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Underground development

Oil, gas shales hold promise of more energy production, but rise in fracking also presents state policy challenges

by Ilene Grossman (igrossman@csg.org)

Over the past three years, the hometown of North Dakota Republican Rep. Patrick Hatlestad has doubled in population size.

Thousands of workers have flocked to the city of Williston looking for work, “man camps” have been set up to make up for local housing shortages, and the area’s infrastructure — from housing to roads to water — is being stretched thin.

“We are growing too fast for our services to keep up,” says Hatlestad.

Williston, like many other North Dakota communities, has undergone a dramatic change as a result of the recent oil boom.

The boom, too, has helped catapult North Dakota to the top of key national economic and fiscal indicators: low unemployment figures, for example, and high rates of growth in tax revenue and personal income.



Rep. Patrick Hatlestad

More than half a million barrels of oil are now being produced in the state each day, a 30 percent increase over production from just a year ago.

The jump in activity is the result of new technologies that have dramatically increased oil production in the Bakken shale formation, which covers close to one-third of the state. Advances in hydraulic fracturing and horizontal drilling are allowing companies to tap into oil and gas deposits that, until recently, couldn’t be reached.

And this activity extends well beyond North Dakota, including to other parts of the Midwest where the potential for expanded oil and gas production is just beginning to be tapped.

States are bracing for a rise in the use of hydraulic fracturing, or fracking. It is a practice that holds the promise of increasing energy production, growing local economies and bolstering state tax

revenues. But it also raises questions about the role of states in regulating operations, safeguarding water resources, and protecting landowners and communities.

“I am in favor of utilizing the natural resources that we have available,” Ohio Democratic Rep. Tom Letson says, “and am of the mind that the regulations being discussed in Ohio are sufficiently protective of the environment.”

What’s needed, he says, are enough trained, experienced inspectors to enforce the state regulations, as well as sufficient disclosure requirements on operations, new protections for landowners and a public that is informed about the process.

Ohio is one of many states just beginning to tackle these issues.

As the chart on page 6 shows, a slew of new fracking-related legislation has been introduced over the past year in nearly every Midwestern state.

A look underground: ‘Shale plays’ in the Midwest

The Bakken formation in North Dakota is between 4,500 and 7,500 feet deep. Like much of the newly available oil and gas in the U.S., Bakken oil is found in shale deposits.

Getting to the oil in these deposits often requires the use of horizontal

drilling (a process that is more expensive than vertical drilling but that also yields more oil and gas reserves) and hydraulic fracturing.

Once a well is drilled, steel pipe casing is installed, the pipe is encased in cement, and fracturing fluids are injected deep underground. The fluids are mostly water (about 90 percent) and sand (about 9.5 percent), but also contain chemicals.

The fracking fluids are injected at high pressure into the rock, and the oil or gas is released and pumped out.

In addition to the Bakken, there are five other current “shale plays” — formations known to contain accumulations of gas and/or oil — in the Midwest, according to the U.S. Energy Information Administration. The Bakken shale has largely been a source of increased oil production; in other parts of the region, fracking is expected to bolster the supply of natural gas.

The Antrim shale, for example, covers a good portion of Michigan, while exploration of the New Albany shale is beginning in southwest Indiana and southeast Illinois. Current shale plays



Rep. Tom Letson

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An oil rig is pictured on the plains of North Dakota, where oil production has skyrocketed in recent years due to advances in hydraulic fracturing, or fracking. Fracking activity is on the rise in several other Midwestern states, where new rules and legislation are being proposed in response.

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Concerns about fracking center on volume of water and types of chemicals being used

are also in parts of Nebraska, Kansas and South Dakota.

And then there is the huge potential for natural gas exploration and discovery in the eastern part of Ohio.

According to a recent study by the Ohio Shale Coalition — a partnership of local chambers of commerce and other groups — total economic output from Utica shale development, currently at \$291 million, is expected to rise to \$9.6 billion by 2014.

Development of the Marcellus shale play, which lies above the Utica formation, is further along in Ohio and neighboring states. It may be one of the largest gas discoveries in the world, covering 95,000 square miles and potentially holding more than 400 trillion cubic feet of natural gas, according to *energyfromshale.org*.

