



Tom Bailey and Hogan Petrick work at Dearing Compressor, which is expanding to capitalize on the Marcellus Shale gas field.

Manufacturers Strike Gold in Marcellus Shale

Key to tapping gas reserve is technology that enables cost-effective horizontal drilling.

By Dan O'Brien

Every industry loves a patient investor. But 400 million years is a l-o-n-g time to wait for a return.

The rock formation known as the Marcellus Shale – a comparatively thin layer of sediment formed and compressed during the Devonian Period and buried deep beneath eastern Ohio, western and central Pennsylvania and southwestern New York – is today yielding riches for energy companies, suppliers, landowners and auxiliary businesses throughout the region.

It's because the shale contains what specialists are calling one of the largest, most significant repositories of natural gas in the United States – a mother lode with enough gas to supply the energy needs of

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\$64 Million, \$650 Million; Big, Even Bigger Projects

By George Nelson

When an economic development effort is so big that it all but eclipses a \$64 million project, that's not a bad situation to have.

In any other year, Patriot Special Metals Inc.'s plans to build a 210,000-square-foot plant – a project that could be the first phase of the company's long-term expansion plan – “would have been the shining star of what we've done,” muses Walter Good, vice president of economic development,

business retention and expansion at the Youngstown/Warren Regional Chamber.

That “significant investment,” though, has been “somewhat eclipsed,” he acknowledges, by speculation over the past several months on whether V&M Star Steel would move forward on its own project. On Feb. 15, the company confirmed plans to build a \$650 million rolling mill near its plant in Brier Hill.

“These are two big projects the
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Walt Good and Eric Planey share development leadership roles at the Regional Chamber.

Marcellus Shale: Manufacturers Strike Gold

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this country for decades to come.

"This could have a tremendous impact on our area and our economy," says Becky Wall, executive vice president of Dearing Compressor & Pump Co., Boardman. The company assembles large, heavy-duty compressors energy companies use to explore for natural gas.

Business for the company, which has undergone steady growth since 2006, has skyrocketed since energy companies started drilling in earnest at the shale about a year and a half ago, Wall says. The natural-gas rush in the region convinced Dearing to pump about \$1 million into a major expansion of its operations just to keep up with orders originating from Marcellus drilling.

"We've had an advantage because we've been growing at a rapid pace," Wall relates. "It prepared us for the opportunities for drilling in the shale." The company is building a 50,000-square-foot manufacturing and assembly area in addition to the 30,000-square-foot plant it occupies on Simon Road. As a result of Marcellus projects, the company expects to hire another 20 to 30 workers once the expansion is finished in June.

Dearing Compressor, which employs 93, should hit the 100 mark by March 31, Wall reports.

The machines Dearing designs and builds are huge – engines that range between 1,500 to 5,000 horsepower, vary in price from \$50,000 to \$3 million and that can drive drilling operations for major energy companies, reports Rick Dearing, president.

"The equipment we're selling has a 30-year lifespan to them," Dearing says. "That means these companies are in it for the long haul."

Development officials in Pennsylvania project that the commonwealth could realize \$14.7 billion in economic development and the creation of 100,000 jobs by Dec. 31 as a result of Marcellus drilling, Wall relates. "We want Ohio to latch onto this," he says.

Some Valley companies have already heard the call loud and clear.

"We've been in Pennsylvania for five years and got in before Marcellus broke loose," says Ben Lupo, president of D&L Energy, Youngstown. The company partners with large drilling companies, such as Atlas Energy in Pittsburgh, to extract the gas. D&L then hauls byproducts – especially resultant contaminated water – for safe disposal.

The company also owns acreage in the shale and expects to begin drilling operations there this summer, Lupo says. Just how much natural gas could be extracted and the money that could be made in the Marcellus is anyone's guess, he says. "A \$5 million well could generate \$50 million" over its lifetime, he speculates.

And, landowners along the shale stand to profit greatly as drilling along the most productive areas – mostly in central to central-western Pennsylvania – steps up, Lupo notes. "There are landowners getting \$1,500 to \$5,000 an acre," he reports. "If you have a 200-acre farm, you could make \$1 million."

Or, as landowners in the Marcellus Shale have discovered, it's more lucrative to lease their land, Lupo relates. Standard leasing agreements call for the landowner to reap a 20% royalty on the natural gas produced from the well.

"We were lucky, we got the acreage ahead of

time," he says. "The biggest problem facing these energy companies now is to get rid of the water."

Companies have perfected the technique of horizontal drilling, which uses a large amount of pressurized water to blast open the highly compressed shale – in some areas 9,000 feet below the Appalachian surface. Because the shale is relatively thin – on average between 100 and 300 feet thick – the drilling then turns horizontally and punches through fractures within the rock, unleashing pockets of natural gas encased tens of millions of years.

The excess water, now contaminated, needs to be cleansed and properly disposed of.

