



Citizens for Pennsylvania's Future
610 North Third Street
Harrisburg, PA 17101-1113
P 717.214.7920 / 800.321.7775
F. 717.214.7927
info@pennfuture.org
www.pennfuture.org

Testimony of
Jan Jarrett
President and CEO
Citizens for Pennsylvania's Future
(PennFuture)
Before the
Environmental Resources & Energy Committee
Pennsylvania House of Representatives

Harrisburg, PA

March 31, 2009

My name is Jan Jarrett and I am the President of Citizens for Pennsylvania's Future. I'd like to thank Chairman George, Chairman Hutchinson and the members of this Committee for the opportunity to share our thoughts on the important matter of the environmental issues that are raised by development of the Marcellus Shale. PennFuture has since its inception in 1998 worked to create a just future where nature, communities, and the economy thrive.

PennFuture has followed the development of the natural gas trapped in the Marcellus Shale; and we are excited by the potential jobs and other economic benefits that development brings to the state – especially its rural communities. But gas drilling, like all other forms of energy production poses risks to the environment. To protect the Commonwealth's natural resources and communities, we must insist that the new drilling activity be regulated and managed efficiently. We want to ensure that Pennsylvania is not left with a legacy of pollution that could erase many of the economic benefits that development of the Marcellus Shale promises to bring to the state.

The Marcellus Shale is a geologic formation that generally lies between five and seven thousand feet beneath parts of West Virginia, Ohio, New York, and Pennsylvania, including almost all of Pennsylvania north and west of the Allegheny Front.¹ Researchers at Penn State University estimate that the Marcellus Shale holds as much as 363 trillion cubic feet of natural gas, making it the largest natural gas deposit in the United States.

The Marcellus Shale has been known to hold natural gas for many years, but until recently, it was not economically feasible to recover that gas.² In the 1990s, drilling companies applied two drilling technologies – hydraulic fracturing and horizontal drilling – to a similar shale formation in Texas, and successfully recovered significant amounts of natural gas at an economical cost.³ In 2003, one company used these same technologies on a well drilled into the

¹ Clifford Krauss, *There's Gas in Those Hills*, NEW YORK TIMES (Apr. 8, 2008), at <http://www.nytimes.com/2008/04/08/business/08gas.html?pagewanted=1>.

² John A. Harper, *The Marcellus Shale – An Old "New" Gas Reservoir in Pennsylvania*, 38 PENNSYLVANIA GEOLOGY 1, 2 (2008).

³ *Id.*, at 10.

Marcellus Shale under Washington County, Pennsylvania.⁴ After the successful results of that test well were announced, gas leasing and drilling activity in Pennsylvania experienced something of a boom.⁵ Although since mid-2008 drilling and leasing activity has slowed along with the rest of the economy and a drop in natural gas prices,⁶ the sheer size of the reserves in the Marcellus Shale ensure that the gas drilling industry is in Pennsylvania to stay.

The development of the Marcellus Shale's gas reserves creates not only unprecedented economic opportunities, but also unprecedented environmental challenges.

I'd like to focus my testimony today on identifying some of the most significant of those challenges and discuss the best ways to meet them.

ENVIRONMENTAL ISSUES

Water Consumption

Recommendation - DEP and the Statewide Water Resources Committee established under Act 220 should expeditiously integrate the information that well operators are providing regarding their water consumption into the State Water Plan to better protect Pennsylvania's water resources.

Hydraulic fracturing is a process used to release the gas trapped in the shale formation. Drilling companies pump fresh water, mixed with sand and a proprietary mixture of chemicals, into gas-bearing rock at extremely high pressure. The pressure causes the gas-bearing rock to fracture and releases the gas; the sand is used to prop the fissures open, allowing more gas to escape; and the chemicals strip gas from the rock and keep the well's pipes free of scaling and

⁴ *Id.*, at 9.

⁵ *Id.*; Krauss, *supra* note 1.

⁶ Ron DeParma and Sam Spatter, *Offers Erode for Land Rich in Resources*, PITTSBURGH TRIBUNE-REVIEW (Nov. 30, 2008), at http://www.pittsburghlive.com/x/pittsburghtrib/news/mostread/s_600759.html.

corrosion.⁷ A well may be fracked several times during its productive life to stimulate greater gas production.⁸

Hydraulic fracturing has been used for years in Pennsylvania in conventional gas wells.⁹ However, a frac job on a conventional well typically uses only between 5,000 and 50,000 gallons of fresh water;¹⁰ a frac job on a horizontal well in the Marcellus Shale can use **three to five million** gallons of fresh water.¹¹ The water that flows back to the surface during a frac job cannot be reused until it is treated.

