



more *Insight.*

ShaleGasOperations

TheEvolutionofWellPermittingRequirements
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Dinsmôre



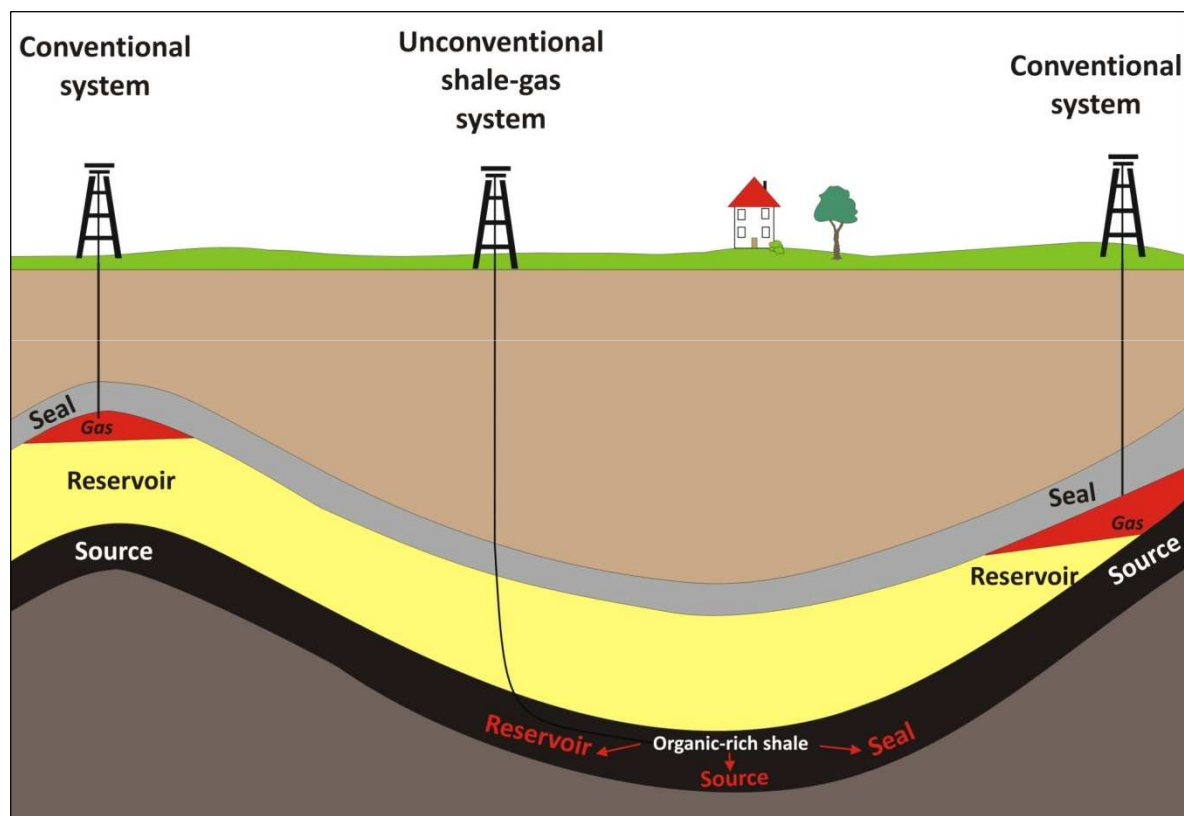
more *Insight.*

We will be covering:

- Well drilling, fracking and step to market
- For each of WV and OH:
 - Well permitting process
 - Special hydraulic fracturing concerns
 - UIC program
- Other considerations
- Litigation risks and recommendations

Drilling the Shale Resources

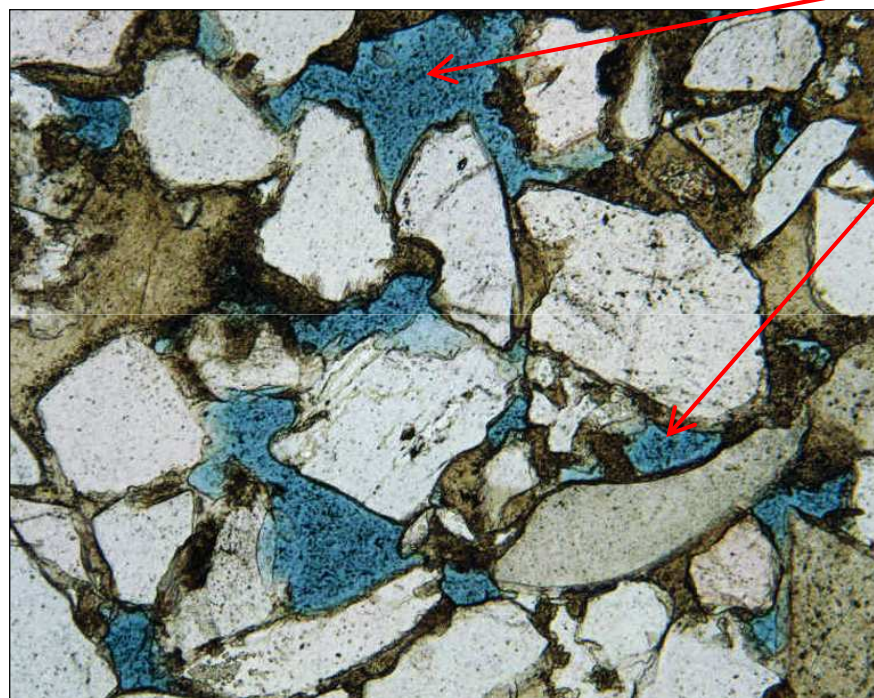
► First, what is shale?



