

MARCELLUS SHALE & HYDRAULIC FRACTURING

WHAT YOU NEED TO KNOW

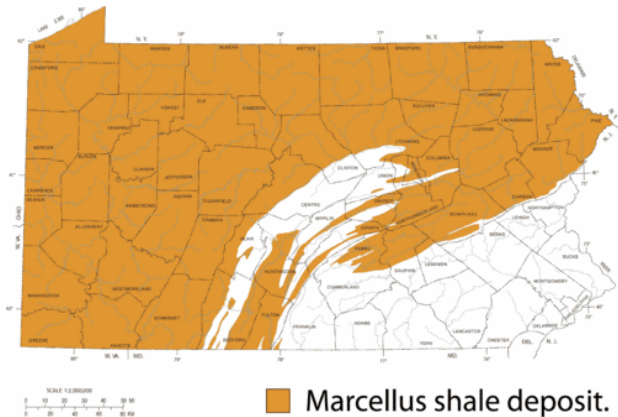
A REPORT BY STATE REPRESENTATIVE CAMILLE “BUD” GEORGE

DEMOCRATIC CHAIRMAN,
HOUSE ENVIRONMENTAL RESOURCES & ENERGY COMMITTEE



BACKGROUND

Marcellus Shale is a natural subterranean shale formation that extends through New York, Ohio, Pennsylvania, and West Virginia. It spans about 54,000 square miles and is located under 60 percent of Pennsylvania.



Source: Penn State College of Agricultural Sciences

Marcellus Shale is rich in natural gas that until recently had been difficult to extract. However, increased development utilizing horizontal hydraulic fracturing has made the extraction commercially viable.

Hydraulic fracturing is not new technology, but it has only recently become a wide-spread method of extracting natural gas from shale formations using horizontal drilling. Since 2000, approximately 14,000 wells have been drilled in the Barnett Shale of Texas, an area 1/10 the size of Marcellus Shale.

The viability of extracting Marcellus Shale gas has been seen as a bonanza for Pennsylvania. It is seen as a major fuel source at a lower cost to consumers than the current source of out-of-state gas, which is priced higher due to the expensive transportation cost.

Marcellus Shale gas can help reduce our dependence on foreign oil. Because natural gas is cleaner burning than other fossil fuels, Marcellus Shale gas can also help reduce air pollution and greenhouse gas emissions. But it also imposes a number of issues critical to the environment and public health that must be carefully examined. This report covers several of those issues.

HYDRAULIC FRACTURING

Hydraulic fracturing, or “fracing” (pronounced as “fracking”), involves drilling several thousand feet into the ground and using a mixture of water, sand and proppant to fracture the surrounding rock formation. Hydraulic fracturing is typically used for horizontal drilling, in which the drilling direction is changed from vertical to horizontal, extending deep within the shale. The purpose of horizontal drilling is to gain access to as much of the shale formation as possible without having to drill dozens or hundreds of individual vertical wells that will not extend far beyond the end of the vertical drill. Once the driller has reached the desired horizontal distance of drilling, the shale formation is fractured using a large and highly pressurized volume of the fracing fluid. The proppant chemicals in the fracing fluid are designed to hold the fractures open, releasing the natural gas that is trapped within the shale. This released gas can then be recovered for commercial use.

Hydraulic Fracturing Chemicals

A major concern facing Pennsylvanians is the chemical composition of the fracing fluid. So far the Commonwealth has been given a list of approximately 60 different chemical compounds that make up fracing fluid, but not their concentrations. Also, it is unclear whether all of the chemical identities have been fully disclosed. Some of the chemicals are common household items – guar gum (a common food thickener), sucrose (sugar), or sodium chloride (table salt) – but some items are dangerously toxic. The table below lists some of those chemicals and the hazards associated with exposure to these substances. It is stressed that without knowing the specific concentrations of each chemical in fracing fluid, the level of harm from exposure cannot be predicted. Additionally, different fracing chemicals contain different formulas and different concentrations.

Methyl Alcohol	Very poisonous – may cause blindness or death if swallowed. Will de-fat the skin, causing it to become dry and cracked upon contact. Inhalation produces toxic effects on nervous system. Symptoms of overexposure include headache, drowsiness, nausea, vomiting, blurred vision, blindness, coma, and death. ⁱ
Hydrochloric Acid	Poisonous, corrosive – liquid and mist can cause burns to body tissue. May be fatal if swallowed or inhaled. Inhalation can cause coughing, choking, and in severe cases, pulmonary edema, circulatory failure, and death. Permanent eye damage, severe skin burns, and erosion of teeth can occur with exposure. ⁱⁱ
Boric Acid	Normally found in roach-killing products – symptoms include blue-green vomit, diarrhea, and a bright red rash. Other symptoms include blisters, collapse, coma, convulsions, drowsiness, fever, low blood pressure, sloughing of skin, and twitching of muscles. ⁱⁱⁱ
Monoethanolamine	Severe eye and lung irritant – may produce tissue damage on mucous membranes of eyes, mouth, and respiratory tract. Corrosive on skin. Other symptoms of inhalation include coughing, choking, or shortness of breath. Eyes may experience redness, watering, and itching. ^{iv}
Potassium Hydroxide	Very poisonous. May cause severe burns to skin, eyes, respiratory tract, and gastrointestinal tract. Extremely destructive to all body tissues and may be fatal if swallowed. Blindness may result from eye contact. ^v
Propargyl Alcohol	Severely corrosive and irritable to eyes, skin, and respiratory tract. Liquid or spray mist may produce tissue damage to mucous membranes of eyes, mouth, and respiratory tract. Other symptoms include coughing, choking, shortness of breath. Skin contact produces itching, scaling, reddening, or blistering. Eye contact produces redness, watering, and itching. Severe exposure may result in death. ^{vi}
Acetic Anhydride	Exposure in either liquid or vapor form causes severe irritation of the eyes, skin, and mucous membranes. The vapor can be irritating even in concentrations as low as 0.09 ppm, with people exposed to concentrations higher than 5 ppm experiencing acute eye and upper respiratory tract irritation. Symptoms included severe eye pain and difficult breathing. Delayed burns that are slow to heal may occur. Damage to the iris and blindness may also occur. ^{vii}

