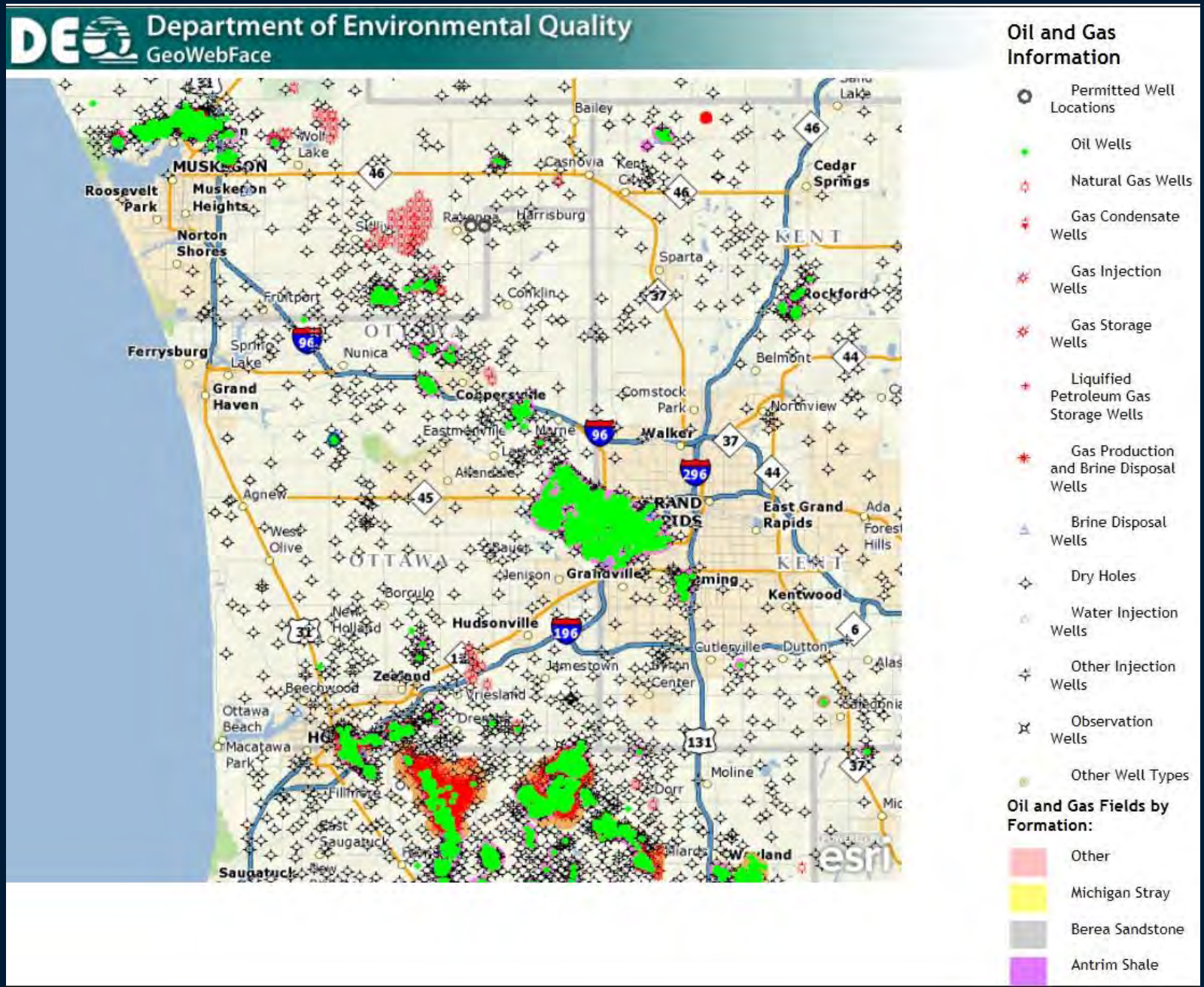
Response #2 - Jay



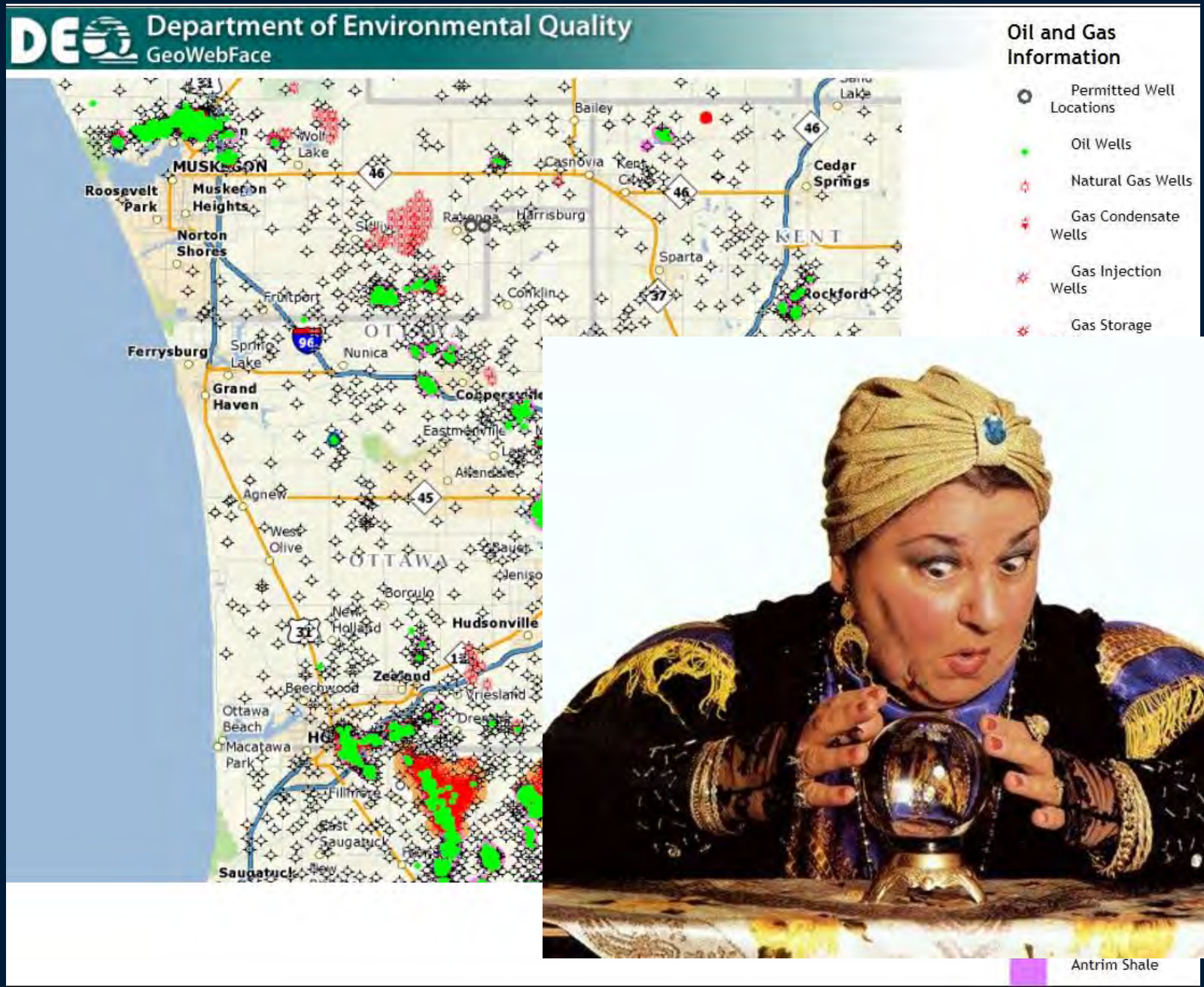
Response #2 - Jay



Response #2 - Jay



Response #2 - Jay



Questions:
State Regulations/
Health and Environmental Concerns

Question #3

What is involved in the application process for an oil and gas well that utilizes hydraulic fracturing?

DEQ

State of Michigan
Department of Environmental Quality
Geological and Land Management Division
P O Box 30256
Lansing, MI 48909-7756

PERMIT TO

☑ DRILL AND OPERATE ☐ DEEPEN AND OPERATE

GRANTED UNDER THE PROVISIONS OF
Part 615 Supervisor of Wells, Act 451, PA 1994, as amended

Violation of and/or non-compliance with the provisions of this act or its rules, instructions or orders of the supervisor, or these permit conditions may result in penalties. This permit includes as requirements all the operations and methods proposed by the applicant in the application to drill, unless rejected or altered by the DEQ. This permit is also subject to the general and specific conditions identified on this page and/or attached to it. Initiation of any work under this permit confirms the permittee's acceptance and agreement to comply with its terms and conditions.

PERMIT NO	ISSUE DATE	EXPIRATION DATE
60161	9/8/2010	9/8/2012

WELL NAME AND NUMBER: **STATE NORWICH 1-6 HD1**

FORMATION AT TOTAL DEPTH	COMPLETION FORMATION
TRENTON	UTICA-COLLINGWOOD
PERMITTED TOTAL DEPTH (MEASURED)	PERMITTED TOTAL DEPTH (TVD)
13755 ft.	9395 ft
TYPE OF PERMIT	API NUMBER
Oil/Gas Well	21-113-60161-00-00

ISSUED TO:
ATLAS GAS & OIL COMPANY LLC
10691 E CARTER RD. SUITE 201
TRAVERSE CITY, MI 49684

LOCATION AND FOOTAGES: SHL: SW SW NW, SEC 6, 24N 6W, NORWICH TWP, MISSAUKEE CO
2450 FT FROM N AND 667 FT FROM W SECTION LINE

BHL: NW NW SW, SEC 31, 25N 6W, GARFIELD TWP, KALKASKA CO
2163 FT FROM S AND 660 FT FROM W SECTION LINE
465 FT. FROM N AND 660 FT. FROM W DRILLING UNIT LINE

CASING AND SEALING REQUIREMENTS

HOLE DEPTH	HOLE DIA.	CASING O.D.	WT /FT	GRADE	CONDITION	DEPTH (M.D.)	SACKS CMT	CEMENT TOP	MUD WT
60'	Driven	24"	100	H-40	N/U	60'	DRIVEN		
625'	20"	16"	75	J-55	N/U	625'	690	SURFACE	9.0
5550'	14 3/4"	11 3/4"	65	P-110	N/U	5550'	760	3500	10.2
9575'	10 5/8"	8 5/8"	40	L-80	N/U	9575'	855	5350	10.9
13755'	7 1/2"	5 1/2"	20	P-110	N/U	13755'	730	9375	11.0

SPECIFIC PERMIT CONDITIONS

1 This well shall be drilled and operated in compliance with the Hydrogen Sulfide Rules (R 324.1101 to R 324.1129). NOTIFY LOCAL EMERGENCY PREPAREDNESS COORDINATOR OF WELL LOCATION, H2S POTENTIAL, and CONTINGENCY PLAN AVAILABILITY prior to moving in rig

2 If the on-site water supply is intended to produce a cumulative total of over 100,000 gallons of water per day when averaged over a consecutive 30-day period, the permittee shall:
A. If there are one or more residential water supply wells within 1320 feet, install a monitor well between the water withdrawal well and the nearest residential water supply well. The permittee shall measure and record the water level in the monitor well daily during water withdrawal and weekly thereafter until the water level stabilizes. The permittee shall report the water level data weekly to the District Supervisor

Response #3 - Jay

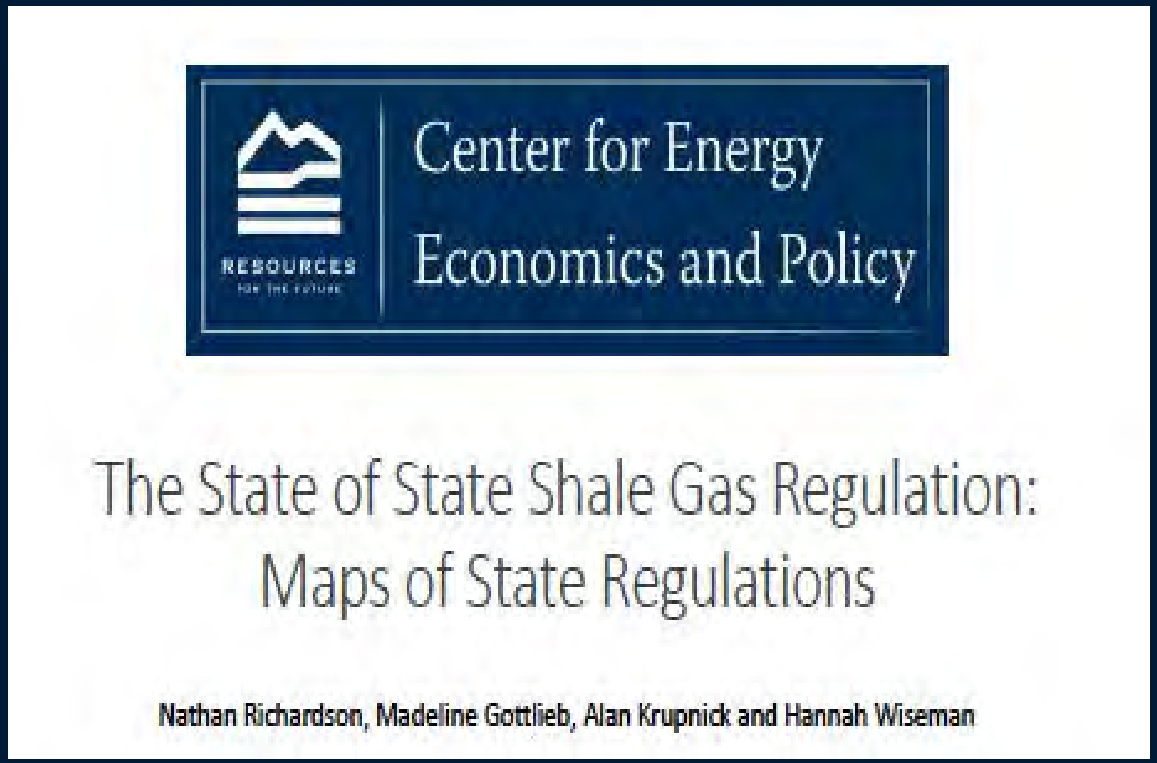
- Basic application package that has 10+ forms and includes:
  - Well engineering details, drilling plans, surveys, maps
  - Environmental Impact Assessment (EIA)
  - Water Well Record (new rules 1-2013)
  - Soil erosion and sedimentation control plan
  - Bond
  - Check for application fee
  - (there are about 50 possible forms/reports depending on well)
- Submitted to the DEQ for careful review…"administratively complete"?
- More data collection during drilling
- Oversight
- Pressure tests
- Spill reports