Shale exploration, in fact, has already proven to be a boon for Ohio's steel industry, according to the online newsletter *EnergyWire* (the steel is needed for the piping to line the wells), and this increased demand for steel as well as other goods has contributed to a drop in Ohio's overall unemployment figures.

Still, there remain many questions and con-

cerns about fracking, and states are just beginning to address them through new regulations and legislation.

In Ohio, for example, Republican Gov. John Kasich ordered a temporary moratorium on the drilling and use of wastewater wells within a five-mile radius of a site in Youngstown, where there has been a series of earthquakes. State and federal officials are investigating the possible link between the seismic activity and the underground injection of waste from fracking operations.

The overall level of uncertainty about the impact of fracking has led some lawmakers in Ohio and Michigan to propose broader moratoria, until more state and federal environmental studies can be completed.

Minus such bans, states are considering legislation to increase oversight, require more disclosure, and establish new rules and standards for fracking operations.

Various proposals, for example, would require new testing of the wells before they are used, set new guidelines governing the treatment and disposal of fracking fluids, and mandate reporting and disclosure of the chemicals contained in these fluids.

Role for states: Proposals focus on fracking oversight, disclosure

The U.S. Environmental Protection Agency is also tightening its oversight of hydraulic fracturing.

Beginning in June, the first federal air-quality rule is scheduled to take effect for natural gas wells that are hydraulically fractured. It will require the operators of these wells to employ technologies that prevent the release of harmful emissions.

In announcing the new rule, the EPA said it was following the lead of states that have already instituted similar requirements.

The federal agency, meanwhile, continues to research the link between fracking activity and the contamination of groundwater.

In North Dakota, state regulators say an increased emphasis on well testing and inspections has helped prevent the threat of such contamination.

"We really stepped up the evaluation of the well



Rep. Jeff Irwin

Bills introduced and passed in Midwestern states in 2012 on hydraulic fracturing (as of April)

State	Bills	Description/details	Status
Illinois	HB 3897	establish new requirements of owners/operators: mechanical integrity tests of casing, disclosure of chemicals used, proper storage and handling of well stimulation fluid, among other provisions	voted down by committee
	HB 3939	prohibit fracking in designated state areas	not passed out of committee
	HB 5853	establish new reporting requirements (volume of water and chemicals used) with provisions to protect trade secrets	not passed out of committee
	SB 3280	establish new reporting requirements (volume of water and chemicals used) with provisions to protect trade secrets; require owners/operators to conduct mechanical integrity tests of casing	passed by Senate in April
Indiana	HB 1107	require new rules for reporting and disclosure of hydraulic fracturing treatments, including volume of fluids and description of additive products used	signed into law
	HB 1085	require owners/operators to get environmental compliance plan approved by state; plan must include well depth, list of chemicals to be used and waste generated, and analysis of impact on surrounding water and land	not passed out of committee
Iowa	SF 2175	establish specific requirements for fracking permit: disclosure of chemicals used and certification that chemicals do not pose threat to human health	not passed out of committee
Kansas	SB 375	allow for disposal, without a permit, of solid waste from oil and gas operations through process known as "land spreading"; activity must be done in accordance with best practices and maximum loading rates established by state regulators	passed by Senate in February
	HB 2526	provide explicit authority for the Kansas Corporation Commission to regulate hydraulic fracturing	signed into law
Michigan	HB 4736	establish presumption that person conducting fracking operation is liable if water near well has been contaminated	referred to committee
	HB 5149	remove exemption status for natural gas industry regarding water withdrawals	referred to committee
	HB 5151	require state study of impact of hydraulic fracturing, with advisory committee recommending new state laws and rules	referred to committee
	HB 5150	stop issuance of certain new fracking permits until state advisory committee has made recommendations (see above)	referred to committee
Nebraska	LR 504	establish interim study of statutes and regulations on hydraulic fracturing	did not pass
	LB 877	require disclosure of chemicals being used and total volume of water being used in fracking process	did not pass
North Dakota (2011)	HB 1216	establish that hydraulic fracturing is an acceptable recovery process in the state	signed into law
	HCR 3008	urge U.S. Congress to delegate fracking regulation to the states	passed
	SB 2371	appropriate \$1 million for potential legal costs to fight any attempts by U.S. EPA to regulate hydraulic fracturing (part of bill passed in special session)	signed into law
Ohio	HB 345/SB 213	establish moratorium on horizontal stimulation of oil and gas wells until completion of U.S. EPA study on impact of practice on drinking water resources	referred to committee
	HB 351	require 7% overriding royalty be paid to state and direct money to Clean Water Restoration Fund, require groundwater testing as well as disclosure of chemicals and water used in process, document plans for waste removal from operations, among other provisions	referred to committee
	HB 464	require capture of methane gas released as result of well stimulation and new state agency rules	referred to committee
	HB 474	establish permitting procedures and fees as well as new recycling and treatment requirements	referred to committee
	HB 493	establish additional requirements and disclosure for wells drilled into the Marcellus shale formation or a deeper formation: groundwater testing, minimum royalty rates for landowners, disclosure of chemicals used, among other provisions	referred to committee
	SB 212	establish requirements for oil and gas drilling and operation of wells on state land, establish 5% overriding royalty for each well stimulated	referred to committee
	SB 318	require disclosure of all chemicals and substances used, require owners/operators to comply with local zoning laws, eliminate mandatory pooling, require a surety bond for an injection well, appropriate money for oil and gas training, among other provisions	referred to committee
South Dakota	HB 1231	establish that hydraulic fracturing is an acceptable recovery process in state	did not pass
	HCR 1005	urge U.S. Congress to delegate fracking regulation to states	passed

