Overview of Gas and Oil Resources in West Virginia

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Renewed Interest in Drilling and Production Activity

**Tanglewood Exploration**
Tanglewood Exploration is an independent oil and gas exploration and production company currently leasing mineral interests in your area. Should you have an interest in discussing the leasing of your minerals, please contact us. Thank you.
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**Atlas America, Inc.**
Atlas America, Inc., are Pittsburgh-based oil & gas wells that produce oil & gas wells with District Offices in Uniontown, PA.
We have been drilling wells in Fayette, Greene, and Westmoreland Counties for over eleven (11) years and currently operate 1,800 wells and have over a hundred (100) local employees.
We are expanding our lease areas to include the Counties of Monongalia and Preston in West Virginia.
If you own property with 10 acres or more and own your gas rights, we would be interested in leasing your property for the drilling and production activity.
Please give us a call 724-439-4311 ext. 125

**Talking Business**
A neighbor has considerable other companies and their business. Chesapeake is buying leases in Preston County. We know Chesapeake is the number one dealer of clean-burning natural gas wells in West Virginia and the entire U.S. Chesapeake is committed to ensuring property and safe in West Virginia, and it's a trustworthy company. So if you're interested in leasing your mineral rights, call us at 724-746-9180 and get talking.
West Virginia’s location is ideal for northeast markets

Figure 8. Gas Pipeline Capacity Into and Out of the Northeast Region

Source: Energy Information Administration

Note: MMcf/d = million cubic feet per day.
Source: Energy Information Administration, Office of Oil and Gas, Natural Gas Pipeline Capacity Database.
WV’s gas and oil fields primarily in the western part of the State.
Wells 19,000 feet or deeper; n=3

Location of well 19,000 feet or deeper

Source: WVGES database
Wells 10,000 feet or deeper; n=43

Location of well 10,000 feet or deeper

Source: WVGES database
Different age rocks of recent interest to oil and gas producers

Coalbed methane
Marcellus Shale
Trenton-Black River
Recent Trenton wells have been drilled in 10 counties
WV Counties with Recent CBM wells reported; total 690 wells

Completed CBM well

09/2006
Annual and Cumulative CBM production for WV; total 103 Bcf of gas; 2007 production >22 Bcf.
The Marcellus Shale Play

- What is it?
- **Shale** is a fine-grained sedimentary rock.
- The **Marcellus** is a particular rock unit which is Devonian in age.
A Play

• A play is defined as a group of geologically similar drilling prospects having similar source, reservoir and trap controls of gas migration, accumulation, and storage.


Modified from White, 1980; 1988.


Marcellus Shale
Historic Devonian Shale Gas Fields and new Marcellus wells permitted in 2006 and 2007

Legend
- Black/Gray Shale Fields
- Black Shale Fields
- 2007 new Marcellus wells
- 2006 new Marcellus wells
Huntersville/Oriskany Gas Fields

Legend

- Huntersville/Oriskany
- Oriskany Combination
- Oriskany Pinchout
- Oriskany Structure

0 30 60 90 120 Miles
Trenton-Black River play spurred additional deep drilling in last 15 years in limited areas.
West Virginia Nomenclature

TIME

W

- Bedford Shale
- Cleveland Member
- Upper Huron Member
- Lower Huron Member
- Java Fm.
- West Falls Formation
- Sonyea Formation

- Dunkirk Shale Member
- Pipe Creek Shale Member
- Angola Shale Member
- Rhinestreet Shale Member
- Cashaquia Shale Member
- Middlesex Shale Member
- West River Shale Mbr.
- Genesee Shale Member

- Mahantango Formation
- Tioga ash bed
- "Corniferous"

E

- Berea Sandstone
- Hampshire Formation
- Greenland Gap Group ("Chemung" Formation)
- Brallier Shale

- Marcellus Shale
- "Corniferous"
- Onondaga Limestone
- Huntersville Chert
- Oriskany Sandstone
- Helderberg Limestone
Extent of Marcellus, Rhinestreet, and Lower Huron
Locations of cross sections from USGS Bulletin 1909
Cross Section Chemung County, NY to Potter County, PA
Cross Section Somerset County, PA to Gilmer County, WV
Where is the Marcellus present in WV?

• It is present below the surface, at varying depths throughout much, but not all of WV.
• It is not present in extreme eastern or western WV.
• It crops out at the surface in parts of the Valley and Ridge province in eastern WV.
• It varies in thickness across WV.
The Onondaga Limestone immediately underlies the Marcellus, so knowing the elevation of the top of the Onondaga and the surface elevation at a particular location provides a way to estimate the depth of a well drilled all the way through the Marcellus Shale.
Outcrops of Marcellus

The Marcellus is exposed at the surface in eastern WV as shown by the outcrop map. In the eastern-most counties, older rocks are exposed at the surface and the Marcellus is not present.

From 1968 state geologic map
Thickness in feet and extent of Marcellus Shale in subsurface

Area of thicker Marcellus

Marcellus not present west of this line

Marcellus not present east of here
For Further Information:


- WV Department of Environmental Protection, Office of Oil and Gas, http://www.wvdep.org/item.cfm?ssid=23
WVGES Interactive Mapping

- http://www.wvgs.wvnet.edu
  Information on Devonian Shales including Marcellus Shale
- Using this application, you can determine where the Marcellus is present below the surface, the approximate depth to drill through the Marcellus, and the approximate thickness of the Marcellus.
- We cannot predict presence or absence of natural gas or quantities of gas with this application.