Question #4a

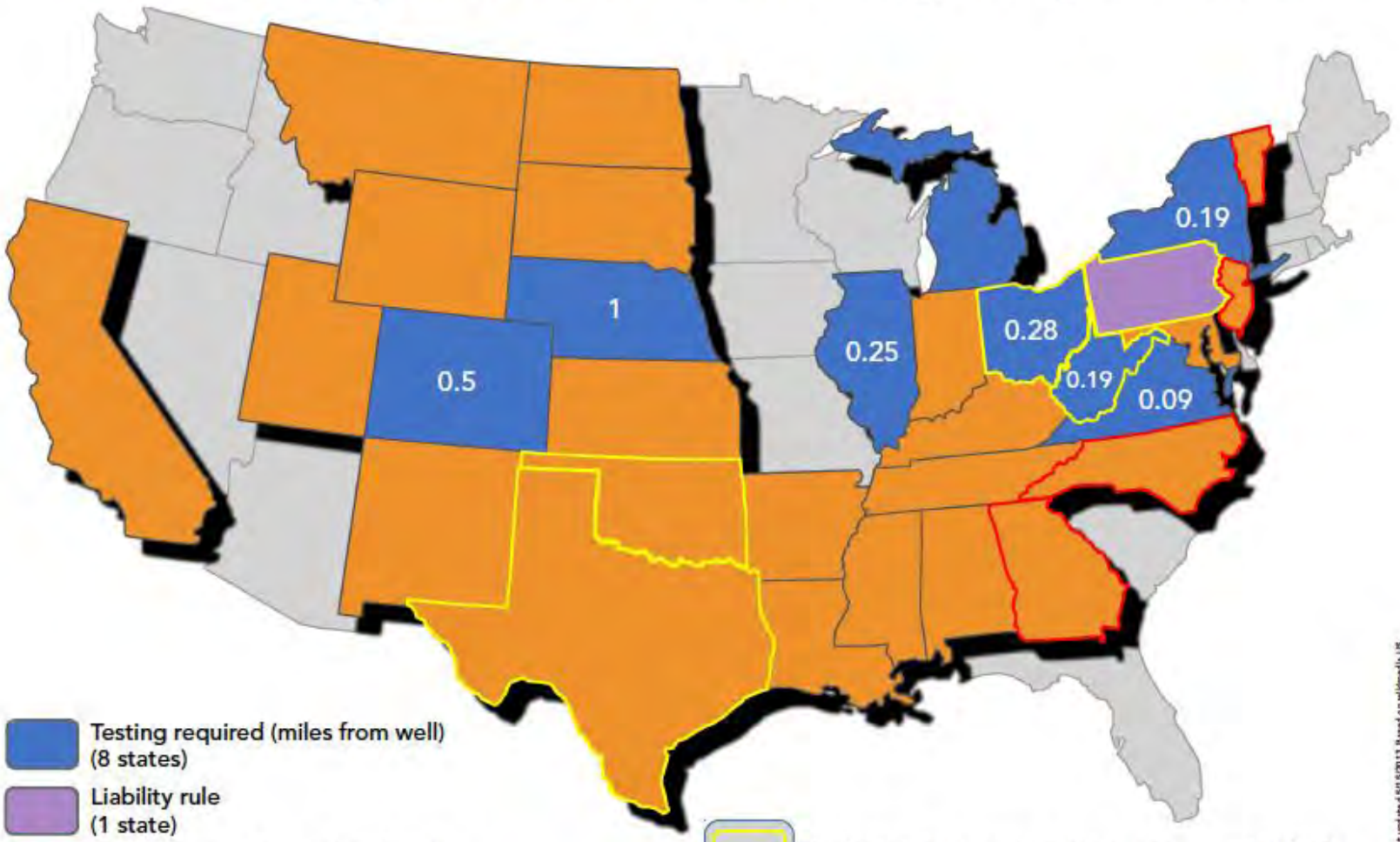
How do Michigan siting well regulations differ from regulations in other states?

Response #4 - Amy

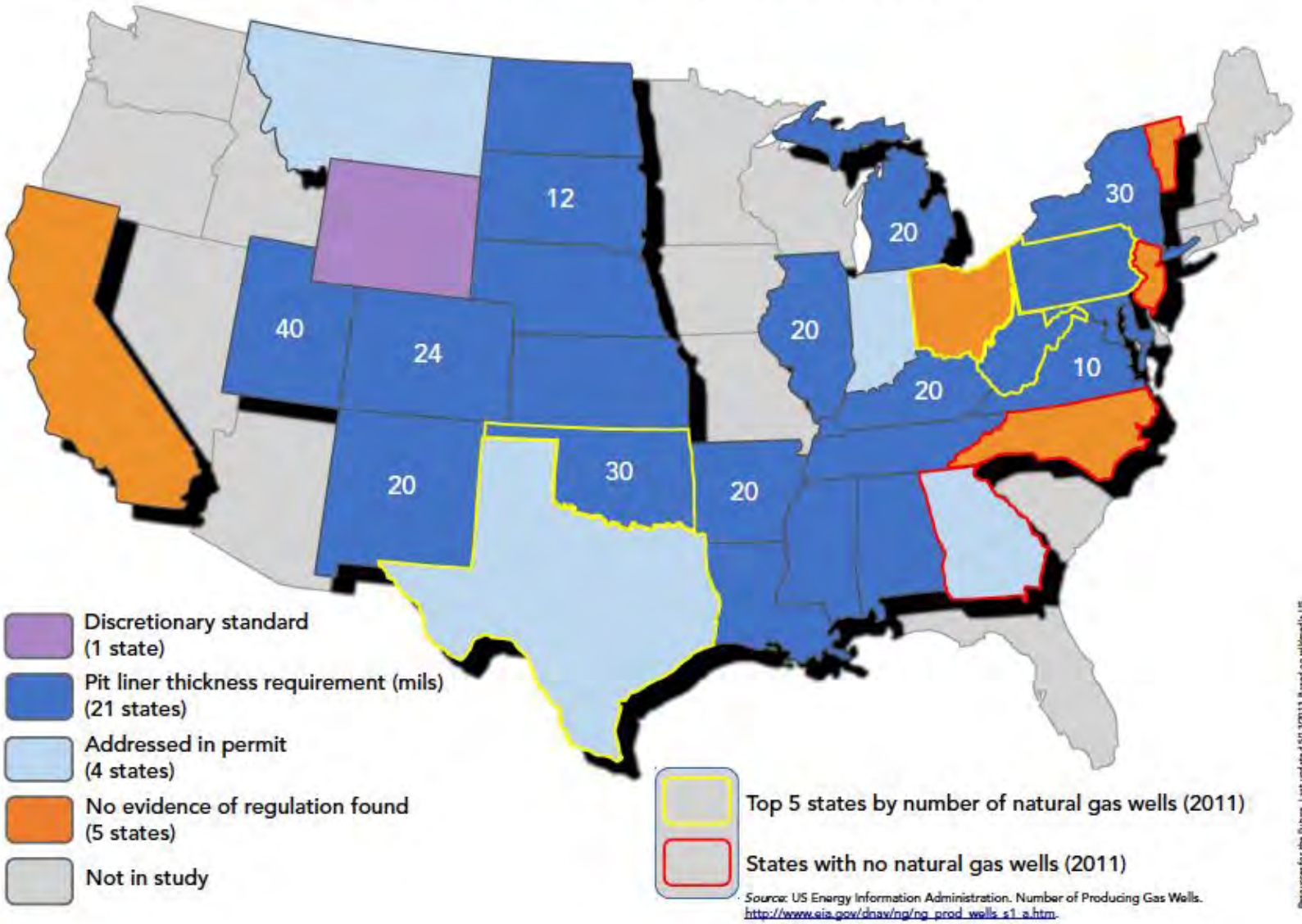
Tables Courtesy of the Graham Sustainability Institute Integrated Assessment Report Series, Volume 11
Hydraulic Fracturing in the State of Michigan
http://graham.umich.edu/knowledge/ia/hydraulic-fracturing
Policy/Law Technical Report



Siting Wells Response - Amy



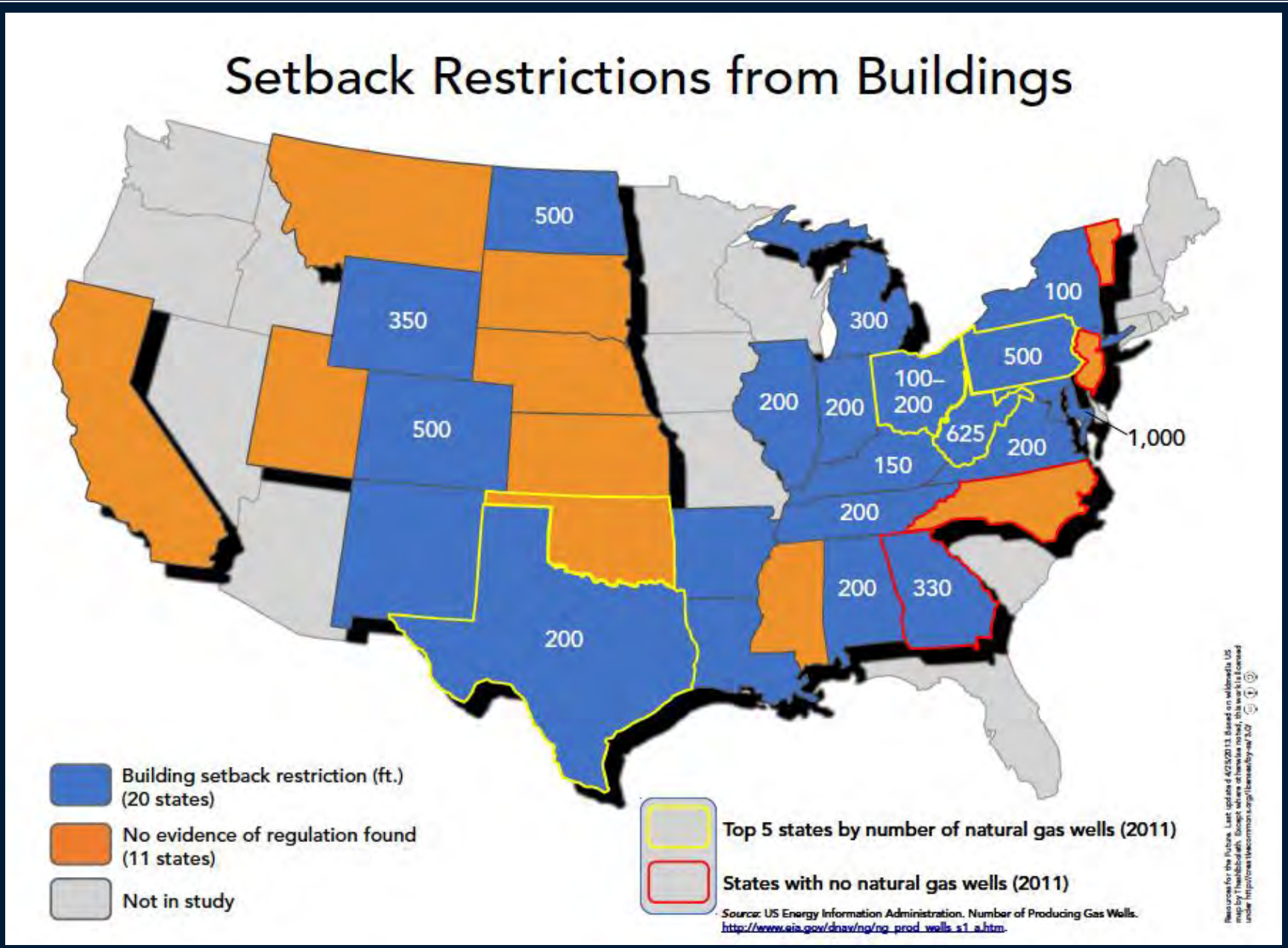
Siting Wells Response - Amy



Question #4b

How do Michigan setback restrictions regulations differ from regulations in other states?

Setback Restrictions Response - Amy



Setback Restrictions Response - Amy

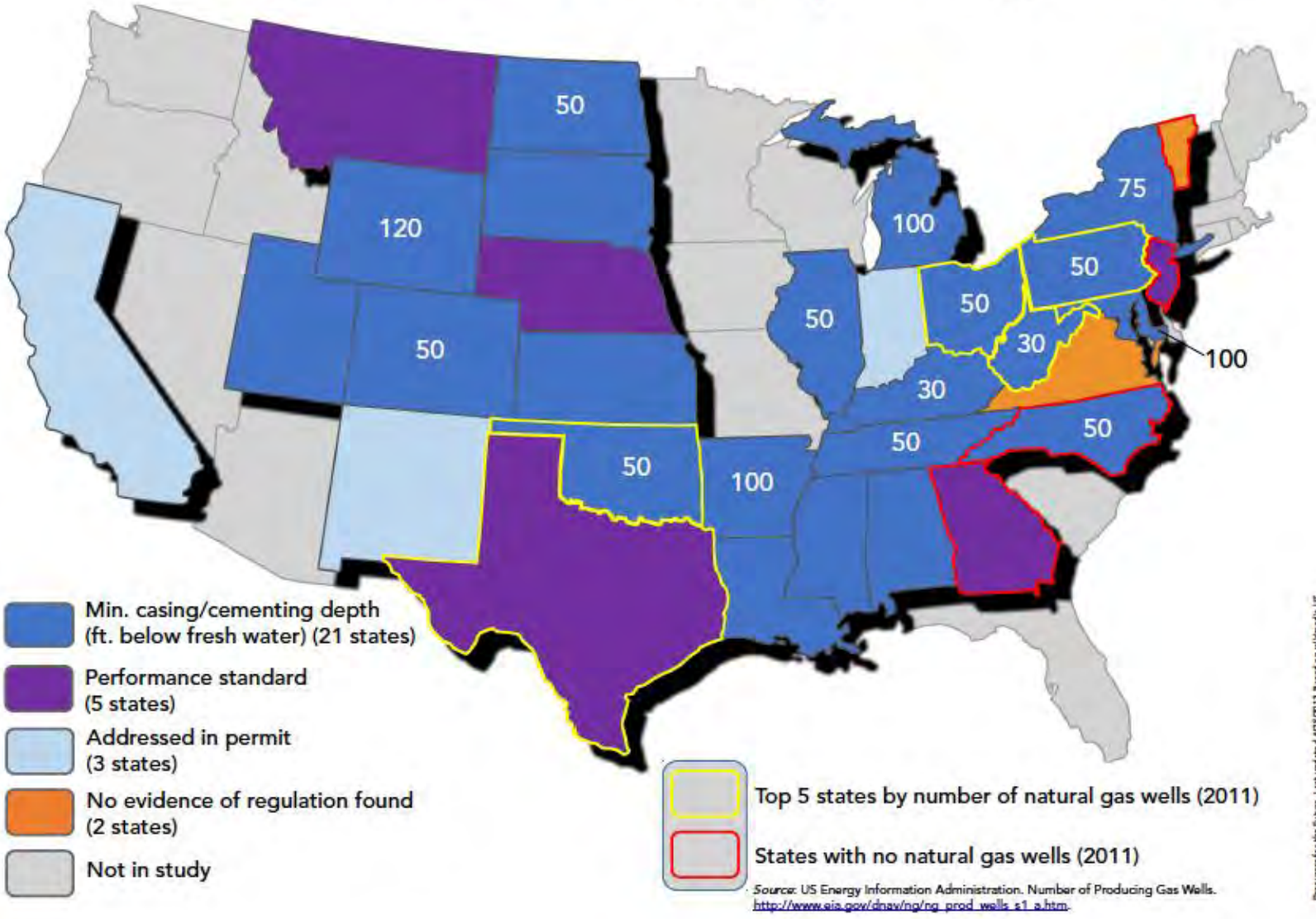
TABLE 2: Setback Requirements for Well Location