Thus, the first significant environmental issue raised by the development of the Marcellus Shale is: “Where will the drilling industry get the millions of gallons of fresh water that it needs to frac the shale?”

Initially, some drilling companies attempted to satisfy their water requirements by taking water directly from streams near their wells.¹² Fortunately, DEP has made it clear to the drilling industry that unpermitted withdrawals of water from streams are illegal,¹³ and seems either to have nipped that practice in the bud or driven it completely underground. Before mid-2008, there were reports that a small number of streams had been temporarily “sucked dry” by the drilling industry,¹⁴ but reports of such withdrawals seem to have ceased. There have been scattered reports from across the Marcellus Shale drilling area that well water levels were

⁷ Harper, *supra* note 3, at 10.

⁸ MARTIN S. RAYMOND AND WILLIAM R. LEFFLER, OIL AND GAS PRODUCTION IN NONTECHNICAL LANGUAGE, at 219 (2006); *Watchful Eyes Will Help Protect Area Streams During Gas Drilling*, DUBOIS COURIER-EXPRESS (Mar. 14, 2009), at http://www.thecourierexpress.com/site/news.cfm?newsid=20280395&BRD=2758&PAG=461&dept_id=572984&rft=6.

⁹ Robert W. Watson, *Going for the Gas*, BINGHAMPTON PRESSCONNECTS (March 12, 2009), at <http://m.pressconnects.com/apps/pbcs.dll/article?AID=/20090311/OPINION02/903110318/1005/OPINION&template=wapart>.

¹⁰ Harper, *supra* note 3, at 11-12.

¹¹ Watson, *supra* note 10.

¹² Hopey, *Area's Gas Deposits*, *supra* note 2.

¹³ Pennsylvania Dept. of Env'tl. Prot., *Daily Update: Natural Gas Exploration, Extraction Will Not Come at Natural Resources' Expense, Says DEP Secretary McGinty* (June 13, 2008), at <http://www.depweb.state.pa.us/news/cwp/view.asp?Q=537981&A=3&pp=12&n=1>.

¹⁴ Hopey, *Area's Gas Deposits*, *supra* note 2; Jim Parsons, *Pa. Streams Drained by Drillers* (transcript of television news broadcast on Pittsburgh station WTAE-TV, Nov. 13, 2008), at <http://www.thepittsburghchannel.com/actionnewsextras/17973811/detail.html>.

temporarily impaired by drilling operations,¹⁵ however, there have, to our knowledge, been no reports of well water levels being permanently impaired by such operations.

Although the Delaware and Susquehanna River Basin Commissions have monitored and regulated the withdrawal and consumptive use of water in the Delaware and Susquehanna River watersheds for many years,¹⁶ DEP very recently acknowledged that it “does not currently know how much water is used, needed or available in this Commonwealth.”¹⁷ While DEP should be commended for revising the well permit application for drilling activity in the Marcellus Shale to require well operators to provide information regarding their water withdrawals and requirements and to ensure that the safe yields of their water sources are not exceeded by those withdrawals,¹⁸ that information cannot be truly useful until it is viewed in the full context of local, regional, and statewide water requirements. The first piece of this puzzle was put into place last week, when the State Water Plan required by Act 220¹⁹ was finally released. We urge DEP and the Statewide Water Resources Committee established under Act 220 to integrate the information that well operators are providing regarding their water consumption into the State Water Plan on an expedited basis to better protect Pennsylvania’s water resources.

¹⁵ Kimberly Collins, *House Environmental Resources and Energy Committee*, PENNSYLVANIA LEGISLATIVE SERVS. (Sept. 30, 2008) (summarizing testimony by acting DEP Secretary John Hanger).

¹⁶ Pennsylvania Dept. of Env'tl. Prot., *DEP Daily Update: DRBC Notifies Company that Water Used for Developing Natural Gas Wells in Delaware River Basin Needs Approval* (May 30, 2008) (stating: “[t]he Pennsylvania Department of Environmental Protection (Pa. DEP) has advised the commission that it will be requiring all natural gas drillers to obtain DRBC or Susquehanna River Basin Commission (SRBC) approval as a condition of Pa. DEP-issued permits for projects in those two basins. Furthermore, drillers will be required to obtain DRBC or SRBC approvals prior to the initiation of any activities”); *see also* 32 P.S. § 815.101 (adopting the Delaware River Basin Compact, which allows the Delaware River Basin Commission to regulate water withdrawals and consumption in the Delaware River Basin); 32 P.S. § 820.1 (adopting the Susquehanna River Basin Compact, which allows the Susquehanna River Basin Commission to regulate water withdrawals and consumption in the Susquehanna River Basin).

