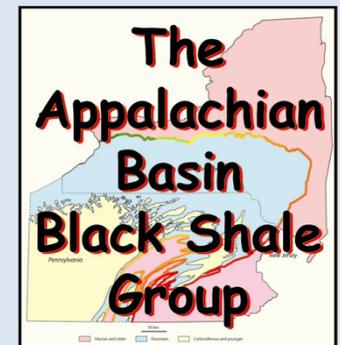


The 640+ acre drainage unit

Recommended by Terry Engelder
to
The Economic and Workforce Development
Subcommittee
(Marcellus Shale Advisory Commission)



Major Objectives of the 640+ acre drainage unit

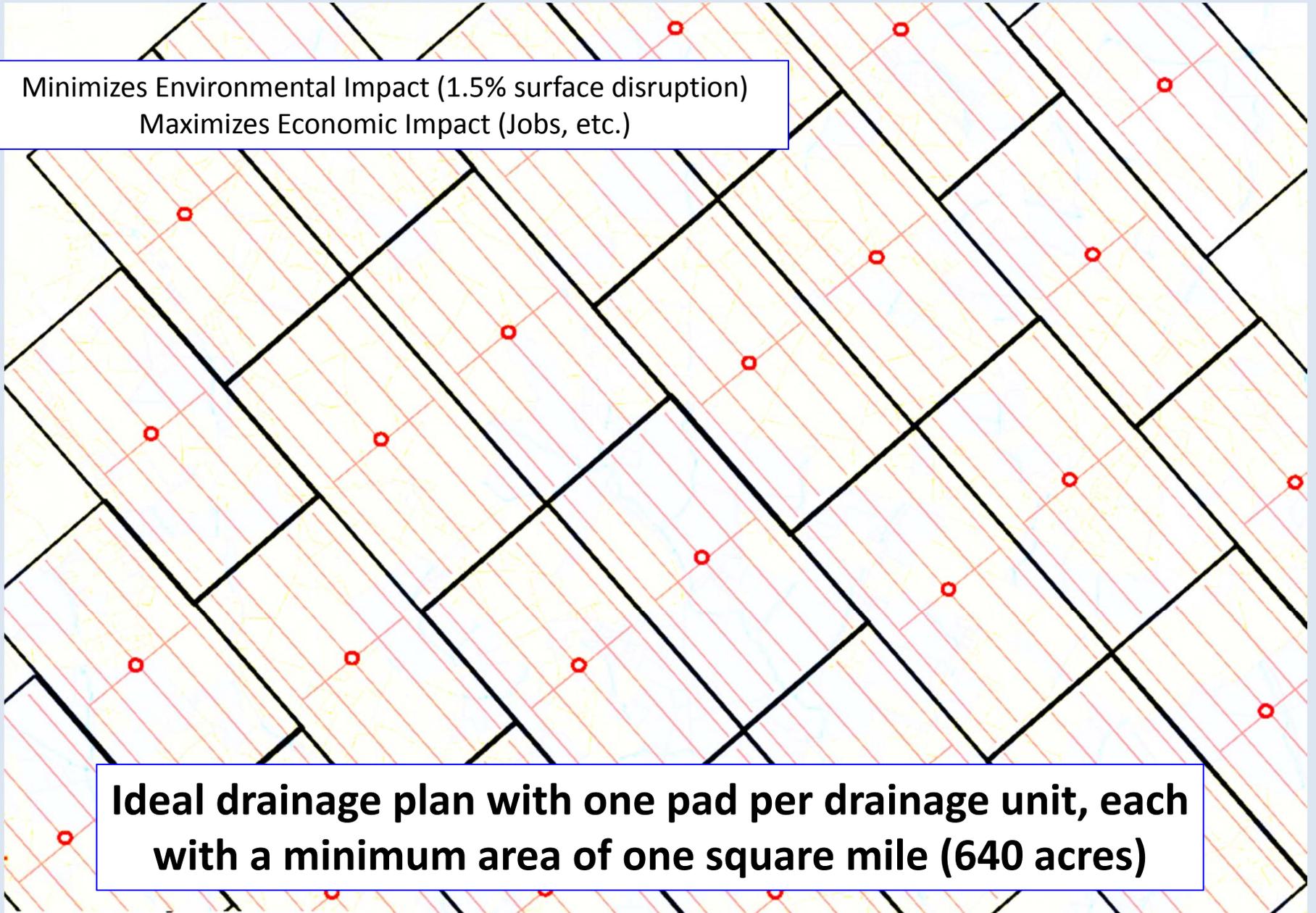
1. Maximize Economic Benefit;
2. Minimize Environmental Footprint;
3. Provide Just and Fair Compensation

All private property would contribute to the greater public good while providing each and every land owner with just and fair compensation.

Industry best practice: 8 wells per drainage unit

Minimizes Environmental Impact (1.5% surface disruption)
Maximizes Economic Impact (Jobs, etc.)

Ideal drainage plan with one pad per drainage unit, each with a minimum area of one square mile (640 acres)



Anadarko Pad E
in
State Forest Tract 285
Well 37-035-21228



DEP USE ONLY
Project # 37-035-21228
Date 10/14/2010

Denotes location of well on topo map.

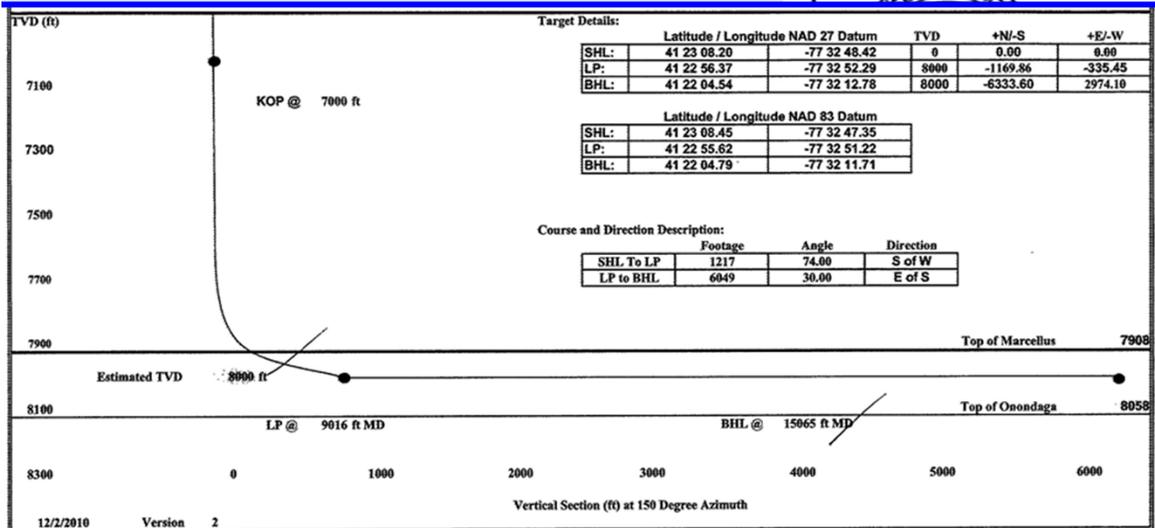
Surface Hole Location (SHL)	
True Latitude (NORTH - NAD83)	True Longitude (WEST - NAD83)
41° 23' 08.45"	77° 32' 47.35"
True Latitude (NORTH - NAD27)	True Longitude (WEST - NAD27)
41° 23' 08.20"	77° 32' 48.42"