	Colorado[225]	Illinois[226]	Michigan[227]	Ohio[228]	Pennsylvania[229]	Texas[230]
Oil and gas well type	All	High-volume horizontal	All	All	Unconventional natural gas	All
Residences	500 feet	500 feet	300 feet; 450 feet in large cities and townships	100 feet in non-urbanized areas; 150 feet in urbanized areas	500 feet	200 feet
Other Structures/ Areas	1,000 feet from "high occupancy building;" 350 feet from "outside activity area"	500 feet from school, hospital, nursing home, place of worship	300 feet from structure used for public or private occupancy	100 feet from "public building" in non-urbanized areas	500 feet from building	None
Water supplies	0–300 feet from designated public water supply stream segment	500 feet from water well or spring; 1,500 feet from public water supply intake	300 feet from freshwater well	None	500 feet from water well; 1,000 from water supply	None
Natural resources	300 feet from gold medal stream, cutthroat trout habitat	300 feet from water body; 750 feet from nature preserve	300 feet from natural river; if state lease, 1,320 feet from lake or stream	50 feet from water body	300 feet from water body, wetland greater than 1 acre	None

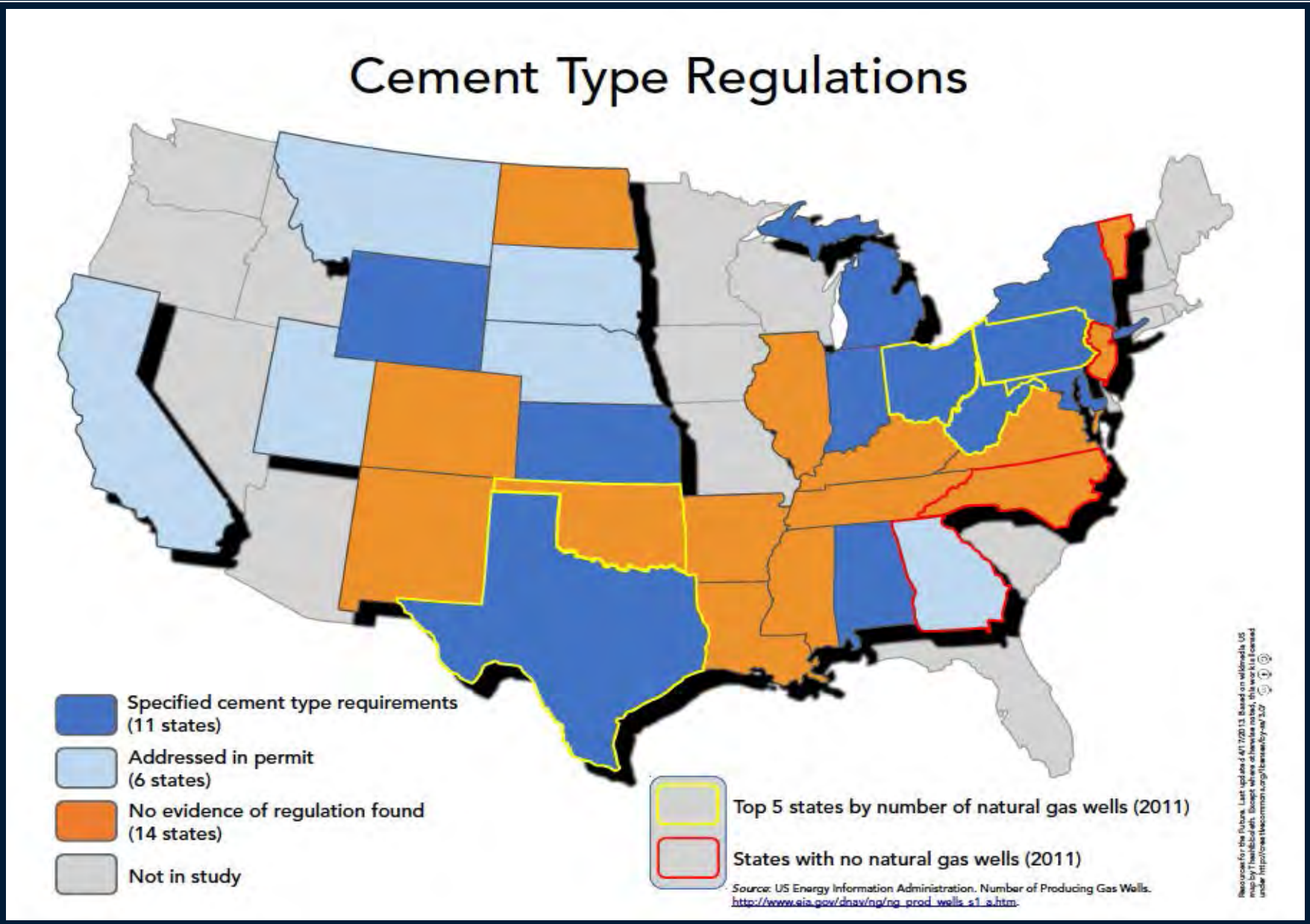
Question #4c

How do Michigan well casings regulations differ from regulations in other states?

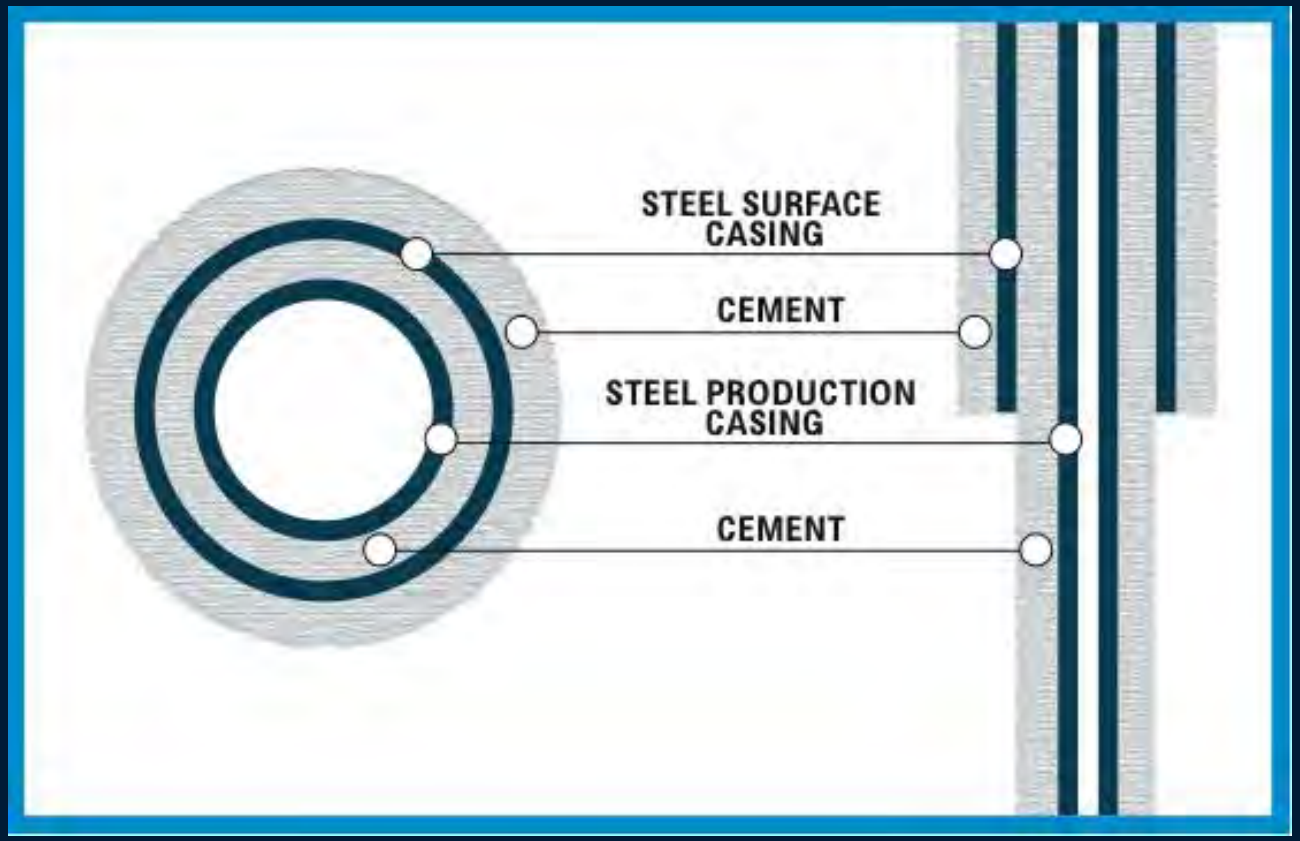
Well Casings Response - Amy



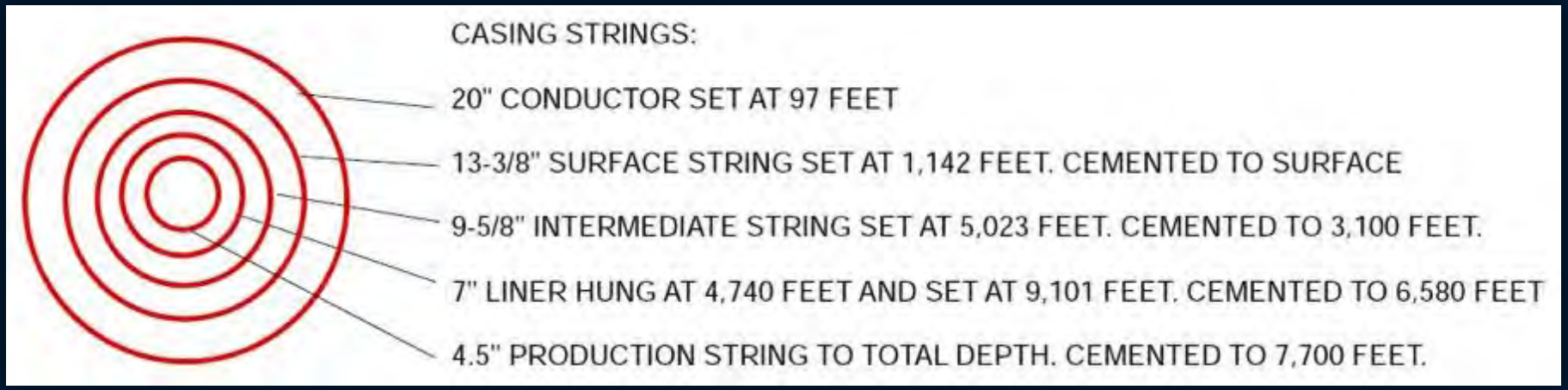
Well Casings Response - Amy



Typical Antrim Well



Well Casings Response - Amy



Question #4d

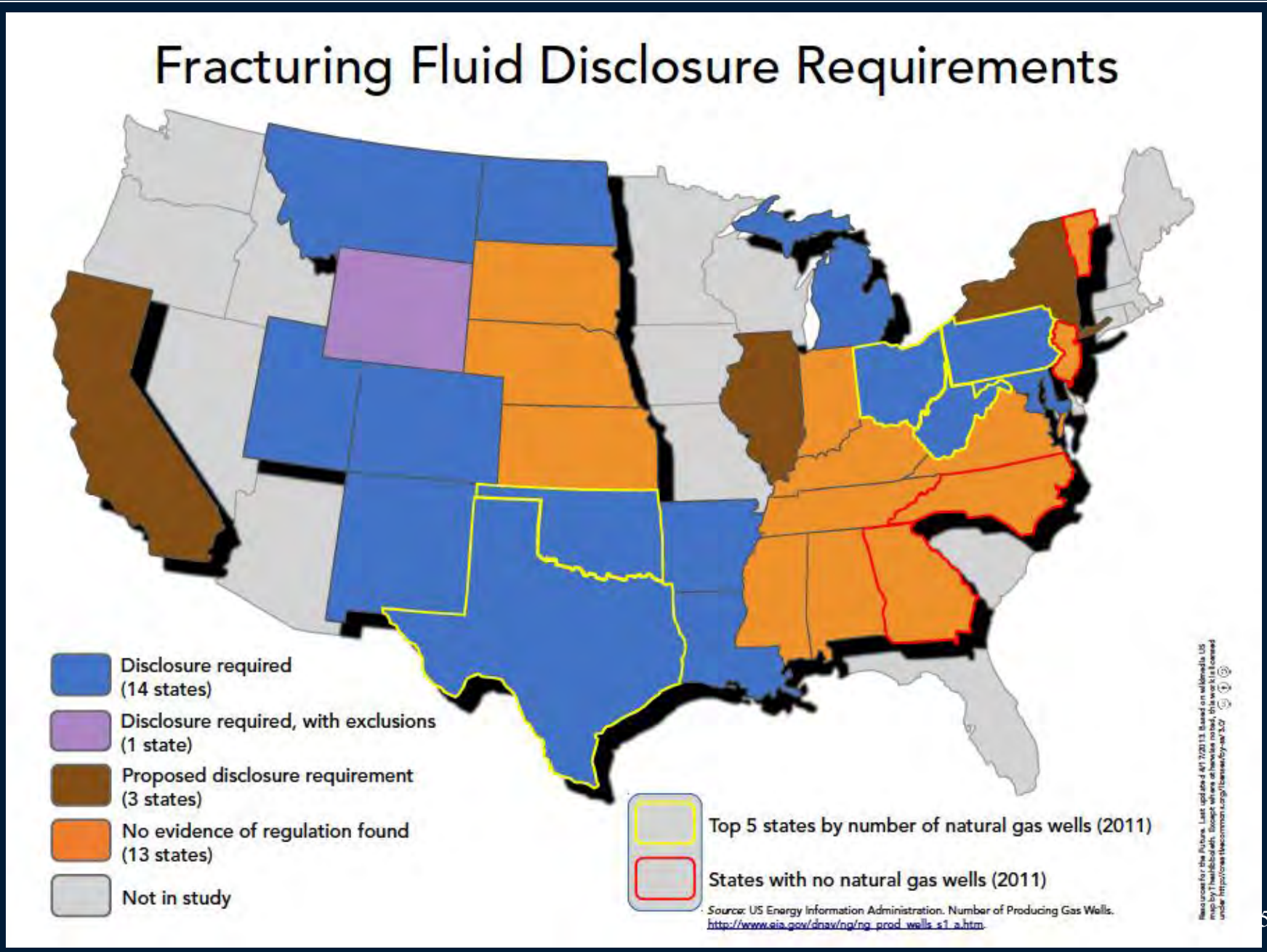
How do Michigan hydraulic fracturing chemical disclosure regulations differ from regulations in other states?