From Kostelnick (2010), modified from Schmoker and Oscarson (1995).

Drilling the Shale Resources

▶ Shale source, up close

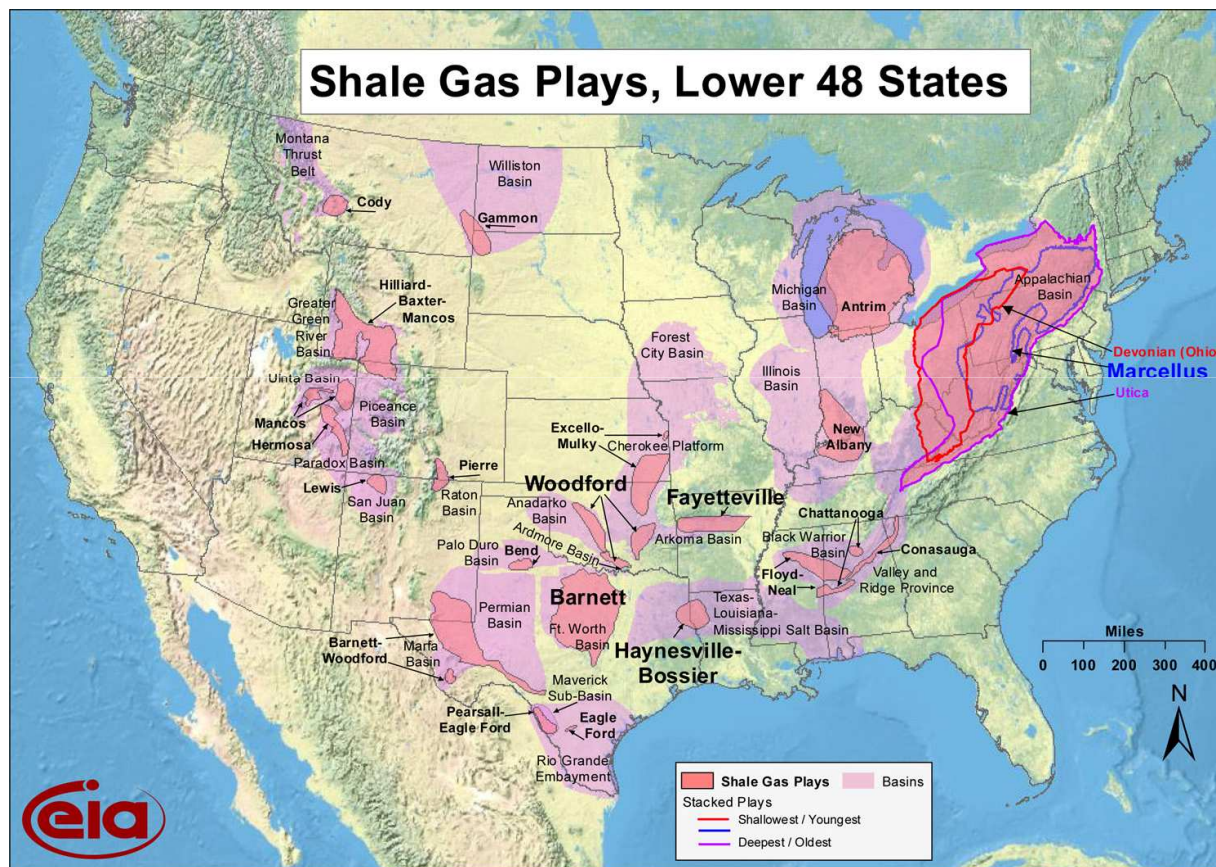


Pore spaces
colored blue

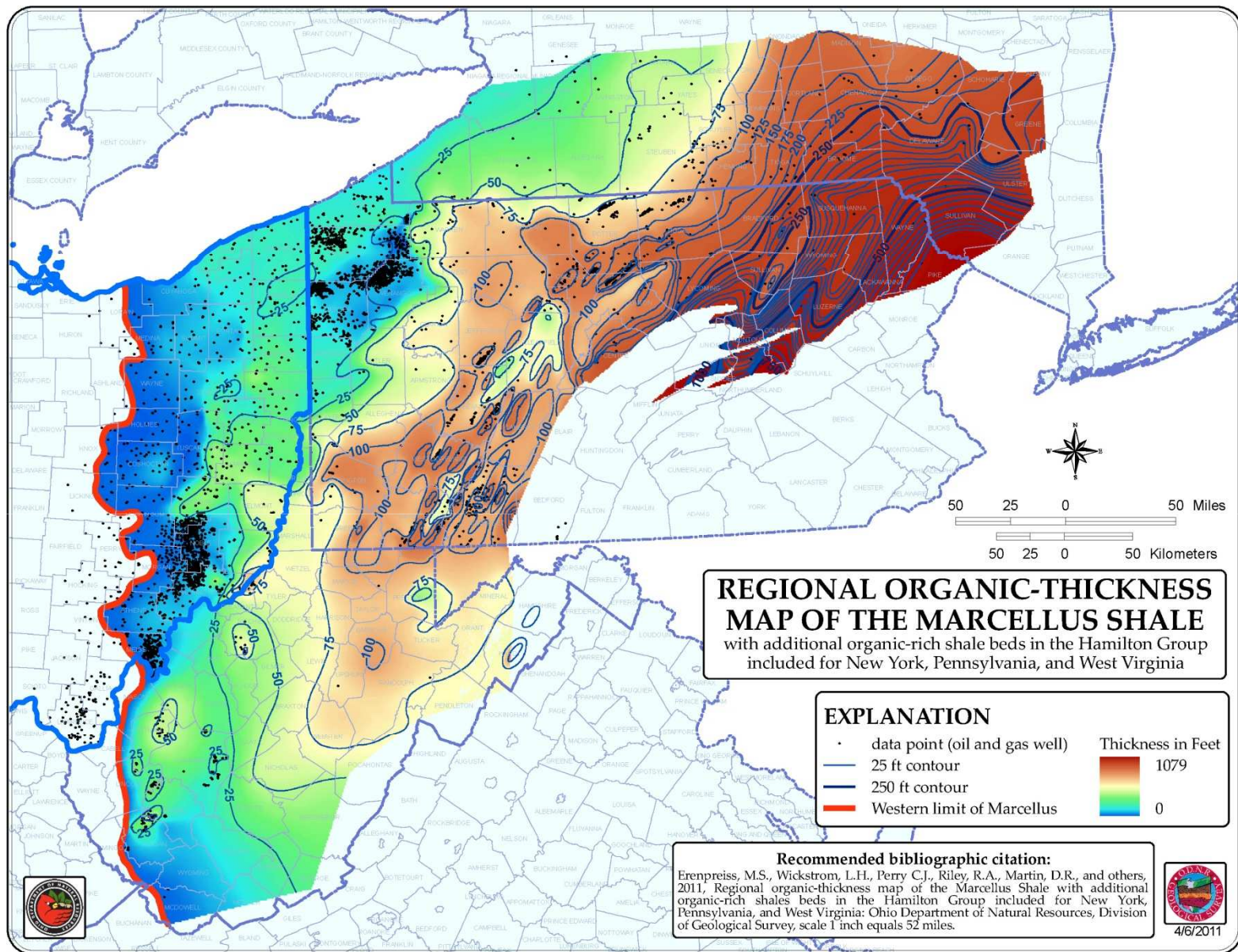
From Kostelnick (2010), modified by ODNR Geological Survey