That's why D&L and another partner, Hart Resource Technologies of Creekside, Pa., plan to construct a \$1.7 million retainer well and wastewater treatment system at the Ohio Works Business Park in Youngstown to cleanse and dispose of the contaminated water produced from drilling the Marcellus shale. In total, the project would create 24 jobs immediately and pave the way for D&L's exploration activities this summer.

"This could blossom big time," Lupo says of the project, noting the area could be home to a half-dozen wells. "He who can get rid of the water and get rid of it legally is king in this business. If we're able to get rid of it first, we could hit big time."

The project is awaiting approval from the Ohio Environmental Protection Agency and Youngstown

City Council. Councilwoman Carol Rimedio-Righetti has said she is concerned about the environmental ramifications because of how close the proposed location is to neighborhoods in the 4th Ward.

Drilling in the Marcellus shale is nothing new. Prospecting companies began exploring the region in the 1830s and areas such as Oil City and Titusville, Pa., became the epicenter of the world's oil industry during the late 19th century.

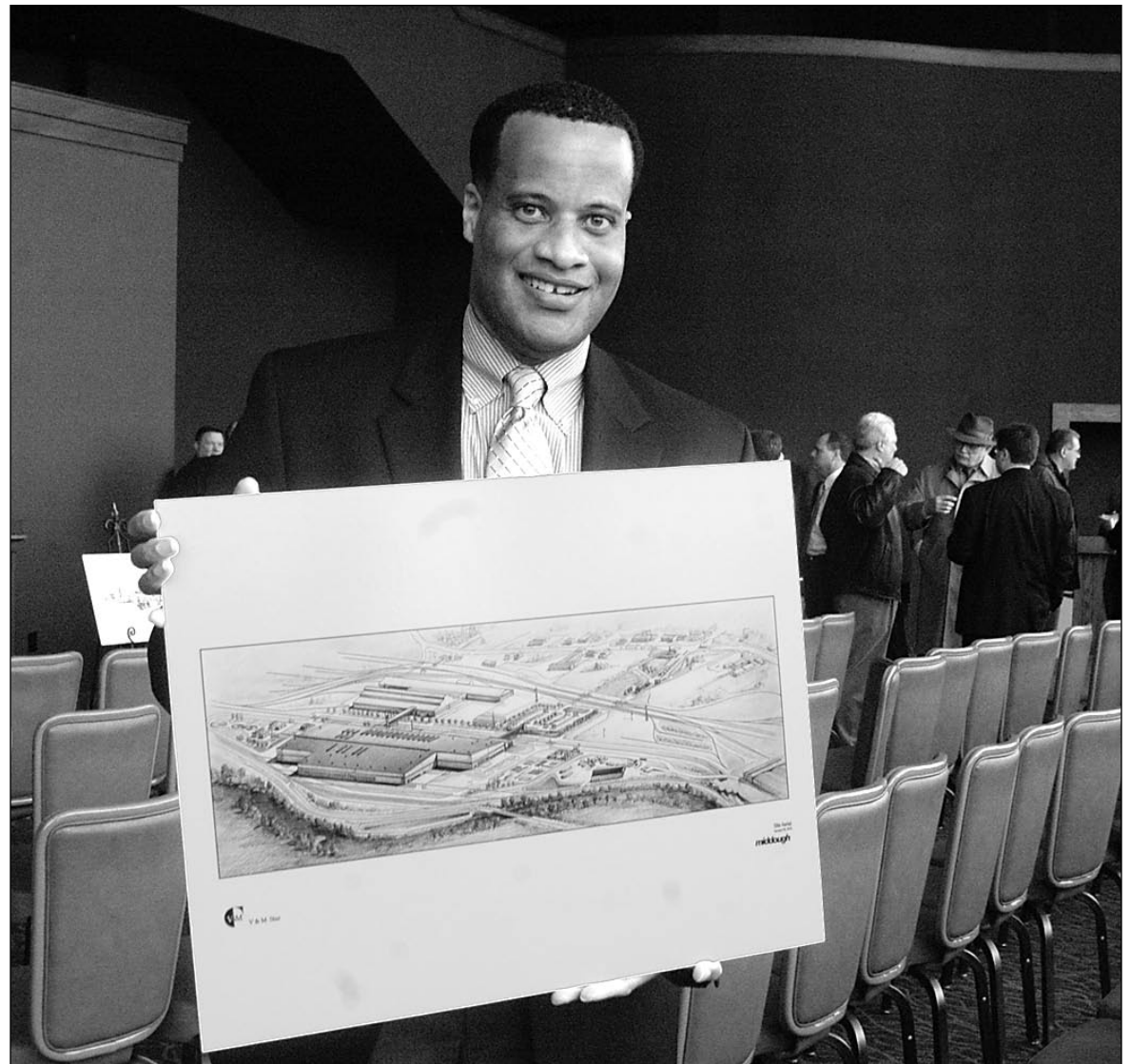
However, reaching and extracting natural gas from the Marcellus has always proved tricky and costly. First, it's deep – the layer forms what amounts to a large pocket beneath the Appalachian Mountains that ranges in depth from 4,000 feet to 9,000 in shallow areas such as eastern Ohio. And, the Marcellus layer is relatively thin, measuring on average about 300 feet thick.

