

Thompson Hill Road Tax ID=30-30-86, ~62 ac)  
Ridgebury Township, Bradford County, PA

## Geologic Summary

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## DISCLAIMER

Information on the subject property set forth herein was originally compiled by Zaengle Geoscience LLC ("Zaengle") for Manzek Land Company ("MLC") c/o of Drake D. Nicholas, Esq., Receiver ("Receiver") to Manzek Land Company. The geologic information contained herein is a compilation of certain available geologic data for the subject property, Thompson Hill Road Tax ID=30-30-85, ~62 ac Ridgebury Township, Bradford County, PA. owned by MLC. Any party interested in purchasing the subject property must make their own evaluation of the subject property and is responsible for performing their own due diligence on the subject property.

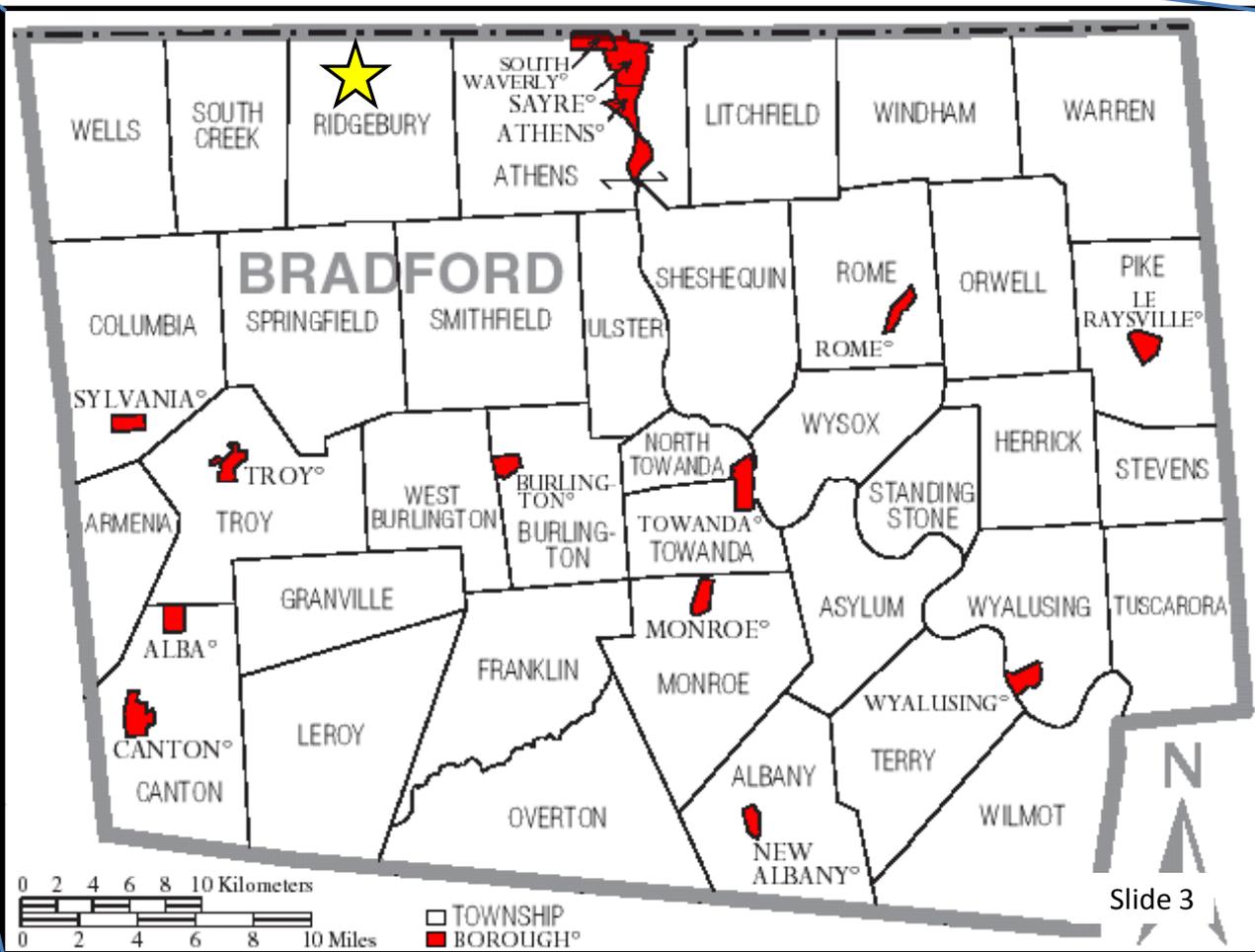
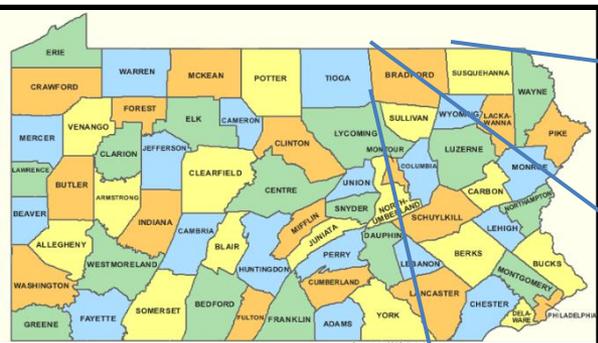
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Any party interested in purchasing the subject property should understand that purchases of properties with potential "in place" or recoverable oil and gas reserves is making an investment which is subject to risks and uncertainties and is a highly speculative investment.

# Location Map, Bradford County, PA



Subject Property, Thompson Hill Road (tax ID=30-30-86, ~62 ac)  
Ridgebury Township, Bradford County, PA



# Tax Map

Subject Property Location, Thompson Hill Road (tax ID=30-30-86, ~62 ac)  
Ridgebury Township, Bradford County, PA