¹⁷ 38 Pa. Bull. 6266 (Nov. 15, 2008).

¹⁸ PENNSYLVANIA DEPT. OF ENVTL. PROT., APPLICATION ADDENDUM FOR MARCELLUS SHALE GAS WELL DEVELOPMENT, Form 5500-PM-OG0083, at 2 (Rev. 8/2008).

¹⁹ 2002 Pa. Laws 220 (codified at 27 Pa. C.S. §§ 701-704 and 3101-3136).

Water Treatment

Recommendation - DEP should impose more stringent discharge limits for the water quality parameters that are most affected by brine from drilling operations, including chlorides, sulfates, and Total Dissolved Solids (“TDS”) to better protect Pennsylvania’s water resources.

During and after a fracking job in the Marcellus Shale, millions of gallons of water return to the surface along with the released natural gas.²⁰ This water consists of water used in fracking operations and water that occurs naturally in the gas-bearing shale, and is referred to “flowback,” “produced water,” or “brine.” Because chlorides present in the gas-bearing shale are dissolved by frac water as it moves through the shale, the “brine” that flows back to the surface typically contains chlorides in concentrations as high as 45,000 parts per million.²¹ By way of comparison, seawater typically contains chlorides in concentrations of between 10,000 and 35,000 parts per million.²² Flowback may also contain the proprietary chemical mixtures that are added to the fracking fluid, and hydrocarbons, metals, radioactive materials, and other substances that occur naturally in the gas-bearing rock.²³

The huge volumes of brine produced by drilling and fracking operations in the Marcellus Shale create a set of water treatment challenges that, in our opinion, neither DEP nor the drilling industry is ready to handle.

DEP regulations prohibit the unpermitted discharge of brine onto land or directly into the waters of the Commonwealth.²⁴ Accordingly, the brine must either be treated or disposed as a hazardous waste. There are three methods of treating brine that are appropriate for use in

²⁰ VENTURE ENG’G & CONSTR., MARCELLUS SHALE – WATER TREATMENT OPTIONS WORTH CONSIDERING 2, at <http://www.ventureenr.com/blog/tag/marcellus-shale/>.

²¹ *Id.*; cf. Laura Legere, *Waste Water Poses Disposal Dilemma*, HAZLETON STANDARD-SPEAKER (Aug. 25, 2008) (stating that brine might be as much as “eight to 10 times saltier than ocean water”), at <http://www.mcadoo.info/documents/Speaker8-25-08.pdf>.

²² VENTURE ENG’G, *supra* note 23.

²³ *Id.*; *Watchful Eyes*, *supra* note 9.

²⁴ 25 Pa. Code §§ 78.57(a) and 78.60(a).

Pennsylvania: 1) treatment at an industrial treatment plant; 2) treatment at a sewage treatment plant; and 3) underground disposal using a disposal well.²⁵

Brine Treatment Plants

There are a limited number of industrial treatment facilities that are capable of treating drilling brines in Pennsylvania, although more facilities are presently proposed for construction.²⁶ The existing facilities have years of experience treating brines produced by conventional oil and gas wells, and their expertise should transfer to treating brines produced by Marcellus Shale wells.

However, using such facilities to treat the brines produced by Marcellus Shale wells gives rise to a number of problems.

First, the aggregate capacity of these treatment plants is not great enough to handle the needs of the drilling activity that is already taking place in the Marcellus Shale, let alone the expected future increases; more treatment plants will need to be brought on line quickly to handle the drilling industry's anticipated needs. Although some new plants have been proposed, and capacity has been added to some existing plants, even more treatment capacity will be required.

Second, because these plants may be located far from a given well, in many cases it costs the well operator as much to transport the waste as to treat it. The high cost of transporting the waste raises concerns that unscrupulous operators may resort to illegal or otherwise improper disposal practices. Further, a large frac job may require as many as 600 truck trips to haul fresh

²⁵ Brine may also be sprayed on dirt roads as a dust suppressor and weed killer with DEP approval, but not in quantities large enough to meet the treatment and disposal needs created by development of the Marcellus Shale. PENNSYLVANIA DEPT. OF ENVTL. PROT., BUREAU OF OIL AND GAS MANAGEMENT, OIL AND GAS OPERATORS MANUAL, (2001), at 4-81 to 4-83 (hereinafter, "OPERATORS MANUAL").

