With other U.S. shale gas plays in decline, is the Marcellus next?

Robert Magyar

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This week the Energy Information Agency reported record gas production for 2011 for the Marcellus shale regions. The report is being cited by Pennsylvania supporters of hydraulic fracking as yet more evidence of all things good news when it comes to U.S. shale gas development. At the same time, the Texas Barnett and Louisiana shale gas formations appear to be peaking in production, seeing significant decreases in drilling activity while shale gas development companies such as Chesapeake Energy and BHP Billiton have been quietly writing off billions of dollars of claimed shale gas reserves in those formations as they declare such reserves as no longer economically feasible to extract.

Just a few short years ago, those same companies were claiming those same reserves were solid evidence of future decades of natural gas supply as part of the U.S. “Shale gas revolution”.

The Texas Barnett and Louisiana Haynesville formations began in earnest back in 2007 while development in the Pennsylvania took off fully in 2010. After reporting record production output in 2009 through 2011, the Barnett and Haynesville now appear to be leveling off. The fall off rate in output in those plays now means more replacement wells are needed to maintain current production levels but shale gas companies such as Chesapeake Energy, Devon Energy and others are sharply pulling back in those plays.

According to Arthur Berman, an experienced oil and gas industry geologist based in Houston, Texas, a review of the numbers coming out of those shale gas regions show troubling trends. Berman recently released a presentation titled, “After the Gold Rush, A Perspective on Future U.S. Natural Gas Supply and Price”. In his presentation Berman cites, among other things, the following:

• Shale gas production from the Haynesville formation currently has a 48% annual output decline rate and despite the addition of 724 new producing wells in the last 12 months, shale gas output has now peaked and appears to be declining.

• It will take more than $13 billion in drilling costs simply to replace the 48% annual output decline of the Haynesville region which translates to finding and replacing an estimated 3.5 billion cubic feet of shale gas per day. The Haynesville region, according to Berman, accounts for 11.5% of all U.S. shale gas production.

• In the Texas Barnett shale formation “Current production is still flat” according to Berman, even as he noted more than 1,250 new producing wells in the last 12 months. Berman notes that the Texas Barnett shale formation supplies roughly 9% of all U.S. shale gas production.

• Berman has calculated a 29% annual base rate decline in production within the Texas Barnett which now requires more than 5,734 wells at an estimated cost of $17 billion simply to keep production at its current level.

The overall message of his presentation continues to state the rapid depletion rates of shale gas wells combined with their much higher operating costs compared to conventional oil and gas wells means shale gas must have significantly higher market prices in order for the companies to even approach breakeven let alone a profit or that of a profit which will satisfy their investors.

Berman is an experienced geologist from the oil and gas industry. While many people have aggressively attacked him personally on this issue, he maintains he is not anti-shale gas but rather wanting to be a realist about the much higher prices for natural gas it’s going to take to make hydraulic fracking economically viable along with the huge amounts of capital needed by the industry on an ongoing basis.

With industry leader Chesapeake Energy in deep financial, legal and regulatory trouble, it has spent the last several years jumping from one shale formation play to the next, first the Texas Barnett, then the Louisiana Haynesville and on into the Fayetteville formation. Immediately after that, Chesapeake played a lead role to open up drilling into the Pennsylvania Marcellus shale formation back in 2008 and 2009. Reserve write downs have now ocurred in several of thier claims as developed prior to the Pennsylvania Marcellus.

Yet today the company has decreased its drilling operations along with those of other companies working in the Marcellus in favor of the wet oil infused shale claims of the Utica formation over in Ohio.

Last week Chesapeake wrote down more than $4.5 billion in claimed shale gas reserves within its Barnett and Haynesville land holdings even as it claimed yet new unproven reserves from other new shale plays while being uncharacteristically quiet about the Marcellus shale formation in all of its recent investor presentations.

Oil and Gas Company BHP Billiton, which purchased $4.8 billion of claimed shale gas reserves from Chesapeake Energy in their Fayetteville formation less than 18 months ago, also last week wrote down $2.85 billion of that reserves purchase, more than 60% of the value of the deal.