# Regional Marcellus Shale Drilling Units & Activity Map

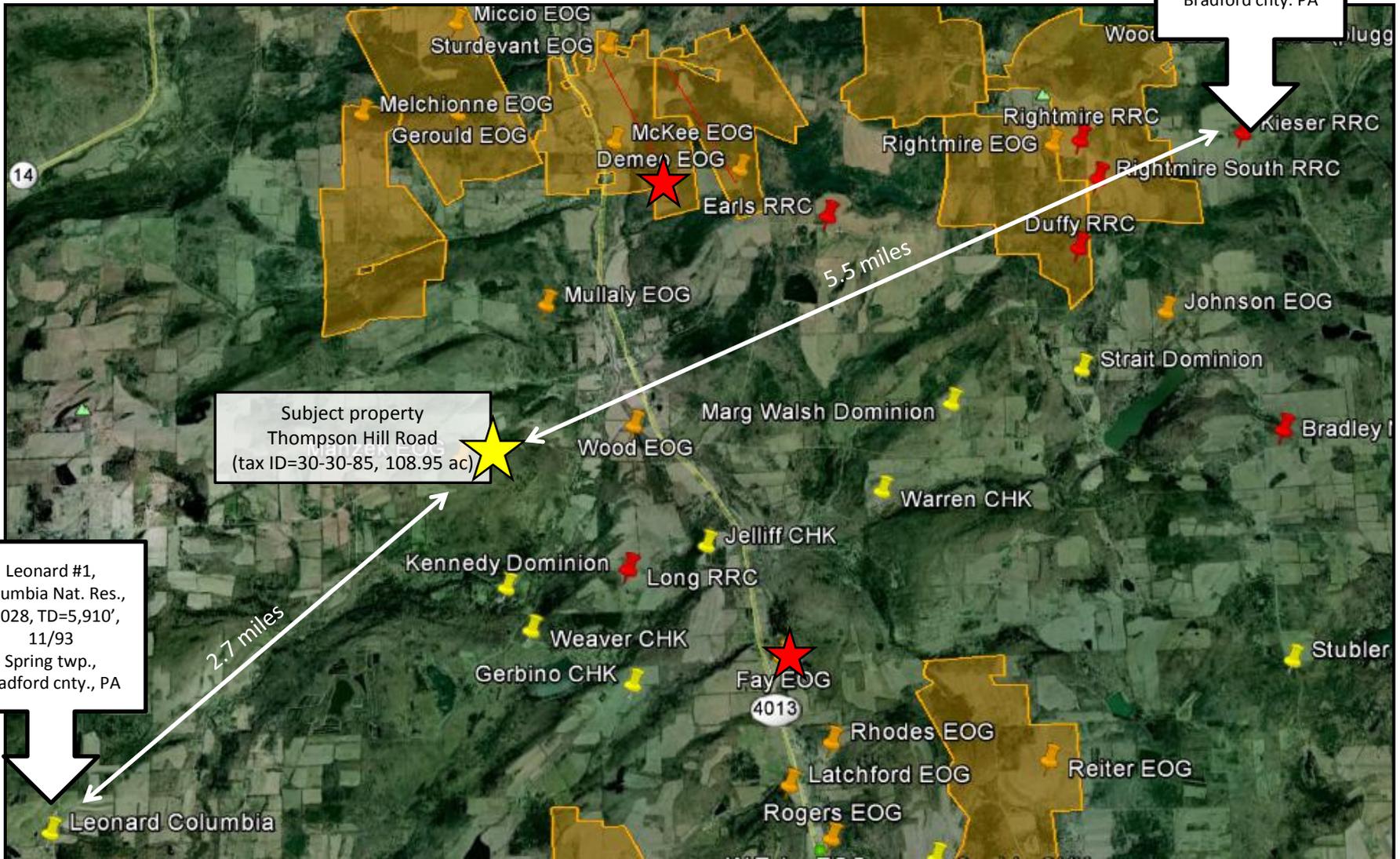


Subject Property, Thompson Hill Road (tax ID=30-30-86, ~62 ac)  
Ridgebury Township, Bradford County, PA (Google Earth 8/15/13)

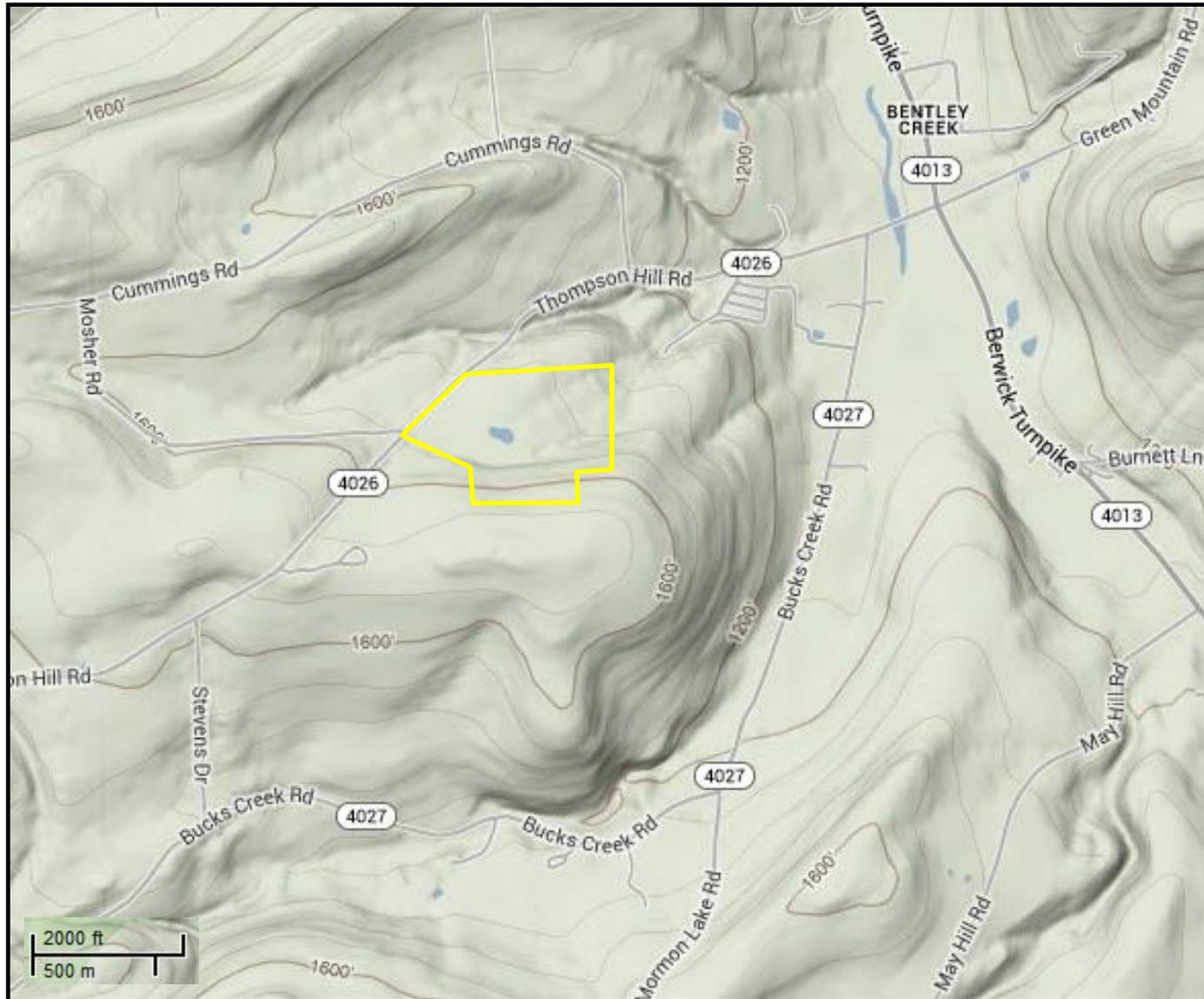
30 well permits filed, 21 wells drilled (none producing gas), EOG 9 well permits, drilled 2



Kieser #1, Range Resources, 20057, TD=12,228' 9/05, Athens twp., Bradford cnty. PA



Topographic Map, Subject Property, Thompson Hill Road (tax ID=30-30-86, ~62 ac)  
Ridgebury Township, Bradford County, PA (Google Earth 8/15/13)



Geologic Section / Historic Production  
 Subject Property, Thompson Hill Road (tax ID=30-30-86, ~62 ac)  
 Ridgebury Township, Bradford County, PA

Period		Group	Unit	Lithology	
Devonian	Upper	Genesee	Genesee Shale		
			Tully Limestone		
	Middle	Hamilton	Marcellus Shale		
			Onondaga Lst		
Lower	TriStates	Oriskany Sst			
		Heldeberg	Manlius Lst Rondout Dol Akron Dol		
Silurian	Upper	Salina	Bertie Shale		
			Syracuse Salt		
			Vernon Dol		
	Lower	Clinton	Lockport	Lockport Dol	
			Rochester Sh Irondequoit Lst		
Ordovician	Upper	Trenton/ Black River	Trenton Lst		
			Black River Lst		
	Lower	Beeman- town	Tribes Hill Lst		
			Oswego Sst	Queenston Sst Lorraine Slst Utica Shale	
Cambrian	Upper		Theresa Sst Little Falls Dol		
Precambrian Basement					

No historic production in Ridgebury township PA

Marcellus Shale

Oriskany Production ~15 miles east Stagecoach field 1985 ~14 Bcf, Currently used as gas storage field

Trenton Black River Langdon Field NY ~ 17 miles north , produced ~ 15.5 Bcf currently producing.