LEGEND

- Proposed Gas Well
- Spring or Water Well (LP)
- Landing Point
- Lease Boundary
- Surface Boundary
- Well Reference
- Exist. Well Tie
- Stream Flow
- Wetlands

NOTE: THE PURPOSE OF THIS PLAT IS FOR THE LOCATION OF PROPOSED GAS WELLS AND DOES NOT REPRESENT A CLOSED BOUNDARY SURVEY. PROPERTY LINES AND OWNERS WERE OBTAINED FROM VARIOUS FIELD EVIDENCE, TAX RECORDS, AND AERIAL MAPPING.

Bottom Hole Location (BHL)	
True Latitude (NORTH - NAD83)	True Longitude (WEST - NAD83)
41° 22' 04.79"	77° 32' 11.71"
True Latitude (NORTH - NAD27)	True Longitude (WEST - NAD27)
41° 22' 04.54"	77° 32' 12.78"



BEARING	DIST.
S 12° 29' W	3470'
S 02° 57' E	1115'
S 30° 00' E	6049'

PARCEL #	OWNER
A	28-002-111 SANDERSON
B	28-002-114 LIBERTY SPORTS LODGE
C	28-002-153 MCCANE
D	28-262-114 BUBER
E	28-242-120 COOPER
F	28-242-121 SCHENK

GRAPHIC SCALE: 0 2000 4000

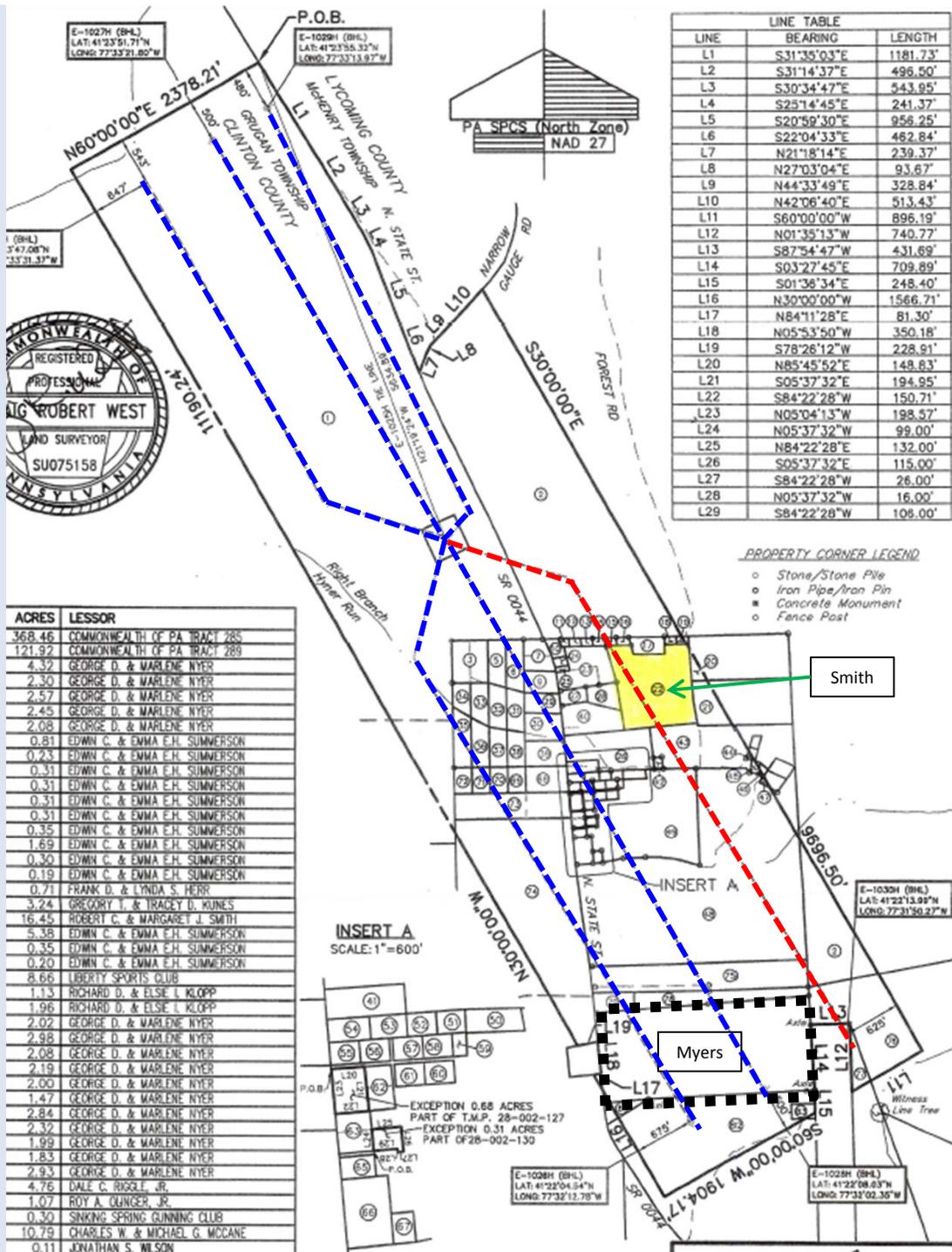
© COPYRIGHT 2010 - VASSALLO ENGINEERING & SURVEYING, INC.

Drawn #	10-537_COP TRACT 285	Date	10/14/2010	Scale	1" = 2000'	Tract Acreage	3,634 ±
Drawn #	701322-6266	Method	GPS-Code Based	Accuracy	±1 ft.	Datum	NGVD88
Survey Date	02/16/2010	Survey Date	02/16/2010	Survey Date	02/16/2010	Survey Date	02/16/2010

DEP ID#	251430	Well/Farm Name	C.O.P. Tract 285	Well #	E-1026H	Serial #	
County (Code)	Clinton (18)	Municipality	Grugan Township (14)	Well Type	Gas		
USGS 7 1/2 Quadrangle Map Name	Slate Run, PA	Map Section	8	Surface Elevation	1811 ft		
Angle & Course of Deviation (On/ing)	See Attached Directional Drilling Plan	Anticipated Total Depth (ft.)	8,000	Anticipated Total Depth (ft.)	15,065		
Owner, Lessee, or Operator of Workable Coal Seam	RECEIVED	Name of Coal Seam		Owned, Leased, or Operated			

OCT 25 2010

ENVIRONMENTAL PROTECTION
NORTHWEST REGIONAL OFFICE



Anadarko Pad E
in
State Forest Tract 285
899.55 Acre Unit

- Anadarko obtains 82 leases
- The Smiths holdout 22 acres (2.4% of unit)

- One holdout means that 1 well in 6 is not drilled! (16.7% of unit)
- One holdout potentially costs the State's economy 5 Bcf of gas or more
- Or
- \$20,000,000 @ \$4/Mcf

- Smith holdout costs Myers family over \$200,000 in revenue

Background:

- Of the various legislative initiatives that have been discussed, **the 640 acre drainage unit** has been the most controversial. Landowners who oppose natural gas development have been outraged by a proposal that would allow their property to be included in a natural gas production unit without their consent, even though there would be no surface impact on the land and they would be entitled to receive royalties. Although there was no legislation officially introduced, just the mention of forced pooling ignited a vociferous debate.