²⁶ E.g., Josh Mrozinski, *Brine Treatment Plant Proposed*, WYOMING COUNTY PRESS EXAMINER (Dec. 17, 2008) (plant proposed near Tunkhannock by North Branch Processing), at <http://newage-examiner.com/sections/news/archive/2008/11/19/proposal-for-brine-plant-in-wyoming-county-aired.aspx>; Pam Kasey, *New Drilling Efforts Raise Questions*, THE STATE JOURNAL (Aug. 14, 2008) (six new plants proposed by Pennsylvania Brine Treatment Co.), at <http://www.statejournal.com/story.cfm?func=viewstory&storyid=42542>.

water and brine.²⁷ That much truck traffic creates air pollution²⁸ and puts considerable strain on rural roads.

Third, we question just how much “treatment” is going on at some of these facilities. Recently, the Pennsylvania Bulletin published notice of a draft NPDES permit for a brine treatment facility that would allow the facility to discharge 147 pounds of chlorides per minute – over four tons an hour -- directly into the Allegheny River.²⁹ Accordingly, we urge DEP to impose more stringent discharge limits for the water quality parameters that are most affected by brine from drilling operations, including chlorides, sulfates, and Total Dissolved Solids (“TDS”) to better protect Pennsylvania’s water resources.

Sewage Treatment Plants

Recommendation - DEP needs to continue to inform treatment facilities of their obligation to seek and obtain revisions to the NPDES permits before they accept brine, and to step up its monitoring efforts to catch facilities that violate the law by accepting brine for “treatment” without first securing the legally-required permits.

Most industrial and municipal sewage treatment plants cannot treat brine.³⁰ Instead, they merely dilute it.³¹ Further, the chlorides in brine can interfere with and impair the biological processes that these plants use to treat sewage.³²

The proposition that brine might successfully be treated by sewage treatment plants was disproved in the fall of 2008, when increased TDS levels in the lower Monongahela River were

²⁷ See Legere, *supra* note 24 (stating that transporting the wastewater from a Marcellus Shale frac job to a treatment facility could require “about 600 tanker trips for each well”).

²⁸ VENTURE ENG’G, *supra* note 23 (estimating that 40 tons of carbon dioxide are released by 300 truck trips done to haul water for a Marcellus Shale frac job).

²⁹ 39 Pa. Bull. 1311 (March 14, 2009) (granting NPDES permit renewal application published at 38 Pa. Bull. 6628 (Dec. 6, 2008)).

³⁰ Legere, *supra* note 24; *Watchful Eyes*, *supra* note 9.

³¹ Don Hopey, *Drillers, Sewer Authority Want State to Lift Waste Limits*, PITTSBURGH POST-GAZETTE (Nov. 22, 2008), at <http://www.post-gazette.com/pg/08327/929978-113.stm>.

³² Legere, *supra* note 24.

traced back to nine sewage treatment plants in Greene, Washington, and Fayette Counties that were receiving Marcellus Shale wastewater. Several important industrial facilities in the Mon Valley, including U.S. Steel, considered shutdowns because the high TDS levels in the water they withdrew from the Mon threatened to destroy industrial equipment, and citizens in the many towns that rely on the Mon for their drinking complained of bad-tasting water.³³ Those nine plants had accepted brine for “treatment” without applying for the necessary revisions to the NPDES permits despite an announcement by DEP confirming that sewage treatment plants must secure DEP approval before treating brine.³⁴ DEP has since imposed consent orders on the nine sewage treatment plants to limit their daily intake of brine to no more than one percent of their total daily inflow, to require them to test their outflows and any brine they accept for treatment for about two dozen different parameters, and to provide DEP with an analysis showing that the brine will not impair their ability to treat sewage. The order also requires any other sewage treatment plant that wishes to treat brine to provide similar information in a formal application for a revision to its NPDES permit.

The Monongahela TDS problem underlines another important issue: many treatment plants across the state have accepted brine for “treatment” without applying for, let alone receiving, the legally-required NPDES permit revisions. Recently, for example, PennFuture discovered that the Sunbury Generation Station, a coal-fired power plant in Shamokin Dam, was accepting brine for “treatment” without having applied for a revision to its NPDES permit.

Conventional sewage plants are not an acceptable treatment option unless they are specially modified to be able to successfully treat brine, and that the plants’ abilities to treat brine is confirmed through the NPDES permitting process. DEP needs to continue to inform treatment facilities of their obligation to seek and obtain revisions to the NPDES permits before they

³³ Hopey, *Drillers, Sewer Authority*, *supra* note 34; Pam Kasey, *State Needs to Plan for Gas Well Drilling Brine*, THE STATE JOURNAL (Nov. 20, 2008), at <http://www.statejournal.com/story.cfm?func=viewstory&storyid=48477>.