(R. Nyahay, J. Leone, L. Smith, J. Martin, D. Jarvie, 2007)  
 Modified D. Zaengle 10/2008

Marcellus: 4.0 - 5.0



Marcellus: ~ 3.0  
Dry Gas Window



Marcellus: ~ 150' (High TOC)



Summary  
Key Geologic Factors  
Subject property,  
Thompson Hill Road,  
Ridgebury Township  
Bradford County, PA  
\* Public data unavailable

Marcellus: \*



Marcellus: 4,750'



Marcellus: ~ 70 Bcf/sq mile



Marcellus: \*



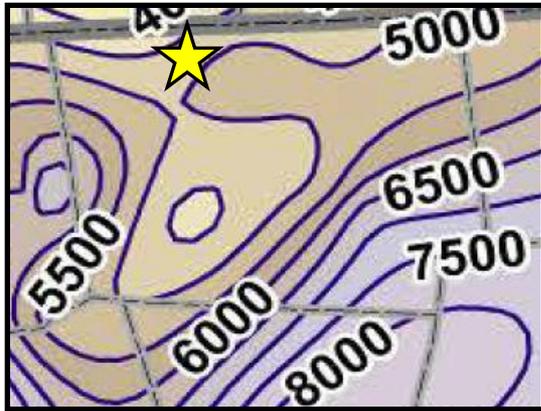
Marcellus: \*



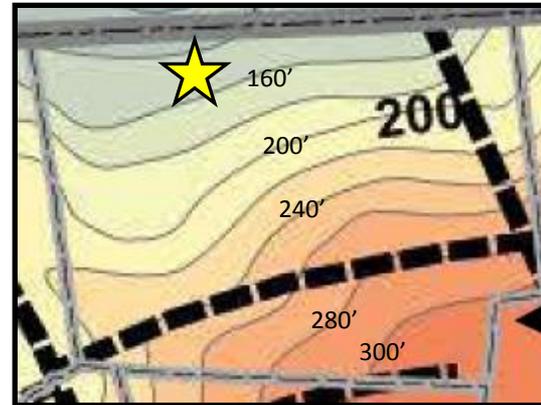
# Regional Geologic Maps

★ Subject Property, Thompson Hill Road,  
Ridgebury Township  
Bradford County, PA

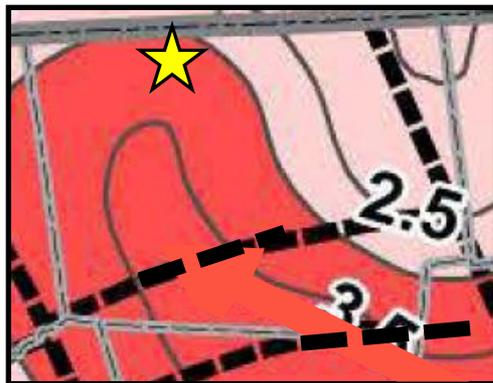
Regional Depth to base Marcellus Shale  
~ 4,750'



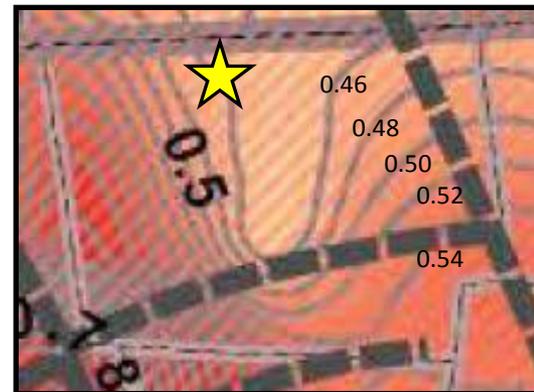
Gross Thickness  
~ 150'



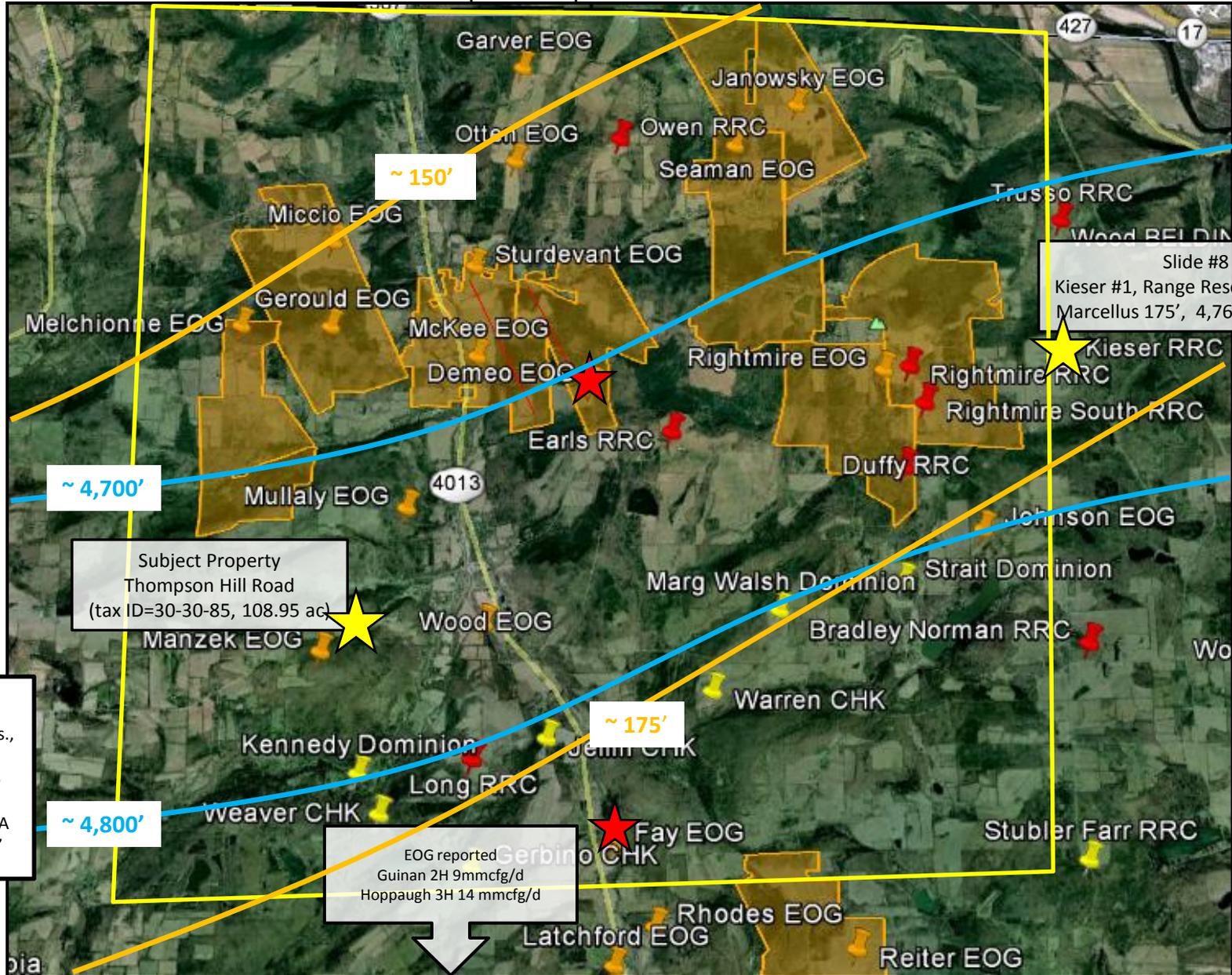
Thermal Maturation (Ro)  
Marcellus: ~ 3.0  
Dry Gas Window