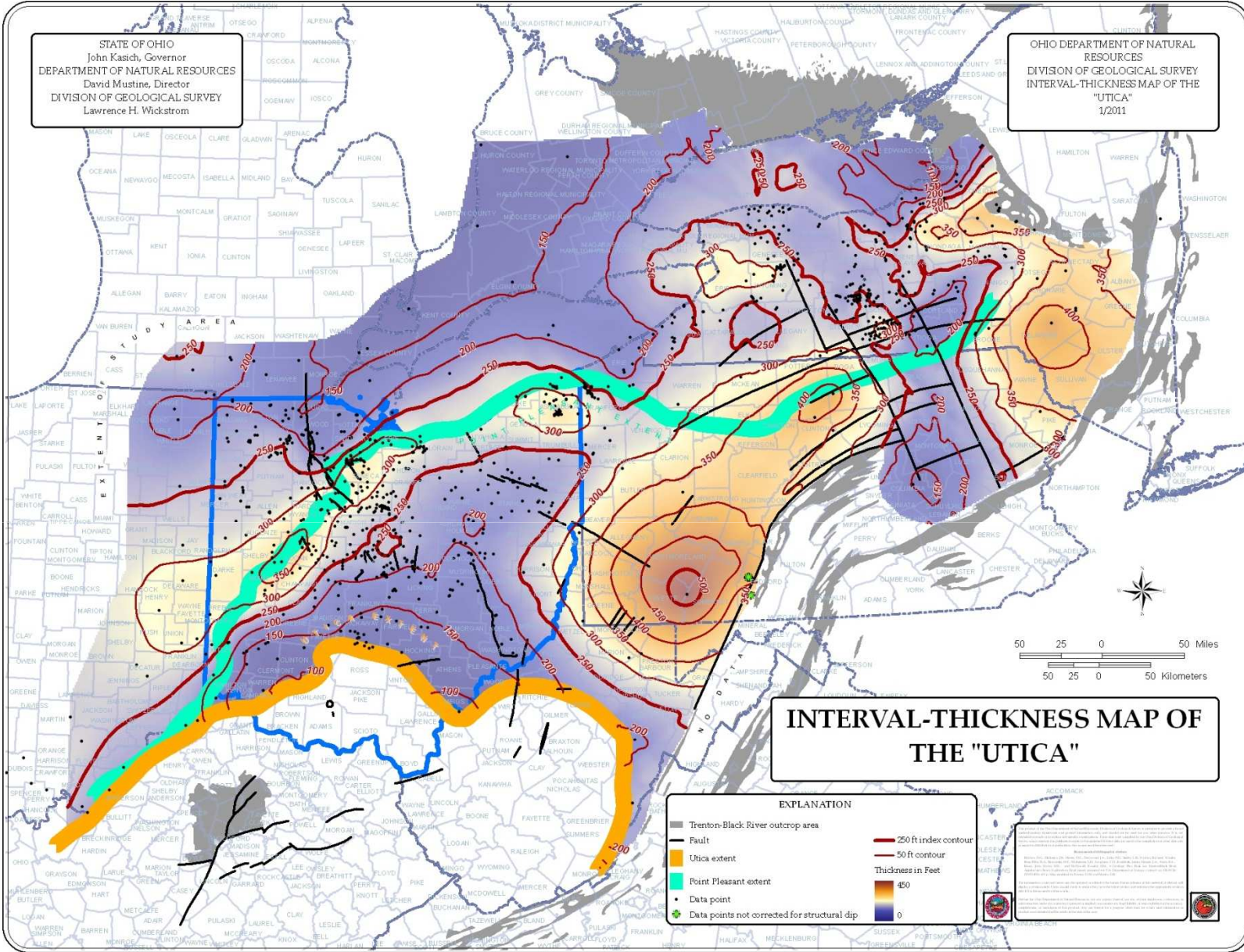
Drilling the Shale Resources

► Where is it, geographically?



From U.S. EIA (2010).

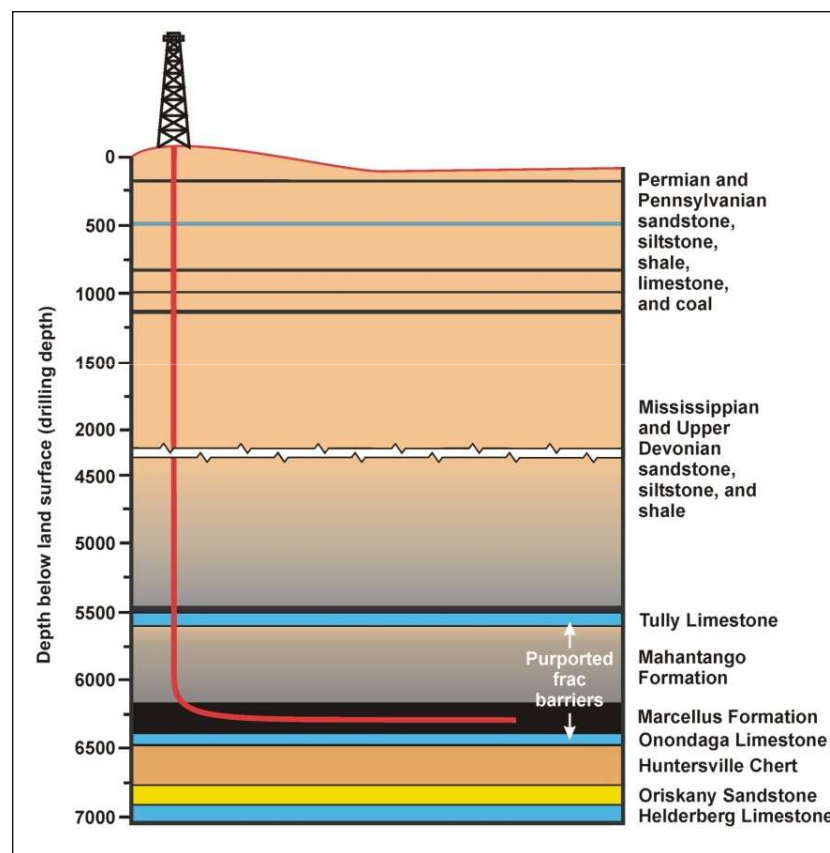