Dozens of other chemicals exist in the frac fluids, including benzene and other known carcinogens and volatile organic compounds.

Advocates for the oil and gas industry assert that these chemicals are present in such small amounts that they pose little threat to either their workers or the general public. That assertion is misleading.

A typical frac job can use as much as 4 million gallons of frac solution. The industry is quick to assert that 99.5 percent of frac fluid is water and sand. Even so, the numbers are still staggering. If just 1 percent of the total frac fluid used in a job is spilled, that equals 40,000 gallons of frac fluid. If just half of 1 percent of that fluid contains dangerous chemicals, that would still amount to 200 gallons of toxic chemicals.



Toxic spills have already occurred. In less than one week in September 2009, Cabot Oil & Gas had three spills, dumping approximately 8,000 gallons of frac water and chemicals. The spill, which occurred in Dimock Township, Susquehanna County, polluted wetlands and caused a fish kill in Stevens Creek.^{viii} The company was fined a paltry \$56,650 and ordered to suspend all hydraulic fracturing operations in Susquehanna County until the company submitted an updated plan and an engineering study on Oct. 6, 2009.^{ix}

Source: Abrahm Lustgarten / ProPublica

As demonstrated in Dimock Township, it does not take very much frac fluid being spilled to have devastating effects on the environment.

Other events have further strengthened public awareness of industrial gas drilling. In June 2010, a Marcellus gas well in Clearfield County experienced a blowout that spewed natural gas and frac fluid 75 feet into the air for about 16 hours. The blowout occurred just outside of Moshannon State Forest, and aircraft were temporarily banned from flying below 1,000 feet within three miles of the area for fear that the escaped natural gas could ignite and place aircraft at risk or cause a forest fire.^x Later, the state Department of Environmental Protection cited EOG Resources, formerly known as Enron Oil & Gas Co., with cutting corners and ignoring safety procedures that could have prevented the blowout. The company and its contractor, C.C. Forbes LLC, agreed to corrective action and to pay a combined \$400,000 in fines.^{xi}

On April 19, 2011, Chesapeake Energy presented a check for \$150,000 to the Galeton Borough Water Authority in Potter County for repairs to the town's public water filtration system. Erosion from drilling activities caused the borough's water intake system to be filled with sediment. Eleven hours later, a Chesapeake well two hours to the east began spilling hydraulic fracturing fluid due to an inability to contain an excessive amount of flowback from the well, located near Towanda in Bradford County. The leak spilled into a tributary of the Susquehanna River and led to the evacuation of seven families from their homes. After two days of leaking fluids and natural gas, Chesapeake finally was able to cap the well and regain control.^{xii}

On May 17, 2011, the Pennsylvania Department of Environmental Protection fined Chesapeake Energy \$1,088,000 for violations related to gas drilling. The fine, the largest ever issued to an oil and gas company by the DEP, was for contaminating private water supplies in Bradford County, as well as for a tank fire that occurred in Washington County on Feb. 23, 2011.^{xiii}

Without knowing the exact chemical composition of frac fluid, the public can only speculate as to the toxicity of the chemical solution. It is of utmost importance to know exactly what is being used. New York's Department of Environmental Conservation issued draft regulations that required full disclosure of chemical concentrations in fracturing fluid, and the New York General Assembly voted in

December 2010 to impose a temporary moratorium on shale gas drilling so that further studies of drilling impacts can be done. The bill was vetoed by then-Governor David Paterson, who while vetoing the bill, issued an executive order prohibiting hydraulic fracturing for gas drilling until at least July 1, 2011. The move was an apparent balance between addressing environmentalists' fears and not hindering economic growth in the state until the Department of Environmental Conservation concludes studies on the effects on drilling on the state's water supplies.^{xiv}

WATER ISSUES

Of the 4 million gallons of fracing fluid used for hydraulic fracturing, up to 70 percent of the fluid may flow back to the surface, though the typical range is 0 to 30 percent. The rest of the fluid (or sometimes, all of the fluid) remains deep underground. The Marcellus Shale formation is thousands of feet underground, below any underwater aquifers connected to our drinking water supply, but a risk, however small, does exist that undetected natural fractures in the geologic formation may allow frac fluid to flow to untraceable places, including an underwater aquifer. The greater risk to underground drinking water supplies, however, is due to improper casing during the drilling process, which may allow frac fluid to leak before it ever reaches the Marcellus Shale formation deep underground. Rep. George has legislation to prevent this through mandatory inspections of well sites during several phases of the drilling process.