Pressure gradient (PSI/ft)  
0.55 PSI/ft



Subject Property, Thompson Hill Road (tax ID=30-30-86, ~62 ac)  
 Ridgebury Township, Bradford County, PA (Google Earth 8/15/13)  
 Marcellus shale depth to top = — Marcellus Shale thickness = —



Slide #8  
 Kieser #1, Range Resources ,9/05  
 Marcellus 175', 4,760' (- 3,134')

Subject Property  
 Thompson Hill Road  
 (tax ID=30-30-85, 108.95 ac)

Slide #9  
 Leonard #1,  
 Columbia Nat. Res.,  
 20028,  
 TD=5,910'11/93  
 Spring twp.,  
 Bradford cnty., PA  
 Marcellus 5,280'  
 170' thick

EOG reported  
 Guinan 2H 9mmcf/d  
 Hoppaugh 3H 14 mmcf/d

~ 150'

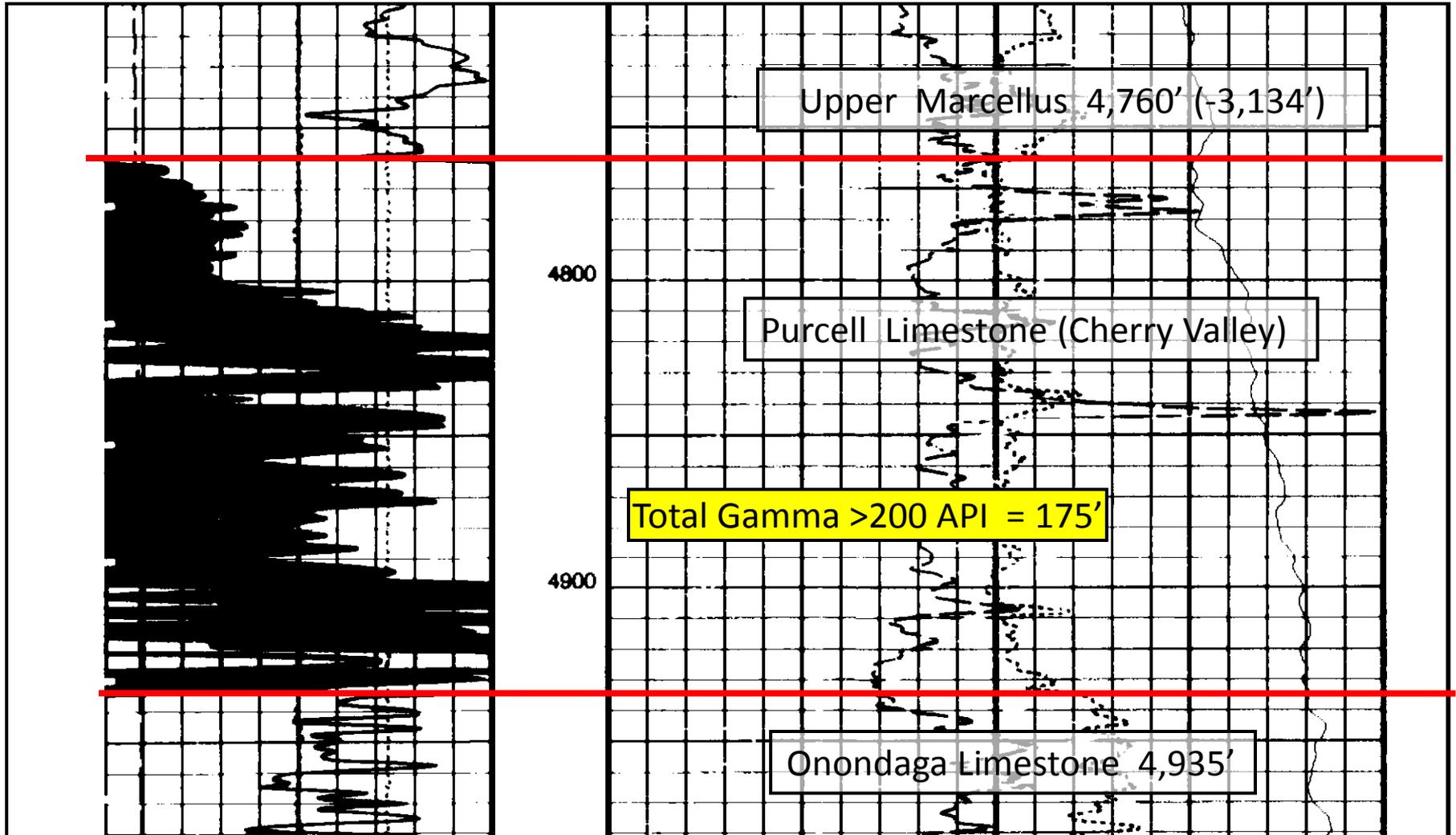
~ 4,700'

~ 175'

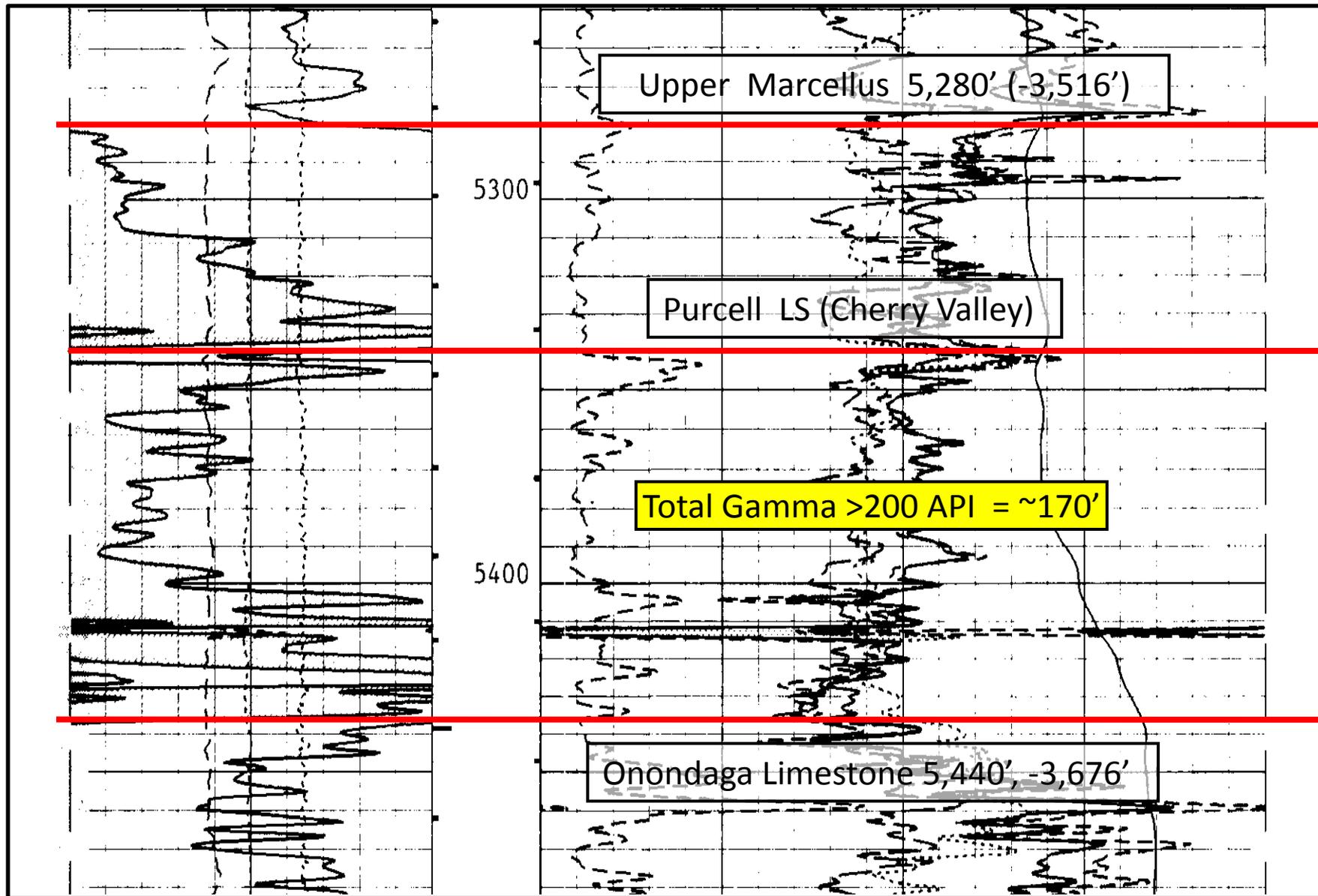
~ 4,800'