Source: www.dnr.oh.state.us

Drilling the Shale Resources

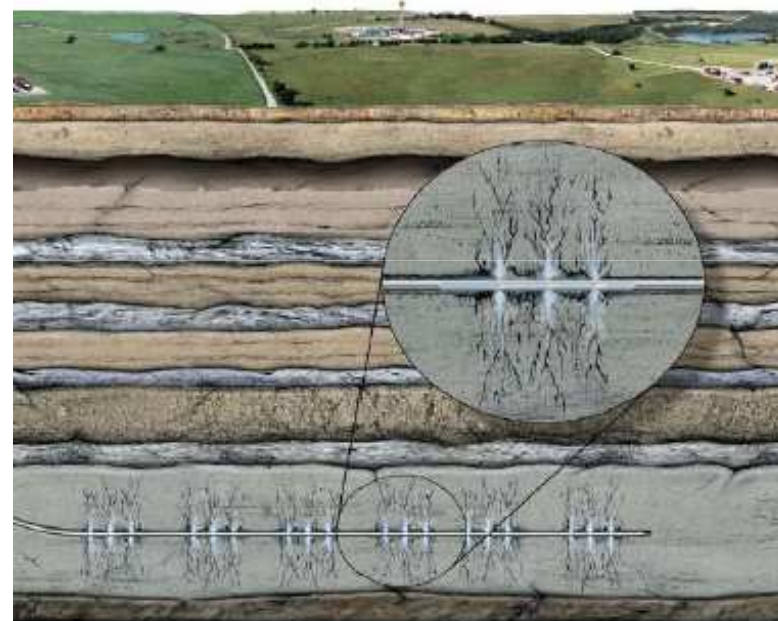
► Where is it, in terms of depth?