in advance of fracking, so there is a lot of pressure testing and visual testing before [owners and operators] can frack a well," says Lynn Helms, director of the state's Department of Mineral Resources. "Those steps have made a major difference in terms of preventing failures during fracking."

As part of legislation advancing in Illinois this year (SB 3280), the owners and operators of fracking operations would have to conduct tests to ensure the integrity of their well casings.

But what happens if contamination occurs?

Proponents of fracking-related legislative proposals in Michigan want to make clear that responsibility lies with the owners and operators. Under HB 4736, a company would be presumed liable if the chemicals it uses are discovered in the groundwater close to a well that has been used for fracking.

Another question for states is how to manage water use. Fracking requires a large amount of water, particularly when it involves explorations in deeper shale formations.

Regulations adopted last year by Michigan's Department of Environmental Quality now require owners and operators to document where they will get the water for their fracking activities and how much water they will use.

Michigan Democratic Rep. Jeff Irwin generally supports these new rules, but he also wants to put them into statute, along with a requirement that owners and operators obtain a permit for using large amounts of the state's groundwater.

Water is the main part of the mixture used to create fractures in a rock formation — in order to extract the oil and natural gas — but it is the chemicals used in the process (less than 1 percent of the mixture) that often raise the most alarm.

"As the companies lease mineral rights from the state," Irwin says, "they should disclose everything they put into the ground here."

In North Dakota, focus is on helping affected towns, post-oil boom planning

In 2005, before the oil boom in North Dakota, 6,000 people in the state were employed in the oil and gas sector. Six years later, that number had jumped to 35,000, says Lynn Helms, director of the North Dakota Department of Mineral Resources.

All of the activity has been part of an economic boom that is the envy of other states: Oil production in North Dakota has reached a half-million barrels a day, a figure that puts the state behind only Texas and Alaska, and tax revenues have doubled over the past two years.

"We started the Bakken [shale] development with just 4,000 wells," Helms notes. "We now have 7,000, and we are headed for 40,000 wells."

The dramatic rise in production has put a greater burden on regulators like Helms, while also causing major changes in the areas where it is taking place.

The more wells in use, Helms notes, the more imperative it becomes to reduce the impact of hydraulic fracturing on the surrounding land and communities.

"As regulators, our biggest concern is reducing the footprint of these drilling operations, the amount of surface area used to extract minerals," he says. "Our efforts are really focused on making that footprint smaller and smaller per well, so that we end up with as little disruption of the surface as possible."

