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House of Representatives
COMMONWEALTH OF PENNSYLVANIA
HARRISBURG

HOUSE DEMOCRATIC POLICY COMMITTEE HEARING
Topic: Marcellus Shale Air Issues
Delaware County Community College – Media, PA
October 12, 2011

AGENDA

- 10:00 a.m. Welcome and Opening Remarks
- 10:10 a.m. John Hanger, Former Secretary, PA Department of Environmental Protection
- 10:30 a.m. Panel of Environmental Advocates:
- Jay Duffy, Attorney, Clean Air Council
 - Joe Osborne, Legal Director, Group Against Smog & Pollution
 - Kevin Stewart, Director of Environmental Health, American Lung Association in Pennsylvania
- 11:20 a.m. Panel from the Marcellus Shale Coalition:
- Andrew Paterson, Executive Vice President of Technical Affairs, Marcellus Shale Coalition
 - Carla Suszkowski, Director of Regulatory Policy, Range Resources
- 12:10 p.m. George Jugovic, Senior Attorney, PennFuture
- 12:30 p.m. Closing Remarks

SUBMITTED INTO RECORD FOR 10/12/11 HDPC HEARING IN MEDIA

Natural Gas Drilling: Public Health and Environmental Regulation

Testimony of
Michael L. Krancer
Secretary
Commonwealth of Pennsylvania
Department of Environmental Protection

Members of the Committee, thank you for the opportunity to provide testimony on behalf of the Commonwealth of Pennsylvania, Department of Environmental Protection.

The potential of the Marcellus Shale play has captured the world's attention. Indeed, not since Edwin Drake drilled North America's first commercial oil well in 1859 have so many focused their attention on Pennsylvania as an opportunity for oil and gas development. Increased well drilling has also brought with it unfounded skepticism about Pennsylvania's ability to properly oversee the oil and gas industry.

I say unfounded because just last year the head of EPA's Drinking Water Program said publically that "I have no information that states aren't doing a good job already [regulating fracking]." That is certainly the case for Pennsylvania. Also, our regulatory program was recently evaluated by the independent, non-profit, multi-stakeholder State Review of Oil and Natural Gas Environmental Regulations organization (STRONGER) and received positive marks. STRONGER was only recently recognized by the United States Department of Energy Shale Gas Subcommittee's August 2011 draft report on Shale Gas development as an "exceptionally meritorious" mechanism for improving the availability and usefulness of shale gas information among constituencies. According to STRONGER, "the Pennsylvania program is, over all, well-managed, professional and meeting its program objectives." I would go beyond that and say that Pennsylvania has done an exceptional job managing the new challenges that shale gas development presents while allowing our citizens to enjoy the enormous benefits created by this industry.

There has been a misconception that the hydraulic fracturing of wells can or has caused contamination of water wells. This is false. First, hydraulic fracturing is only a temporary feature of natural gas development which lasts a few weeks. Hydraulic fracturing of wells is not new in Pennsylvania; it has been going on here since about the 1950s and has been standard practice since about the 1980s. In 2010, the head of EPA's drinking water program, Steve Heare, said that despite claims by environmental organizations, he had not seen any documented cases that the hydro-fracing process was contaminating water supplies. EPA Administrator Lisa Jackson said the exact same thing just a couple of weeks ago in her May 24 testimony before the U.S. House Committee on Oversight and Government Reform. In a January 2010 article in Platts Gas Daily, Energy Secretary Stephen Chu said that hydraulic fracturing is safe and lawmakers should be cautious in their efforts to restrict it. My predecessor, former DEP Sec. John Hanger, told

Reuters in October 2010 that “Pennsylvania has not had one case in which the fluids used to break off the gas from 5,000 to 8,000 feet underground have returned to contaminate groundwater.” Even the limited recent Duke Study of Dimock, Susquehanna County, water samples reports that there was no evidence of fracturing fluids in any sample from any of the 68 wells they tested. The study states, “[w]e found no evidence for contamination of drinking-water samples with deep brines or fracturing fluids.”