Chemical Disclosure Response - Amy

TABLE 4: Chemical Disclosure Requirements

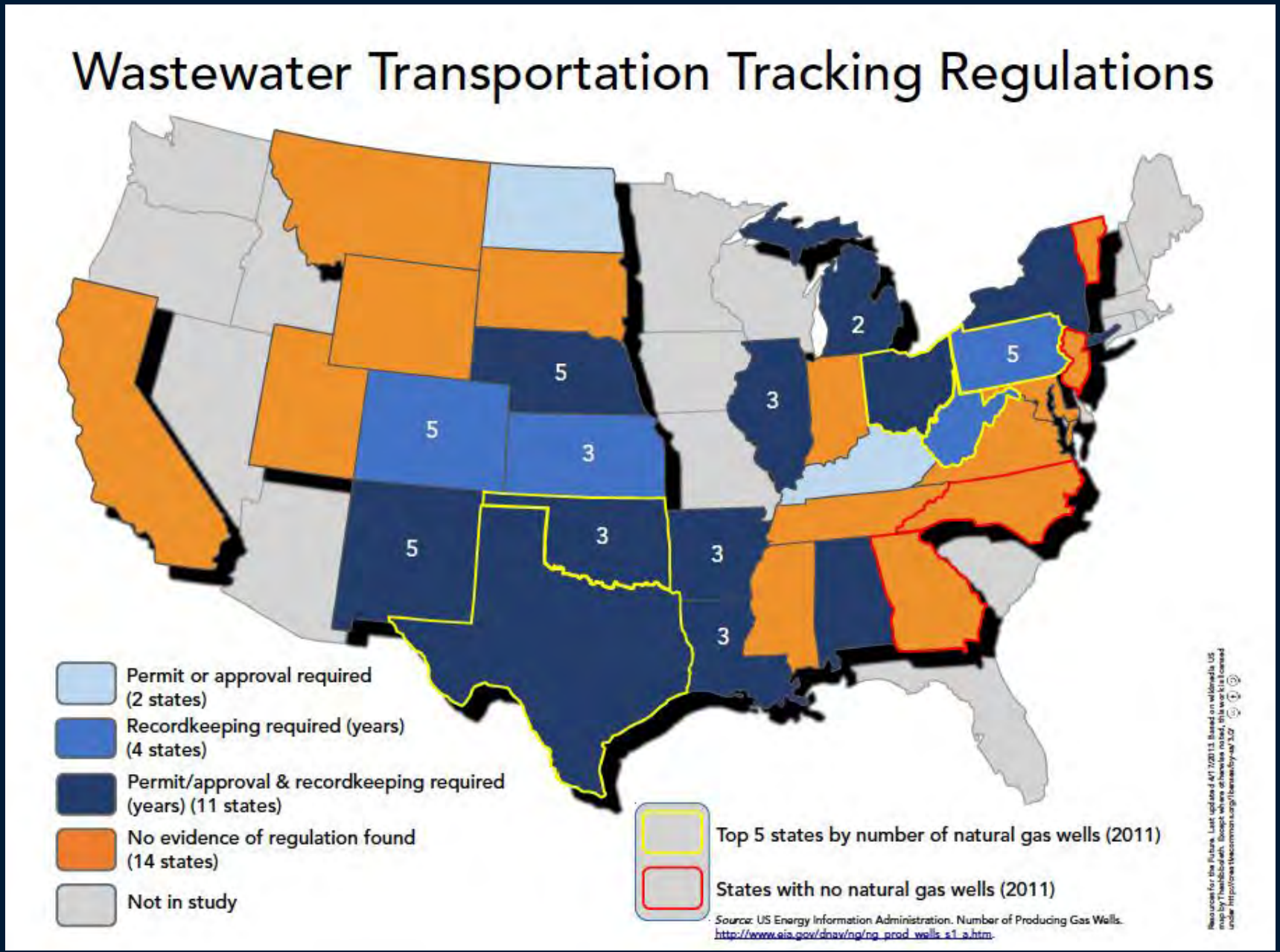
	Colorado[255]	Louisiana[256]	Michigan[257]	New York (proposed)[258]	Texas[259]	Wyoming[260]
Oil and gas well type	All	All	High-volume	High-volume	All	All
Additive disclosure	Trade name, vendor, function	Trade name, supplier, type	MSDS for additives; volume of each additive	Trade name, type, function, concentration; MSDS	Trade name, supplier, function	Trade name, type, rate or concentration
Ingredient disclosure	All constituents by CAS number, maximum concentration in fluid	Hazardous constituents by CAS number, maximum concentration in additive and fluid	Hazardous constituents by product, concentration in additive and CAS if in MSDS	All constituents by chemical name, CAS number, actual or maximum concentration in fluid	Hazardous constituents by CAS number, actual or maximum concentration in fluid; non-hazardous constituents by CAS number	All constituents by CAS number
Timing	After	After	After	Before and after	After	Before and after
Means	FracFocus	FracFocus or state	State; placed on state website	State and FracFocus	FracFocus	State; no public disclosure
Trade secret claims	Written claim of entitlement to state	Statement on FracFocus	By manufacturer under worker safety law	Upon state approval	Statement on FracFocus; nearby owners and state agencies may challenge	Upon state approval
Replacement information	Chemical family	Chemical family	None	Chemical family	Chemical family	None
Trade secret exceptions	Health care professional; state if necessary to respond to spill or release	Health care professional	No provision	No provision	Health professional or emergency responder	No provision

Chemical Disclosure Response - Amy

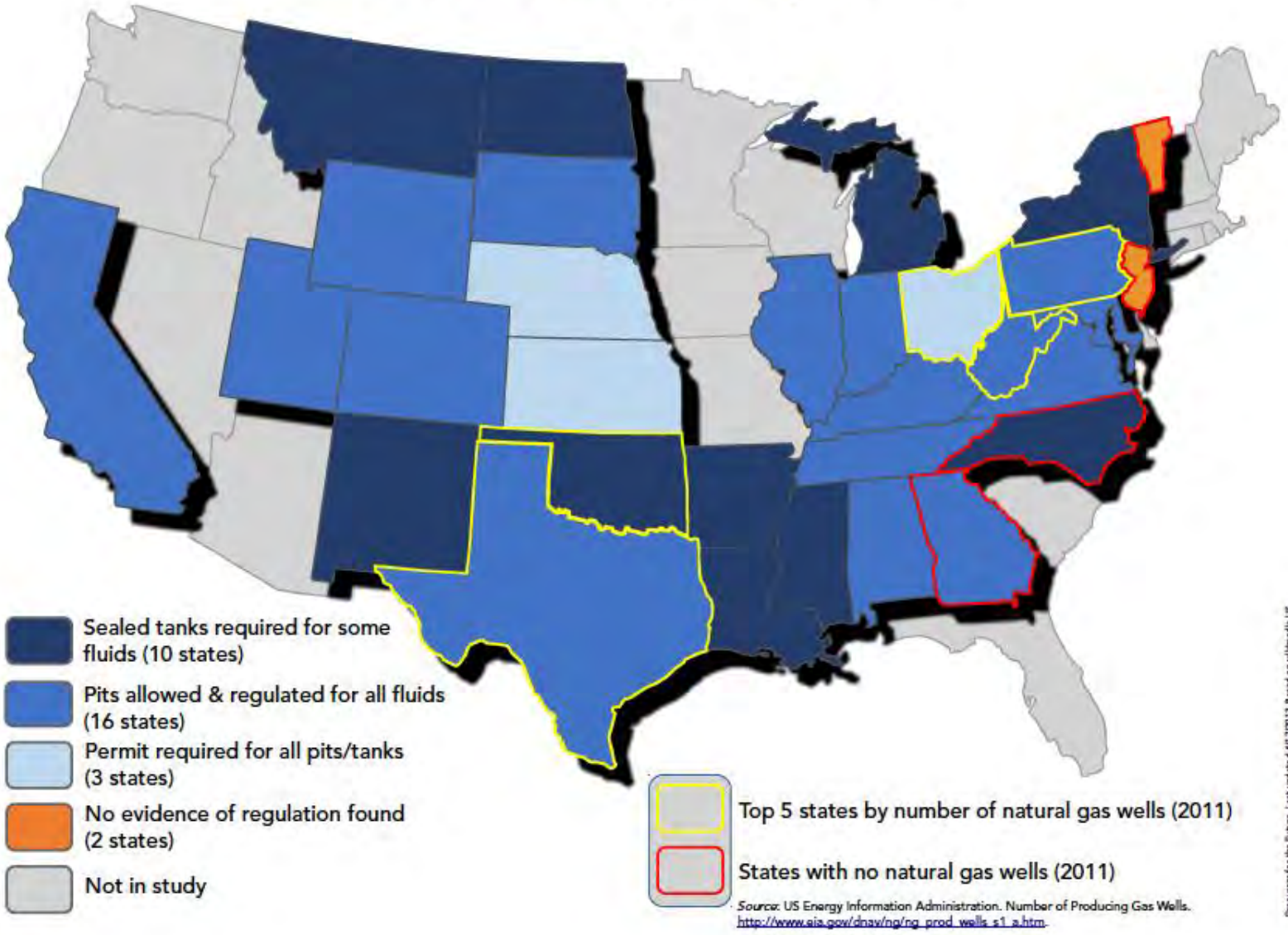


Question #4e

How do Michigan flowback water handling regulations differ from regulations in other states?


Wastewater Transportation Tracking Regulations
2
5
3
5
3
5
3
3
3
Permit or approval required (2 states)
Recordkeeping required (years) (4 states)
Permit/approval & recordkeeping required (years) (11 states)
No evidence of regulation found (14 states)
Not in study
Top 5 states by number of natural gas wells (2011)
States with no natural gas wells (2011)
Source: US Energy Information Administration. Number of Producing Gas Wells.
http://www.eia.gov/dnav/ng/ng_prod_wells_s1_a.htm

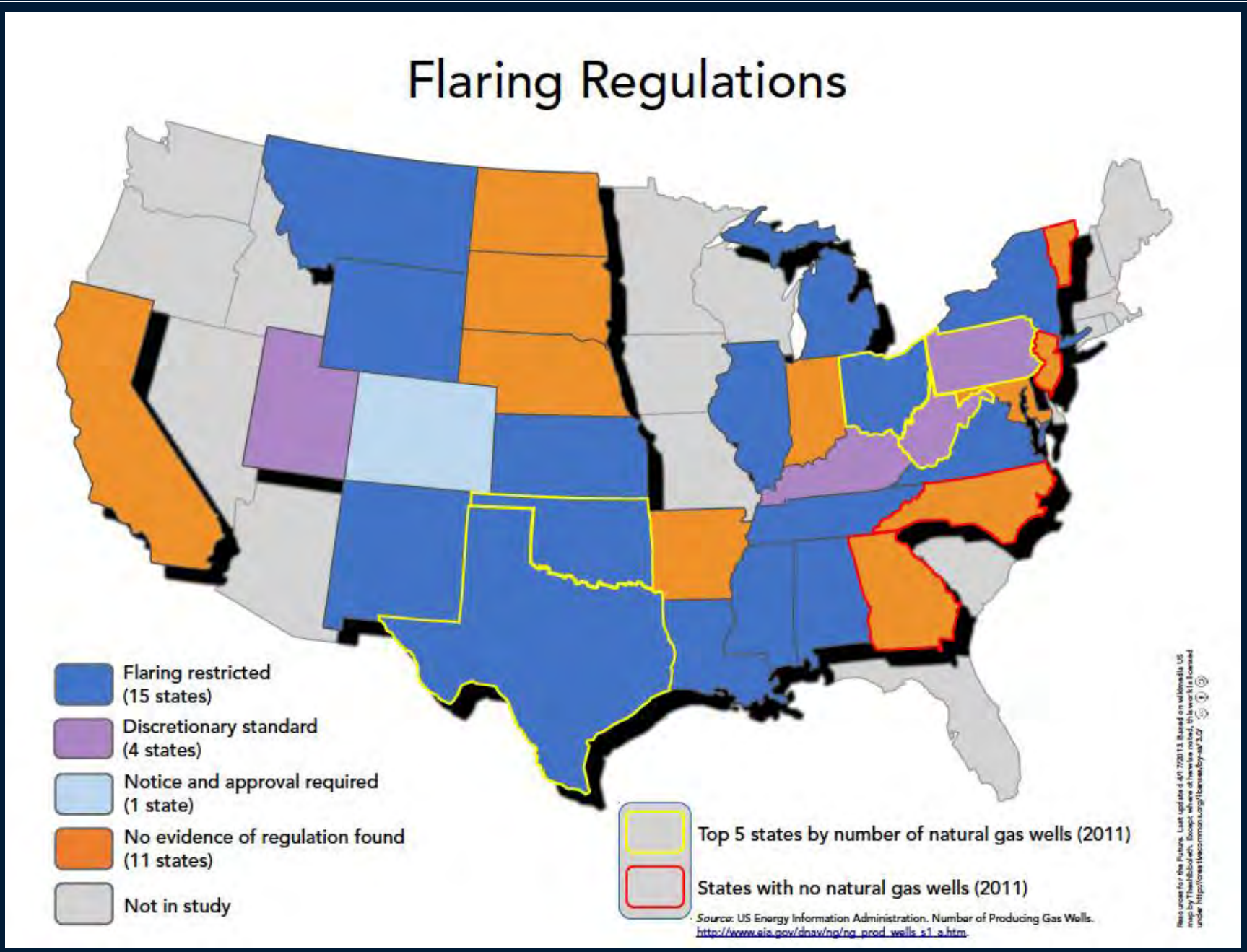
Flowback Water Handling Response - Amy



Question #4f

How do Michigan oil &gas well emissions regulations differ from regulations in other states?

Emissions Response - Amy



Controlling Emissions In Michigan

Question #4g

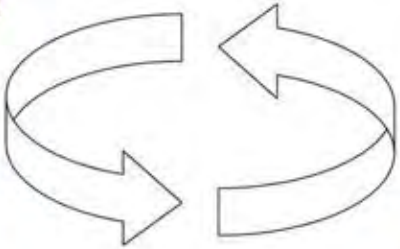
How do Michigan flowback water disposal regulations differ from regulations in other states?