Rep. George examines a stream with a young citizen

Surface mismanagement remains a high concern as a risk to surface water supplies. Frac fluid that flows back to the surface and is stored in pits is not only a threat to the air quality, fully discussed later in this report, but also to water supplies. Pits used for frac fluid storage are lined (sometimes double-lined), but these liners may still leak, and leaks are hard to detect. Further risk to water supplies occurs when rain or snowfall causes an overflow from the pits, spilling frac fluid into our environment.

TOTAL DISSOLVED SOLIDS (TDS) IN THE MON

Water that is returned to the surface after fracing must first be treated before it can be put back into our streams and rivers. Many companies are simply paying municipal wastewater treatment facilities to accept frac water. The facilities may be happy to take on the extra capacity for a profit, but the majority of the facilities are inadequately equipped to remove the harsh chemicals that are not normally found in municipal wastewater. Consequently, even after treatment, the water being released from the plant can still contain high levels of foreign and toxic substances not normally present in our watersheds. In addition to the chemicals found in fracing fluid, water flowing back to the surface also contains high levels of salts and chlorides that are naturally found deep underground in the shale formation. These salts and chlorides are collectively known as Total Dissolved Solids (TDS) and produce a brackish solution of brine water.

In October 2008, along 70 miles of the Monongahela River, which provides drinking water to 350,000 people, an unusually high level of TDS was detected in the water. TDS may include metals, salts, and other elements. Levels of TDS were detected at up to 852 mg per liter, with 500 mg per liter being the state and federal standard for Secondary Maximum Contaminant Level. TDS is referred to as a secondary contaminant because it affects the taste and odor of water, but is not considered threatening to human health in the same manner that primary contaminants are.^{xv}

Several sources were speculated to be the cause, with some of the blame focused on wastewater illegally dumped into the river from oil and gas drilling activities, as well as from acid mine discharges. The TDS levels have since gone down below federal and state excess levels. On Nov. 7, 2009, the Environmental Quality Board proposed new regulations that created stricter standards for wastewater discharges containing high levels of TDS.^{xvi}

The regulations, which passed in 2010, grandfathered in 27 wastewater treatment plants that had been accepting drilling wastewater under the old regulations. Those facilities were not required to adhere to the stricter TDS standards set forth for new facilities.

On April 19, 2011, the state Department of Environmental Protection called upon gas drillers to stop delivering wastewater to the remaining plants. Of the original 27 treatment plants that were grandfathered in, 15 were still accepting drilling wastewater at that time. DEP cited new studies that showed elevated levels of bromide in rivers in the western part of the state where treatment plants had been releasing treated wastewater.

Bromide, which is removed from drilling wastewater when TDS is also removed, is itself non-toxic. However, when it is combined with chlorine during the treatment process, it produces substances called Total Trihalomethanes, potentially harmful compounds.

DEP asked drillers to cease delivering wastewater to the grandfathered plants by May 19, 2011, and the gas industry, acknowledging the risks involved with Total Trihalomethanes, supported the request.^{xvii}

TWO WORDS: DUNKARD CREEK

While the Cabot Oil & Gas Company's spill in Susquehanna County was a major problem, perhaps the single biggest Pennsylvania environmental disaster of 2009 may be the annihilation of aquatic life in Dunkard Creek, Greene County.

In early September 2009, the 38-mile Dunkard Creek suffered a complete fish kill – 161 aquatic species died in the creek, including fish, mussels, salamanders, crayfish, and aquatic insects. Preliminary counts put the fish kill number as high as 10,000. This includes 18 species of fish and 16 species of freshwater mussels.^{xviii}



Source: West Virginia Dept. of Environmental Protection

Initial reports stated that the pollution in the water may have emanated from discharges from a mine water treatment facility at Consol Energy's Blacksville No. 2 mine in West Virginia. Water sampling found that the stream had extremely high levels of TDS and chlorides, substances not generally present in such high concentrations. Some speculated toward unauthorized dumping of gas drilling wastewater into the creek as a cause for the high levels of TDS. However, reports by the Department of Environmental Protection (DEP) and the United States Environmental Protection Agency (EPA) did not substantiate those claims. Levels of TDS reported through testing were in the 25,000-35,000 mg per liter range, far above the 500 mg per liter standard.^{xix}

After testing a dozen streams and the Monongahela River for golden algae, DEP and EPA stated that they believed golden algae was the cause of the massive fish kill. Golden algae thrive in salty, brackish water, the same type created by high concentrations of TDS in streams and rivers. Normally found in coastal waters, this was the first time that golden algae had been discovered in mid-Atlantic

states. The introduction of this invasive species has led investigators to believe that the algae may be the cause for the environmental destruction in Dunkard Creek.^{xx}

Consol Energy's Blacksville No. 2 mine is believed to be the primary source of the high levels of TDS in this case. However, it should be noted that natural gas drilling wastewater does contain high levels of TDS. No matter the source, if golden algae are present in water with high levels of TDS, the algae may thrive and result in a fish kill.