³⁴ Legere, *supra* note 24; Kasey, *supra* note 36.

accept brine, and to step up its monitoring efforts to catch facilities that violate the law by accepting brine for “treatment” without first securing the legally-required permits.

Well Disposal

Recommendation - DEP should track the volume of brine that is disposed by well in Pennsylvania to ensure that the uses protected by the State Water Plan developed under Act 220 are protected.

Brine may also be disposed by injecting it into wells. This disposal process entails pumping brine into a geologic formation that is lower than all underground sources of drinking water and separated from those sources by a layer of impermeable rock.³⁵ Such wells are regulated by both USEPA (under its underground injection control program pursuant to Part C of the Safe Drinking Water Act³⁶ and the regulations promulgated under that Act³⁷) and DEP.³⁸ DEP regulations prohibit disposal by well into an abandoned oil or gas well or an abandoned mine.³⁹

Although only a very few brine disposal wells are in use in Pennsylvania.⁴⁰ If designed and operated properly so that the brine is disposed below at least one thick layer of impermeable rock, such wells should virtually eliminate the possibility that the disposed brine could contaminate groundwater and streams.⁴¹ However, this disposal method does have a significant

³⁵ INTERSTATE OIL AND GAS COMPACT COMM’N AND ALL CONSULTING, A GUIDE TO PRACTICAL MANAGEMENT OF PRODUCED WATER FROM ONSHORE OIL AND GAS OPERATIONS IN THE UNITED STATES 45 (2006).

³⁶ Part C of the Safe Drinking Water Act is codified at 42 U.S.C. §§ 300h to 300h-8.

³⁷ USEPA has primary permitting and enforcement responsibility over underground injection wells in Pennsylvania because Pennsylvania did not seek primary enforcement responsibility over such wells. The regulations governing underground injection wells in Pennsylvania are codified at 40 C.F.R. §§ 147.1951-1955, which incorporate the requirements of 40 C.F.R. Parts 124, 144, 146, and 148.

³⁸ Although USEPA has primary enforcement responsibility over underground injection wells in Pennsylvania, the operator of such a well must have a well operator’s permit from DEP. 25 Pa. Code § 78.18(a)(1). DEP will not grant such a permit unless the well has been approved by USEPA. 25 Pa. Code 78.18(a)(2).

³⁹ See 25 Pa. Code §§ 91.51 and 91.52.

⁴⁰ Stephen Rhoads, President of the Pennsylvania Oil and Gas Assn., Testimony before the Pennsylvania House Env’tl. Res. and Energy Committee (Sept. 30, 2008) (estimating that there are only two brine disposal wells operating in Pennsylvania).

⁴¹ INTERSTATE OIL AND GAS COMPACT COMM’N, *supra* note 38, at 45.

disadvantage: once pumped into a well, the water is, as a practical matter, lost for any future consumptive use. Because the amounts of brine produced by Marcellus Shale wells promises to be so large, this could become a problem. Thus, the volume of brine that is disposed by well must be tracked to ensure that the uses protected by the State Water Plan developed under Act 220 are protected.

On-Site Treatment

We would like to suggest a fourth brine treatment method and urge DEP to encourage drilling companies to use it whenever appropriate: on-site treatment of brine by mobile facilities. Several companies have designed mobile water treatment units for use in connection with gas drilling operations, and they have been used successfully in Texas and Oklahoma.⁴² To our knowledge, such units have not been used in Pennsylvania. The units are moved from drill site to drill site by trucks.⁴³ The mobile treatment option may permit brine to be reused for other frac jobs,⁴⁴ and also has the advantage of eliminating the dozens, if not hundreds, of truck trips over rural roads that may be necessary to treat the brine produced by a Marcellus Shale well.⁴⁵

⁴² JOHN A. VEIL, ARGONNE NAT'L LAB., THERMAL DISTILLATION TECHNOLOGY FOR MANAGEMENT OF PRODUCED WATER AND FRAC FLOWBACK WATER (Water Technology Brief # 2008-1); Legere, *supra* note ***.

⁴³ *Id.*; VENTURE ENG'G, *supra* note 23, at 3.

⁴⁴ Legere, *supra* note 24.

⁴⁵ *See id.* (stating that transporting the wastewater from a Marcellus Shale frac job to a treatment facility could require "about 600 tanker trips for each well").