Dale A. Tice on February 08, 2011

<http://www.marcellusshalelawmonitor.com/legislation-and-regulation/>

OIL AND GAS CONSERVATION LAW

Act 1961-359

- What did legislators have in mind when framing the Conservation Law?
- to foster, encourage, and promote the development, production, and utilization of the natural oil and gas.... in such manner as will encourage discovery, exploration, and development **without waste!**
- to provide for the drilling, equipping, locating, spacing and operating of oil and gas wells so as to protect correlative rights and **prevent waste** of oil or gas or loss in the ultimate recovery thereof

OIL AND GAS CONSERVATION LAW

Act 1961-359

- What did legislators have in mind when framing the Conservation Law?
- to regulate such operations so as to protect fully the rights of royalty owners and producers of oil and gas to the end that the people of the Commonwealth shall realize and enjoy the maximum benefit of these natural resources

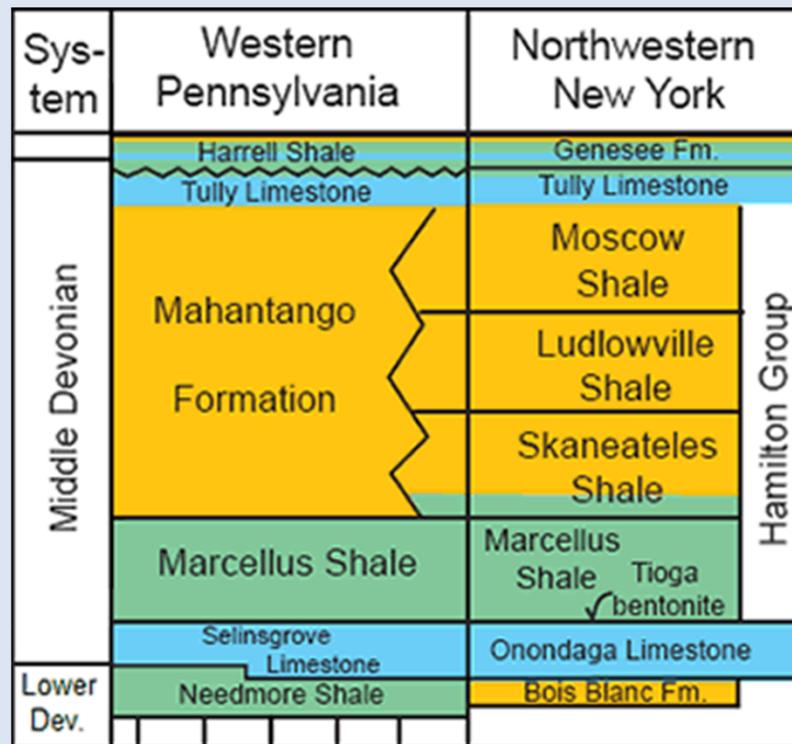
Conservation versus deep well

- A “conservation” well is defined as any well penetrating the top of the Onondaga Limestone (or equivalent formation when the Onondaga is absent) and is at least 3,800 feet deep. This term is defined by the Oil and Gas Conservation Law (Act 1961-359).
- The Pennsylvania Geological Survey considers a “deep” well to be any well that penetrates the Middle Devonian Tully Limestone.

Marcellus wells

- As the Onondaga Limestone is below the Marcellus gas shale, Marcellus horizontal wells are NOT conservation wells.

