

Marcellus Shale Gas Drilling Industry Update

Centre County, Pennsylvania



**2009 Activity Report
and
2010 Outlook**

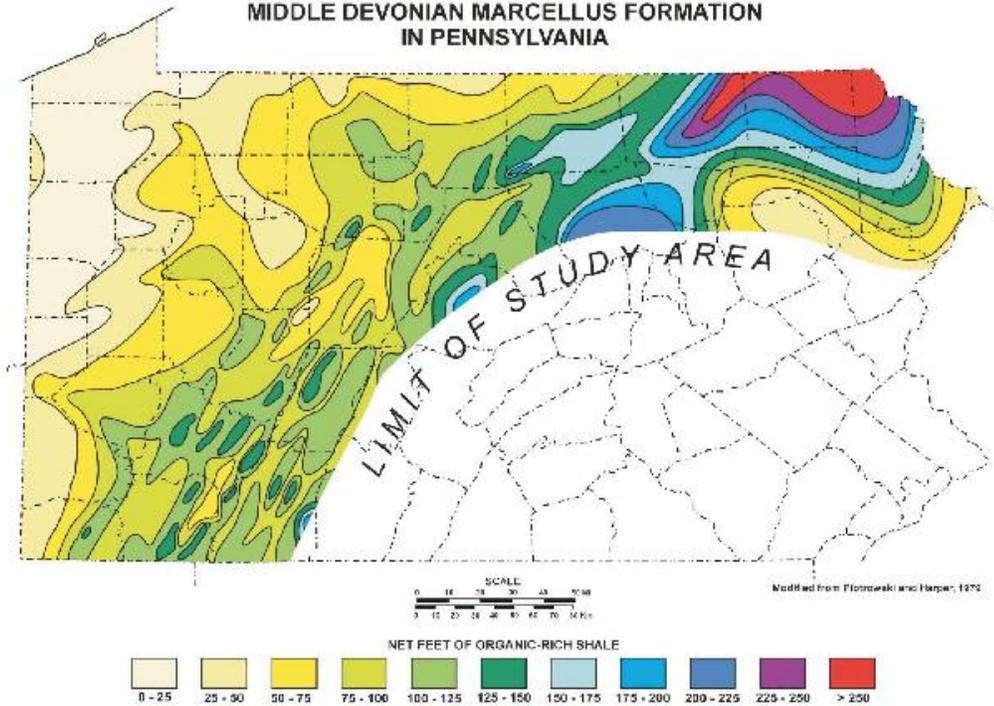


Prepared by the

**Centre County Planning and Community Development Office
420 Holmes Street
Belleville, PA 16823**

January 20, 2010

NET FEET OF ORGANIC-RICH SHALE IN THE MIDDLE DEVONIAN MARCELLUS FORMATION IN PENNSYLVANIA

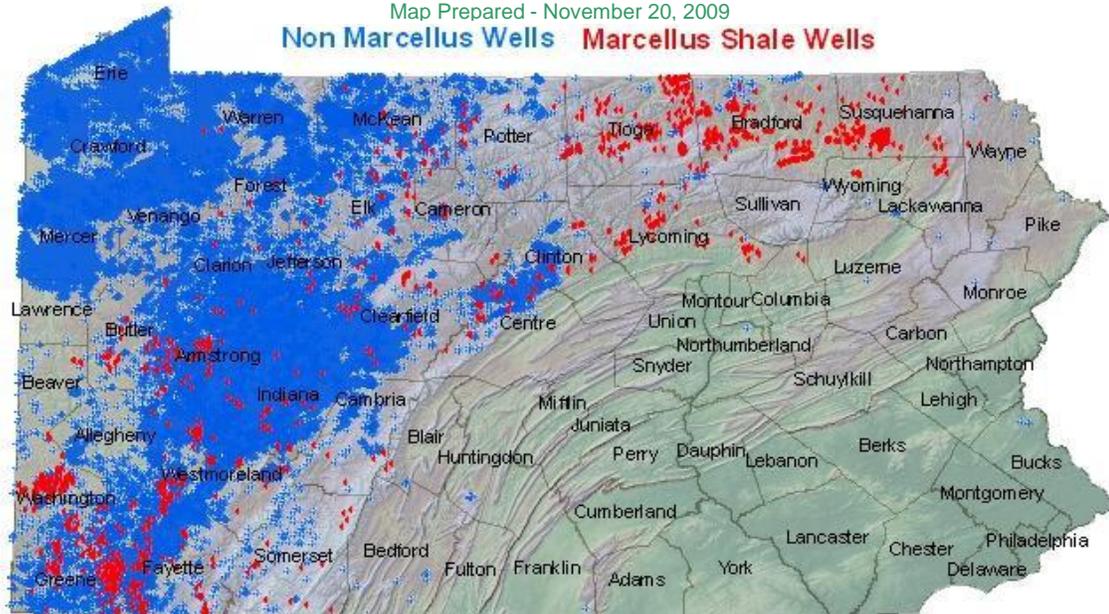


In Centre County, the thickness of the Marcellus Shale in Burnside and Snow Shoe Townships has ranged between 180 feet and 200 feet.