Our ability to unlock the huge clean burning energy source contained in unconventional shale formations will transform Pennsylvania into an energy exporter and move our nation toward energy independence. In addition, we are looking at an economic and energy transformation. We have already seen tens of thousands of new jobs here in Pennsylvania from the industry itself as well as from new industries spawned to support it. These are good paying career jobs in many fields. And that is just the start. There will be hundreds of thousands more good paying skilled and unskilled jobs in a variety of sectors.

While interest in the economic and energy possibilities of the Marcellus is high, my job is to protect public safety and the environment and to do so based on sound science and not fiction or fear.

Pennsylvania’s Regulatory Program

Pennsylvania regulates oil and gas well operations under several statutes including the Oil and Gas Act, the Clean Streams Law, the Air Pollution Control Act, the Dam Safety and Encroachments Act and the Solid Waste Management Act. As described in more detail below, this network of laws and their associated regulations provides the Department of Environmental Protection (DEP) with the tools it needs to comprehensively regulate everything associated with oil and gas development - from locating the well site, site preparation, drilling the well, fresh water withdrawals and water storage, wastewater management, and site restoration.

Simply put, because of our long history of oil and gas development and comprehensive regulatory structure, Pennsylvania does not need federal intervention to ensure an appropriate balance between resource development and environmental protection is struck.

Well Site Location

The Oil and Gas Act (58 P.S. §§ 601.101 *et. seq*) is the primary law governing well drilling in Pennsylvania. With the exception of wells drilled through workable coal seams, there are no spacing requirements for Marcellus Shale wells. Although spacing restrictions do not generally apply, the Oil and Gas Act, the Dam Safety and Encroachments Act (32 P.S. §§ 693.1 *et. seq*) and the Clean Streams Law (35 P.S. §§ 691.1 *et seq*) regulate where well sites may be located and how the site should be constructed.

Section 601.205 of the Oil and Gas Act prohibits operators from developing a well site within 100 feet of any stream, spring or body of water that is identified on a topo map (small intermittent or head water streams are not always identified). In addition, the site may not be located within 200 feet of buildings or water wells. The department may waive these restrictions if additional protective measures are included as conditions to the well permit. Typical conditions include additional erosion and sediment control measures and measures to deal with the additional fresh water that will be encountered while drilling.

25 Pa. Code Chapter 105 (the Dam Safety and Encroachment regulations) requires well operators to obtain an encroachment permit if a well site or other support facility (such as an access road or water withdrawal pad) is located within a FEMA designated floodway. If FEMA has not designated a floodway (as can be the case for small streams), the operator must obtain a permit if the facility will be within 50 feet of a stream. For Chapter 105 purposes, a stream is anything that has a defined bed and bank – this is much more inclusive than the Oil and Gas Act provisions.

Finally, locating well sites within a floodplain may be regulated by municipalities through the Flood Plain Management Act. Certain ordinances promulgated through this statute are not preempted by the Oil and Gas Act. 58 P.S. § 601.602.

Site Development

Developing a well site outside the location restrictions of the Oil and Gas Act and the Dam Safety and Encroachments Act is regulated under the Clean Streams Law through the Department's erosion and sediment control program.

Stormwater runoff is the leading cause of stream impairment in Pennsylvania. To address this problem, DEP has developed a comprehensive stormwater management program. Pursuant to 25 Pa. Code Chapter 102, all earth disturbance activities must employ "best management practices" like silt fences and road side culverts to control erosion and manage stormwater. Relative to building sites in floodplains, pits and impoundments used to store waste material may not be used if the bottom of the pit will be within 20 inches of the ground water table. 25 Pa. Code § 78.56. In floodplains, the ground water table will be close to the surface and therefore, drilling wastes would need to be contained in tanks if a pit could not be used.

If well site construction will disturb more than 5,000 square feet or has the potential to discharge sediment to High Quality or Exceptional Value waters (so classified pursuant to 25 Pa. Code Chapter 93), the operator must develop and implement an erosion and sediment control plan. This E&S plan must be kept on site for review by DEP. If development of the well site, access roads and other related facilities will disturb 5 or more acres, the operator must obtain an erosion and sediment control permit before the site can be developed.