In all the controversy, hype and pro and con claims surrounding hydraulic fracking of U.S. shale gas formations the critical driver of what these companies do and why they do it remains obscured. It is however an issue geologist Berman seems to understand well. This is the strange and baffling rapid depletion rates of the shale gas production on a per well basis. It is now well documented these wells lose more than 85% of their initial output often within the first 12 to 18 months of lifetimes.

It appears to be more and more a never ending ‘Drilling to exhaustion’ rather than an acclaimed ‘Shale gas miracle’. Offsetting claims of “hyperbolic” production, read as long term 30 and 40 year per well lifetimes, by the industry remain to date unproven as do much of what is being claimed as recoverable reserves.

Is Pennsylvania’s Marcellus shale formation immune from such rapid per well aggressive depletion rates now experienced in every other U.S. shale gas formation? Will Pennsylvania’s Marcellus not see perhaps 30% to 45% or more annual decline rates in the next few years such as now being seen in Texas and Louisiana? Given the Marcellus' deeper drilling depths, difficult up and time hills and mountains which make trucking in and out all that heavy equipment somehow going to result in lower extraction costs here than in the flat and open plains of Texas?

Do such rapid per well aggressive depletion rates explain the intense pressure by the industry to open up drilling in nearby New York State as soon as possible? Bradford and Susquehanna counties in Pennsylvania, both sweet spots for the industry would be short drives to deliver drilling equipment from Pennsylvania and into New York State.

Time will tell given the increasingly difficult operating environments of today’s energy realities.

Disclaimer: The writer holds no U.S. securities in any shale gas company nor is he a member of any environmental group or anti-fracking group. He holds no financial arrangements with any of the entities and/or individuals listed in the article. He is not being paid to write by any shale gas industry group, pro or con.

To see the latest EIA report on Marcellus shale gas production, go to:
http://www.eia.gov/analysis/studies/usshalegas/

To view Arthur Berman's presentation, go to:
http://www.theoildrum.com/node/8914

To see a video of Mr. Berman's presentation, go to:
http://www.youtube.com/watch?v=1386Jt17myY

Suggested by the author:

- Chesapeake Energy writes off 4.6 trillion cubic feet of shale gas reserves
- Shale gas realities continue to disrupt the hype

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Bob Magyar has more than 30 years of business development in the water and power generation/electrical distribution systems industries. He has held senior management positions in GTE Sylvania, American Standard and provided consulting services to BP Solar and Shell Solar. Today he runs his own..