Flow-Back Disposal In Michigan

Fluid Life Cycle

START Temp.
Water Supply
Well Is Pumped
And Water
Stored On-site

END
Disposal in
Class II
Disposal
Well



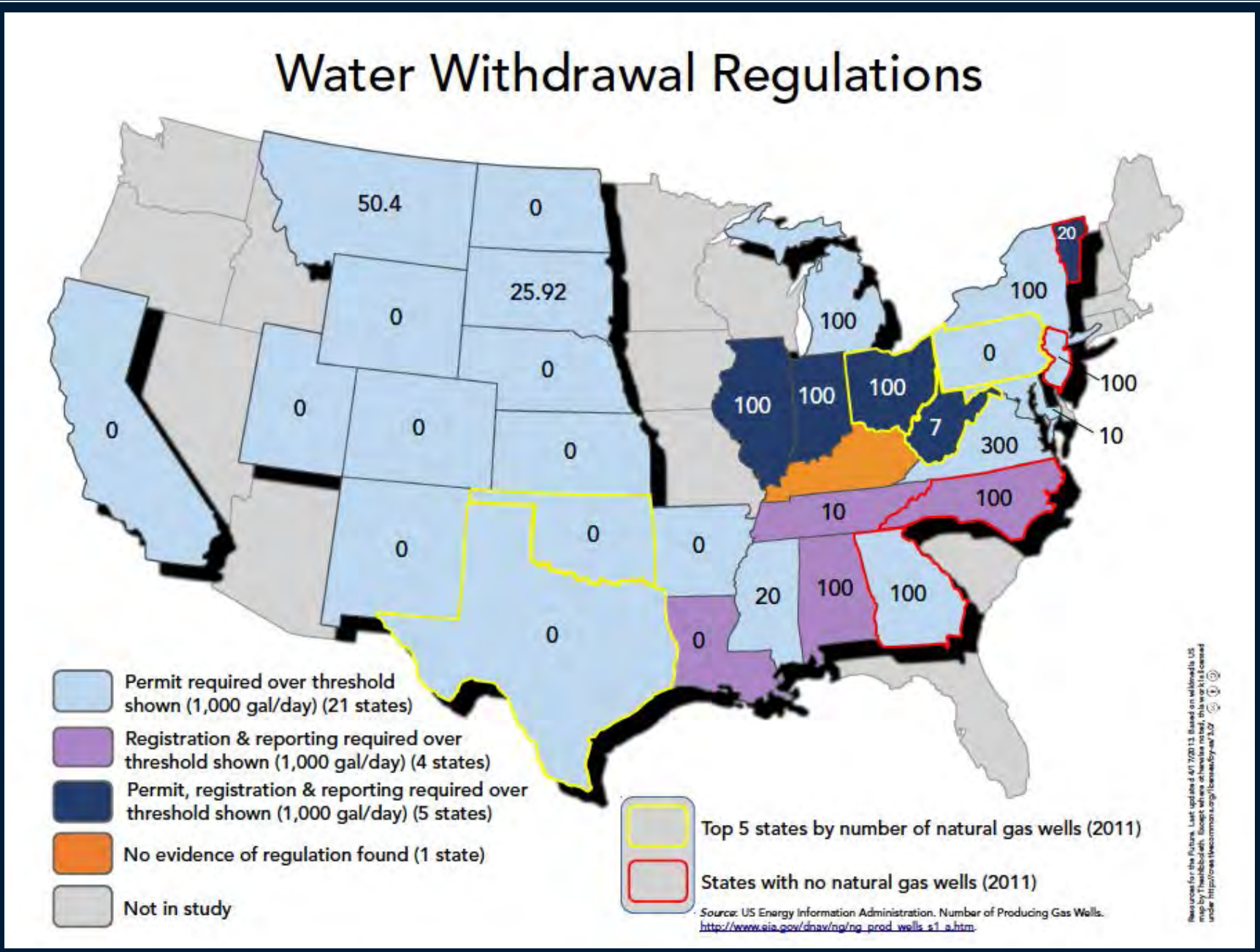
Water Used To
Hydraulically The
Fracture Oil or
Gas Well

Flowback Fluid Stored In
Frac Tanks

Question #4h

How do Michigan hydraulic fracturing water usage regulations differ from regulations in other states?

Water Usage Response - Amy



The Water Withdrawal Assessment Tool (http://www.miwwat.org)

- Intended for use prior to installing a new or increased large quantity withdrawal for the purpose of determining the potential impact to nearby water resources.
- With respect to any proposed hydraulic fracturing operation that will require a "large volume water withdrawal" (defined as a withdrawal of more than 100,000 gallons of water per day, on average, over a 30-day period), the permitting instructions require a comprehensive evaluation and review using an internet-based assessment tool, as well as site specific reviews by MDEQ personnel.

OOGM's Water Withdrawal Analysis for High Volume Hydraulic Fracturing

- Review and evaluation of the potential for Adverse Resource Impacts (ARI) related to large volume water withdrawals for hydraulic fracturing is a two phase process.
  - Phase one is a preliminary screening process by the OOGM permitting and field staff during the permit application review.
  - Phase two is done by the operator using specific parameters for the water withdrawal needed for completion.
- Under no circumstances will water withdrawals that are determined to create an actual ARI be approved.

"Adverse Resource Impact"

MCL 324.32701(a)(vii)

- Decreasing the level of a lake or pond with a surface area of 5 acres or more through a direct withdrawal from a lake or pond in a manner that would impair or destroy the lake or pond or the uses made of the lake or pond, including….

Ground Water Wells
Common Law Limitations

Only applicable if the withdrawal would interfere with:

- Another groundwater well
- Riparian rights in a connected stream or lake

Ground Water Wells
Common Law Limitations

Reasonable Use Balancing Test – *Michigan Citizens for Water Conservation v Nestlé Waters North America Inc*, 269 Mich App 25; 709 NW2d 174 (2005); reversed on other grounds 479 Mich 280 (2007).

Question #4i

How do Michigan brine application regulations differ from regulations in other states?

Brine Application For Dust And Ice Control

Office of Oil, Gas, and Minerals approves source well

- R324.705 Rule 705(3)
- (a) Less than 500 ppm H2S per liter brine;
- (b) 20,000 mg per liter or more Calcium;
- (c) Less than 1,000 ppb Benzene, Ethylbenzene, Toluene, Xylene;
- (d) Only brines approved by supervisor.

Water Resources Division permits the application of the brines.

Question #4j

How do Michigan silica dust regulations differ from regulations in other states?

Silica Dust Response - Adam

Question #5

Which agency reviews hydraulic fracturing permits submitted to the State?

Question #6

What opportunity does the public have to review and comment on State hydraulic fracturing permits?

Question #7

Has the State denied any permit applications?

Question #8

What is the State's policy regarding disclosure of permit violations by oil and gas operators?

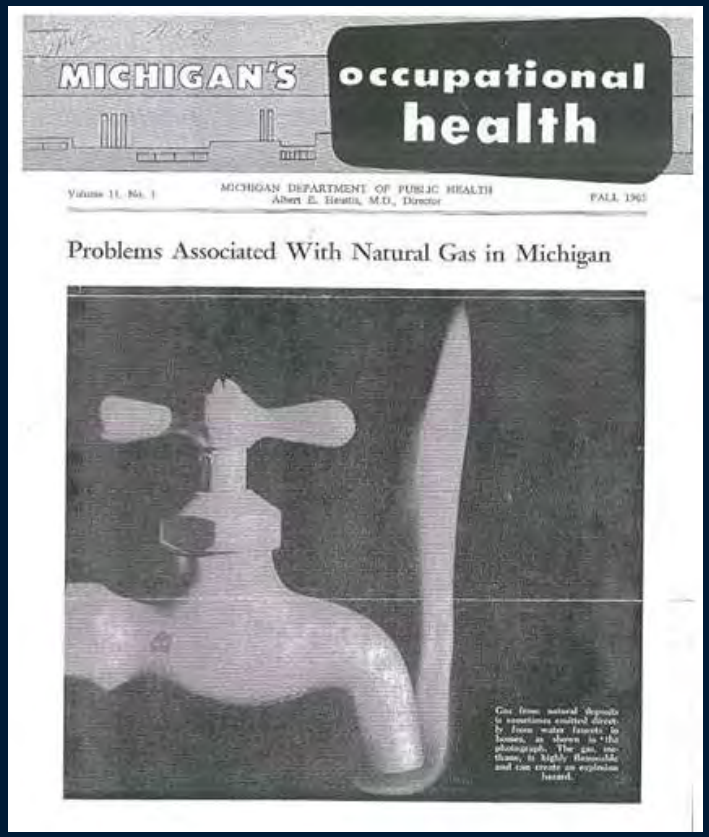
Question #9

What permit violations have occurred in Michigan?

Question #10

Movies such as *Gasland* and videos circulating on the Internet show residents in Pennsylvania near hydraulic fracturing sites lighting their tap water on fire. Is this really occurring in Pennsylvania? Is this a concern for Michigan?

Natural Stray Gas in Water Wells vs Man Caused


MICHIGAN'S occupational health

Volume 11, No. 1 MICHIGAN DEPARTMENT OF PUBLIC HEALTH Albert E. Heuttis, M.D., Director FALL 1965

Problems Associated With Natural Gas in Michigan

Has been reported in Michigan for a while (Article from 1965). Can occur when the aquifer is in connection with gas bearing shales or buried organics

Question #11

What are the possible water contamination risks for Michigan from hydraulic fracturing through the following mechanisms:

a. Hydraulic fracturing?
b. Directional drilling?
c. New subsurface fractures in the bedrock caused by hydraulic fracturing?
d. Existing natural fractures networks in the bedrock?
e. Flowback water?

Response #11 - Jay

Well sites are engineered to protect surface

Well casing is designed to seal the aquifers OUT

Disposal is regulated

Secondary containment measures in place

Routine monitoring of the groundwater (secondary containment monitoring)

NORM – Low concentrations, not at harmful levels, blocked by steel.

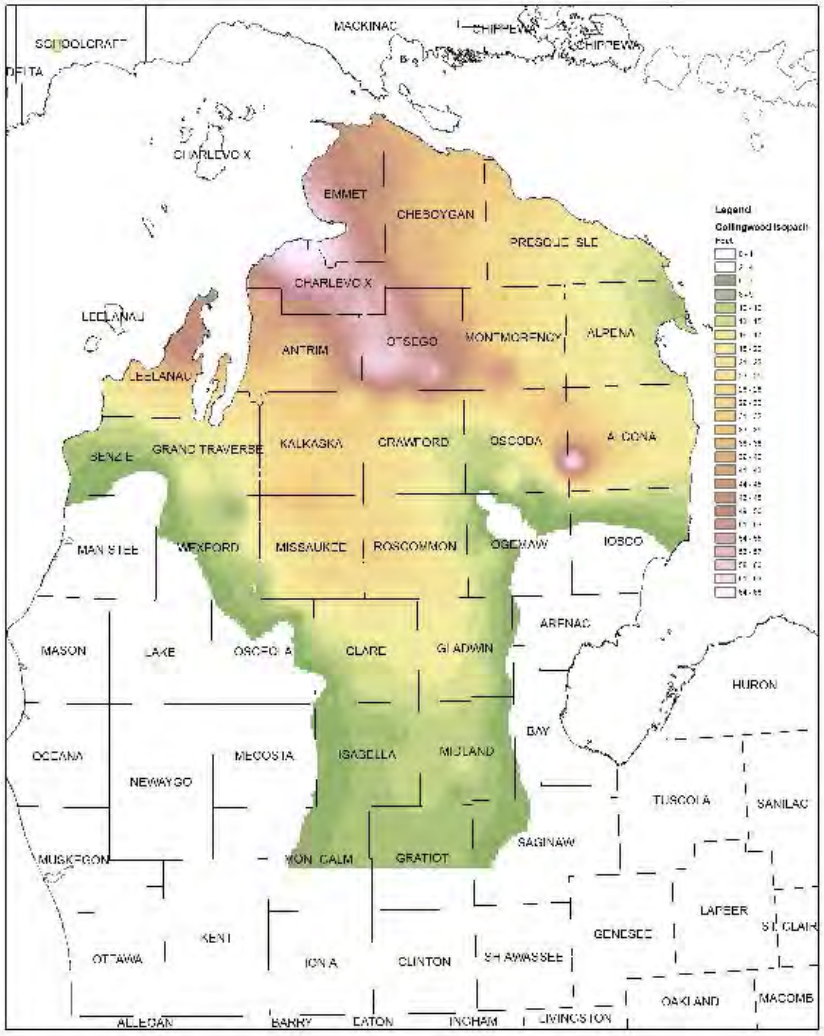
As in any industry, accidents can and do happen.

It is our obligation to work to prevent accidents and facilitate the cleanup of ones that do happen.

Question #12

Have there been any reports of water contamination as a result of hydraulic fracturing and/or flowback disposal methods in Michigan? In other States?