Greater Transparency

Recommendation - Well operators should be required to report to DEP the types and amounts of waste that each well generates, and the facilities to which those wastes were sent for treatment or disposal, on at least a monthly basis. DEP should make the information provided in those reports available online.

DEP regulations currently require well operators to report the types and amounts of waste they dispose of, and the facilities to which they ship their wastes, on an “Annual Well & Waste Production Report.”⁴⁶ By providing DEP with a completed Annual Well & Waste Production Report, a well operator satisfies its obligation to file a residual waste report pursuant to regulations applicable to generators of industrial waste.⁴⁷ However, DEP, as required by the Oil and Gas Act,⁴⁸ keeps Annual Well & Waste Production Reports confidential for five years after they are submitted.⁴⁹ As a practical matter, this precludes any member of the public from being able to ascertain that the wastes generated by a particular well are being properly disposed. By way of contrast, other generators of industrial wastes provide DEP with “Residual Waste Reports” that are not kept confidential, absent some showing of need for confidentiality.⁵⁰

Senator Gene Yaw (R-Lycoming) has introduced a bill (S.B. 297) to amend the Oil and Gas Act of 1984 to require well operators to submit reports “specifying the amount of production” for each well to DEP semi-annually and to require DEP to make those reports immediately available to the public on the Internet.⁵¹ S.B. 297 is a good first step because it will bring Pennsylvania into line with the other major oil and gas producing states, all of which make

⁴⁶ PENNSYLVANIA DEPT. OF ENVTL. PROT., ANNUAL WELL AND WASTE PRODUCTION REPORT FORM, Form 5500-FM-OG0049 (rev. 1/2008).

⁴⁷ OPERATORS MANUAL, *supra* note 28, at 4-89 (“By submitting the waste information to the Oil and Gas Management Program, you do not have to submit a separate report to the Bureau of Land Recycling and Waste Management”).

⁴⁸ 58 P.S. § 601.212(a).

⁴⁹ OPERATORS MANUAL, *supra* note 28, at 4-89.

⁵⁰ 25 Pa. Code § 287.5(a); *see also* 25 Pa. Code §§ 287.51-55 (setting forth the requirements for Residual Waste Reports).

⁵¹ S.B. 297 (2009).

well production information publicly available on an immediate basis.⁵² Ideally, DEP and the public should be able to track the generation, treatment, and disposal of brine on a “cradle to grave” basis. Accordingly, PennFuture urges that S.B. 297 be amended to require well operators to report to DEP the types and amounts of waste that each well generates, and the facilities to which those wastes were sent for treatment or disposal, on at least a monthly basis. Further, DEP should post the information contained in such reports online.

Cumulative Impacts

Recommendation - Applications for drilling permits, especially for permits to drill into the Marcellus Shale, should be required to demonstrate affirmatively that the natural resources in the area of the proposed wells will not be adversely impacted by the proposed drilling and fracking activities.

Neither the Oil and Gas Act nor the Oil and Gas regulations in Chapter 78 require, or even contemplate, that DEP will assess the probable cumulative impacts of gas drilling on the natural resources in the area of a proposed well or wells.

That omission should be rectified. Although the environmental impact from any one well and its related infrastructure – which may include deforestation and habitat fragmentation, and will include the construction of a well pad, roads, and pipelines – may be negligible, the cumulative impact from numerous wells within a single watershed may be substantial.

Applications for drilling permits, especially for permits to drill into the Marcellus Shale, should be required to affirmatively demonstrate that the natural resources in the area of the proposed wells, including most especially the water quality and hydrologic balance in the affected watershed, will not be adversely impacted by the proposed drilling and fracking activities.

⁵² Marc Levy, *Pa. May Reveal Gas Drillers' Secrets*, YORK DAILY RECORD (Feb. 23, 2009), at http://ydr.inyork.com/ci_11761278.

As I've already discussed, such an assessment is already going on to with respect to consumptive use issues raised by drilling permit applications in the Delaware and Susquehanna River Basins.⁵³ We believe that is only a start – the assessments should be broadened to include affected non-water resources and made a statewide requirement.

ADMINISTRATIVE ISSUES

Recommendation - DEP must be funded to hire the additional staff it needs to enforce the laws that govern oil and gas drilling and waste disposal.