Graphic from Kostelnick (2010).

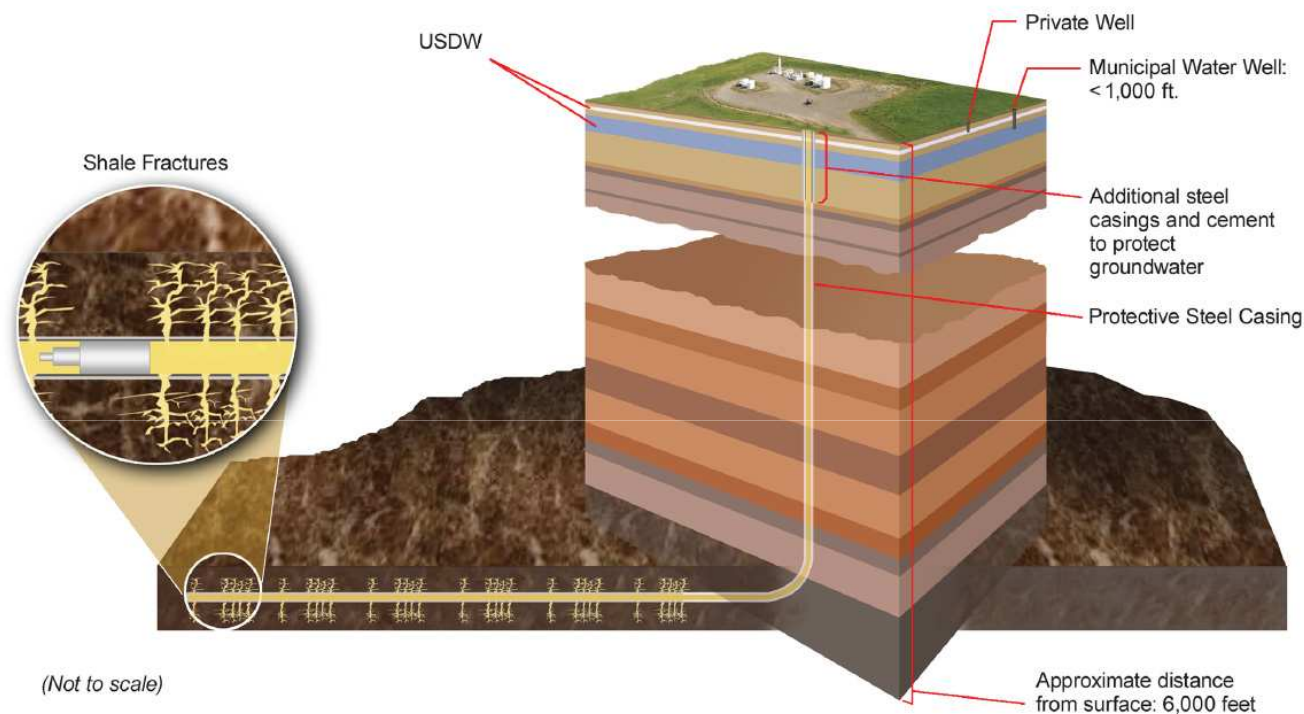
Drilling the Shale Resources

▶ Basic Process



Source:PIOGA.

Drilling the Shale Resources



Steel casing lines the well and is cemented in place to prevent any communication up the wellbore as the fracturing job is pumped or the well is produced. Shallow formations holding fresh water that may be useful for farming or public consumption are separated from the fractured shale by thousands of feet of rock.

Source: Shale Gas: Applying Technology to Solve America's Energy Challenges, "NETL, 2011 (as posted on www.fossil.energy.gov).

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Drilling the Shale Resources

- ▶ Estimating the Resources:
 - ▶ Marcellus wells drilled in West Virginia:
 - ▶ 2008: 299
 - ▶ 2009: 430
 - ▶ 2010: 58
 - ▶ 2020 (estimate): 900
 - ▶ Estimated economic impact in W. Va. (2008):
 - ▶ \$371 million – gross economic impact
 - ▶ \$189 million – value added
 - ▶ \$68 million – taxes
 - ▶ 2,200 jobs
 - ▶ Estimated cumulative value added (2020): \$2.8 billion*

*U.S. DOE, NETL, March 31, 2010

Drilling the Shale Resources

▶ Estimating the Resources, cont'd:

▶ Chris Perry, ODNR Geological Survey:

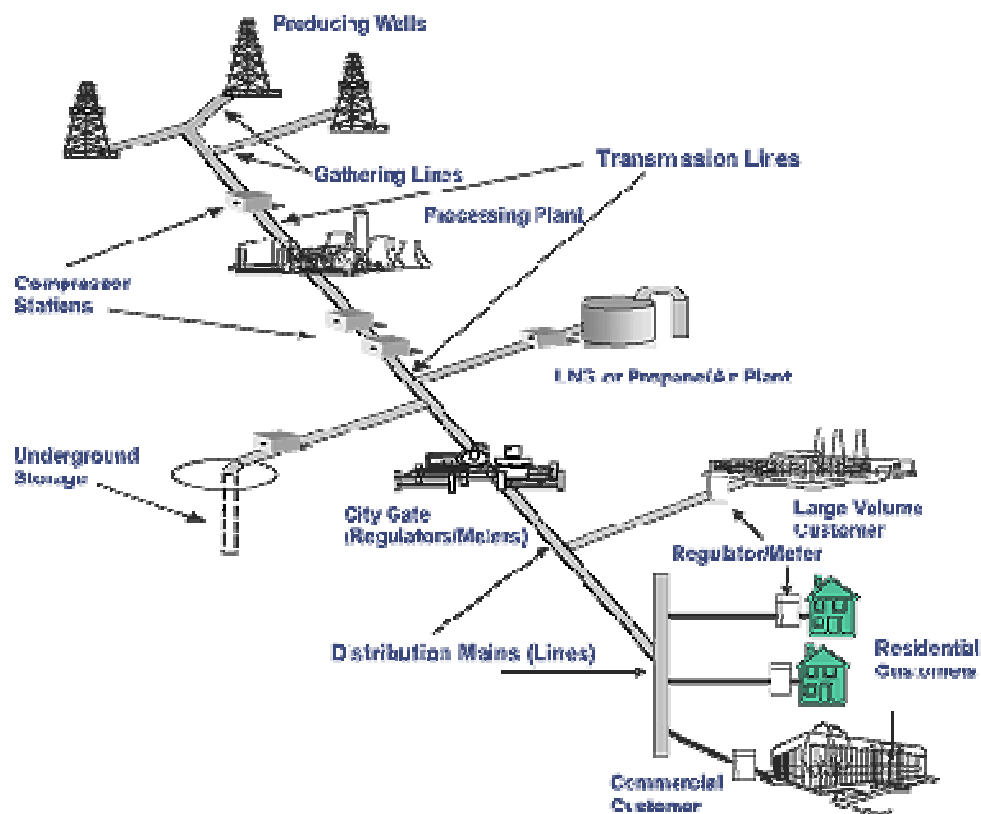
- ▶ Estimates Utica/Point Pleasant to have 3.75-15.7 Tcfn natural gas & 1.31-5.5 billion barrel soil (recoverable from the interval)

▶ Chesapeake:

- ▶ Aug. 1, 2011: Estimated it's then-acreage of 1.25 million acres in the Utica formation to be worth \$15-20 billion
- ▶ Sept. 21-22, 2011 Kasich Energy Summit: Overall shale play could be worth \$500 billion. Aubrey McClendon: "I say half a trillion."

Drilling the Shale Resources

► Steps beyond production



Source: www.epa.gov

Well Permitting – West Virginia

- ▶ First things first: Secure real estate rights
 - ▶ Right to drill into Onondaga for completion
 - ▶ Right to pool with production from adjacent areas
 - ▶ Full right to use surface for production facilities, pipelines, roads

Well Permitting– West Virginia

▶ Permitting Changes

- ▶ July 12, 2011: W. Va. Governor Tomblin's Executive Order 4-11
- ▶ August 29, 2011: WVDEPE Emergency Rule, W. Va. CSR 35-8-1, *et seq.*
 - ▶ “Rules Governing Horizontal Well Development”
 - ▶ Expires November 29, 2012
- ▶ Senate Bill 424 (2011)

Well-Permitting– West Virginia

▶ Pending Legislation:

- ▶ Revision to existing oil and gas statute (WV Code 22-6-1, *et seq.*)
 - ▶ Definition of “shallow well” and “deep well”
 - ▶ “Shallow”: Allows drilling up to 100’ into Onondaga formation for completion (no production)
 - ▶ Classification affects availability of special field rules
 - ▶ Shallow: Normally, 2000’ apart, exceptions up to 1500’
 - ▶ Deep: Spacing of 1000’ apart or less
 - ▶ Classification affects appeal entity (Shallow Gas Well Review Bd. v. Oil and Gas Conservation Comm’n) to consider objections

Well Permitting – West Virginia

- ▶ WVDEP authorization regarding fracking:
 - ▶ Authorized to issue new or amended regulations on plat to be filed before drilling, fracturing and introducing liquids for enhanced recovery

Well Permitting– West Virginia

- ▶ NEW “Natural Gas Horizontal Well Act” (22-6A-1, *et seq.*)
 - ▶ Joint Select Committee on Marcellus Shale
 - ▶ 31 Amendments adopted or pending
 - ▶ N/A to coal bed methane wells

Well Permitting – West Virginia

▶ NGHWA definitions:

▶ Horizontal well:

Any well (other than coalbed methane) drilled using a horizontal method

▶ Horizontal drilling:

- ▶ Initially vertical, but curved to become horizontal or nearly horizontal, to maximize exposure to formation

Well Permitting – West Virginia

- ▶ NGHWA's incorporation by reference:
 - ▶ Key aspects of existing law (WV Code 22, Art. 6)
 - ▶ Most notices: to surface owners, coal owners and lessees; go from 15 days to comment to 30
 - ▶ *But* new notice requirement:
 - ▶ At least 72 hours notice to surface owner before entering to conduct survey for plat

Well Permitting– West Virginia

- ▶ Substantially expanded permit application requirements
 - ▶ Separate permit for each well (may be combined in one application)
 - ▶ Application fee: \$5,000 for first well on site, \$1,000 for each additional [AMENDMENT: \$10,000/\$5,000]
 - ▶ Detailed casing program
 - ▶ Soil and erosion control plan (if 5 acres or greater– RPE) [AMENDMENT: 3 acres]
 - ▶ If 5 acres or greater: Site Construction Plan