Reports of high initial production (IP) as well



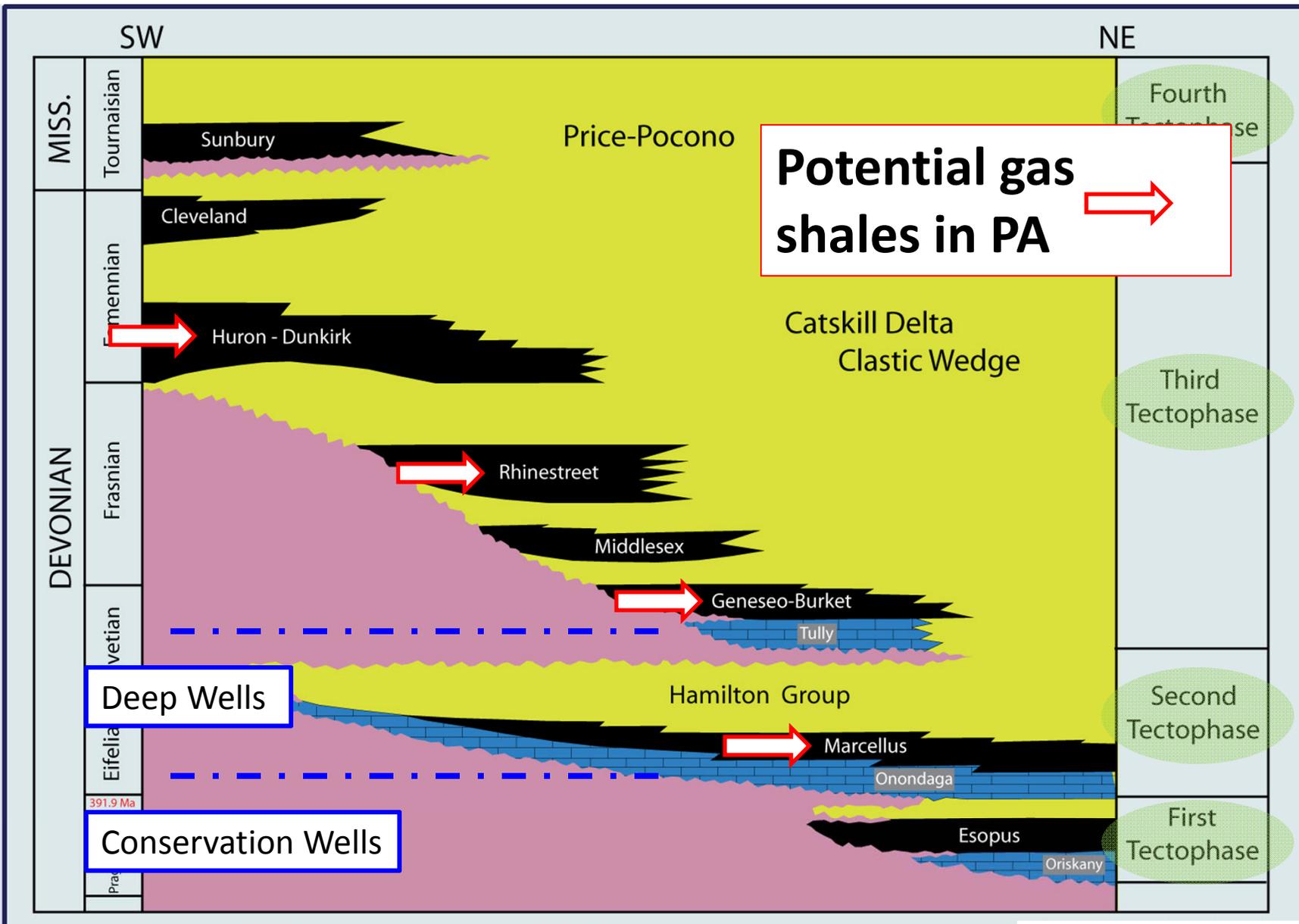
Deep Wells



Conservation Wells

The Law

- Oil & Gas Conservation Law: Act 1961-359
 - Simple stated, horizontal wells in the Marcellus can be placed within the nearest foot of a boundary of an unleased property
- **House Bill 2453** - allows Marcellus Shale to be included in “oil and gas conservation law “ Act-359
 - Benefit : No well to be drilled within 330 feet of land not leased.
 - However, Act-359 sanctions 640 acre drainage units.
 - Everyone participates and should be given just and fair compensation.



House Bill 2453 sets a precedent for stipulating that all gas shales in PA will be drained by Conservation Wells! Is this a good idea??

People who don't lease

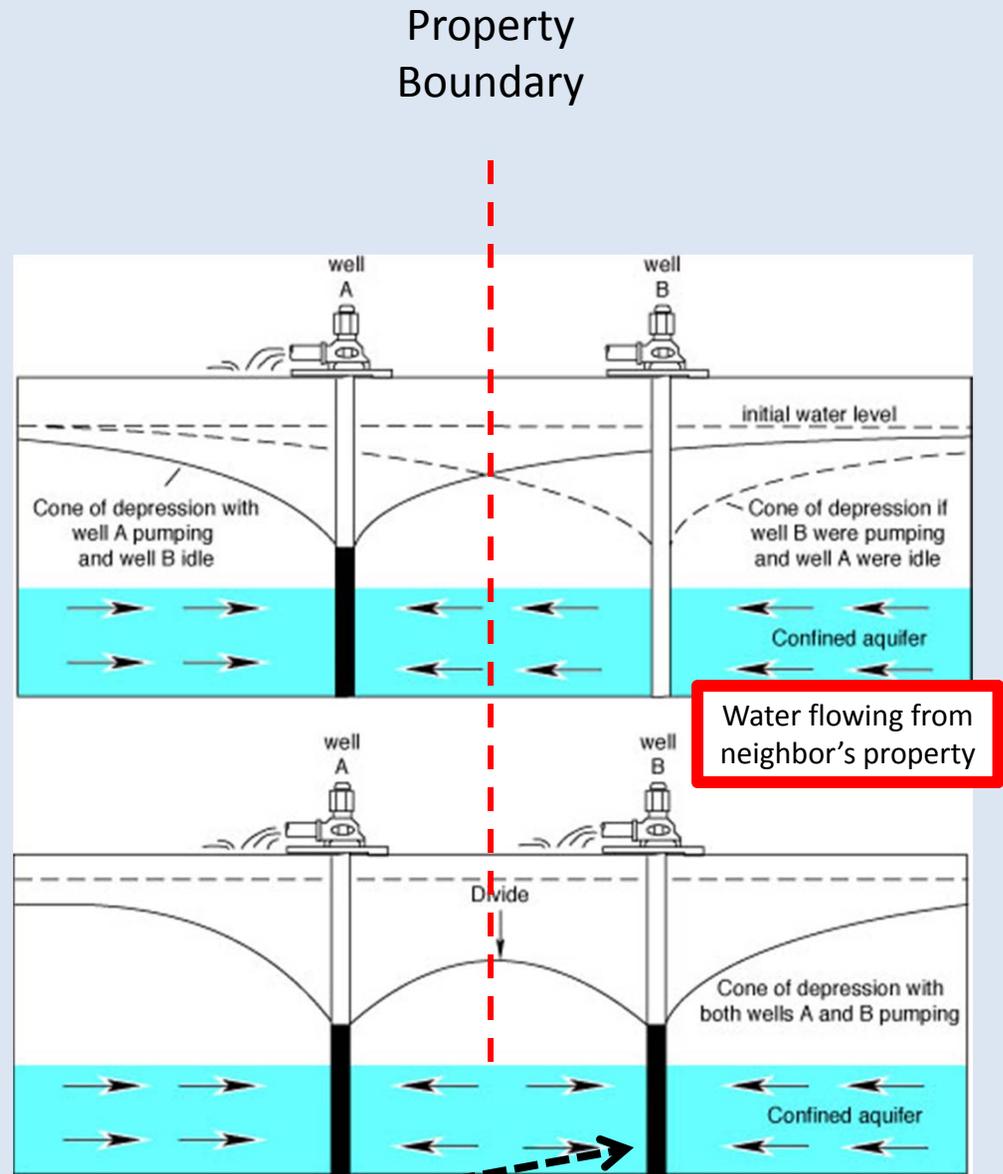
- **Rule of Capture**: Your oil or gas could be produced or captured from a well outside your property tract boundaries.
- In fact, your only protection is if your oil or gas property is subject to the Oil and Gas Conservation Law, 58 P.S. 401.1 et seq.
 - But this law does not apply to any of the economic Devonian Gas shales in the State of PA unless HB 2453 passes and then your property is brought into a drainage unit.

Drainage from under non-consenting properties is a lawful practice

- Coastal Oil & Gas v. Garza Energy Trust
 - Simple stated, the Rule of Capture allows drainage of unleased land without any benefit to the owner of the mineral rights
 - Hydraulic fractures that cross under property boundaries are not subject to the laws of subsurface trespass

Rule of Capture

- **Conventional Vertical Oil Wells**: Production decreases formation pressure around well, thus causing flow toward the well.
 - Seen as a cone of depression in water wells.
- Unless incorporated in a production unit, only protection against loss is drilling



Coastal Oil & Gas v. Garza Energy Trust

- The primary issue in this appeal is whether subsurface hydraulic fracturing of a natural gas well that extends into another's property is a trespass for which the value of gas drained as a result may be recovered as damages.

Coastal Oil & Gas v. Garza Energy Trust

- On August 29, 2008 the Texas Supreme Court reversed the court of appeals, holding that fracing across property lines does not constitute actionable trespass because any resulting drainage is protected by the rule of capture.