Staffing

The Department has established non-binding guidelines for the frequency of inspections of oil and gas wells.⁵⁴ Specifically, the Department has stated its intention to inspect each well:

- once before a permit is issued;⁵⁵
- once when objections are raised to a permit application;⁵⁶
- “at least once during each of the phases of siting, drilling, casing, cementing, completing, altering and stimulating a well;”⁵⁷
- once during the period in which the area of the well is to be restored after drilling is completed;⁵⁸
- once before the well is granted inactive status;⁵⁹
- once during plugging;⁶⁰
- once during the period in which the area of the well is to be restored after the well is plugged;⁶¹
- once before the bond on the well is released;⁶²

⁵³ Pennsylvania Dept. of Env'tl. Prot., *DEP Daily Update: DRBC Notifies Company that Water Used for Developing Natural Gas Wells in Delaware River Basin Needs Approval* (May 30, 2008) (stating: “[t]he Pennsylvania Department of Environmental Protection (Pa. DEP) has advised the commission that it will be requiring all natural gas drillers to obtain DRBC or Susquehanna River Basin Commission (SRBC) approval as a condition of Pa. DEP-issued permits for projects in those two basins. Furthermore, drillers will be required to obtain DRBC or SRBC approvals prior to the initiation of any activities”).

⁵⁴ 25 Pa. Code § 78.902(a).

⁵⁵ 25 Pa. Code § 78.903(1).

⁵⁶ 25 Pa. Code § 78.903(2).

⁵⁷ 25 Pa. Code § 78.903(3).

⁵⁸ 25 Pa. Code § 78.903(4).

⁵⁹ 25 Pa. Code § 78.903(8).

⁶⁰ 25 Pa. Code § 78.903(9).

⁶¹ 25 Pa. Code § 78.903(10).

⁶² 25 Pa. Code § 78.903(11).

- at least once to determine that any violation by the operator has been corrected;⁶³
- at least once in response to any complaint;⁶⁴ and
- at least once a year to determine the operator's compliance with the applicable statutes and regulations;⁶⁵

This is not an exhaustive list.⁶⁶

As of March 20, 2009, there were only **seventeen** oil and gas inspectors on staff at the Department to conduct those inspections.⁶⁷ If one of those inspectors attempted to visit each of the approximately 63,000 operating wells in Pennsylvania only once every year to ensure compliance, he or she would need to visit fifteen wells each and every working day just to meet the annual compliance check-up guideline. That is an impossible task -- gas wells are usually widely dispersed and located in remote rural, or even wilderness, areas and often far from paved roads. Even when the approximately-forty new inspectors that the Department has been authorized to hire⁶⁸ begin working it will still be impossible for them to meet the Department's well inspection guidelines. Each of the inspectors then on staff would need to visit five wells on the average working day just to meet the annual compliance check-up guideline.

Consequently, Pennsylvania has its gas well operators working on the honor system. Well permit fees have recently been increased and the Department should expeditiously hire enough staff to meet its well inspection guidelines. As the legacy of acid mine discharge has taught us: it's much cheaper to prevent natural resource damages than to remediate them.

⁶³ 25 Pa. Code § 78.903(15).

⁶⁴ 25 Pa. Code § 78.903(16).

⁶⁵ 25 Pa. Code § 78.903(14).

⁶⁶ See 25 Pa. Code § 78.903.

⁶⁷ STATE CIVIL SERV. COMM'N, TEST ANNOUNCEMENT NUMBER 2008-185 (examination for Oil and Gas Inspector positions) (rev. Jan. 14, 2009), at <http://www.scsc.state.pa.us/scsc/cwp/view.asp?a=392&q=152155>.

⁶⁸ Katie Weidenboerner, *Marcellus Shale Drilling Issues: Withdrawal, Treatment of Water are Major Concerns in Pennsylvania and Locally*, DUBOIS COURIER EXPRESS (Feb. 21, 2009), at http://www.thecourierexpress.com/site/news.cfm?newsid=20267070&BRD=2758&PAG=461&dept_id=572984&rft=6.

Bonding

Recommendation - The bond amounts in the Oil and Gas Act must be increased to reflect the current cost of plugging abandoned wells, to ensure that well operators, rather than taxpayers, bear those costs.

Section 215(a) of the Oil and Gas Act requires well operators to post a bond in the amount of \$2,500 for each well, or a blanket bond of \$25,000 for all wells.⁶⁹ The Act imposes a bonding requirement to help ensure that well operators comply with the Act and with other applicable laws, and, supposedly, “reflects the costs which the Commonwealth would incur to plug an abandoned or illegally operated well.”⁷⁰

The bonding amounts set forth in section 215(a) have not been adjusted since the Oil and Gas Act was passed by the legislature in 1984, and no longer reflect the full amount the Commonwealth is forced to spend to plug abandoned and illegally-operated wells. In 2008, the Department spent \$2.288 million to plug 150 wells in ten counties in western Pennsylvania,⁷¹ an average cost of about \$15,000 per well. Moreover, the cost of plugging an abandoned well is relatively small in comparison to the cost of drilling wells into the Marcellus Shale. A vertical well drilled into the Marcellus Shale is expected to cost as much as \$800,000, while a horizontal well may cost several million dollars.⁷² The bond amounts in the Oil and Gas Act must be increased to reflect the current cost of plugging abandoned wells, to ensure that well operators, rather than taxpayers, bear those costs.