# Type Log

★ Kieser #1, Range Resources, 20057, TD=12,228', KB=1,626'  
9/05, Athens twp., Bradford Cnty. PA



Type Log, Leonard #1, Columbia Nat. Res., 20028, TD=5,910', KB= 1,764', 11/93  
Spring twp., Bradford Cnty., PA



Upper Marcellus 5,280' (-3,516')

Purcell LS (Cherry Valley)

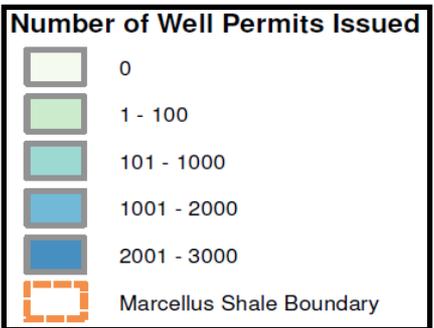
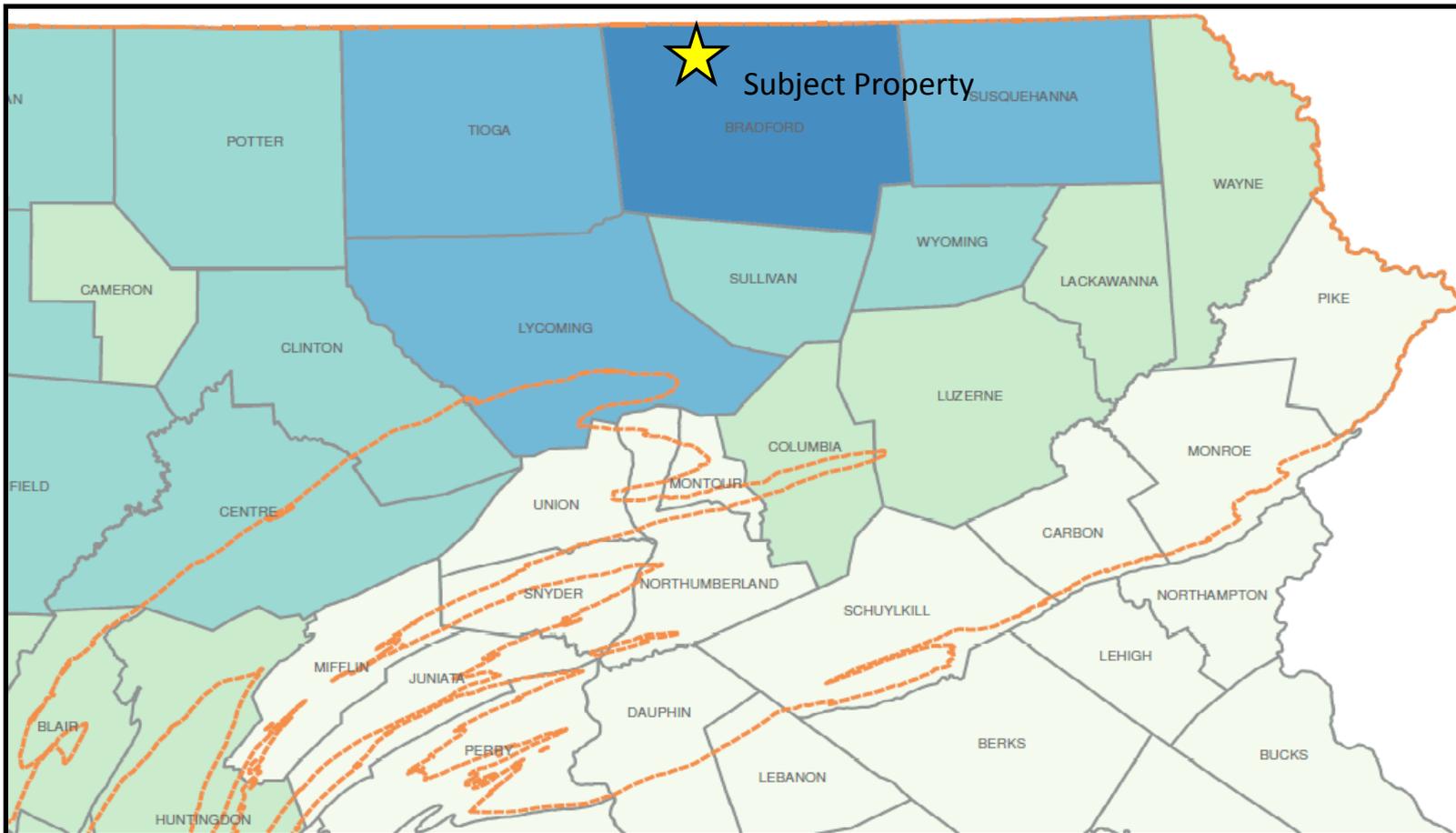
Total Gamma >200 API = ~170'

Onondaga Limestone 5,440', -3,676'

# Northeast PA, Number of Marcellus Shale Well Permits by County

(from Bradford County Office of Planning & Grants, "Primer on Natural gas development in Bradford County, PA", 1/21/13)

(Data from DEP Oil and Gas Reports Website 1/21/13, [http://www.portal.state.pa.us/portal/server.pt/community/oil\\_and\\_gas\\_reports/20297](http://www.portal.state.pa.us/portal/server.pt/community/oil_and_gas_reports/20297))