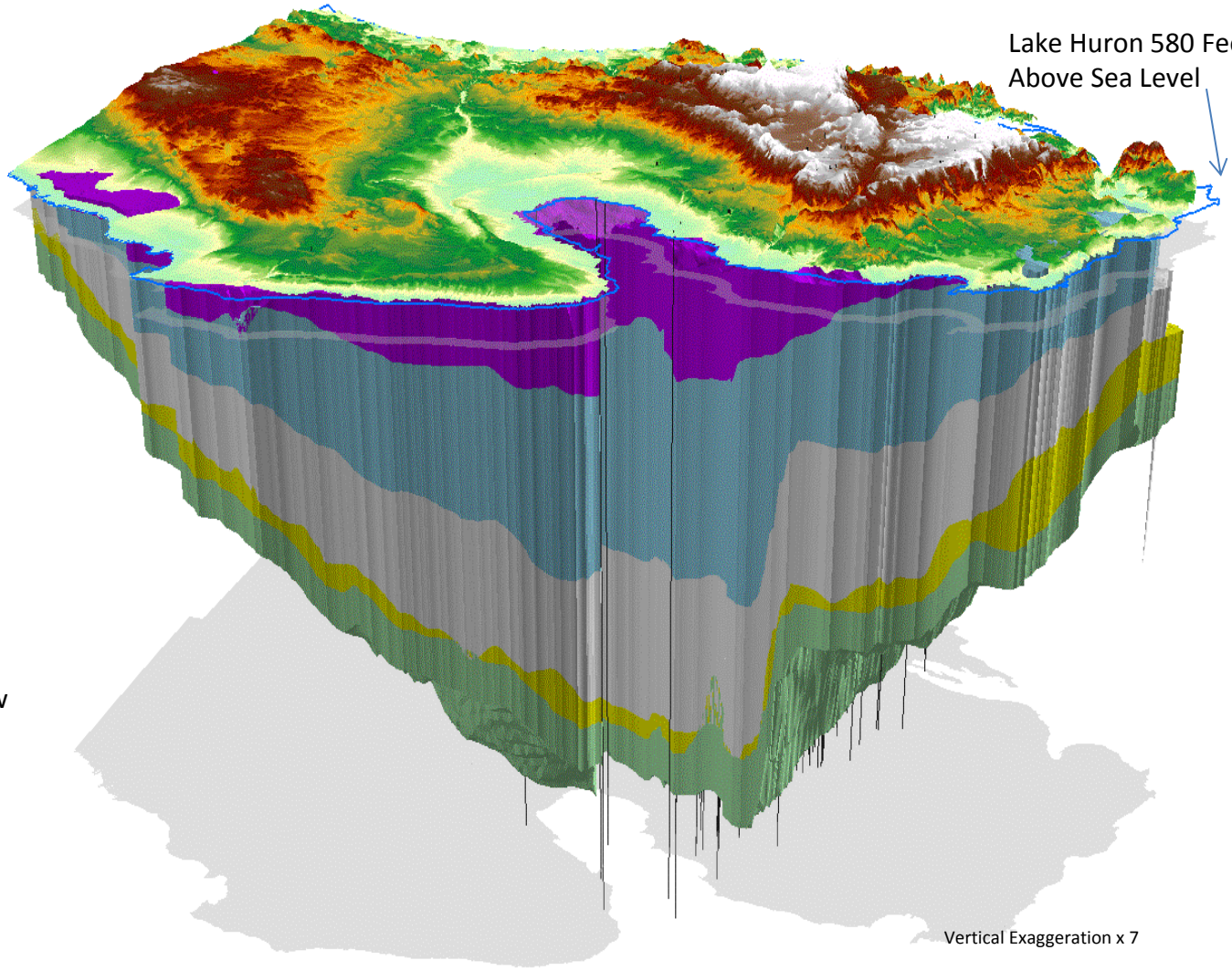
Response #12 -Adam



COLLINGWOOD ISOPACH

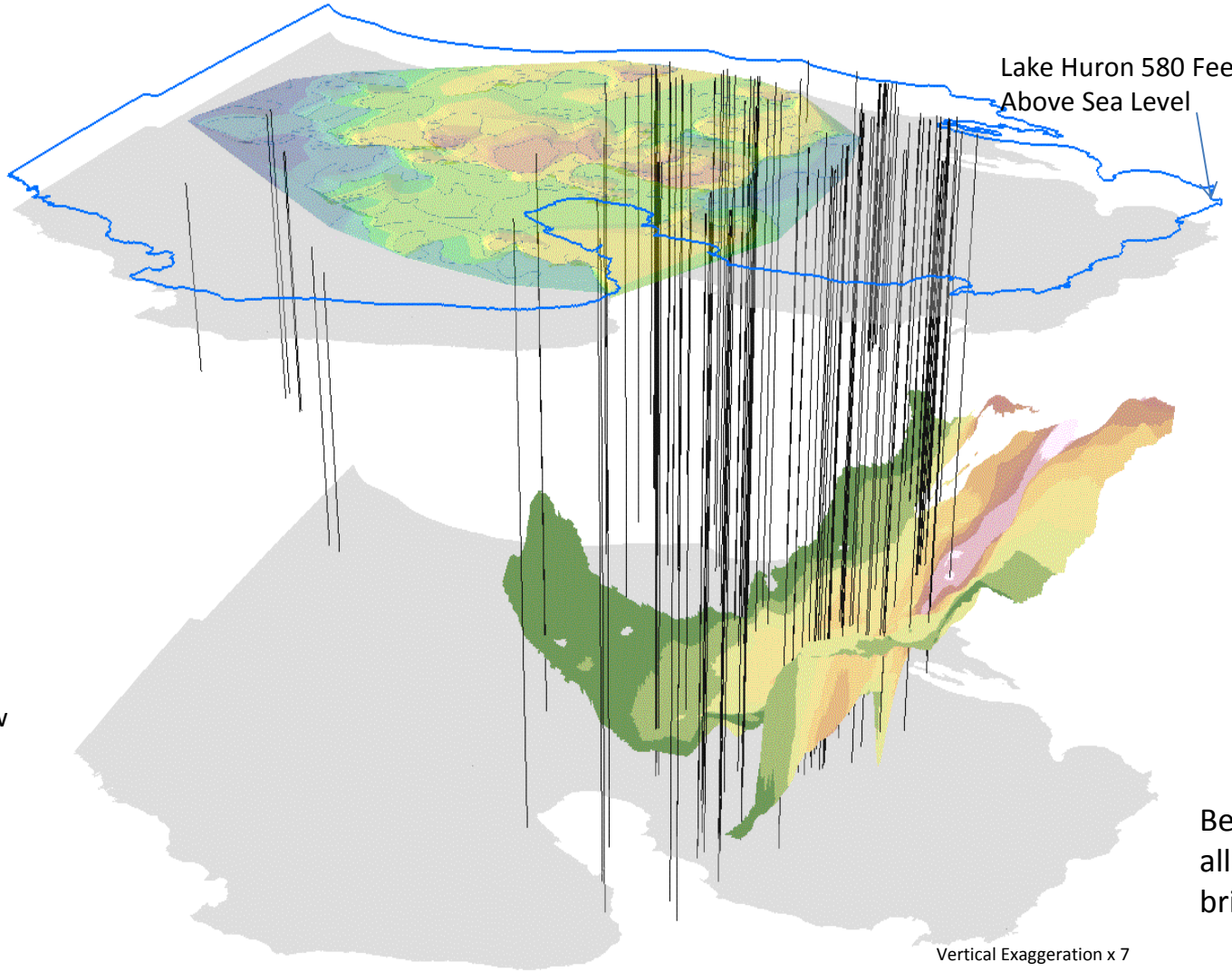
Collingwood Thickness

Response #12 -Adam



Lower Peninsula of Michigan Subsurface, Wells >8500’

Response #12 -Adam



Below this surface all water is saline or brine

Base of Fresh Water, Wells >8500', Collingwood Shale

Question #13

What is the failure rate of well casings for fracking wells over an extended period of time (20 to 30 years)? What is the expected life-cycle of cement casings? Are there regulations which require that well casings are replaced once their life-cycle expires?

How Long will Steel and Cement Last?

Question #14

What short-term and long-term impacts to our water supply may occur as a result of the water usage necessary for hydraulic fracturing? For example, one hydraulic fracturing operation in Kalkaska County used 21.1 million gallons of water. What impacts have/would home-owners near to these water withdrawals experience?

Response #14 - Jay

High Volume (<100,000 gallons) Hydraulic Fracturing Well Completions

SoW Instruction 1-2011 (Effective June 22, 2011)

a) WWAT
b) Data and records (volume, number, aquifer, type (drift/bedrock), pump rate)
c) Supplemental map of well site showing:
    a. Proposed location (lat/lon)
    b. Locations of all recorded (and reasonably identifiable) fresh water wells within a quarter mile (1,320 feet) of proposed withdrawal
    c. Proposed freshwater pit location
d) Completion Instructions
    a. If within quarter mile of fresh water well, install an "Observation Well" and measure water level DAILY during pumping and WEEKLY thereafter, until stable.
    b. Freshwater pit should not create hazard, remain onsite after completion, and may need soil erosion protective measures and fencing
    c. During Hydraulic Fracturing process, the operator shall monitor/record injection pressure at the surface and the annulus pressure between the injection string and next string of casing (unless cemented to surface).
e) Submit data with Record of Well Completion:
    a. MSDS and volumes used
    b. Hydraulic Fracturing records

Response #14 - Jay

High-volume Hydraulic Fracturing is relatively rare, most uses present “negligible” or short-term changes

Increased scrutiny will tell us more, tracked water usage and disposal

Permitted or proposed withdrawal is not the same as actual

Cost/benefit: there are REAL and substantial costs to the production company for water use and disposal…if it gets to be too high, the costs may outweigh the benefits

We can use the history of Antrim Hydraulic Fracturing production as an analog to future drilling in Michigan

Michigan is NOT the same as other states

Large Volume Hydraulic Fracturing Water Usage

(from www.hydraulicfracturingdisclosure.org/fracfocusfind/ and http://www.encana.com)

- State Excelsior 1-25 HD1

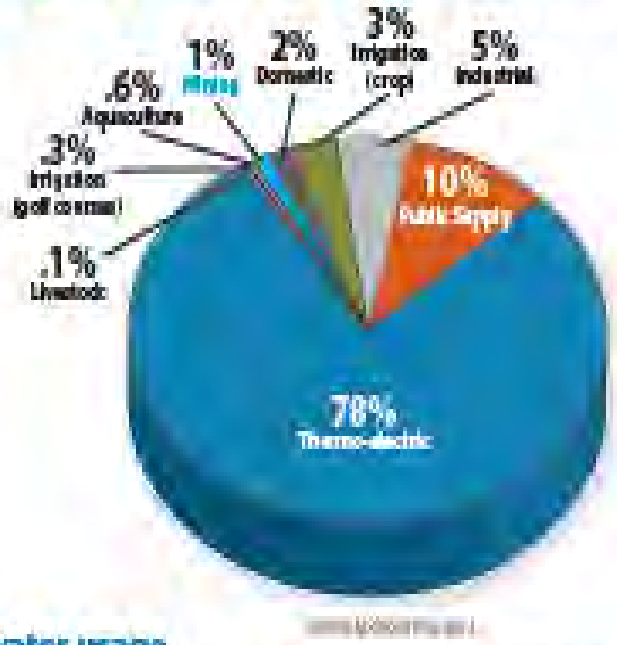
  (Utica-Collingwood Shale Well, Kalkaska County, MI)

  - 8,461,635 gallons
  - 30 stages
  - 282,000 gallons per stage

- Typical Antrim Shale Well
  - 40,000 – 100,000 gallons
  - 3 – 4 stages

Michigan Oil & Gas Producers Education Foundation—Hydraulic Fracturing in Michigan

Michigan Water Use (Millions Gallons/Day)



The oil and natural gas exploration and production industry is a very small part of water use. Oil and gas production is part of the mining sliver in the graph to the left. Mining, overall, including oil and gas production uses less than 1 percent of the water used statewide.

Michigan's water usage

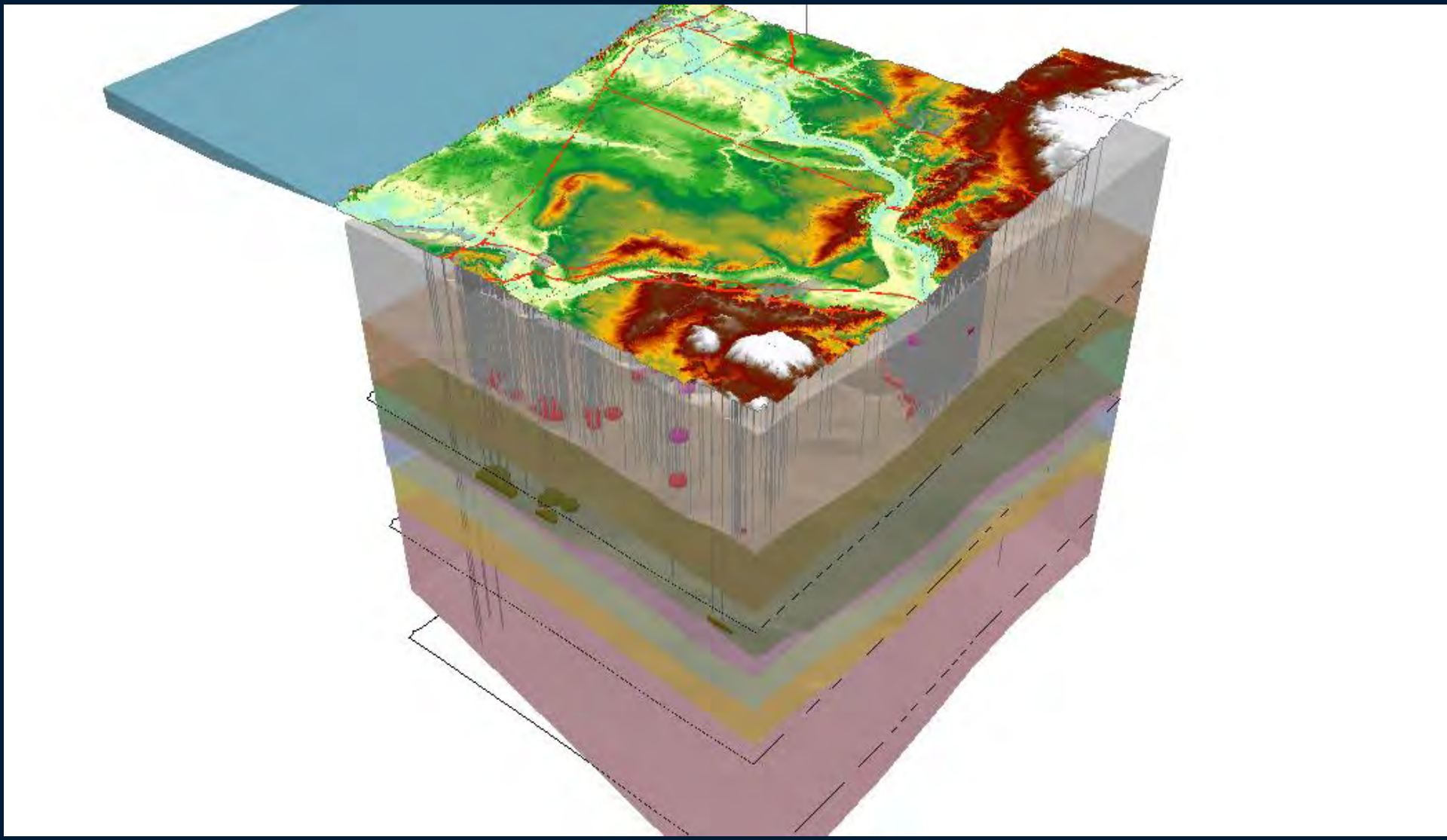
At first glance the amount of water used in hydraulic fracturing, particularly in shale gas formations, may appear substantial, but it is small when compared to other water uses. Unlike other uses, water used to produce natural gas through hydraulic fracturing is a one-time use that promotes efficient energy production for the next 20 years. It's an investment that pays off in the form of long-term, clean, reliable, and affordable energy.

Michigan uses more than 11 billion gallons of water each day with nearly 80 percent of this used for thermoelectric power generation *(source: MDEQ, 2004 Water Withdrawals for Major Water Uses in Michigan)*.

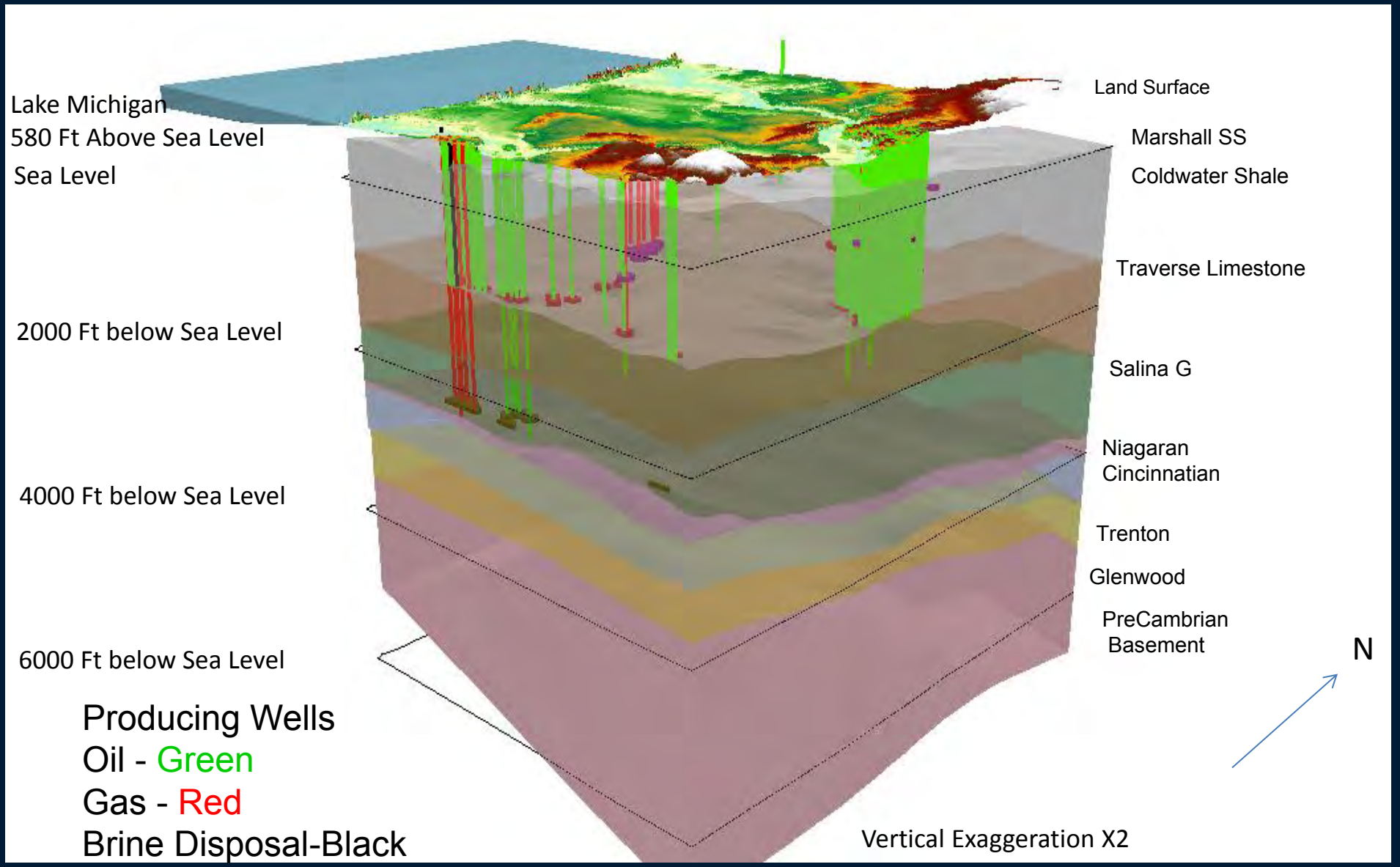
Question #15

If hydraulic fracturing occurred in Ottawa County, what would be the likely water source(s) for hydraulic fracturing? If groundwater is used from local sources, would it cause sodium chloride to be pulled out of Marshall bedrock and cause high sodium levels in wells over short and/or long-term?