**Department of Environmental Protection
Bureau of Oil and Gas Management
Active Oil and Gas Wells**

Map Prepared - November 20, 2009

Non Marcellus Wells **Marcellus Shale Wells**



Centre County Marcellus Shale Gas Drilling: 2008-2009

Exploration of the Marcellus Shale in Centre County for natural gas production began mid-year 2008 and continued through 2009 with a focused interest in the Mountaintop and Moshannon Valley regions of the county. The majority of the activity was concentrated in Burnside and Snow Shoe Townships, with lesser activity (at this time) in Boggs, Curtin and Rush Townships.

Five drilling companies currently have investments in Centre County: Anadarko Petroleum Corporation; Carrizo Oil and Gas, Inc.; EXCO-North Coast Energy, Inc.; Range Resources – Appalachia, LLC; and Rex Energy Corporation. Of these five, the most active companies have been Anadarko and EXCO-North Coast, both of which received a permit for drilling their initial well within days of each other in June 2008. Range Resources was also at the forefront of the activity but has left their early permits expire. At the present time, they are concentrating their activities in other Pennsylvania counties and have nothing moving forward in Centre County. Mid-year 2009, Rex Energy Corporation, after having permitted six wells in the county, entered a Participation and Exploration Agreement with Williams Production Company / Williams Production Appalachia, LLC wherein Williams could acquire, through a “drill to earn” structure, Rex’s interest in their Centre County well sites. Activity by Williams Appalachia is concentrated on private land in Rush Township. None of the previously permitted Rex Energy well permits will be used by Williams. The sole remaining company, Carrizo, has drilled a single well in Rush Township, has tentative plans for seismic testing and three additional wells – all being done as exploratory to prove the “commerciality” of proceeding.

Much of the drilling activity in Centre County is occurring on state-owned lands and in relatively close proximity to large transmission pipelines. Private property owners include Resource Recovery, the Sterling Run Club, and a few local landowners. Placement of well pads near existing pipelines has made it initially possible for four (4) of the County’s Marcellus Shale gas wells to go “on line” with transmission to the Leidy underground storage fields, located in northern Clinton County.



View of the Litke 1H / Litke 2H well site location in Snow Shoe Township, Centre County, showing the on-site activity just prior to completing the hydraulic fracturing process (commonly referred to “fracing”). Two Marcellus Shale wells are located here. The depth of the wells is approximately 8000 feet.

In the early exploration phases of 2008 and early 2009, permits were being submitted for single and double well sites per location; but, by mid-year 2009, the process changed and permits were being processed for four to six well sites per drilling pad location. Advancements in drilling technology, a better understanding of the underlying geology, and more experience working within the constraints of the local topography have made it advantageous to concentrate

development activities. By the close of 2009, Marcellus Shale well sites in Centre County were, on average, located 15 feet apart on a nearly 5-acre cleared and level parcel of ground, referred to as a pad. Once this industry reaches the development phase, it is expected that the distance between well pads will typically range between 1,500 and 2,000 feet.

The PA Department of Environmental Protection’s Bureau of Oil and Gas Management provides various Marcellus Shale drilling activity reports one of which is an annual report of permits issued and wells drilled. This information is available to the public at <http://www.dep.state.pa.us/dep/deputate/minres/oilgas/RIG09.htm> Please caution that the DEP data documenting wells drilled is “as reported by the operators”. Furthermore, it is important to understand that a permit expires one year from its date of issue; and as a result, permits for well sites may appear in the DEP lists that essentially have been “abandoned” by the drilling companies. As a result, the Centre County Planning and Community Development Office chose to collect primary source information available directly from the drilling companies and through on-site field visits to compile a summary of drilling activity in the county. In addition to the current data for wells drilled, hydraulically fractured, and wells in production, this data also documented Marcellus gas wells in the planning and engineering phases, thus providing some indication of future activity and the viability of this industry in Centre County.

The following chart summarized the information collected from the five drilling companies that were actively working in Centre County in 2009.