The key to tapping into the Marcellus reserve is technology that has enabled horizontal drilling techniques to become more cost-effective, says Terry Engleder, professor of geosciences at Penn State University.

These advances, which energy companies started to employ in earnest just two years ago, has the potential to open an energy field so vast that, by itself, could supply the natural gas needs of the country at least 20 years.

"It's mind-boggling how large this is," Engleder

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Youngstown Mayor Jay Williams holds a rendering of V&M Star's \$650 million mill, a project fueled by demand for tubular pipe.

says. "Many believe that this area could yield 489 trillion cubic feet of gas supplies."

Engleder, who has studied the Marcellus Shale 25 years, says those numbers are based on just 10% of the natural gas that is packed within – an area that conservatively covers 15 million acres. Others have pegged the area of useable gas at close to 35 million acres.

"Something of this magnitude hasn't happened in America for a long time," Engleder notes. The reserve is so significant that he compares it to the oil rush that kicked off in 1859 with the Drake Well near Titusville, Pa., in Venango County. That single moment, also made possible by the perfection of new drilling techniques, is largely considered the birth of the world's modern petroleum industry.

The Marcellus play could have the same effect on the world's natural gas industry, providing an alternative source to oil and thereby eliminating global dependence on energy sources in the Middle East. "Our dependence on foreign oil also jeopardizes our security," he says.

The first gas wells in the Marcellus were drilled as early as the 1880s, Engleder notes. In 1940, explorers trying to drill vertically below the shale in Allegany County, N.Y., fractured the rock and unleashed a torrent of natural gas with no means to control the geyser. "We now have the technology to control and transport the gas," he relates.

The Marcellus shale was formed 400 million years ago, when Ohio and Pennsylvania were covered with heavy organic sediment that decayed over millions of years. As the sediment degraded, methane and other gases compressed and forced fractures in the rock. As the sediment hardened and became packed under layers and layers of other formations in the earth's crust, the gas became trapped in the fissures.

Horizontal drilling through the use of hydraulic fracturing has proved revolutionary for exploration because it unlocks these unconventional reservoirs, Engleder says. Through this method, operators drill vertically until they hit the shale. Then, the drill path turns horizontally and bores 5,000 feet through the fractures, creating a path for the released gas.

Strict vertical drilling is useless in the shale because the formation is so thin, Engleder says.

The best drilling sites are those where the shale is thickest and deepest, which is generally in the center to western portion of Pennsylvania, Engleder says. He said it's not likely that there would be any substantive drilling in the Mahoning Valley or nearby Pennsylvania counties such as Lawrence and Mercer any time soon.

"Mercer and Lawrence don't have good shale for drilling," Engleder says. "It's too shallow and thin." In Centre County, Pa., for example, the shale could be buried 7,800 feet compared to just 4,000 to 3,500 in eastern Ohio and far western Pennsylvania.

As drilling technology improves, though, extracting gas from this portion of the shale is very possible, Engleder says. "In my opinion, it will happen, and that includes areas around Youngstown. It's just a matter of when."

But it's clear the Mahoning Valley is already reaping major rewards for the drilling activity because of its proximity to the sites.

On Feb. 15, V&M Star announced it would spend \$650 million on its tube-making operations in Youngstown and construct a new rolling mill. The company melts scrap steel to produce oil-country tubular pipe used for the exploration of natural gas

and oil. Demand is on the increase for the company's products, largely because of Marcellus drilling. The project is expected to create 350 full-time jobs and another 400 to 500 temporary construction jobs.

And, another tube maker, Russian-based TMK Ipsco, announced Feb. 23 that its subsidiary, Ultra Premium Connections, has leased the former Sharon Tube operation in Brookfield to start a threading mill there that could eventually employ up to 120.

"These shales are a game-changing phenomenon" for natural gas exploration worldwide, says Pitor Galitzine, TMK Ipsco's chairman. The company manufactures seamless pipe in Ambridge, Pa., north of Pittsburgh, and will then send it to Brookfield for

threading and coupling processing. The pipe is then sent to drill rigs in the Marcellus shale.

The Brookfield plant "eliminates any logistical problems" that could arise as a result of its Marcellus customers, Galitzine says.

He says the Marcellus will quickly be inundated with business interests across the country – Pittsburgh is already attracting its share of cars bearing Texas and Oklahoma license plates – and also a strong international presence.

"In the last three months, you've seen about \$50 billion in takeover and investment deals related to shale exploration [around the world]," Galitzine says. "This is the energy of the future."



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