Well Drilling

Drilling any well – even a water well – has the potential to impact fresh groundwater. While this potential may exist, such an impact is not acceptable. Protecting groundwater supplies is of utmost importance and the Oil and Gas Act is particularly strict in this regard. If a well operator impacts a water supply (by pollution or diminution), they *must* restore or replace it and pay for any increased costs of maintaining or operating the replacement supply. 58 P.S. § 601.208.

In fact, if an oil or gas well is drilled within 1,000 feet of a water supply and the water supply becomes polluted within 6 months of drilling, the operator is *presumed* to have caused the pollution unless they took a water sample that demonstrates the pollution was present before the oil or gas well was drilled. 58 P.S. § 601.208(c). Needless to say, taking a pre-drilling water sample from all supplies within 1000 feet of a gas well should be a standard business practice.

Of course, the goal is to avoid groundwater impacts in the first place. To that end, DEP recently promulgated new regulations that significantly strengthen our well construction standards. These new regulations accomplish five things.

First, the regulations will establish more stringent well construction standards for all new wells drilled in Pennsylvania. Second, the regulations impose new requirements on operators to inspect existing wells and report their findings to the Department. Third, the regulations codify existing caselaw on water supply replacement requirements and clearly describe an operator's responsibilities if they contaminate or diminish a water supply. Fourth, the regulations impose a duty on operators to investigate complaints of gas migration and to mitigate any hazards found in the course of the investigation. Finally, the regulations require reporting of chemicals used to hydraulically fracture wells.

Below is a brief description of the significant new requirements in 25 Pa. Code Chapter 78.

I. New Well Drilling

Properly cementing and casing a well is critical to preventing gas migration. Prior to drilling a well, operators will now be required to develop a casing and cementing plan that shows how the well will be drilled and completed. Use of centralizers (which keep the casing centered in the well bore) must be used at prescribed locations to insure that cement is evenly distributed between the casing and the well bore. Cement meeting ASTM criteria for oil and gas wells must be used. Documentation of the cement quality and cementing practices used at the well must be available for Department inspection.

When cementing a well, if cement is not returned to the surface the operator must install a second string of casing for an added layer of protection. If cement is returned to the surface and the operator intends to only use surface casing (Marcellus operators typically

use surface, intermediate and production casing), the operator must demonstrate that any gas, oil and produced fluids cannot leave the well bore.

Used or welded casing must be pressure tested. Casing strings attached to heavy duty blow-out preventers (such as Marcellus intermediate casing) must also be pressure tested.

II. Existing Wells

Operators must inspect all of their wells quarterly and report the findings of the inspections to the Department annually. If defective casing, evidence of leaks, or if excessive pressure within the well bore is discovered, the operator must immediately notify the Department and take corrective action.

III. Water Supply Replacement

The Oil and Gas Act requires any operator who contaminates or diminishes a water supply to restore or replace the supply with one that is adequate in quantity and quality for the purposes served. Case law on these requirements has defined when an operator must provide compensation for increased operation and maintenance costs (when costs are more than a de minimus amount) and for what duration (in perpetuity). The regulations codify these and other relevant holdings to clearly describe the operator's responsibility.

IV. Gas Migration Response

The new regulations impose a duty on operators to immediately investigate a gas migration complaint and to notify the Department if they receive such a complaint. If natural gas is found at elevated levels (10% of the lower explosive limit) the operator must immediately notify emergency responders and initiate mitigation measures (including advisories and controlling access to the area).

V. Reporting Requirements

The practice of hydraulic fracturing has drawn considerable attention recently. One of the primary concerns involves the chemicals used during the process. DEP's new regulations require operators to disclose the chemical additives and the hazardous constituents of those additives on a well by well basis. While DEP has never observed any evidence that hydraulic fracturing has directly contaminated fresh groundwater despite tens of thousands of wells being "fraced" over the past several decades, mandating public disclosure of the chemicals used in the process should end much of the controversy surrounding the subject.