Marcellus Shale Drilling Activity in Centre County, Pennsylvania by Drilling Company, January 4, 2010

Company Name	Wells Drilled	Well Pads Sited	Wells Fractured	Wells Permitted But Not Drilled	Wells in Production	Wells in Planning Phase
Anadarko	3	14	1	20	0	30
Carrizo	1	0	1	0	0	3
EXCO – North Coast	5	5	5	5	4	59
Range Resources	0	0	0	0	0	0
Williams Appalachia	0	0	0	0	0	5
Totals	9	19	7	25	4	97



Site Preparation for Litke Well #7H and #8H

DRILLED NATURAL GAS WELL SITES in the MARCELLUS SHALE FORMATION

Centre County, Pennsylvania

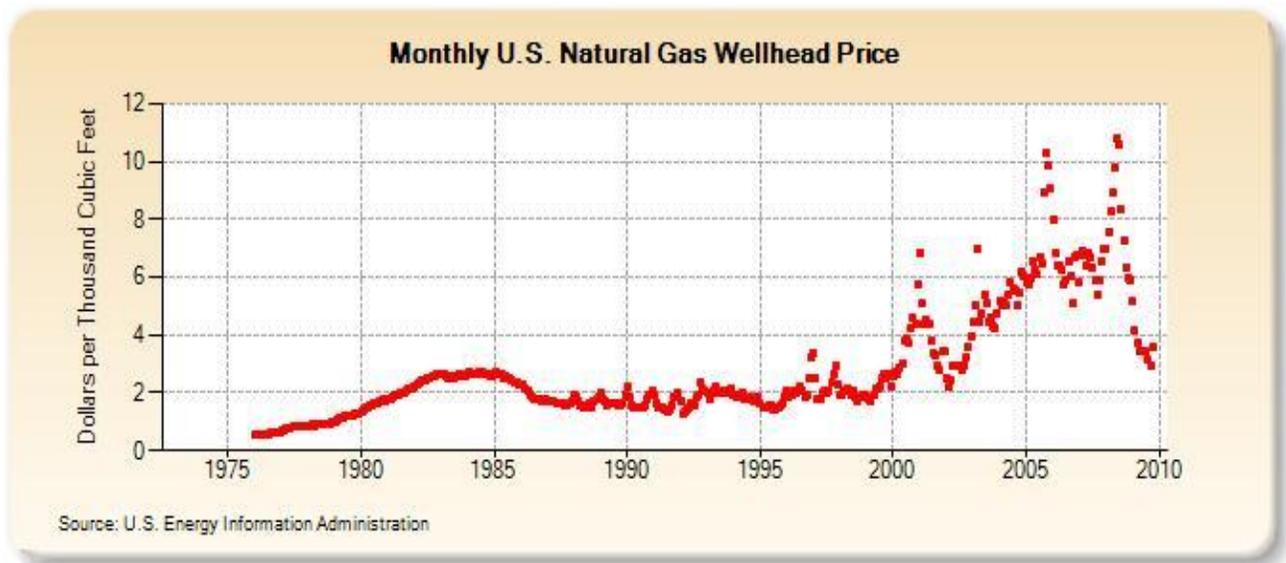
All data and information current as of January 14, 2010.



Prepared by the Centre County Office of Planning & Community Development, Willowbank Building, 420 Holmes St., Bellefonte, PA, 16823.

2010 Expectations:

Many factors relate to the profitability of the Marcellus Shale gas industry – the thickness of the Shale, the quantity and quality of the gas, the cost of production, the demand; and also the pricing point of the natural gas. In mid-2008 when the first Marcellus Shale gas well permits were issued in Centre County, the wellhead price per thousand cubic feet of natural gas was \$10.82; and by year end it had fallen to \$5.87. The prices in 2009 continued to drop reaching its lowest value of \$2.92 in September. Market trends as published by the U.S. Energy Information Administration, an agency of the U.S. Department of Energy responsible for data keeping and energy projections, expect the natural gas prices to improve and remain between \$6 and \$7 between 2015 and 2025. (Source: 2010 Annual Energy Outlook available from the U.S. Energy information Administration). Perhaps it is this economic projection plus the quantity and quality of the Marcellus Shale gas located in close proximity to the large Northeast US populations that will continue to spur this industry forward in the coming years. The sheer number of wells in planning and engineering phases in the County would indicate that the Marcellus Shale gas in Centre County is well worth the investment. Therefore, it is expected that in 2010, the Marcellus Shale natural gas industry in Centre County will move away from the exploratory phase to the development phase bringing with it much more activity and many more impacts to the local economy, local infrastructure, the environment, cultural resources, educational opportunities and training, and public service agencies. More activity is also expected for pipeline installation and compressor station construction.