Many have been wondering how the golden algae came to be found in Dunkard Creek, and signs point to the possibility of the algae migrating here on drilling equipment used in Texas for gas drilling activities. DEP does have standards in place to decontaminate out-of-state equipment, but as the Dunkard Creek incident indicates, we can never be fully immune from the introduction of a foreign substance or an invasive species into our environment. The high level of TDS in the creek simply provided a well-suited habitat for the golden algae. Although the high level of TDS in the creek in this instance came from a mine, we must be sure that our natural gas drilling wastewater is properly treated to prevent the creation of more possible habitats for golden algae.



Source: <http://www.observer-reporter.com/>

ROAD DEGRADATION

One of the issues having the most immediate public impact is the degradation of local roads that occurs each time a frac job must be done. Because most of the Marcellus Shale deposit in Pennsylvania spans large sections of rural land, many of the roads used by trucks to haul water to the drilling sites are small, local roads that are not built for heavy machinery or trucks. Water is transported to the drilling sites using large tanker trucks – the kind we often see hauling gasoline on our highways. A large tanker can hold between 5,000 and 9,000 gallons of water,^{xxi} which can weigh from 40,000 to 75,000 pounds. A frac job for a horizontal well could use up to 4 million gallons of water, which will require 445 to 800 tanker truck trips, which occur 24 hours a day for several days or weeks at a time, creating road degradation, dust pollution, and the constant noise of trucks hauling water. Meanwhile, local citizens are left to pay the taxes necessary for road repairs while they put up with the noise and dust.

Gas companies are supposed to repair roads damaged by their trucks, and the industry cites spending approximately \$200 million in 2010 on repairing destroyed roads. However, the Pennsylvania Department of Transportation claimed that the industry still owed more, citing as much as \$35 million in road damage that was left unpaid by the gas industry, according to a transition report delivered from then out-going Governor Ed Rendell to Governor Tom Corbett.^{xxii}

AIR QUALITY ISSUES

Because Marcellus Shale gas extraction is still only a few years old, little data is available to examine the effects of large-scale natural gas drilling on surrounding air quality in Pennsylvania. However, numerous studies have been completed on the effects of natural gas extraction in the Barnett Shale region in Texas. Barnett Shale gas extraction has already expanded rapidly, and as of March 3, 2009, 10,539 gas wells and 5,037 permitted wells existed in the Shale field.^{xxiii} In comparing the two geologic formations, Barnett Shale covers approximately 5,000 square miles,^{xxiv} while Marcellus Shale covers approximately 54,000 square miles.^{xxv} The potential for drilling in Marcellus Shale far exceeds that of Barnett Shale, and this should be taken into account when the air quality studies in

the Barnett Shale are examined. By sheer size difference alone, the speculative emissions from Marcellus drilling could dwarf the measured emissions from Barnett within a decade.

A study conducted in the Barnett Shale area divided emissions sources from the oil and gas sector into several point sources, including compressor engine exhausts and oil/condensate tanks, fugitive and intermittent sources, including production equipment fugitives, well drilling, and fracing engines, well completions, gas processing, and transmission fugitives. The pollutants fell into several categories, including greenhouse gases, air toxic chemicals, and smog-forming compounds, such as nitrogen oxide (NO_x) and volatile organic compounds (VOC).

Based on the study, emissions of smog-forming compounds for 2009 from all oil and gas sources were estimated at 191 tons per day (tpd) on an annual average, with peak summer emissions at 307 tpd. Of those total emissions during the summer, 165 tpd came from the five counties in the Dallas-Fort Worth metropolitan area that have significant oil and gas production.

In comparison, state and federal regulators estimated emission inventories for 2009 from all airports in the Dallas-Fort Worth area to be 16 tpd, and the emission estimates for the nine-county Dallas-Fort Worth metropolitan area for on-road motor vehicles was 273 tpd. In the five counties of that area with significant oil and gas production, the total on-road vehicle emissions was 121 tpd, meaning that the oil and gas sector was providing greater emissions than cars and trucks in those counties.

Air toxic compounds, including benzene and formaldehyde, were predicted at 6 tpd on average, with 17 tpd during summer months, and greenhouse gases like carbon dioxide and methane were predicted at 33,000 tpd of CO₂ equivalent, as much as two 750 MW, coal-fired power plants.^{xxvi}

Although the high emissions in the Dallas-Fort Worth metropolitan area in part come from a large number of vehicles and other smog- and greenhouse-producing gases in the area, it should be noted that beginning in 2002, the rural Denton County air-testing site has maintained the highest concentrations of total non-methane organic carbon concentrations every year.^{xxvii}

A study conducted in the town of DISH, Texas (located in Denton County) tested for volatile organic compounds, hazardous air pollutants, and Tentatively Identified Compounds in multiple locations. The results confirmed the presence of multiple "Recognized and Suspected Human Carcinogens in fugitive air emissions" at several locations throughout the town. As the study states, the chemicals identified are known ingredients used within natural gas industrial processes, such as exploration, drilling, flaring, and compression. Laboratory results confirmed levels of toxins in excess of the Texas Commission on Environmental Quality's Short Term and Long Term Effects Screening Levels. Several locations confirmed high levels of a chemical that is categorized with the capability for "disaster potential."^{xxviii}

As numerous studies have already confirmed, drilling activity in the Barnett Shale has increased the emissions levels of several known carcinogens, volatile organic compounds, greenhouse gases, and smog-producing components. Various practices involved with hydraulic fracturing, as well as emissions from the machinery used, have been the source for rapid degradation of air quality in areas where gas drilling is occurring.