Water Withdrawal

While the volume of water to frac a Marcellus well is greater than the amount required to frac traditional wells in Pennsylvania, the Marcellus industry's use of water is miniscule

in comparison with other energy sources and other sources in general. Marcellus fracing is the smallest major user in Pennsylvania using only 0.2% of the daily water withdrawn which ranks it ninth of the top nine water users in the state. Marcellus drilling uses only 1.9 million gallons per day (MGD). This is in stark contrast to power plants which use 6.43 *billion* gallons per day (BGD). Other major uses include public water suppliers (1.42 BGD); industrial users (770 MGD); aquaculture (524 MGD); private water wells (152 MGD); mining (95.7 MGD); livestock (61.8 MGD); and irrigation (24.3 MGD). Thus, shale gas drilling is a very efficient energy production source measured as a function of water usage.

I have attached a graphic which dramatically illustrates this which was prepared by the PA Fish and Boat Commission.

There are three entities charged with protecting water quality by managing water withdrawals in Pennsylvania - DEP, the Susquehanna River Basin Commission and the Delaware River Basin Commission. DEP is on the forefront of protecting headwaters of the Commonwealth's streams in areas outside the Basin Commission jurisdiction by requiring operators to adhere to water management plans which governs their water withdrawal practices. The Basin Commissions were formed by a compact between the federal government, Pennsylvania and neighboring states within the respective watersheds. If a Marcellus well is drilled within the Susquehanna or Delaware River watershed, DEP and Commission approval of the operator's water management plan must be obtained before construction of the well site can begin. If the well is located outside those two river basins, only DEP approval is necessary.

The water management plan is based on low flow conditions and describes where water will be withdrawn how much water will be needed and the amount of water that will be taken at any one time. Evaluation of the plan involves looking both upstream and downstream to assess cumulative impacts, taking into account all other withdrawals and discharges and their impact on the resource, particularly during low flow periods.

Generally speaking, if the water withdrawal is less than 10 percent of the natural or continuously augmented 7-day, 10-year low flow (Q7-10) of the stream or river, a passby (a restriction on the ability to take water during low flow conditions) will not be required. Q7-10 is the lowest average, consecutive 7-day flow that would occur with a frequency or recurrence interval of one in ten years. A 10-year low flow event has a 10 percent chance of occurring in any one year. Accepted hydrologic practices must be used to determine the Q7-10 flow.¹

Once approved, the plan is valid for each location for five years. Although the Commonwealth has ample water resources, operators will need to cooperate to make sure that access to water is available as more and more plans are submitted for headwater streams.

¹ Policy No. 2003-01 Guidelines For Using and Determining Passby Flows and Conservation Releases For Surface-Water and Ground-Water Withdrawal Approvals, November 8, 2002.

Water and Wastewater Storage

Once an operator gets the water needed to frac a well, the question becomes where to put it? Even more important, where to put the wastewater that is returned to the surface (called flowback)? A new development with Marcellus wells is the advent of centralized impoundments. Unlike pits located immediately adjacent to the well, centralized impoundments use dam like structures to hold enough water to service multiple wells over an extended period of time. These impoundments can store freshwater, and more increasingly, flowback from a frac job.

Under DEP's dam safety regulations, small freshwater impoundments – similar to a farmer's pond - do not need a permit. However, Marcellus impoundments can hold over 15 million gallons and if they store wastewater, must be permitted and constructed according to DEP standards. Key standards include two impervious 40 mil liners with a leak detection zone and groundwater monitoring wells around the impoundment. Impoundments located where a breach could threaten public safety must undergo a much more stringent engineering review.

Wastewater Management

The most significant issue facing Marcellus operators today is wastewater treatment and disposal. Operators report that approximately 15% of the water used to frac a well is returned to the surface during the initial flowback period. The Department has seen an increase in reuse of this wastewater – industry wide approximately 80% of the flowback is used on another frac job. Thus, the total volume of wastewater that must be disposed is a small fraction of the volume needed to frac the well.

Still, flowback from Marcellus frac jobs contain pollutants of concern – particularly high levels of dissolved salts. Indeed, flowback water is several times saltier than sea water. Thus, Total Dissolved Solids (TDS) represent a growing concern for the Commonwealth's waterways and the Department has developed a proactive strategy to address this concern before widespread impacts are felt.