That means, in part, clarifying and extending state oversight of hydraulic fracturing activities. For example, North Dakota is implementing a new rule that will require the mud from drilling activities to go into tanks, rather than into pits.

Questions about severance taxes surface with rise in fracking

Most states already levy severance taxes on companies in the business of mineral extraction. Ohio is among that group of states, but Republican Gov. John Kasich says his state's severance-tax structure reflects a time when it wasn't a major oil and gas producer. That is changing, he says, and the severance tax should as well.

He has proposed increasing state revenue from oil and gas production in exchange for cuts in the income tax. With the proposed increase in the severance tax, Kasich says, Ohio's severance tax rate would remain competitive with other oil- and gas-producing states. Under his plan, the tax rate would be as follows: for the first year of operations, a rate of 1.5 percent on the value of crude oil and natural gas liquids produced and 1.0 percent for natural gas; and in subsequent years of operation, or following the initial cost-recovery period, a rate of 4.0 percent would be levied on the value of crude oil and natural gas liquids.

His proposal has not gained traction in the legislature. The table below lists Ohio's existing severance tax, as well as those of the seven other states in the Midwest with such taxes. According to U.S. Census Bureau data, North Dakota is the only Midwestern state where severance taxes account for a significant portion of state tax collections: 49.3 percent of the state's total in 2011.

Severance tax structures in Midwest	
State	Details
Indiana	Petroleum production tax — 1% of market value or \$24 per barrel of oil or \$.03 per cubic foot of gas, whichever is greater
Kansas	Severance tax — 8% of gross value of oil and gas, less property tax credit; oil and gas conservation tax — 91.00 mills per barrel of oil, 12.9 mills per thousand cubic feet of gas
Michigan	Gas and oil severance tax — 6.6% on value of oil, 5% on value of gas (up to 1% maximum additional fee on gross market value on all oil and gas produced in the state the previous year)
Nebraska	Oil and gas severance tax — 3% of the value of oil and natural gas; oil and gas conservation tax — maximum of 15 mills per dollar value at the wellhead (currently 2.0 mills)
North Dakota	Gross production tax — 5% of gross value for oil, \$.0914 per metric cubic foot (1,000 cubic feet) of gas; oil extraction tax — 6.5% of the gross value
Ohio	Resource severance tax — \$.10 per barrel of oil, \$.025 per 1,000 cubic feet of natural gas
South Dakota	Energy minerals severance tax — 4.5% of the taxable value of any energy minerals; conservation tax — 2.4 mills of taxable value of all energy minerals
Wisconsin	Oil and gas severance tax — 7% of market value of oil or gas at the mouth of the well

Source: CSG's "The Book of the States," 2011

Most companies, though, consider their chemical mixtures to be proprietary information, a trade secret that they don't want disclosed to

competitors.

Some states now require fracking owners and operators to disclose basic information about the hazardous chemicals they use — sometimes through FracFocus, an online registry created by the Groundwater Protection Council and the Interstate Oil and Gas Compact Commission. (North Dakota recently began requiring such disclosure.)

In some cases, too, this information must be provided to regulators, who can then make the information available to the public.

But some say the exemptions being granted to companies — on the grounds that it is proprietary information — undercut the public's right to know what is being injected underground.

The Michigan DEQ is already requiring chemical disclosure through its newly developed regulations. However, Irwin says proposed legislation (HB 5565) would strengthen these rules by requiring public comment before a permit is issued and by calling for the least harmful chemicals to be used. Ohio, Nebraska and Indiana are among the other Midwestern states where new disclosure laws are under consideration or where new regulations are being developed.

Rep. Letson says disclosure is one of many policy strategies that merit consideration now in Ohio.

Another idea, he says, is to adopt a "bill of rights" for landowners, with guidelines and standards for the leases signed and the royalty agreements agreed upon between them and the companies that want to use their land.

Beyond specific new laws and regulations, Letson says, the state should attempt to raise public awareness about fracking as more and more communities are affected by it. ★