At the onset of 2010, the hottest issue related to Pennsylvania's natural gas industry was Pennsylvania's Minimum Royalty Act litigation which is the subject of numerous cases that have been filed in State and Federal courts with one case pending before the Pennsylvania Supreme Court. The Royalty Act provision provides that a lease conveying the right to remove or recover oil, natural gas or gas of any other designation from a land owner to a lessee shall not be valid if such lease does not guarantee the land owner at least one-eighth royalty of all oil or natural gas recovered or removed. The question surrounds the deduction of certain gas production expenses by the lessee from the royalty amount. This could have a huge impact on many leases (those that provide the landowner with the bare 1/8th royalty) as the law seems to imply that if the Act's provision is violated the lease is invalidated.

In other court related activities, local government's powers with respect to the location of gas well drilling activities were heard by the State Supreme Court in 2009 with decisions on two cases issued in February. Oil and gas well drilling activities are largely governed by the PA Oil and Gas Act, which expressly supersedes all local ordinances, except those adopted under authority of the Municipalities Planning Code (MPC) and the Flood Plain Management Act. Local regulation may not impose conditions or requirements on well operations that are regulated by the Oil and Gas Act. Essentially, "the court noted a "how-versus-where" distinction, meaning that municipalities may regulate *where* such activities may be conducted but not *how* they are conducted." (Source: PA Township News, May 2009) Furthermore, since health and safety purposes are nearly consistent in both the Oil and Gas Act and the MPC, local ordinances using health and safety as a basis for disallowing drilling activity would likely be pre-empted and the local municipal decision would be denied. In summary, the PA Planning Association rendered this statement. "In effect, every single well drilled in a Pennsylvania municipality or county that has adopted a zoning ordinance must be placed only in a zoning district where it is allowed under that zoning ordinance." Due to the delicate nature of this issue, the Centre County Planning and Community Development Office recommends that municipalities include their solicitor in all decisions pertaining to ordinance revisions related to drilling activity.

Given the outlook for continued drilling activity, the known impacts occurring here and elsewhere throughout the State, and the court's involvement in several related areas, the Centre County Board of Commissioners in December 2009, authorized the staff of the Centre County Planning and Community Development Office to proceed with the formation of a natural gas task force which would be challenged with studying and formulating recommendations that would minimize the negative impacts of the drilling activity while maximizing the economic benefit. Below is a general overview of the task force and its purpose.

Centre County Natural Gas Task Force

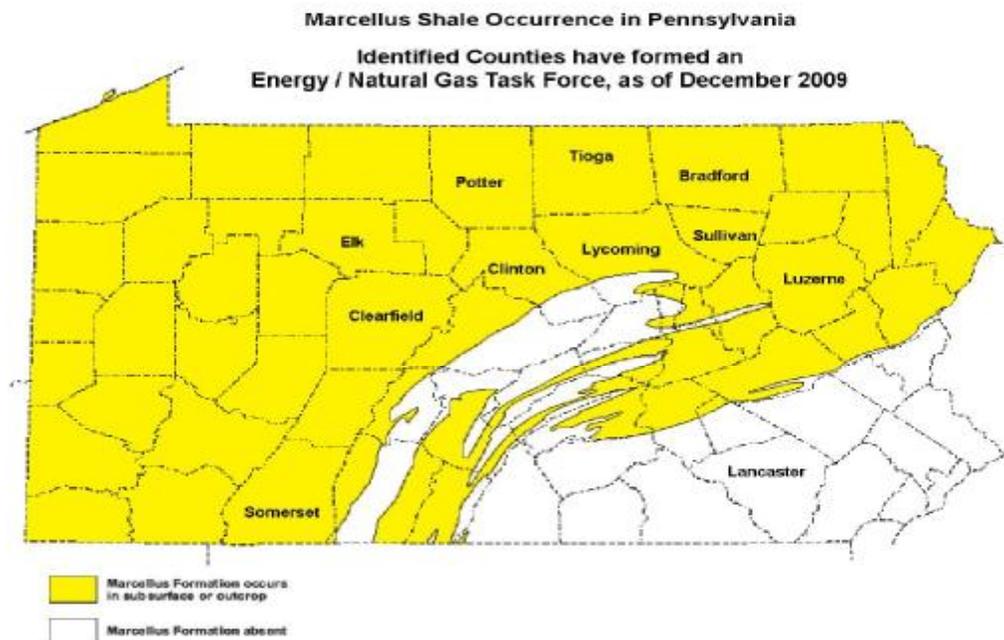
Purpose: To identify planning and community development principles and policies for economic development, education, environment, planning and zoning, public safety, and public policy/legal issues related to the exploration, development and production of natural gas in Centre County. This effort is intended to gather information, identify cooperative ventures, and guide county discussions / decisions for current and future generations of Centre County.