Well Permitting– West Virginia

- ▶ Expanded permit requirements, cont'd:
 - ▶ Wellsite safety plan
 - ▶ Withdrawing 210,000 gallons or more water in one month:
 - ▶ Water Management Plan
 - ▶ Signage at water withdrawal locations
 - ▶ Impoundment capable of holding 210,000 gallons or more: Certificate of Approval (RPE)
 - ▶ Bond: \$5,000 for each horizontal well or \$50,000 blanket bond [AMENDMENT: \$50,000/\$250,000]

Well Permitting– West Virginia

- ▶ Expanded permit requirements, cont'd:
 - ▶ Reclamation:
 - ▶ Detailed requirements
 - ▶ Generally required 6 months after completion of drilling
 - ▶ Civil actions for contamination or disruption of drinking water wells; rebuttable presumption of causation if within 1000' of water well [AMENDMENT: \$2,500'/mandatory pre-drilling surveys; water replacement regime like SMCRA]
 - ▶ \$5,000 civil penalty for violation of the Act; \$100,000 for certain willful violations

Well Permitting – West Virginia

- ▶ Expanded permit requirements, cont'd:
 - ▶ Local ordinances: Pre-empted except for “zoning and land development” ordinances, including restrictions on time and places of gas activities
 - ▶ Permit-blocking: Previous violations of permits; workers comp and unemployment comp compliance [AMENDMENT: mandatory reporting of place of residence of employees, average wages, etc.]
 - ▶ Road construction standards; mandatory Road Maintenance Agreement with WVDOH

Well Permitting – West Virginia

- ▶ Expanded permit requirements, cont'd:
 - ▶ AMENDMENT: mandatory Surface Use and Compensation Agreement
 - ▶ Offer of compensation for damage to the surface
 - ▶ 15% “offer of judgment” rule
 - ▶ AMENDMENT: well location restrictions
 - ▶ Gas wells: 250’ from drinking water wells or springs
 - ▶ Pads: 625’ from occupied dwelling; 2500’ from barns
 - ▶ Wells or pads: 100’ from streams or lakes; 200’ from wetlands; 300’ from trout streams; 1000’ from public water intake
 - ▶ WV DEP Secretary: request STRONGER review within 60 days

Well Permitting– Ohio

- ▶ First things first: Secure real estate rights

- ▶ Key principle:

ODNR has “ sole and exclusive authority to regulate the permitting, location and spacing of oil and gas wells and production operations within the state ”
except “those activities regulated under federal laws.
..[and] delegated to the [OEPA] and activities regulated under 6111.02 to 6111.029 of the [ORC]..
.” (ORC 1509.02)

Well Permitting– Ohio

- ▶ Key legislative actions (ORC Chap. 1509)
 - ▶ Senate Bill 165 (effective June 30, 2010)
 - ▶ First comprehensive update to oil and gas laws in 25 years
 - ▶ Meant to address drilling in urban areas
 - ▶ Proactive as to hydraulic fracturing
 - ▶ House Bill 153 (effective September 30, 2011)
 - ▶ Budget bill
 - ▶ Expanded definition of “production operations”
 - ▶ Created new “Division of Oil and Gas Resources Management”
- ▶ *Note: Rulemaking ongoing*

Well Permitting– Ohio

- ▶ Production operations (ORC 1590.01 (AA)):
 - “Production operation” means all operations and activities and all related equipment, facilities, and other structures that maybe used in or associated with the exploration and production of oil, gas or other mineral resources that are regulated under this chapter, including operations and activities associated with site preparation, site construction, access road construction, well drilling, well completion, well stimulation, well site activities, reclamation and plugging
- ▶ Specifically includes:
 - ▶ Piping, equipment, facilities
 - ▶ Processes of extraction/recovery, lifting, stabilization, processing, storage, waste disposal...
 - ▶ Well drilling, stimulation and completion activities

Well Permitting– Ohio

- ▶ Well stimulation (ORC 1590.01 (Z))

“Well stimulation” or “stimulation of a well” means the process of enhancing well productivity, including hydraulic fracturing operations

- ▶ Owner (ORC 1509.01 (K))

“Owner” means the person who has the right to drill on a tractor drilling unit....

- ▶ Urbanized area (ORC 1509.01 (Y))

“Urbanized area” means an area where a well or production facilities of a well are located within a municipal corporation or within a township that has an unincorporated population of more than five thousand in the most recent federal decennial census prior to the issuance of the permit for the well or production facilities

Well Permitting– Ohio

▶ ORC 1509.06– Permit applications

▶ “To drill a new well, drill an existing well deeper, reopen a well, convert a well to any use other than its original purpose, or plug back a well to a different source of supply, including associated production operations”

▶ Key requirements:

- Owner info
- Royalty interest owners
- Location/geological formation
- Drilling equipment
- Survey or map
- Surety bond (1509.07)
- Liquids composition
- Access roads
- Restoration plan
- Urban area statement
- Fee