The State of the Air 2009 report, issued by the American Lung Association, lists the Dallas-Fort Worth, Texas area as the seventh most ozone-polluted city in the nation. Further, Dallas County is listed as the 19th most ozone-polluted county. Rural Denton County is listed as 22nd.^{xxix}

The documented history of what has happened in Texas recently is a prophecy of what can happen in Pennsylvania without proper regulations and air quality standards. The Texas experience also shows

the need for restrictions – or even bans – on open pits that allow volatile organic compounds existing in fracking fluids to evaporate into the air.



Source: <http://www.un-naturalgas.org/>

It is unknown what will happen to the air quality in Pennsylvania if open pits such as these are allowed to continue, releasing evaporated chemicals into the air from used hydraulic fracturing fluid. Machinery and other gas drilling activities add to the problem.



Sources: J. Henry Fair / <http://www.industrialcars.com/>, Light Hawk & Catskill Mountainkeeper

NATURALLY OCCURRING RADIOACTIVE MATERIAL

Deep below the Earth’s surface, rock formations (including Marcellus Shale) contain low levels of radiation. This material, called Naturally Occurring Radioactive Material, or NORM, has raised concerns over whether or not the material, including flowback water, is safe once it has been contaminated. Due to questions of water safety due to NORM, Rep. George has introduced House Bill 1565, which would mandate that wastewater is tested before treatment and after treatment, before discharge into waterways of the Commonwealth.

OIL & GAS INDUSTRY – FEDERAL ENVIRONMENTAL LAW EXEMPTIONS

An October 2007 study by the Oil & Gas Accountability Project highlights several of the exemptions to federal environmental laws that allow the oil and gas industry to operate without meeting certain standards required of other industries. Current federal statutes containing provisions exempting the oil and gas industry include:

- Clean Air Act**
- Clean Water Act**
- Safe Drinking Water Act**
- National Environmental Policy Act**
- Resource Conservation and Recovery Act**
- Comprehensive Environmental Response, Compensation, and Liability Act**
- Toxic Release Inventory under the Emergency Planning and Community Right-to-Know Act^{xxx}**

Legislation pending in Congress, called the Fracturing Responsibility and Awareness of Chemicals (FRAC) Act, would remove the exemption under the Safe Drinking Water Act. However, the oil and gas industry remains excused from meeting many of the standards that most other industries must meet.

FORCED POOLING

Pooling

Pooling is a practice used by oil and gas companies to group adjoining mineral rights leases to form a larger drilling unit. This is an important issue for producers seeking to drill horizontal wells because a larger land unit would allow for longer and more cost-efficient drills. Typically companies attempt to

pool through agreements. However, when they encounter mineral rights owners who are unwilling, for whatever reason, to lease their rights, the companies have resorted to "forced pooling."

Forced Pooling

Forced pooling is a government process by which the unwilling or unavailable mineral rights owner would be forced to lease his or her interest in exchange for a royalty share. Currently, some form of forced pooling exists in Oklahoma, Louisiana, Texas, Colorado and New York, although the applicability of forced pooling, as well as the rights and duties of those force-pooled, vary considerably.

Under the process, a gas producer would file a pooling application with the appropriate government agency. After notice and an opportunity to respond, the agency may issue a pooling order setting the terms and conditions of the forced pooling, including compensation for the unwilling owner.

Issue: Economic Efficiency vs. Eminent Domain

Proponents of forced pooling assert that, as a policy matter, pooling promotes economic drilling and limits the environmental footprint of drilling. They also assert that pooling protects the interests of the willing mineral rights owners in the drilling unit who want to maximize their financial benefits. However, critics of forced pooling call it an eminent domain for mineral rights for the pure benefit of private companies.

Pennsylvania Law

In Pennsylvania, a forced pooling provision in the Oil and Gas Conservation Law already exists. However, there is no official record indicating that this law was ever invoked or used. The provision would allow a currently non-existent Oil and Gas Commission to administer forced pooling applications and issue a forced pooling order after a public hearing. Importantly, this provision applies only to wells penetrating the Onondaga formation, situated just below the Marcellus, and apparently would not apply to Marcellus. However, if gas companies get their way, forced pooling in Marcellus Shale gas wells will soon be a reality in Pennsylvania.