Premises leading to the ruling in Coastal v. Garza

- *Hydraulic fracturing is essential to America's energy security* (and PA's economic growth)
- The lateral growth of hydraulic fractures can not be predicted during engineering well design
- The lateral growth of hydraulic fractures can not be controlled during well stimulation
- Drainage after well stimulation and not be restricted within certain defined boundaries

Hydraulic Fracturing

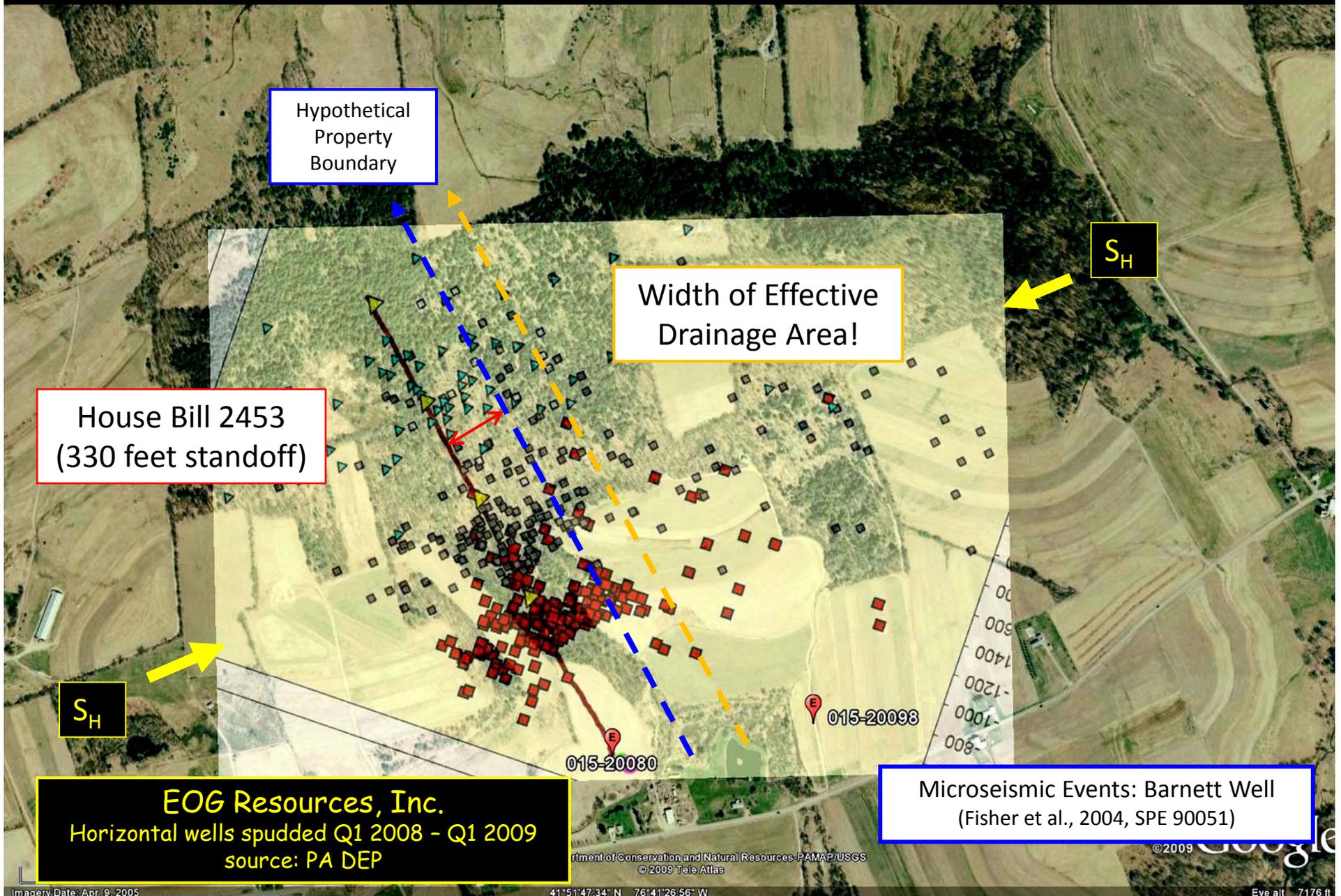
Fractures opened by hydraulic pressure generally drain a swath of a production unit about 300-500 feet either side of a well

- This is a common drainage distance even under unleased land

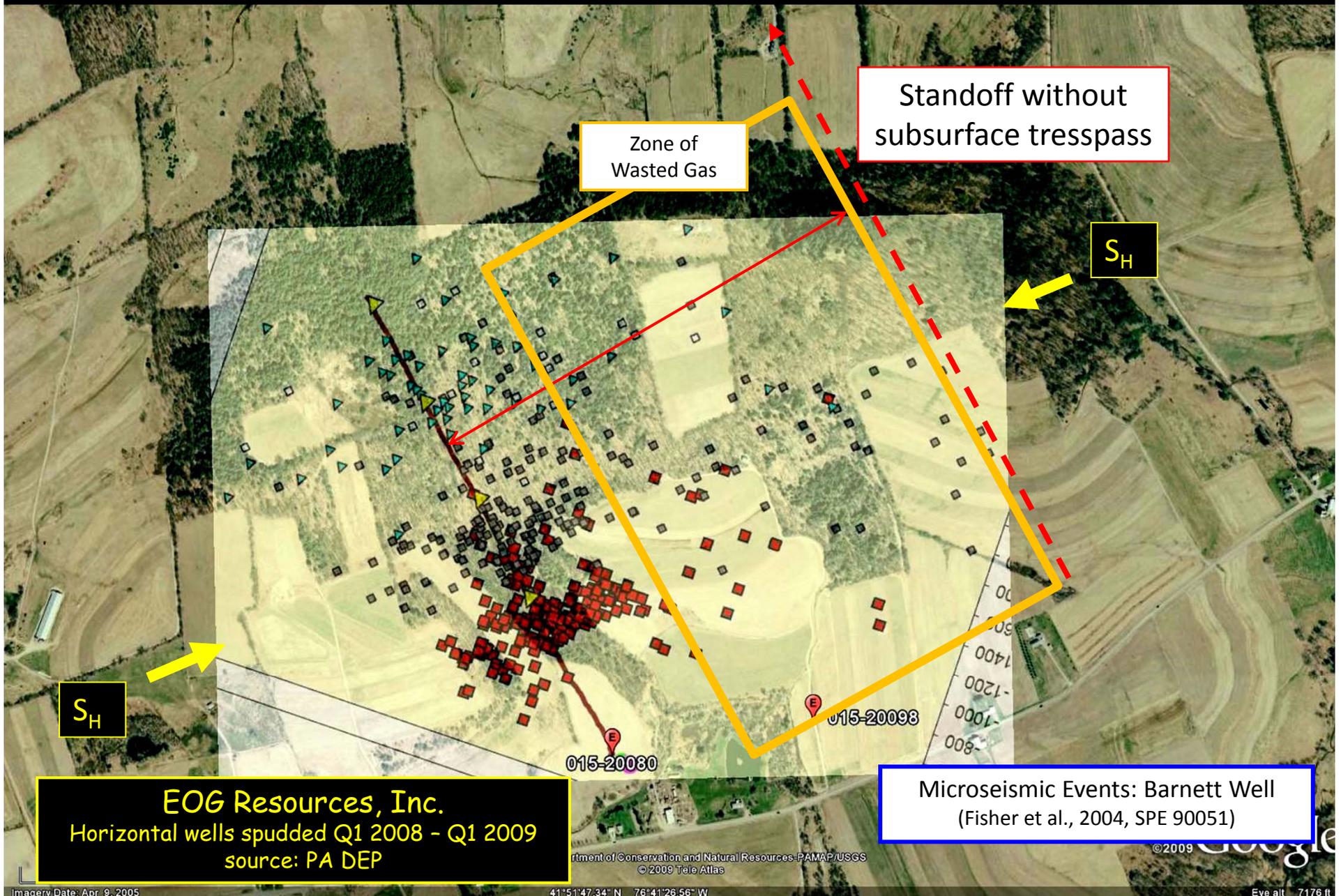
Rock splitting by hydraulic pressure is known to travel as much as 2000 feet from a horizontal well