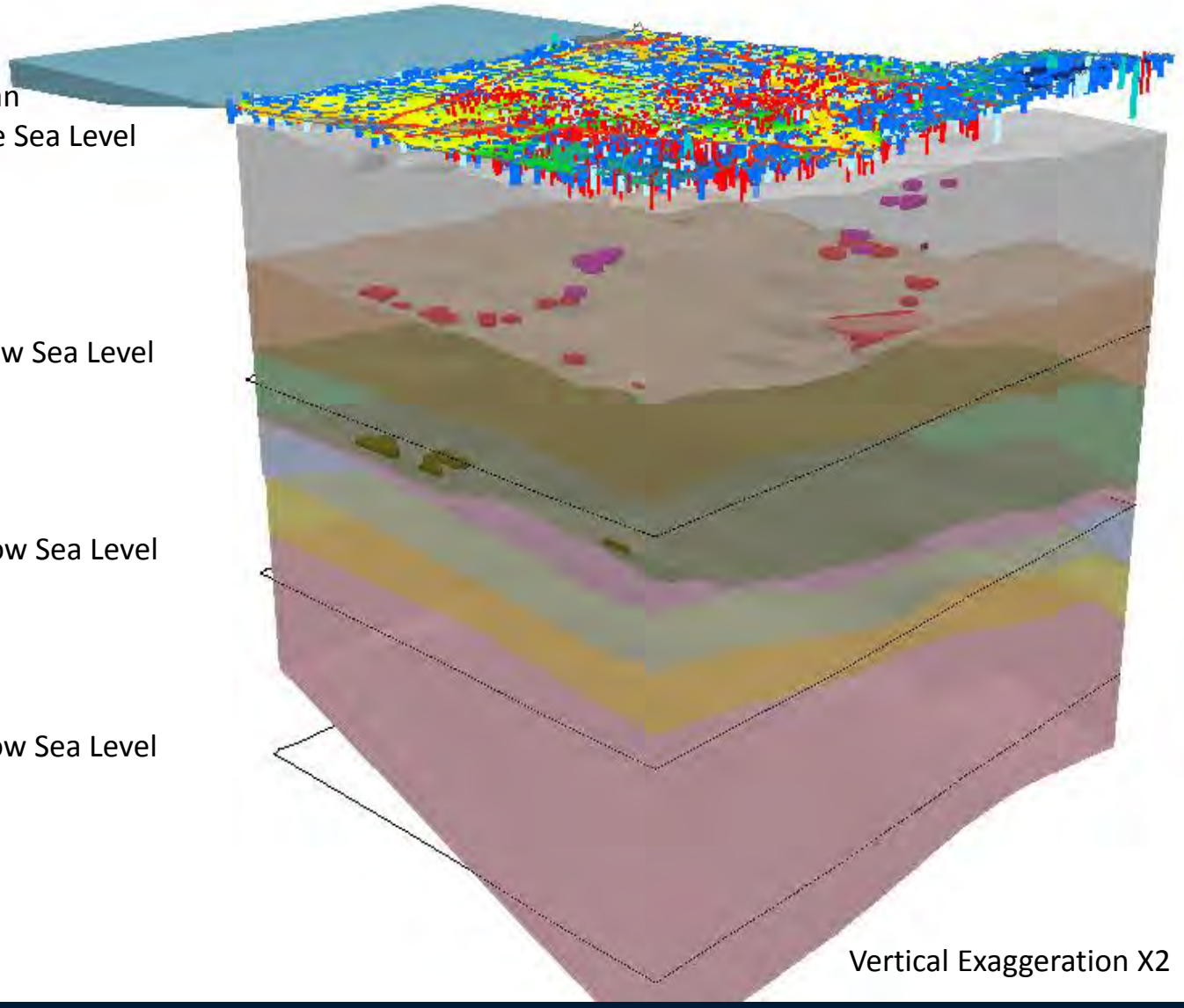
OTTAWA COUNTY



OTTAWA COUNTY



Response #15 - Adam

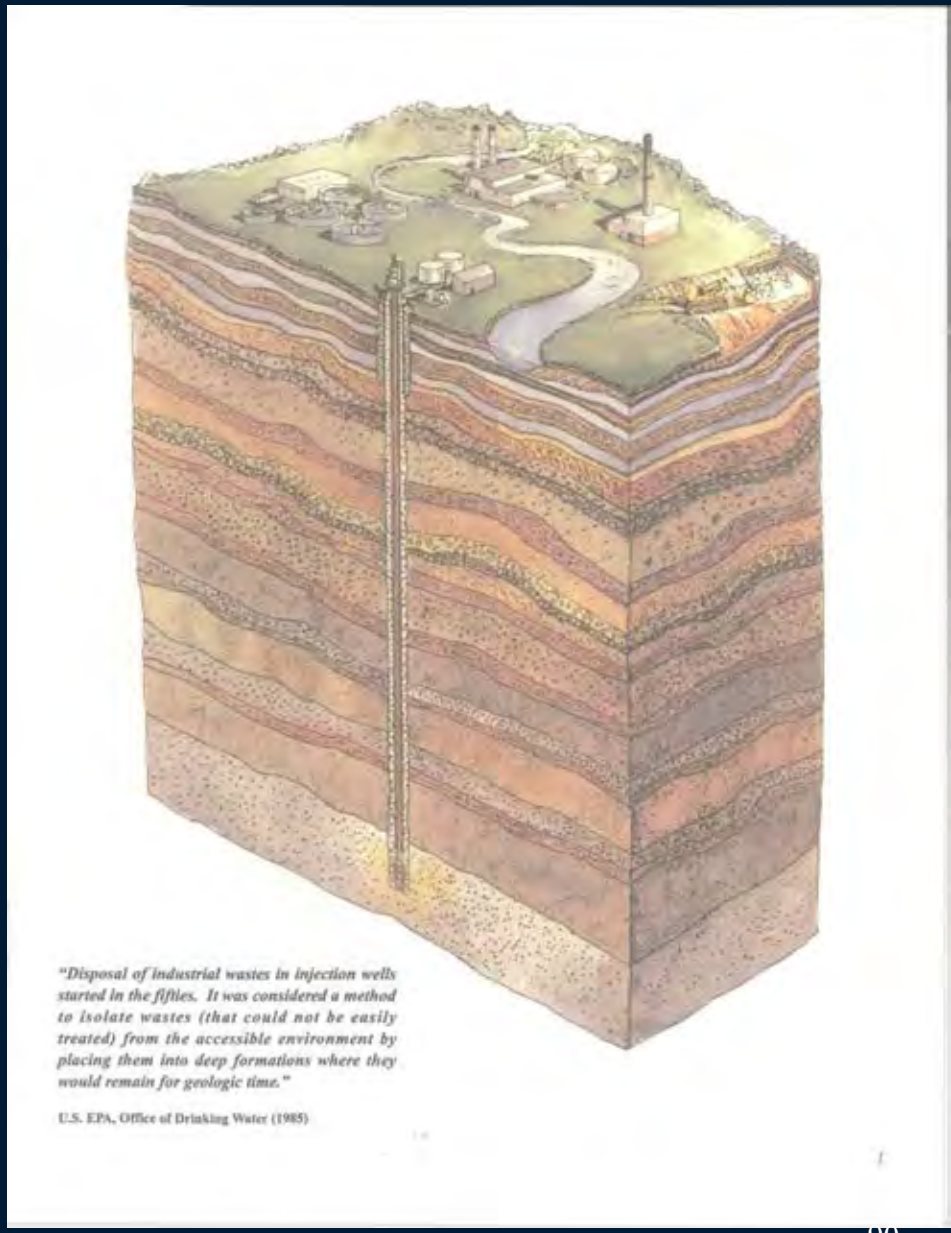


Question #16

What are the risks associated with using deep injection wells for disposal of flowback waste water?

Waste Disposal Well Disposal of Flowback Wastewater

Associated Risks?



Response #16 - Adam

Well-established in Michigan

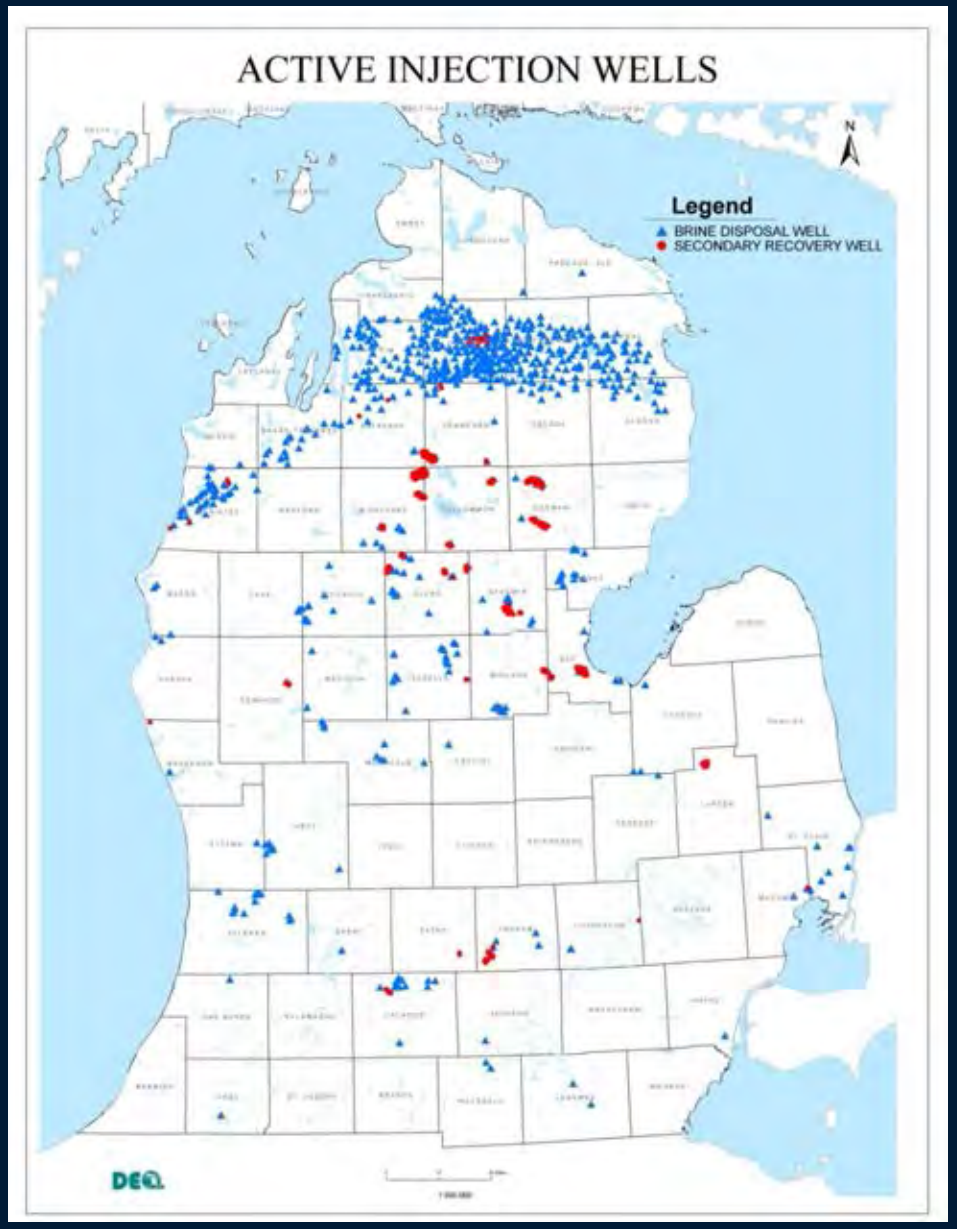
- Regulated and permitted Class II wells, EPA "Safe Drinking Water Act"
- 1,460 wells in Michigan, about half are for brine
- Disposal often near or co-located with production and can enhance production
- No open pits at injection site

Earthquakes? A.K.A: Induced seismicity…not likely and certainly not significant

- Stable, "wet" basin
- Fracturing not conducive to a good reservoir anyway
- Careful site selection