**Number of Well Permits by County**

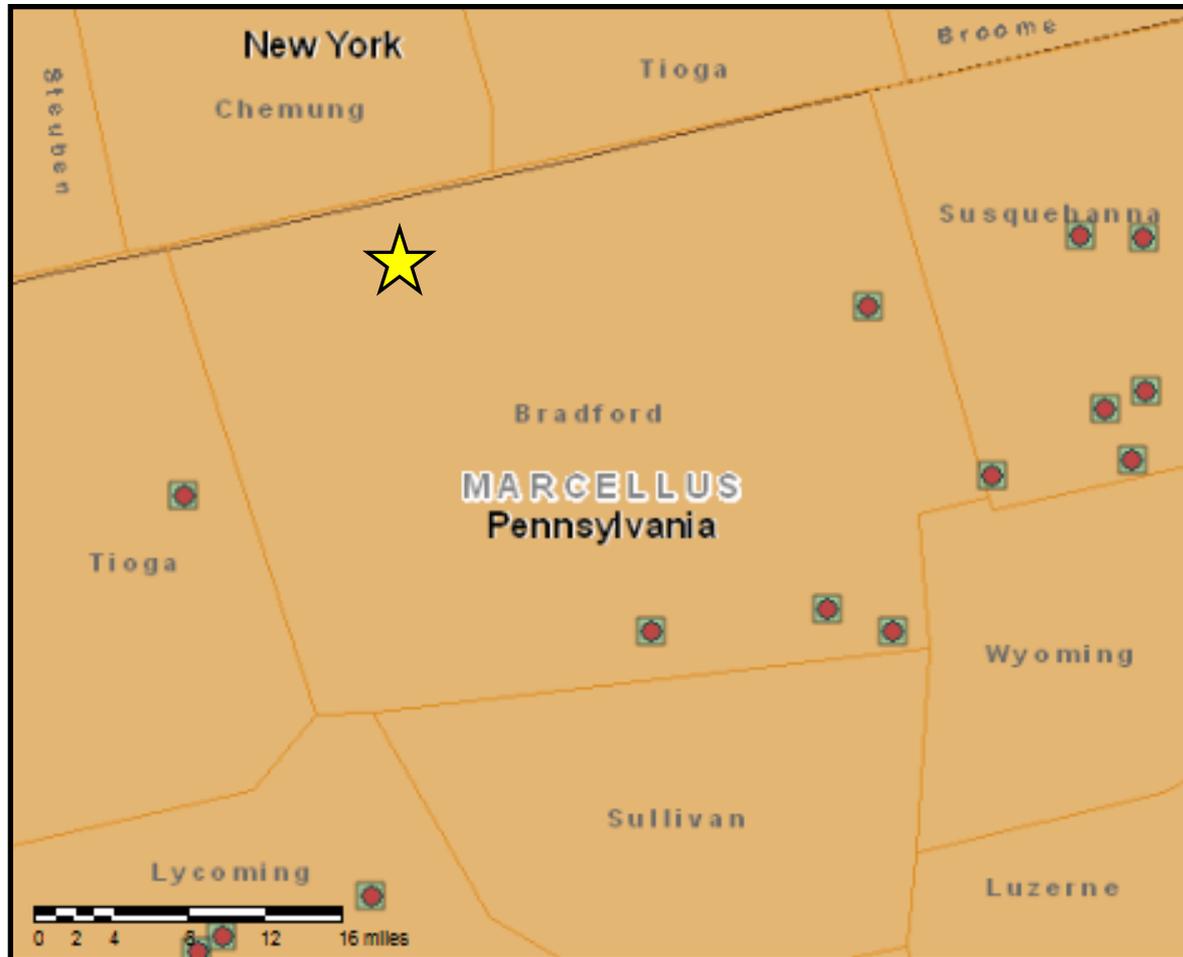
2544, BRADFORD	197, SULLIVAN	23, CAMBRIA	0, CARBON	0, MONTGOMERY
1601, TIOGA	189, CENTRE	16, COLUMBIA	0, CHESTER	0, MONTOUR
1248, WASHINGTON	165, CLINTON	15, LUZERNE	0, CUMBERLAND	0, NORTHAMPTON
1171, SUSQUEHANNA	140, MCKEAN	10, VENANGO	0, DELAWARE	0, NORTHUMBERLAND
1160, LYCOMING	105, JEFFERSON	9, BLAIR	0, DAUPHIN	0, PERRY
835, GREENE	85, CLARION	9, MERCER	0, ERIE	0, PHILADELPHIA
435, WESTMORELAND	82, INDIANA	9, WARREN	0, FRANKLIN	0, PIKE
400, BUTLER	80, BEAVER	4, WAYNE	0, FULTON	0, SCHUYLKILL
400, CLEARFIELD	51, SOMERSET	3, CRAWFORD	0, JUNIATA	0, SNYDER
339, FAYETTE	46, ALLEGHENY	2, HUNTINGDON	0, LANCASTER	0, UNION
254, ARMSTRONG	38, CAMERON	2, BEDFORD	0, LEBANON	0, YORK
250, WYOMING	37, LAWRENCE	0, ADAMS	0, LEHIGH	
231, POTTER	33, FOREST	0, BERKS	0, MIFFLIN	
200, ELK	29, LACKAWANNA	0, BUCKS	0, MONROE	

# Ridgebury Township & surrounding townships Active Drilling Rig Count, Bradford County PA

★ Subject Property, Thompson Hill Road (tax ID=30-30-86), Ridgebury Township, Bradford County, PA

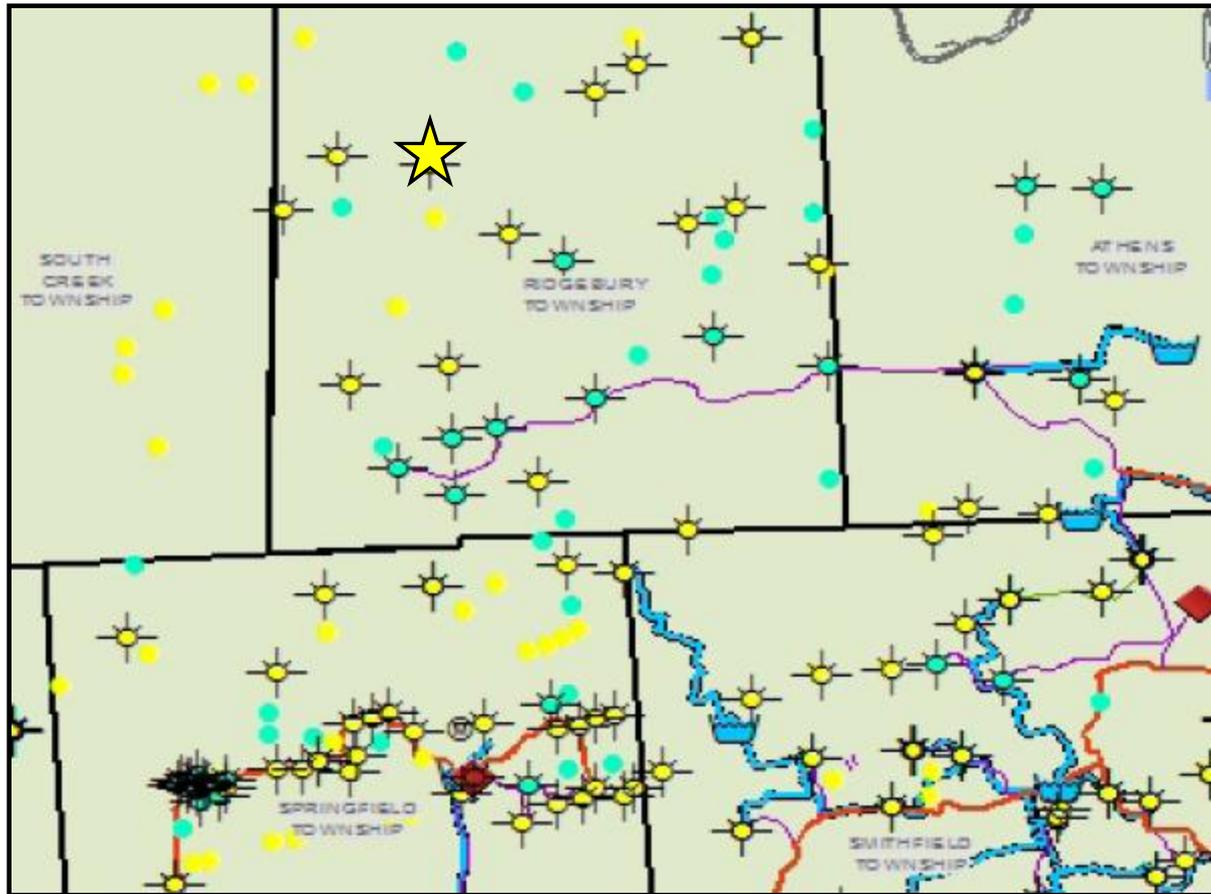
(from Bradford County Office of Planning & Grants, "Primer on Natural gas development in Bradford County, PA", 1/21/13)