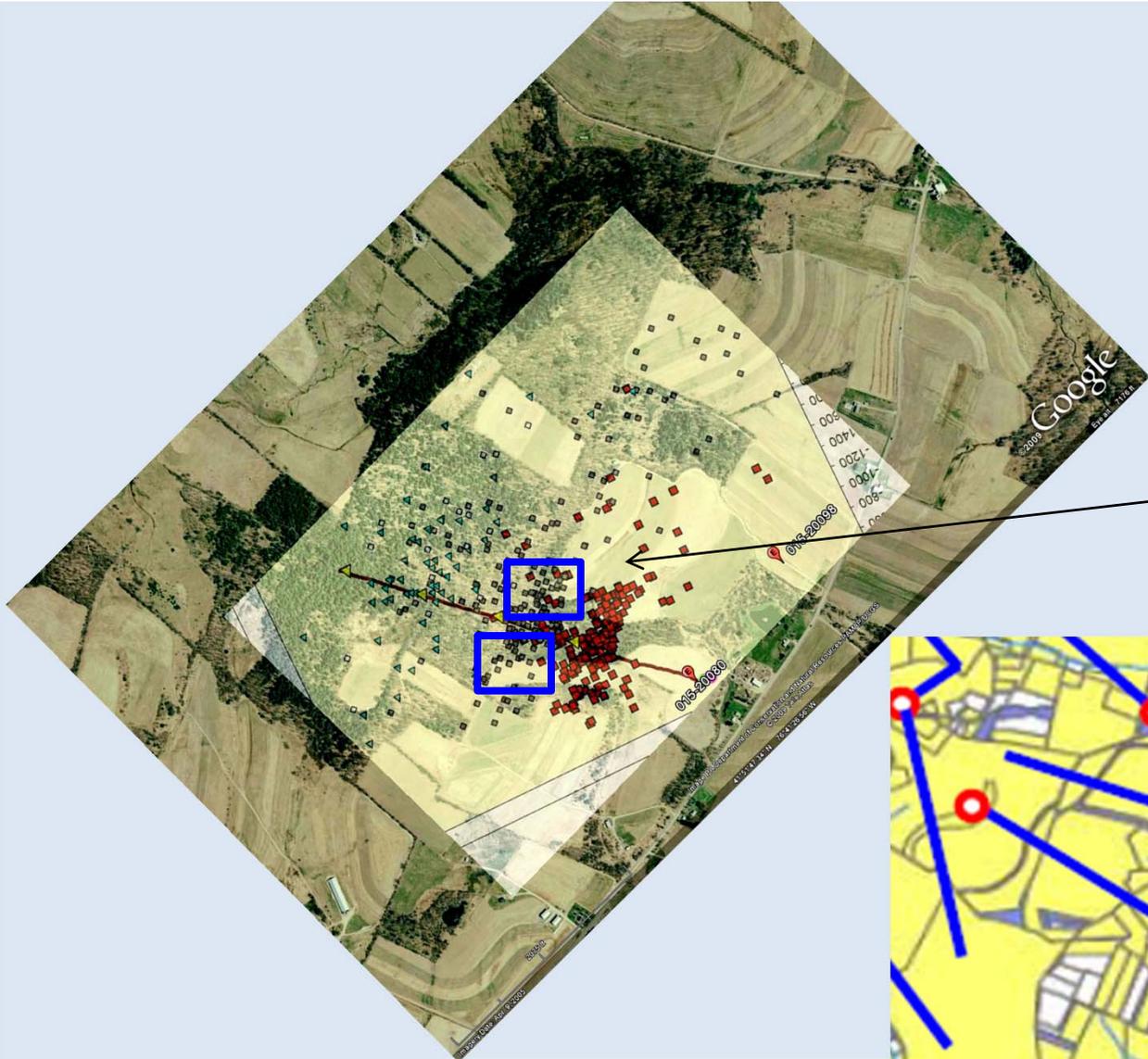
- Some gas may come from distances up to 2000 feet although the volumes from this distance are very low.

Hydraulic Fracturing Crosses Property Boundary



Hypothetical case: Subsurface trespass outlawed!





By rule of capture these property are drained without benefit to the land owner.



Lease Position
Yellow – Company A
Blue – Company B
White – Unleased

Coastal Oil & Gas v. Garza Energy Trust

- Drainage of gas by 'Rule of Capture' is:
- NOT an issue associated with the individual citizen's property rights.
- NOT akin to authority usurping individual property by right of eminent domain.