Well Permitting– Ohio

- ▶ ORC 1509.06 cont'd– Notices/timing
 - ▶ Urban areas– notice of application to parcel owners within 500 feet
 - ▶ Within 5 days, owner then to provide notice to each residence in occupied dwelling
 - ▶ Permit processing:
 - ▶ Urban areas– permit issued within 18 to 30 days
 - ▶ Non-urban areas– permit issued within 10 to 21 days
 - ▶ Permit to be denied by order if “substantial risk that the operation...will present imminent danger to public health or safety or damage to the environment”
 - ▶ Urban permit lasts for 1 year, non-urban for 2 years

Well Permitting– Ohio

- ▶ ORC 1509.021– New well spacing requirements

- ▶ Urban areas

- ▶ Generally 150 feet from occupied dwelling

- ▶ Owner can consent to 100 feet

- ▶ If parcel *not* in drilling unit and directional drilling being used–
150 feet from property line

- ▶ If parcel *mandatorily pooled*, 150 feet from property line and
200 feet from occupied dwelling

- ▶ Non-urban areas

- ▶ Generally 100 feet from occupied dwelling or public building

- ▶ 100 feet from other wells

- ▶ Generally 50 feet from water bodies, RR, roads

Well Permitting– Ohio

- ▶ Drilling unit (ORC 1509.01 (G))

“Drilling unit” means the minimum acreage on which one well may be drilled, but does not apply to a well for injecting gas into or removing gas from a gas storage reservoir.

- ▶ *But* ORC 1509.022 adds confusion...

[T]he surface location of a new well that will be drilled using directional drilling may be located on a parcel of land that is not in the drilling unit of the well.

- ▶ *But* directional drilling ≠ horizontal drilling!

Well Permitting– Ohio

- ▶ Drilling unit related to expected total well depth (OAC 1501:9-1-04)
 - ▶ If 2000-4000 ft depth:
 - ▶ 20 acres
 - ▶ 600 feet from another well producing from same formation
 - ▶ 300 feet from drilling unit line
 - ▶ If over 4000 ft depth (shale):
 - ▶ 40 acres
 - ▶ 1000 feet from another well producing from same formation
 - ▶ 500 feet from drilling unit line
 - ▶ *If doing a horizontal well bore, then would need 500 feet beyond the length of that horizontal bore*

Well Permitting– Ohio

▶ ORC 1509.27– Mandatory Pooling

- ▶ Limit of 5 applications per year

- ▶ \$5,000 fee

- ▶ Requires 3 elements:

1. Trace of land of insufficient size or shape

2. Inability to form drilling unit under agreement on just and equitable basis

3. Necessary to protect correlative rights and provide effective development, use and conservation of oil and gas

- ▶ Only acreage needed to meet minimum spacing and setback requirements must be mandatorily pooled

Well Permitting-- Ohio

- ▶ Reporting, recording-keeping requirements
 - ▶ 24-hour notice to inspector prior to “commencement of drilling, reopening, converting, well stimulation, or plugback operations” (ORC 1509.06(J); 1509.19)
 - ▶ 24-hour notice to chief upon discovery of defective well casing (ORC 1509.12)
 - ▶ Immediately repair; correct construction inadequacies; or plug & abandon
 - ▶ File detailed log report within 60 days of well completion
 - ▶ Include all wireline electric logs
 - ▶ Frac/acid information
 - ▶ Pressure, rate graphs
 - ▶ Invoices for all materials used
 - ▶ Cement tickets 60 days after completing cementing operations
 - ▶ DNR must maintain MSDS
 - ▶ 24-hour notice to inspector prior to well plugging (1509.13(C)) (application for plugging required too)

Permitting– Ohio

- ▶ Other key notices and permits:
 - ▶ Water withdrawal
 - ▶ ORC 1521.16– If withdraw > 100,000g/day from waters of the state, register within 3 months
 - ▶ ORC 1501.32– If withdrawing > 100,000g/day from Lake Erie or Ohio river drainage basins, permit required
 - ▶ ORC 1501.33– If increased consumptive use from waters of state > 2,000,000g/day avg. during 30 -day period, permit required
 - ▶ Local level water concerns (well field protection)
 - ▶ Wetland crossings, etc.
 - ▶ Air concerns– pending U.S. EPA Oil and Gas NSPS/Mac t proposal
 - ▶ Green completions
 - ▶ Advance notice of completions

Underground Injection Control, Generally (H₂O Disposal)

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- ▶ Volumes of frac water depend on well type
 - ▶ Vertical: 100,000 to 1 million gallons
 - ▶ Horizontal: 2 to 5 million gallons
- ▶ WV
 - ▶ Primacy
- ▶ Ohio
 - ▶ Injection preferred method (ORC 1509.22)
 - ▶ Primacy
 - ▶ 170 active Class II injection wells

Other Considerations

(see accompanying documents)

- ▶ EPA/Congressional study on use of diesel fuel in fracturing
- ▶ EPA– NPDES Effluent Limits Guidelines review
- ▶ U.S. Army Corps of Engineers Notice
- ▶ WVDOH Guidance
- ▶ Ongoing federal, state studies

Litigation Risks, Recommendations

- ▶ Lease issues
- ▶ Competing mineral rights
 - ▶ e.g., affected mine issue
- ▶ Water contamination
- ▶ Air issues
 - ▶ Argument that major source
- ▶ Toxic torts
- ▶ Governmental bodies
 - ▶ e.g., Morgantown, WV



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Questions?

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