⁶⁹ 58 P.S. § 601.215(a).

⁷⁰ *Pennsylvania Independent Petroleum Producers v. Commonwealth, Dept. of Envtl. Res.*, 525 A.2d 829, 833 (Pa. Commw. Ct. 1987), *aff'd*, 550 A.2d 195 (Pa. 1988), *cert. denied*, 489 U.S. 1096 (1989).

⁷¹ Department of Environmental Protection, *Daily Update: Governor Rendell Says Pennsylvania Protecting Communities, Miners from Abandoned Gas Wells* (Sept. 19, 2008), at <http://www.depweb.state.pa.us/news/cwp/view.asp?a=3&q=529329>.

⁷² MICHAEL J. MILLER (MARSHALL MILLER & ASSOCIATES), MARCELLUS SHALE (Power Point presentation to Fireside Pumpers, Bradford, PA March 12, 2008), at <http://www.mmal.com/company/pdf/Fireside%20Pumpers%203-12-08.pdf>; *see also* <http://www.oilshalegas.com/marcellusshale.html> (estimating the cost of drilling a vertical well into the Marcellus Shale to be \$810,000 and the cost of a horizontal well to be \$3-5 million).

SEVERANCE TAX

Recommendation - PennFuture supports the Governor's severance tax proposal and strongly urges that a portion of the proceeds of that tax should be used to protect and improve Pennsylvania's environment, natural resources, and fish and wildlife and to compensate local governments that host drilling sites for the costs incurred from drilling activity

Pennsylvania is the only state with a significant oil and gas industry presence that does not assess a severance tax on the natural gas it produces. Given the vast amount of recoverable natural gas that the Marcellus Shale under Pennsylvania is thought to hold, even a modest severance tax could generate hundreds of millions of dollars of much-needed revenue for the Commonwealth. The governor has proposed a severance tax modeled after the one West Virginia first imposed in 1987 – five percent of the value of the natural gas at the wellhead plus 4.7 cents per thousand cubic feet of severed natural gas. A poll that was recently commissioned by PennFuture and other environmental groups found that a majority of Pennsylvanians support such a tax and nine out of ten want a portion of the proceeds of the tax to be used to protect Pennsylvania's natural resources.

PennFuture's Recommendations

- DEP and the Statewide Water Resources Committee established under Act 220 should expeditiously integrate the information that well operators are providing regarding their water consumption into the State Water Plan to better protect Pennsylvania's water resources.
- DEP should impose more stringent discharge limits for the water quality parameters that are most affected by brine from drilling operations, including chlorides, sulfates, and Total Dissolved Solids ("TDS") to better protect Pennsylvania's water resources.
- DEP needs to continue to inform treatment facilities of their obligation to seek and obtain revisions to the NPDES permits before they accept brine, and to step up its monitoring efforts to catch facilities that violate the law by accepting brine for "treatment" without first securing the legally-required permits.
- DEP should track the volume of brine that is disposed by well in Pennsylvania to ensure that the uses protected by the State Water Plan developed under Act 220 are protected.
- Well operators should be required to report to DEP the types and amounts of waste that each well generates, and the facilities to which those wastes were sent for treatment or disposal, on at least a monthly basis. DEP should make the information provided in those reports available online.
- Applications for drilling permits, especially for permits to drill into the Marcellus Shale, should be required to demonstrate affirmatively that the natural resources in the area of the proposed wells will not be adversely impacted by the proposed drilling and fracking activities.
- DEP must be funded to hire the additional staff it needs to enforce the laws that govern oil and gas drilling and waste disposal.
- The bond amounts in the Oil and Gas Act must be increased to reflect the current cost of plugging abandoned wells, to ensure that well operators, rather than taxpayers, bear those costs.
- PennFuture supports the Governor's severance tax proposal and strongly urges that a portion of the proceeds of that tax should be used to protect and improve Pennsylvania's environment, natural resources, and fish and wildlife and to compensate local governments that host drilling sites for the costs incurred from drilling activity.