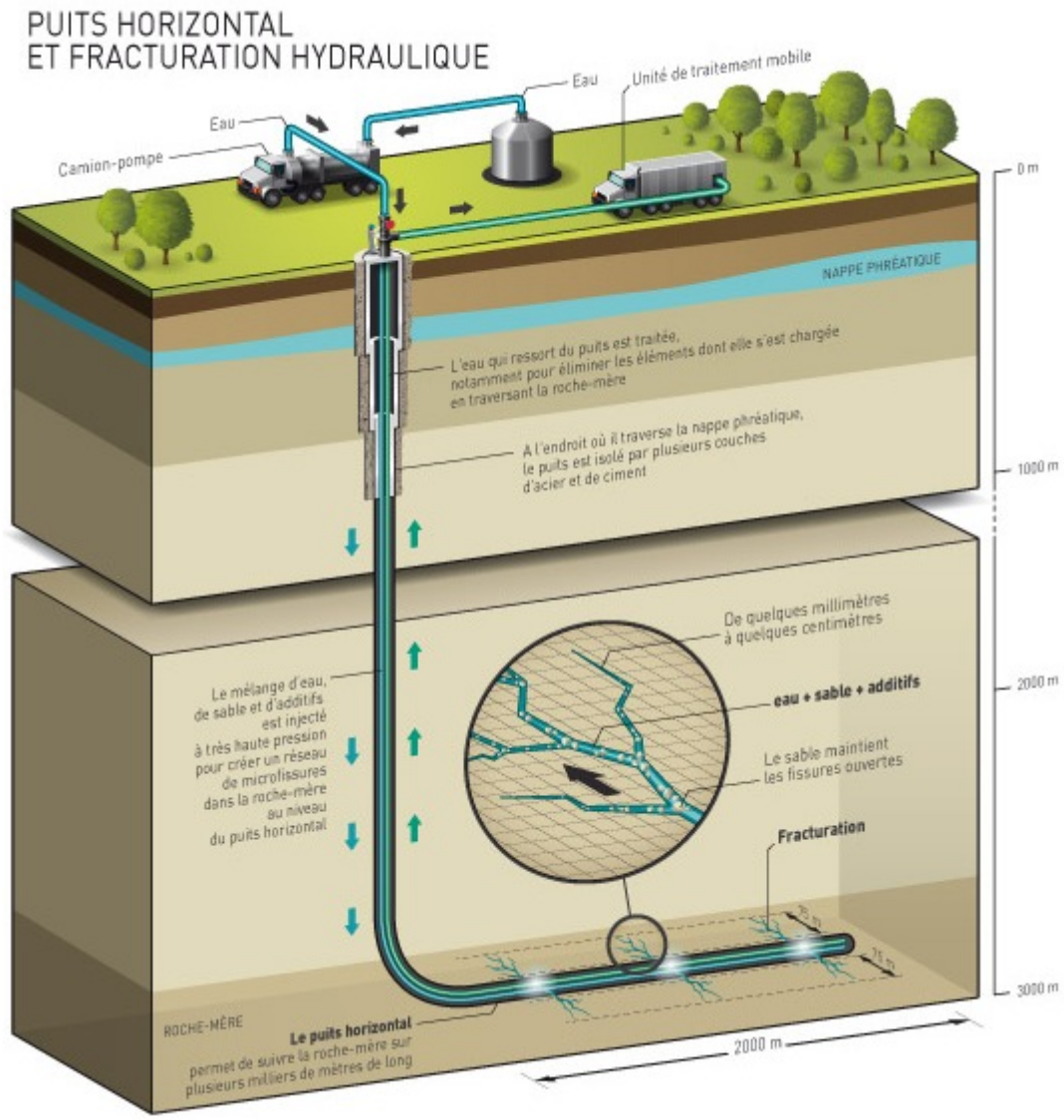
PA natural gas drilling may not be all its fracked up to be

Anthony Loconte, December 29, 2011 - Même source

Most geologist and natural gas companies have long known that the Marcellus Shale formation, which lies under a significant part of Pennsylvania, contained pockets of untapped natural gas. But no one had a cost efficient way of extracting it. In fact, two drawbacks kept companies from drilling for it. One drawback was the lack of an informed estimate on how much natural gas the shale may contain. The second obstacle was drilling technology which hadn't advanced to the point of allowing its extraction. But the extraction of natural gas in Pennsylvania may not come with out its hazards.[…]

Another development in the drilling industry which led to increased shale natural gas exploration was the invention of slant drilling and hydraulic fracturing. Slant drilling allows companies to drill vertically and then horizontally while hydraulic fracturing, also known as "fracking" involves capping the well and forcing high pressure water into the rock to dissolve the shale. Together, the techniques allow easy extraction of any natural gas trapped inside a shale formation.

Drilling for natural gas through the use of fracking has not gone without controversy. In 2009, residents of Pavillion, Wyoming noticed an odd taste and smell in their well water. When the water was tested by the United States Environmental Protection Agency (EPA), contaminates were discovered including Methane as well as petroleum by-products. The contaminates were present at a level which caused concern and residents were advised to use alternate water supplies until the source of the contamination could be identified. On December 8, 2011, the EPA released its findings implicating natural gas fracking as the likely source of the ground water contamination even though the depth of the drilling in the area was below the water table.



Since the first drill was installed in Pennsylvania, over 2000 drilling permits have been approved in the state with suspected Marcellus Shale drilling intent. In 2010 alone, over 1200 new wells were installed over suspected Marcellus Shale natural gas deposits. All total, an estimated 2.8 trillion cubic feet of natural gas is hidden in the Marcellus Shale field and its worth millions. But what is the cost to public health and the environment to extract it?

Source image : ecologie.blog.lemonde.fr

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