MUNICIPAL PREEMPTION

Background

Generally, the ability of a municipality to promulgate its own regulations in relation to a state's regulations falls under two categories: Home Rule – in which municipalities are inherently given powers not expressly granted to the state, and Dillon's Rule – where municipalities have no additional regulatory powers beyond those expressly granted by the state to the municipalities. Dillon's Rule is the law of the land in Pennsylvania, and the idea of preemption of a municipality's regulatory powers is something the natural gas industry is watching very closely.

Municipal Preemption

Municipalities do have the ability to promulgate some regulations that are supplemental or additional to those of the Commonwealth. However the regulations cannot contradict or be otherwise offensive to the state's regulatory provisions. Additionally, there are two ways in which legislative preemption of local regulation may occur – either through explicit language within a statute providing for a statewide regulatory scheme, or by implication when local powers conflict with state powers.

When no explicit preemption exists, and it must be determined if that preemption is to be implied, legislative intent is often examined by the courts. Several criteria are examined, including whether

the ordinance forbids what the Legislature has permitted, whether the subject matter requires uniformity across the Commonwealth, and also if the ordinance is an obstacle to the full goals and objectives of the Legislature.

Courts have ruled in favor of preempting local ordinances across the board in several areas already, including alcoholic beverages, banking, and anthracite strip mining.^{xxx}

Oil and Gas Regulations

Generally in the Commonwealth, oil and gas laws are established through the Oil and Gas Act of 1984, with regulations being promulgated by the Department of Environmental Protection and the Environmental Quality Board. However, several provisions, including zoning ordinances and the times in which oil and gas drilling could occur, have traditionally been left to local governments to control.

With Marcellus Shale drilling expanding across the Commonwealth at an exponential rate, it is without a doubt that municipalities may seek to enact stricter regulatory guidelines than those established by the state. Concerns over water quality, land use and reclamation, and air and noise pollution may lead local governments to enact ordinances for protection where the Commonwealth has failed to act.

In fact, local municipalities have already attempted to place some stricter rules on the oil and gas industry – an attempt that was nixed by the Pennsylvania Supreme Court in February 2009.

In the case of *Independent Oil and Gas Association of Pennsylvania, et al v Salem Township, Commonwealth of Pennsylvania*, several oil and gas producers, along with a trade association, challenged a local oil and gas ordinance enacted by Salem Township, Westmoreland County, in 2005.

Under the Oil and Gas Act, all local oil and gas well regulations are superseded by the provisions of the act, except for ordinances adopted pursuant to the Pennsylvania Municipalities Planning Code and the Flood Plain Management Act. Salem Township attempted to adopt an ordinance under the Municipalities Planning Code. However, oil and gas producers argued that the ordinance was essentially a miniature Oil and Gas Act. The municipal ordinance regulated several phases of oil and gas production, including well site construction, well head construction and plugging, water treatment, and waste disposal. Additionally, the township created its own permitting system, complete with penalties that included fines and imprisonment.

At every level in the court system, up to and including the Supreme Court (in a unanimous decision), the ruling favored the oil and gas producers. Salem Township's argument that the Oil and Gas Act only preempts local regulations of a technical nature was struck down, and consequently the ordinance was defeated.

In another case, *Huntley & Huntley, Inc. v Borough Council of the Borough of Oakmont*, the Supreme Court ruled that the designation of well locations within zoning districts is not covered in the Oil and Gas Act, and therefore, as has traditionally occurred, the local government retained the ability to designate where drilling may occur. However, the court was quick to point out that local regulations preempted by the Oil and Gas Act may not be used in granting drilling in a particular area.^{xxx}

As exhibited in both cases, depending on the type of ordinance that is enacted and the intent to regulate the oil and gas industry, local governments may find great difficulty in controlling drilling activities within their borders.

PA SURFACE OWNERS' PROTECTION RIGHTS

Current law in Pennsylvania does provide some protection to surface owners, but more protection is needed. Gas companies seeking land for natural gas storage must attempt to reach an agreement with the surface owner regarding payment for surface damages before any storage activity can take place. If no agreement is reached, a surety bond must be posted. If the surface owner does not believe the bond is sufficient, the owner may petition the court, who may appoint viewers to assess the damages to arrive at reasonable compensation for the owner. The appointed individuals must be disinterested freeholders of the county. After filing a report with the court, the court will issue reasonable compensation to the viewers.

After the bond is approved, the company then has the right to conduct activities within the storage reservoir boundary or reservoir protective area. The activities include storing gas and entering properties to locate, condition, maintain, plug, or otherwise operate active or abandoned wells.^{xxxiii}

House Bill 1163 would create the Surface Owners' Protection Act. This legislation requires compensation to surface owners for damages resulting from diminished property value as a result of drilling, as well as a mandate for drillers to reclaim any land affected by oil or gas drilling within nine months of termination of activities. Several other provisions exist in the legislation to further protect surface owners against degradation of their property, land, and water.

HOUSE BILL 833: SEVERANCE TAX

Of the natural gas producing states, most have a severance tax to deal with most of the issues mentioned in this report. Pennsylvania, to date, has yet to enact such legislation. Although the House of Representatives passed a measure for a severance tax in 2009, the Senate blocked the measure. In 2010, the House, Senate, and Governor Rendell came to an agreement that a severance tax would be enacted by October 1 of that year, but political pressures and inaction by the Senate once again stalled the effort. The debate continues whether a severance tax is right for Pennsylvania. However, it is important to consider the following points:

Gas producers claim that a severance tax would hurt a fledgling industry that is still in its infancy, but the two top drillers in Pennsylvania have been in business since the 1960s and 1970s, and alone account for 67 percent of the growth in the Marcellus Shale drilling.