(Barker Hughes <http://gis.bakerhughesdirect.com/RigCounts>, July 12, 2013), 4 Rigs Drilling in Bradford County, PA, 2 Rigs drilling in Wilmot Township,



# Ridgebury Township & surrounding townships Gas Well Activity Map, Bradford County PA

★ Subject Property, Thompson Hill Road (tax ID=30-30-86), Ridgebury Township, Bradford County, PA  
(from Bradford County Office of Planning & Grants, "Primer on Natural gas development in Bradford County, PA", 1/21/13)



## Gas Wells

- All Received Permits and Notices
- Active DEP Gas Wells - January 2013

— WaterLines

## Gas Lines

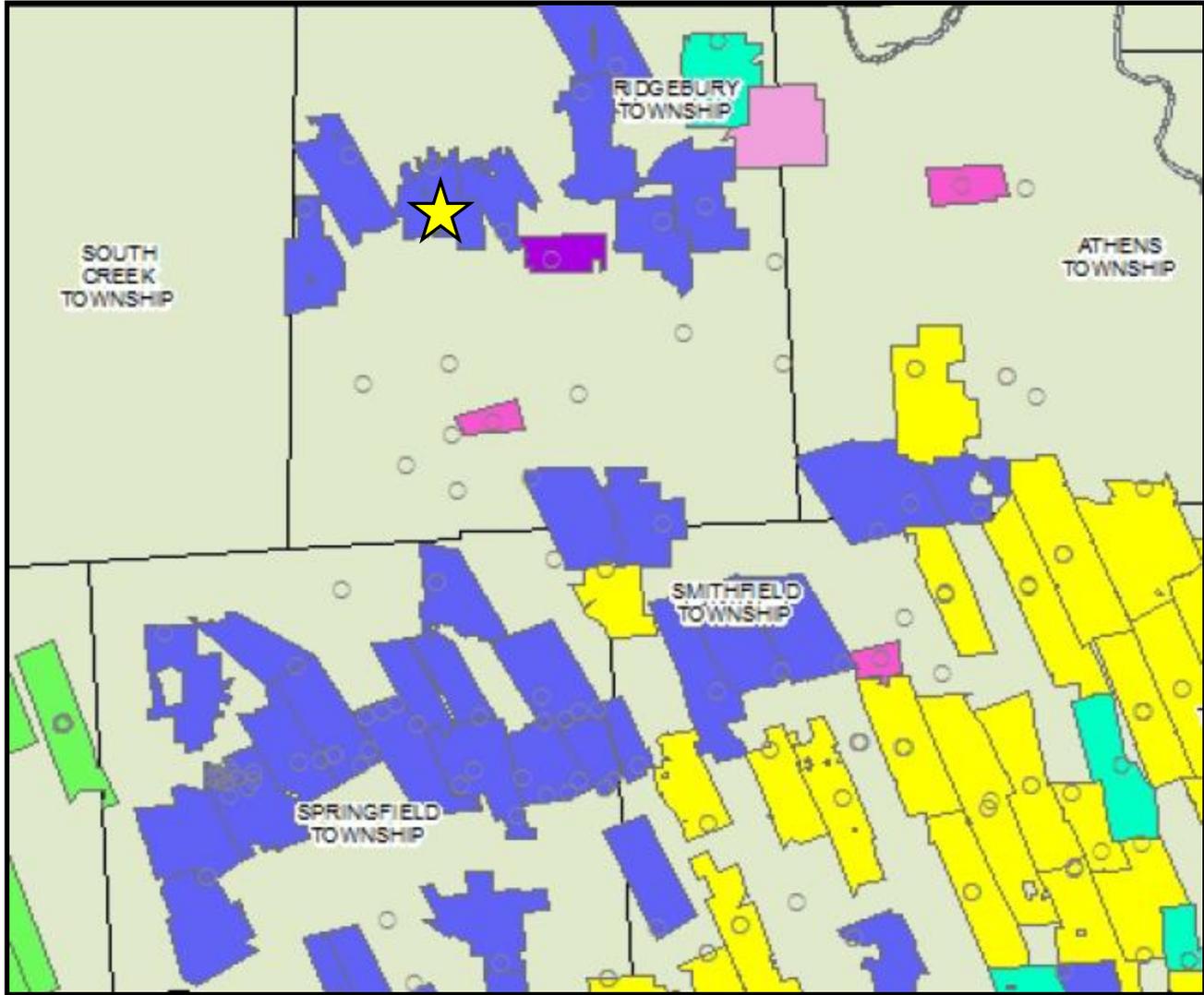
### PIPE SIZE

- Unknown
- 2
- 4
- 6
- 8
- 10
- 12
- 16
- 18
- 20
- 21
- 24
- 30
- 36



# Ridgebury Township & surrounding townships Production Units, Bradford County PA

Subject Property, Thompson Hill Road (tax ID=30-30-86), Ridgebury Township, Bradford County, PA  
(from Bradford County Office of Planning & Grants, "Primer on Natural gas development in Bradford County, PA", 1/21/13)