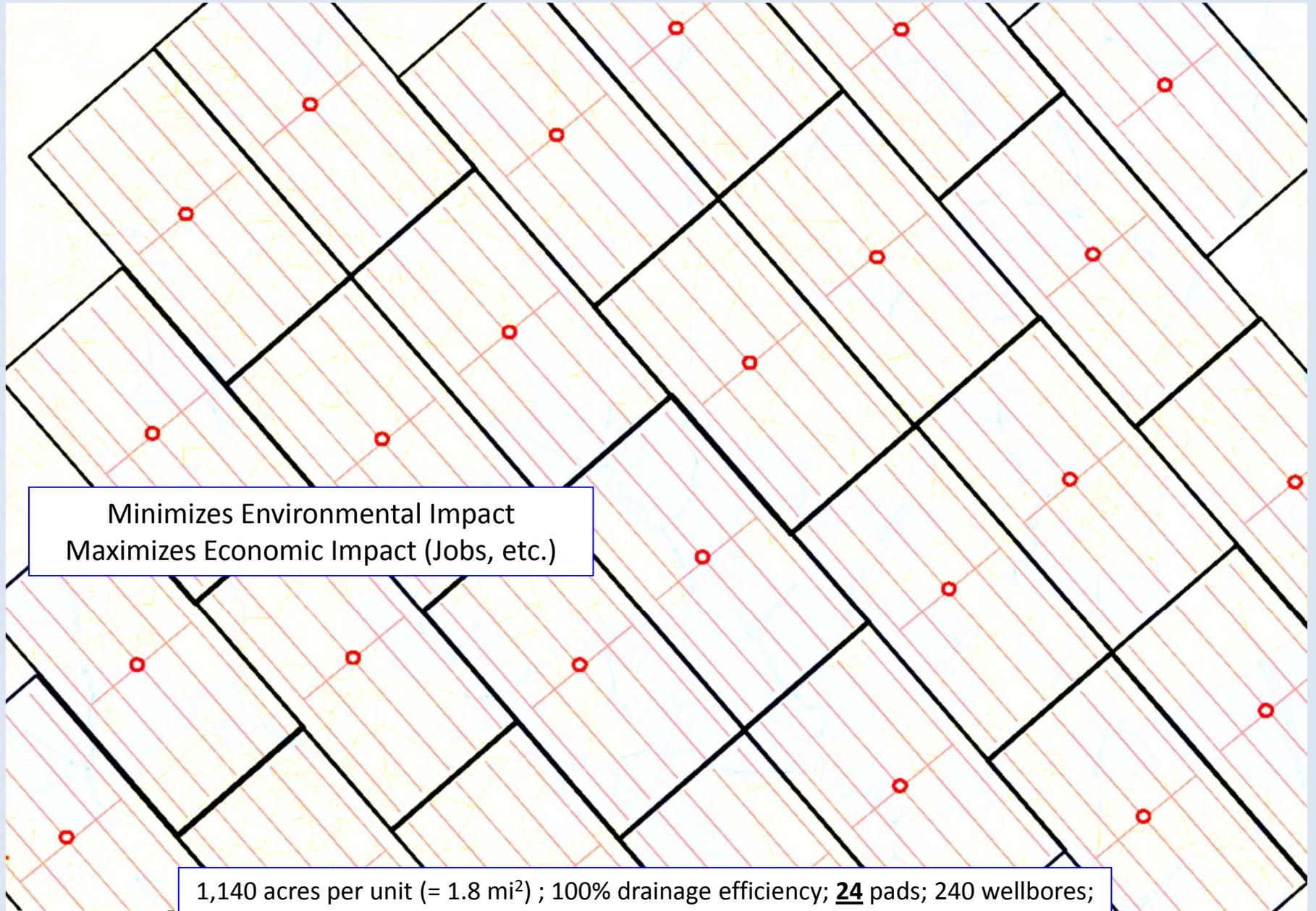
The Pennsylvania Oil and Gas Conservation Law: A Summary of the Statutory Provisions 58 P.S. §§ 401-419

- Section 6: Drilling Permits (58 P.S. § 406)
- For those wells drilling into, or deeper than, the Onondaga horizon,and..... if a spacing or pooling order is not in place, the well must be located a minimum of 330 feet from the nearest outside boundary line of the leased property.

The Pennsylvania Oil and Gas Conservation Law

- Deeper than 3800 feet and penetrating the Onondaga Limestone, the well would be subject to the Oil and Gas Conservation Law (58 P.S. § 401.1 et seq.,) which means minerals would likely be included in a voluntary unit or pool, or be included in a unitization or pooling order applied for by a producer in the adjacent tract.

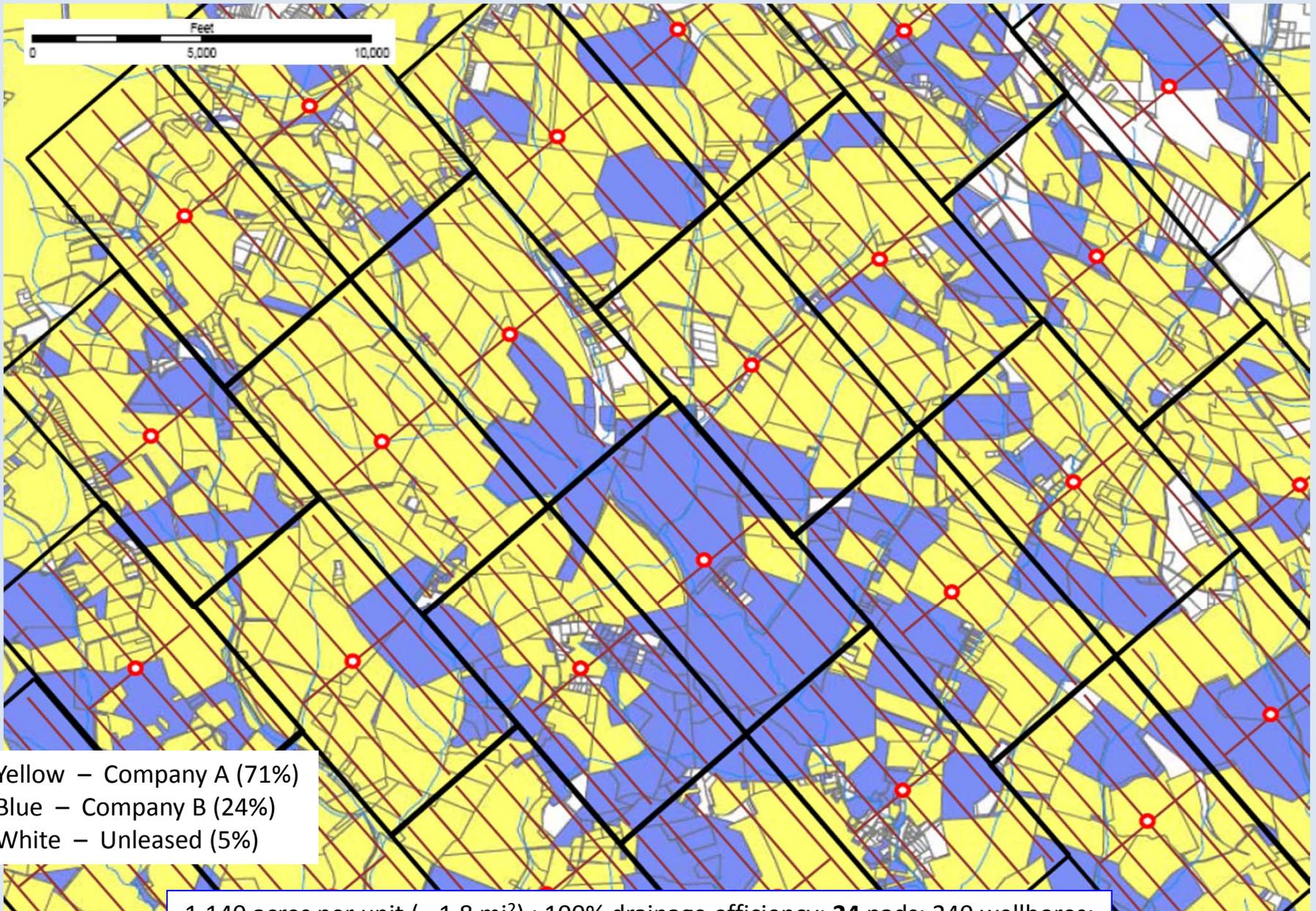
Industry best practice: 8 wells per drainage unit (27,000 acres = 42.2 mi²)



Minimizes Environmental Impact
Maximizes Economic Impact (Jobs, etc.)