Most natural gas drillers in Pennsylvania do not pay the 9.99 percent Corporate Net Income Tax. Rather, 70 percent of these companies operate as Limited Liability Corporations that are subject to only the 3.07 percent Personal Income Tax – the same tax rate as paid by citizens of the Commonwealth – and are exempt from the Corporate Net Income Tax.^{xxxiv}

Fines for spills and bonding requirements for wells often do not cover the excessive costs associated with cleaning up spills and reclaiming areas that have been damaged by natural gas drilling. A severance tax will place money back in the hands of local governments to help them repair and reclaim these areas.

House Bill 833 would levy a tax of 30 cents per 1,000 cubic feet of gas severed, with an adjustment mechanism if the price of gas changes more than 5 percent from year to year. Also included in the bill is a tax credit for gas companies creating jobs for Pennsylvania residents.

The money raised through HB833 would be allocated in the following manner:

- **NO MONEY** to the General Fund
- 35% to a Local Government Services Account (to be distributed among counties, municipalities, and the Pennsylvania Emergency Management Agency)
- 20% to the Pennsylvania Infrastructure Investment Authority – half of revenues for Marcellus wastewater treatment plants
- 15% to the Environmental Stewardship Fund
- 10% to PennDOT for road and bridge repair
- 6% to the Liquid Fuels Tax Fund
- 3% to the Conservation District Fund
- 3% to the Pennsylvania Fish and Boat Commission
- 2% to the Pennsylvania Game Commission
- 2% to the Department of Welfare for LIHEAP assistance
- 2% to the Hazardous Sites Cleanup Fund
- 2% to the Oil & Gas Environmental Disaster Recovery Account

Under this model and based on production figures from a 2010 Penn State University study titled “The Economic Impacts of Pennsylvania’s Marcellus Shale Natural Gas Play: An Update,” it is estimated that Rep. George’s House Bill 833 would generate approximately \$343 million in Fiscal Year 2011/12 and \$483 million in Fiscal Year 2012/13. The revenue would be distributed as follows:

FY2011/12 BASED ON \$343 MILLION

FY2012/13 BASED ON \$483 MILLION

NO MONEY TO THE GENERAL FUND

<p>\$120.05M 35% Local Government Services Account</p> <p>30% counties where gas severed \$36.015M (=10.5% of total money)</p> <p>40% municipalities where gas severed \$48.02M (=14% of total money)</p> <p>20% municipalities with no producing sites, but in a county with producing sites \$24.01M (=7% of total money)</p> <p>10% PEMA \$12.005M (=3.5% of total money)</p> <p>\$68.6M 20% Pennvest</p> <p>\$51.45M 15% Environmental Stewardship Fund</p> <p>\$34.3M 10% PennDOT</p> <p>\$20.58M 6% Liquid Fuels Tax Fund</p> <p>\$10.29M 3% Conservation District Fund</p> <p>\$10.29M 3% Fish & Boat Commission</p> <p>\$6.86M 2% Game Commission</p> <p>\$6.86M 2% LIHEAP</p> <p>\$6.86M 2% Hazardous Sites Cleanup Fund</p> <p>\$6.86M 2% Oil & Gas Environmental Disaster Recovery Account</p>	<p>35% Local Government Services Acct. \$169.05M</p> <p>30% counties where gas severed \$50.715M (=10.5% of total money)</p> <p>40% municipalities where gas severed \$67.62M (=14% of total money)</p> <p>20% municipalities with no producing sites, but in a county with producing sites \$33.81M (=7% of total money)</p> <p>10% PEMA \$16.905M (=3.5% of total money)</p> <p>20% Pennvest \$96.6M</p> <p>15% Environmental Stewardship Fund \$72.45M</p> <p>10% PennDOT \$48.3M</p> <p>6% Liquid Fuels Tax Fund \$28.98M</p> <p>3% Conservation District Fund \$14.49M</p> <p>3% Fish & Boat Commission \$14.49M</p> <p>2% Game Commission \$9.66M</p> <p>2% LIHEAP \$9.66M</p> <p>2% Hazardous Sites Cleanup Fund \$9.66M</p> <p>2% Oil & Gas Environmental Disaster Recovery Account \$9.66M</p>
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The money from a severance tax will ensure that the costs to the environment and our infrastructure are borne by the drillers and not by the taxpayers who otherwise would have to pay to repair the local infrastructure damages and environmental degradation associated with increased gas drilling. The

tax is not meant to balance a budget; no unrestricted revenue is directed toward the General Fund. The bill is aimed at distributing funds to those entities directly affected by drilling.