Format: The Task Force (**CCNGTF**) is to include 9 members supported by an advisory team comprised of representatives from the county offices of: Assessment, Emergency Management, Geographic Information Systems, County Planning, the County Conservation District, 911, and Penn State Cooperative Extension. All state legislators will be extended a role as ex officio members. This includes Senators Corman and Wozniak and Assemblymen Benninghoff, Conklin and Hanna. Seven of the nine core members are expected to represent a topic area of interest, as defined below. The core committee may recommend expanded membership as it determines necessary; and may extend involvement to the PA Department of Environmental Protection, Department of Conservation and Natural Resources, or another state agency with involvement in the development of the Marcellus Shale Industry, and a gas industry representative.

It is anticipated that task force meetings will be held monthly during daytime hours. Subcommittee meeting schedules will be determined by committee decision.

Task Force Member Representation:

- Economic Development: Commercial and Residential Real Estate / Business and Industrial Development Opportunities; Financing; Transportation: Roads and Bridges, Rail; New wealth life-style changes or lack thereof, Workforce Development
- Education: Property Owners; Workforce Development; School District Issues
- Environment: Ground Water / Water Treatment / Drinking Water; Forest Fragmentation and Public Land Impact; Stormwater; Reclamation / Site Restoration; Impoundments; Agriculture; Historic Resources; Traffic, Lighting, Noise and Dust
- Planning and Zoning: Land Use; Housing; Infrastructure; Pipelines / Gathering Lines; Compressor Stations
- Public Policy and Legal Issues: Road Bonding; Financing; Impact Fees; Leases; Local Ordinances; Tax Matters; DEP / Susquehanna River Basin Commission (SRBC) Regulations; New Legislation; Property Rights; Media Releases
- Property Owner / Lease Holder:
- Local Government Official:



Tangible Economic Benefits in Centre County

Just what is that economic benefit and how can it be measured? In addition to the millions of dollars being invested by the drilling companies in order to extract the natural gas, dollars are being generated by lease agreements, royalties, business expansion and development, increased retail sales, and overnight accommodations. Local products and services directly and indirectly related to the industry include stone from local quarries, fencing and portable restroom

facilities for drilling sites, hotel services, food and beverage sales, water sales, and concrete sales – to name a few. While no documentation currently exists to confirm the magnitude of these economic impacts to local businesses, it is hoped that further research will confirm such data in future years.

Informational Resources

During 2009, two research documents were produced in an effort to quantify the impact and the potential of the Marcellus Shale Gas Industry in Pennsylvania, and identify capacities for local community growth, suggesting mitigation strategies where necessary. We have listed these documents here due to their applicability and encourage the reader to access them for additional information.

An Emerging Giant: Prospects and Economic Impacts of Developing the Marcellus Shale Natural Gas Play, July 24, 2009

Available for download here:

<http://pamarcellus.com/EconomicImpactsofDevelopingMarcellus.pdf>

Energy Boomtowns and Natural Gas: Implications for Marcellus Shale Local Governments and Rural Communities, January 2009

Available for download here: <http://nercrd.psu.edu/Publications/rdppapers/rdp43.pdf>

In addition to the two documents listed above, extensive information is available at the following websites:

Centre County Government GIS mapping <http://www.co.centre.pa.us/gis/public.asp>

PA Department of Environmental Protection
http://www.dep.state.pa.us/dep/deputate/minres/oilgas/new_forms/marcellus/marcellus.htm

PA Marcellus Shale Coalition <http://pamarcellus.com/>

Penn State Cooperative Extension's Natural Gas Website
<http://naturalgas.extension.psu.edu/>

PA Geology, Spring 2008 edition
<http://www.dcnr.state.pa.us/topogeo/pub/pageolmag/pdfs/v38n1.pdf>

Pennsylvania Shale Education and Training Center <http://www.pct.edu/msetc/>

Susquehanna River Basin Commission – Marcellus Shale and Natural Gas Well Development
<http://www.srbc.net/programs/projreviewmarcellus.htm>

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*Drilling Rig: Sterling Run Club Well #5
Truck Delivery: Litke 1H / Litke 2H access road
Water Storage Tanks: Litke 1H / Litke 2H on site prior to fracing.*