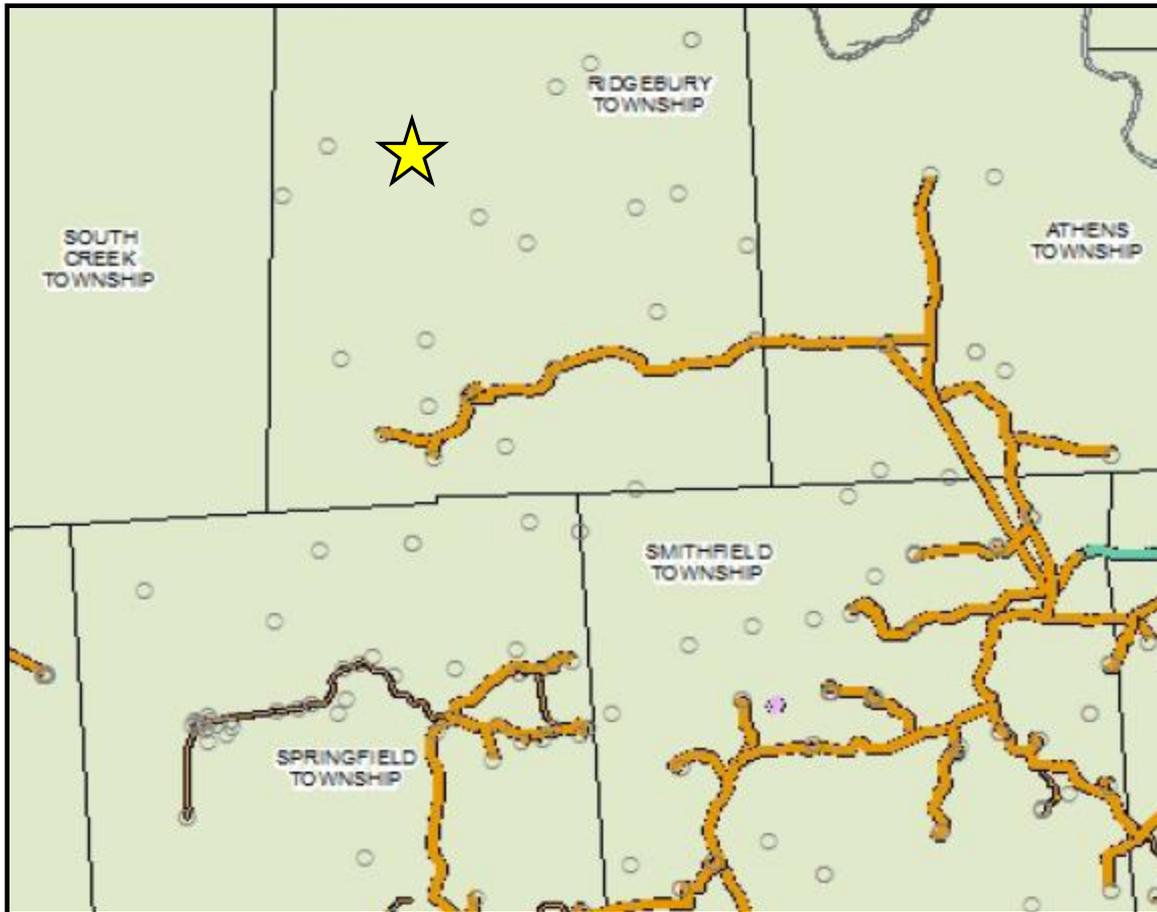
○ DEP Wells - January 2013

**COMPANY NAME**

- CHESAPEAKE APPALACHIA
- TALISMAN ENERGY
- EOG
- CHEIF OIL & GAS
- SOUTHWESTERN ENERGY
- EAST RESOURCES
- BELDEN & BLAKE
- FORTUNA ENERGY
- SWEPI
- VAVCO
- GREAT LAKES ENERGY PARTNERS
- RANGE RESOURCES

# ★ Ridgebury Township & surrounding townships Pipeline map, Bradford County PA

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(from Bradford County Office of Planning & Grants, "Primer on Natural gas development in Bradford County, PA", 1/21/13)



## SITE STATUS

- ▲ ACTIVE
- ★ INACTIVE
- ▲ ABANDONED
- PROPOSED, NEVER MATERIALIZED

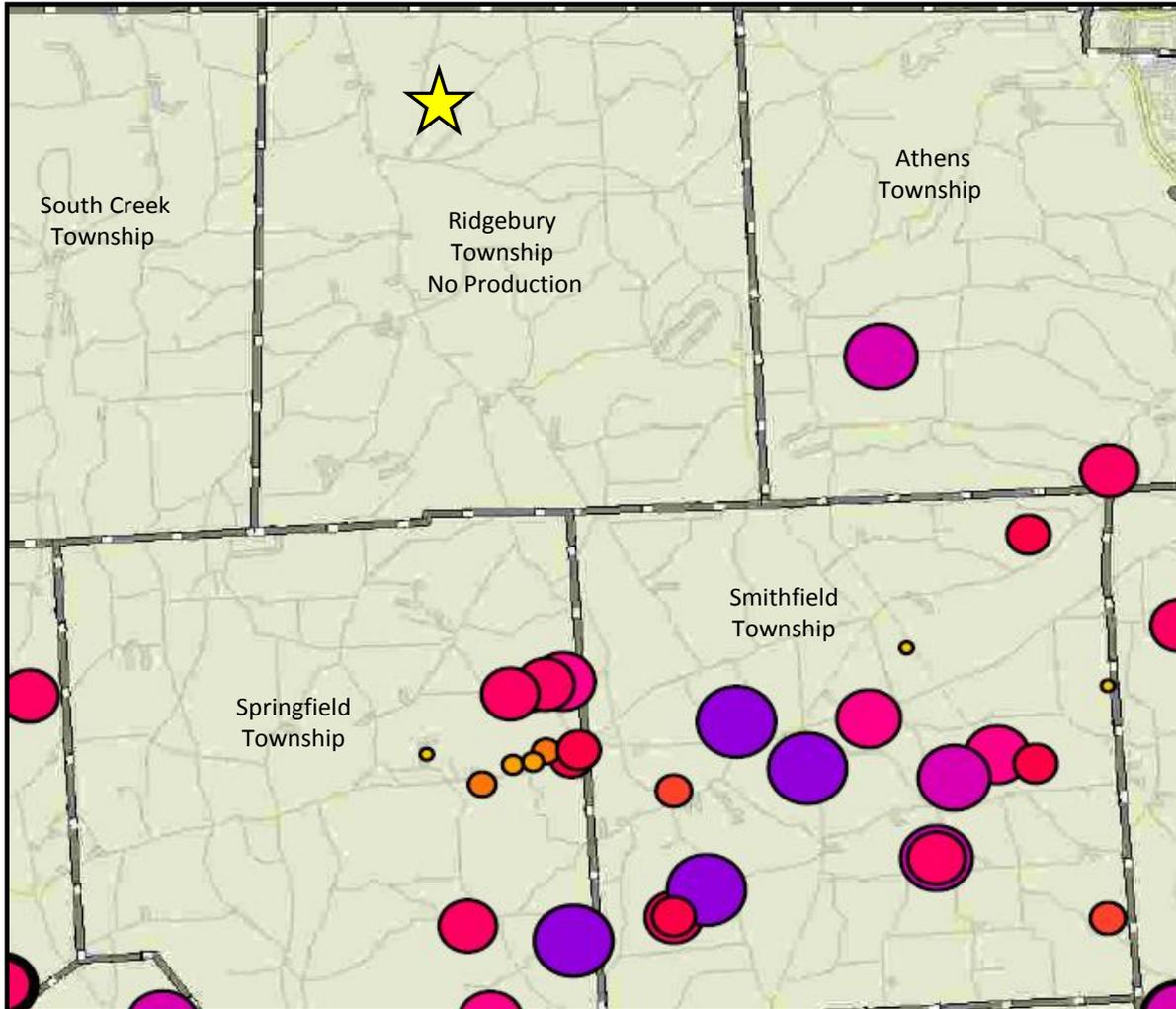
## Gas Lines

### LINE TYPE

- GATHERING - BUILT
- GATHERING - PROPOSED
- SERVICE - BUILT
- STORAGE - BUILT
- TRANSPORT - BUILT
- TRANSPORT - PROPOSED

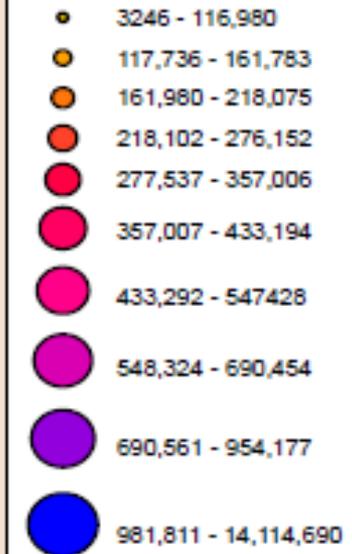
# Ridgebury Township & surrounding townships Regional Production map, Bradford County PA

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## Jan-July 2013 Producing Wells

### Gas Quantity (Mcf)



Summary  
Subject Property

Thompson Hill Road (tax ID=30-30-86), Ridgebury Township, Bradford County, PA

- Within Core Marcellus Shale production fairway.
- Marcellus > 200 API gamma ~ 150' thick, depth ~ 4,750'
- High Marcellus Shale Total Organic Carbon (TOC) content 4.0 – 5.0 %.
- Within dry gas window  $R_o = 3.0$ , little if any processing required, high BTU value.
- Gas- in -place estimate for area (~ 70 Bcf/square mile).
- No Marcellus Shale production within Ridgebury Township.
- Limited pipeline access.
- Near high-demand northeastern natural gas markets.
- Abundant Water Resources near property. Within Susquehanna River Basin.