1300 Injection Wells In Michigan

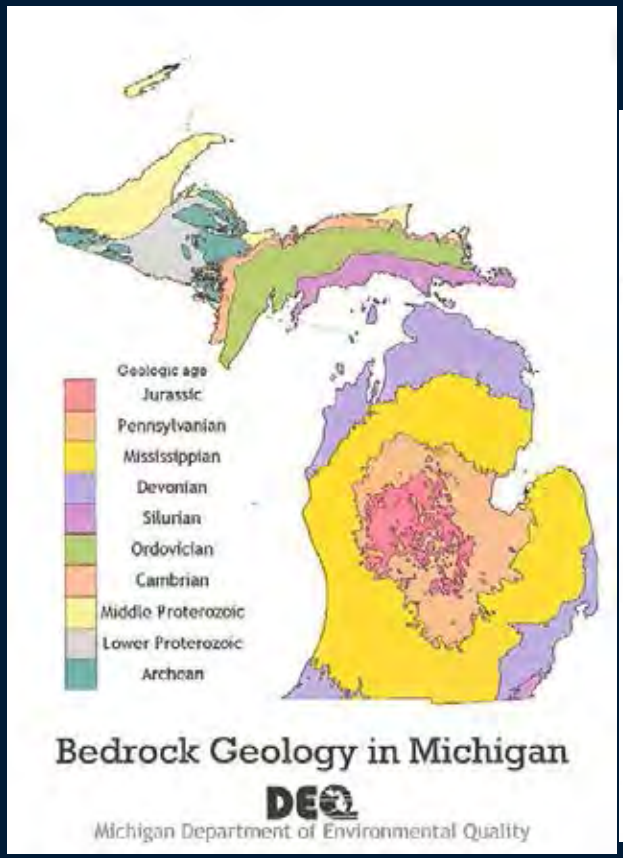
Operating Safely for Decades

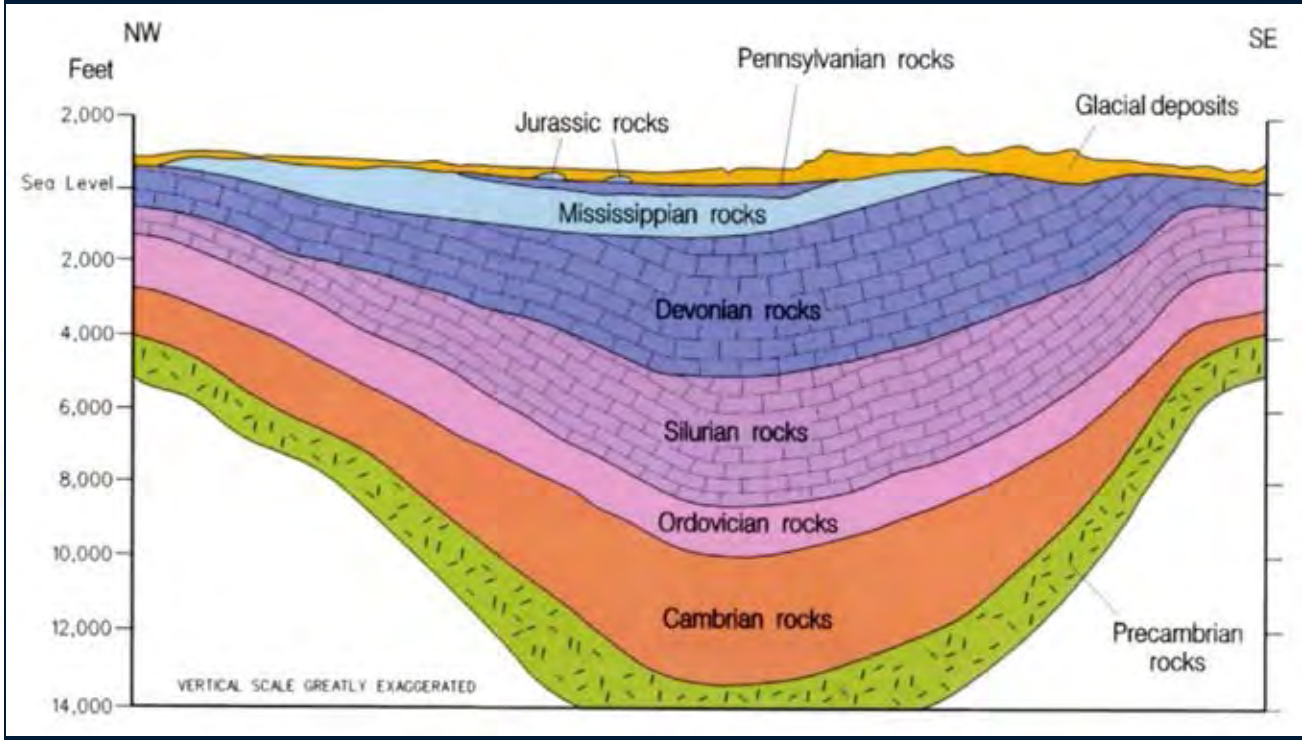


Question #17

Is there any documented proof that hydraulic fracturing has caused an earthquake?

Induced Seismicity Potential

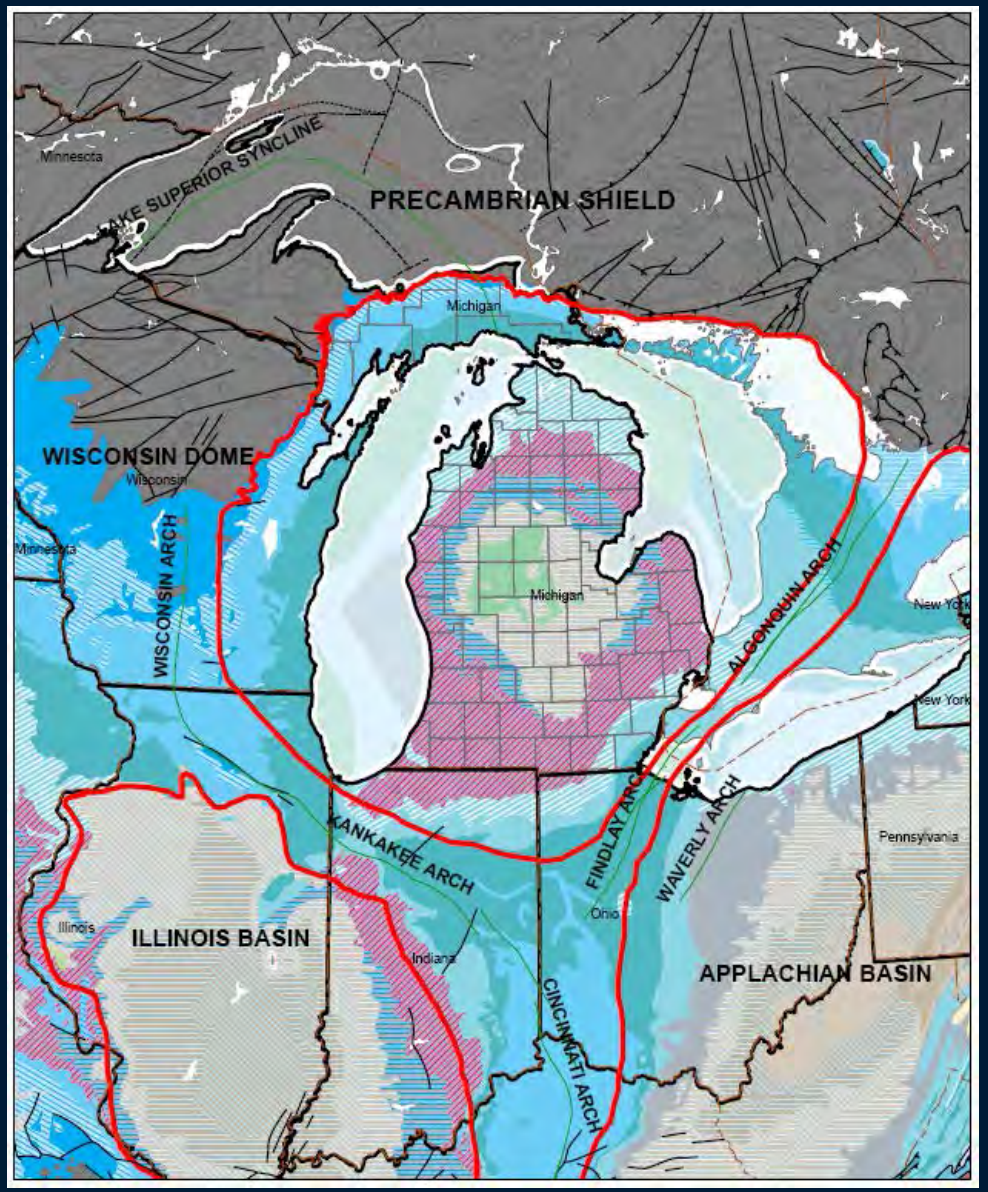


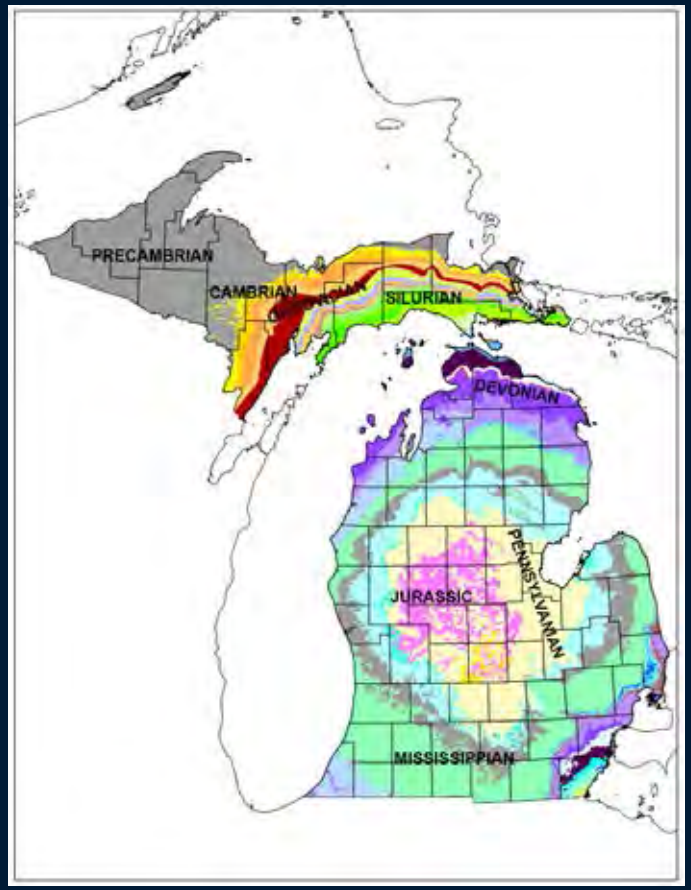


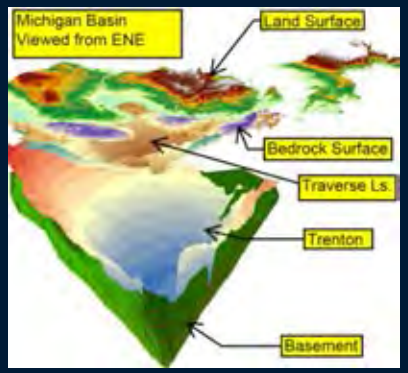
Question #18

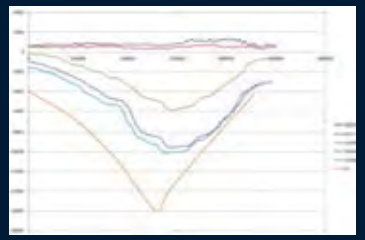
According to University of Memphis researchers, earthquakes in Arkansas have been linked to disposal of flowback water in deep injection wells. Is it possible earthquakes related to deep injection wells could occur in Michigan?

Response #18 - Adam





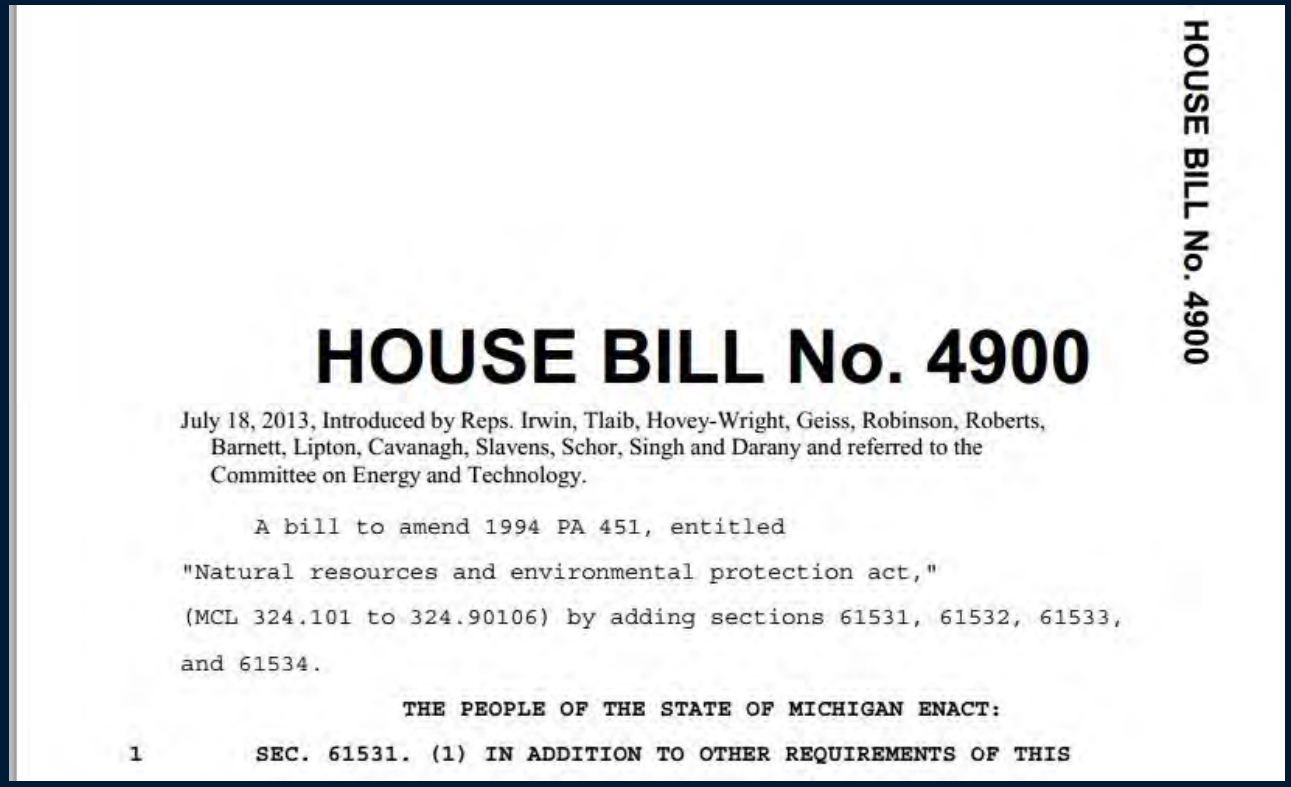




Questions:
Public Policy & Legal Cases

Question #19

What is the status of the MDEQ's proposed revisions to State oil and gas rules? What impact would these proposed revisions have if these rules are adopted? What is the status of State legislation (HB 4061, HB 4070, HB 4900, HB 4901, HB 4902, HB 4904, HB 4905) related to hydraulic fracturing? What impact would these proposed bills have if they became law?



HOUSE BILL No. 4900

HOUSE BILL No. 4900

July 18, 2013, Introduced by Reps. Irwin, Tlaib, Hovey-Wright, Geiss, Robinson, Roberts, Barnett, Lipton, Cavanagh, Slavens, Schor, Singh and Darany and referred to the Committee on Energy and Technology.

A bill to amend 1994 PA 451, entitled

"Natural resources and environmental protection act,"

(MCL 324.101 to 324.90106) by adding sections 61531, 61532, 61533, and 61534.

THE PEOPLE OF THE STATE OF MICHIGAN ENACT:

SEC. 61531. (1) IN ADDITION TO OTHER REQUIREMENTS OF THIS

DEQ Proposed Rules

Four Main Issues:

- Water withdrawals
- Baseline water sampling
- Monitoring and reporting
- Chemical additive disclosure

Water Withdrawal

- Codifies requirement for Water Withdrawal Assessment Tool
- Withdrawal not approved if adverse impact

Baseline Sampling

- Baseline water well samples within 1/4 mile

Monitoring and Reporting

- Install monitor well to check water levels
- Plan for preventing loss of water in supply wells
- Receive advance approval before each High Volume Hydraulic Fracturing
- Notify DEQ 48 hours in advance
- Measure and report pressures and volumes

Chemical Disclosure

- Disclose chemical information online at FracFocus.org
  - Chemical name and concentration
  - Chemical family and trade name for trade secret chemicals

Other Rule Issues

- Well location rules more flexible
- Terms clarified on forming of drilling tracts and designating well locations

Question #20

Are there any legal cases in which hydraulic fracturing was used as a reasonfor a lawsuit? Are there any legal cases in which hydraulic fracturing has been found in court, or through a settlement, to have caused any of the following:

a. Human health problems?
b. Water contamination?
c. Environmental contamination?
d. Damage related to earthquakes?

Question #21

21. What legal cases related to hydraulic fracturing are active in Michigan? What legal cases have occurred in the past?

Audience Questions

MISC SLIDE: Antrim Well Spacing, Family Cabin