HOUSE BILLS 971 & 1410

Rep. George introduced House Bill 971, which would strengthen several of our environmental laws regarding natural gas drilling. Highlights of the bill include:

- An extended well setback requirement from existing buildings or water wells from 200 feet to 1,000 feet.
- For public water sources, a setback of 2,500 feet for surface water sources and 1,000 feet for groundwater sources.
- DEP will be required to inspect the well site during each phase of cementing, completing, and altering a well.
- The scope of rebuttable presumption concerning pollution of a water supply is extended to 2,500 feet, from 1,000 feet of an oil or gas well.
- Outdated well plugging bond amounts are updated to cover the actual cost of service.
- Clarification of local governments’ zoning power to regulate the time and place of oil and gas activities.
- Disclosure of chemicals used in hydraulic fracturing, including specific concentrations in cases of medical emergencies.

Additionally, House Bill 1410 increases the minimum royalty amounts to be paid to lessors who lease land to oil and gas drillers to 15 percent from 12.5 percent, and post-production costs may not decrease the royalty payment owed to a landowner.

A LEGACY OF MISSED OPPORTUNITIES

Pennsylvania citizens know all too well the legacy costs associated with failure to act when the time is right. Many citizens who live in the coal regions are familiar with orange or rust discoloration in local streams that is a result of acid mine drainage, a problem that DEP has spent decades and countless resources attempting to fix. Had this state enacted measures early on to tackle this problem, perhaps our citizens would not be dealing with the costs and pollution that plague us today as a result of careless coal mining.



Source: <http://www.hazlett-kincaid.com/>

State lands are being leased for natural gas drilling. Private landowners are also taking advantage of the money to be made by leasing their land to gas drillers. While this represents a great opportunity, we must ensure that our lakes, streams, ponds, and game lands are preserved so that generations ahead may use them to hike, fish, hunt, or simply to enjoy nature. It is through education and action that we can take advantage of the Marcellus Shale that exists under the Commonwealth, without compromising the quality of our environment.

The right to a clean environment is not simply a talking point or political tool – it is a guarantee provided in the Commonwealth’s Constitution. Article I, Section 27 provides for the following:

"The people have a right to clean air, pure water, and to the preservation of the natural, scenic, historic and esthetic values of the environment. Pennsylvania's public natural resources are the common property of all the people, including generations yet to come. As trustee of these resources, the Commonwealth shall conserve and maintain them for the benefit of all the people."



WHAT YOU CAN DO

CONTACT YOUR LEGISLATORS

To find your State Representative and State Senator, visit <http://www.legis.state.pa.us/> and send them an email or write, voicing your concerns. We are here to serve the people of Pennsylvania.

Visit <http://www.house.gov/> or <http://www.senate.gov/> to contact your federal Representative or Senator.

Tell your state legislators to support House Bill 1163, the Surface Owners' Protection Act, which will provide for better accountability on the part of oil and gas drillers to compensate landowners for damages and mandate reclamation of disturbed lands, as well as House Bill 833, the Natural Gas Severance Tax Act, which will provide funding for cleanup of hazardous spills, land reclamation, and road repairs, among other projects. House Bills 971 and 1410 will further protect the Commonwealth's water and land and guarantee those leasing land will receive fair royalty payments, and House Bill 1565 will ensure that drilling wastewater that is treated must be tested for radiation before discharge into Commonwealth waterways.

Contact your members of Congress and tell them to support the Fracturing Responsibility and Awareness of Chemicals Act, H.R. 1084 and S. 587 in the House and Senate, respectively. The FRAC Act will amend the federal Safe Drinking Water Act to: "(1) repeal the exemption from restrictions on underground injection of fluids near drinking water sources granted to hydraulic fracturing operations under such Act; and (2) require oil and gas companies to disclose the chemicals used in hydraulic fracturing operations," according to a summary produced by the nonpartisan Congressional Research Service.^{xxxv}

KNOW YOUR RIGHTS

If a gas company contacts you to lease your land for drilling, do your homework! Read the entire lease to be sure you are aware of all stipulations and be aware of what you are entitled to in terms of royalties and compensation for water or land damage. Consult an attorney.

STAY INFORMED

Read up on the latest news online, follow local newspapers for meetings held by county or municipal officials, and come prepared with questions. Knowledge is power and we have a responsibility to keep ourselves informed as to what is occurring in our own backyards.

NATURAL GAS HAS ITS BENEFITS AND ITS DRAWBACKS. AN INFORMED CITIZEN IS AN EMPOWERED CITIZEN.

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Source: West Virginia Surface Owners' Rights Organization – <http://www.wvsoro.org/>

MARCELLUS SHALE & HYDRAULIC FRACTURING – WHAT YOU NEED TO KNOW

A REPORT BY STATE REPRESENTATIVE CAMILLE “BUD” GEORGE, DEMOCRATIC CHAIRMAN
HOUSE ENVIRONMENTAL RESOURCES & ENERGY COMMITTEE

QUESTIONS, COMMENTS, ADDITIONAL INFORMATION, OR FOR COPIES OF THIS REPORT

PENNSYLVANIA HOUSE OF REPRESENTATIVES
ENVIRONMENTAL RESOURCES & ENERGY COMMITTEE
Room 38B East Wing, P.O. Box 202074
Harrisburg, PA 17120-2074
(717) 787-7316 or toll-free 1 (866) 354-0890
<http://www.pahouse.com/george/>