1,140 acres per unit (= 1.8 mi²) ; 100% drainage efficiency; **24** pads; 240 wellbores;
960 bcf recoverable gas; \$4.8 billion revenue; \$768 billion royalties

Hypothetical lease position: Marcellus Play, PA (27,000 acres = 42.2 mi²)



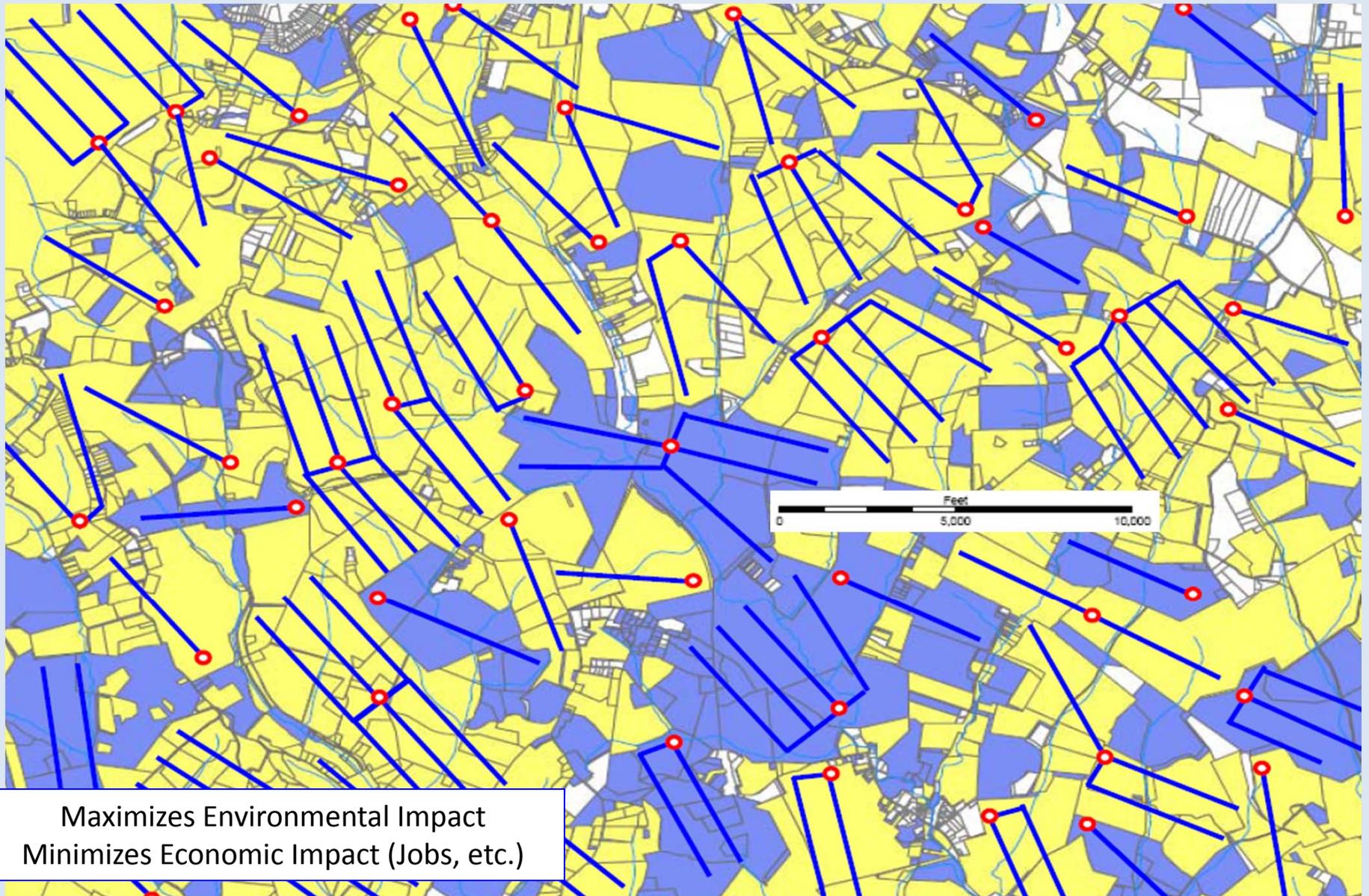
Yellow – Company A (71%)
Blue – Company B (24%)
White – Unleased (5%)

1,140 acres per unit (= 1.8 mi²) ; 100% drainage efficiency; **24** pads; 240 wellbores;
960 bcf recoverable gas; \$4.8 billion revenue; \$768 billion royalties

Situation #2: 640 acre drainage units

- All private property would contribute to the greater public good while providing each and every land owner with just and fair compensation. There would remain NO surface trespass under the environmentalist's plan.

Hypothetical lease position: Present state laws



60 % drainage efficiency; 53 pads; 109 wellbores;
436 bcf recoverable gas; \$2.2 billion revenue; \$349 billion royalties

Situation #1: No rules for 640 acre drainage units

- Under present State law, the number of pads is double the number that is necessary under a prudent development scenario. Note also that the number of effective wells is cut in half relative to surface plans that the environmentalists are pushing to maximize prudent development of the Marcellus

SB 447 Unconventional Oil and Gas Unit Establishment Act:

- This legislation introduces the concept of compulsory integration, but on a “company to company” basis, and does not affect “holdout” landowners. If a gas company wants to create a production unit for drilling, and a landowner in the middle of the proposed unit refuses to enter into a gas lease, the gas company may have to develop two well pads instead of one to extract the gas from under the proposed unit, which increases the environmental impact.

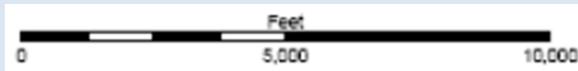
SB 447 Unconventional Oil and Gas Unit Establishment Act:

- Sen. Yaw has said that “90% of the pooling problems” are not caused by “holdout” landowners, but by gas companies that happen to have a gas lease in the middle of an area where another company wants to drill. This legislation would allow a gas company, which holds at least 65% of the leases in a proposed unit, to move forward developing the production unit and pay the “holdout company” holding the remaining acreage, their working interest and the royalty interests.

Property boundaries for Conservation wells!



A 330 foot Conservation well standoff is possible!



A 330 foot conservation well standoff is not possible but Marcellus wells are not Conservation wells!

Lease Position

Yellow – Company A
Blue – Company B
White – Unleased

Recommendation

Legislation instituting the 640 acre drainage unit

1. Maximize Economic Benefit;
2. Minimize Environmental Footprint;
3. Provide Just and Fair Compensation