The best solution for disposing of high TDS wastewater is deep well injection. Unfortunately, the best geology in Pennsylvania for this method of waste disposal is being used for gas storage. Exploration for new injection sites is ongoing but not commercially available yet.

Therefore, the current preference for flowback water disposal is through existing DEP approved wastewater treatment plants. These plants typically do not have the technology necessary to remove TDS from the effluent and instead rely on dilution. The DEP's recently promulgated Chapter 95 regulations completely address the cumulative impacts of oil and gas wastewater discharges.

This new rule is the first of its kind in the country and limits the discharge of TDS to drinking water standards from new or expanded facilities that take oil and gas wastewater. This means that new discharges cannot exceed 250 mg/l for chlorides and that drinking water supplies will never be impaired because of oil and gas drilling. The process of eliminating the TDS will also remove radium – which has been the subject of recent articles. Thus, in addition to reducing the contaminants discharged to our streams, the new Chapter 95 rule will increase the use of recycled water, promote the development of alternative forms of disposal and perhaps promote the use of alternative sources of fracturing fluid.

Drinking Water Protection.

I outlined in my April 6, 2011 letter to EPA Region III Administrator Garvin, over the past three years the Commonwealth has been very pro-active in protecting potential sources of drinking water. In addition to the Chapter 95 TDS regulations discussed above there are other measures being implemented. DEP recently announced the results of our in-stream water quality monitoring for radioactive material in seven of the Commonwealth's rivers. All samples showed levels at or below the normal naturally occurring background levels of gross alpha and gross beta radiation. Those tests were conducted in November and December of 2010 at stations downstream of wastewater treatment plants that accept flowback and production water from Marcellus Shale drilling. These sampling stations were installed last fall specifically for the purpose of monitoring stream quality for potential impacts from unconventional gas drilling operations. The raw water river samples were collected above public water suppliers' intakes where the water receives further treatment.

The seven river testing stations are located at the Monongahela at Charleroi in Washington County; South Fork Ten Mile Creek in Greene County; Conemaugh in Indiana County; Allegheny at Kennerdell in Venango County; Beaver in Beaver County; Tioga in Tioga County; and the West Branch of the Susquehanna in Lycoming County. These stations were chosen because of their proximity to public water supply intakes and at the time, were located downstream of facilities permitted to or proposing to discharge oil and gas wastewater. Future monitoring will include monthly sampling at the Monongahela; South Fork Ten Mile; Allegheny; and Beaver sites and every other month at the remaining three sites. Moreover, gross alpha and gross beta testing was added to a second water quality network station on the Monongahela, in March 2011. This site is further downstream in Allegheny County. All of the results will be frequently evaluated and available to the public via EPA's Modernized STORET database.

There is more. Pennsylvania DEP has taken measures to have additional monitoring of finished water at 14 public water supplies with surface water intakes downstream from wastewater treatment facilities that accept Marcellus wastewater. On March 11, 2011, under Pennsylvania regulation 25 *Pa Code* §109.302, we directed a letter to public water suppliers that have surface water intakes located downstream of one or more facilities that are accepting Marcellus wastewater to immediately conduct testing of radionuclides

(i.e., radioactivity) and other parameters including TDS, pH, alkalinity, chloride, sulfate and bromide. A copy of that letter and the list of recipients are enclosed.

In addition, Pennsylvania DEP, on March 18, 2011, under Pennsylvania regulation 25 *Pa Code* §92a.61(g), sent letters to 25 Publicly Owned Treatment Works and Centralized Waste Treatment facilities that currently accept this wastewater calling for immediate twice monthly effluent monitoring for radionuclides and other parameters including TDS, pH, alkalinity, chloride, sulfate, bromide, gross alpha, radium 226 & 228, and uranium.

DEP has shown it is ready, willing and able to act in other important and decisive ways to protect drinking water also. On April 19, 2011, at the direction of Governor Tom Corbett, I called on all Marcellus Shale natural gas drilling operators to cease by May 19 delivering wastewater from shale gas extraction to 15 facilities that then accepted it under an exemption from being covered by last year's Total Dissolved Solids (TDS) regulations. The next day the industry publically stated its commitment to compliance. From what we can see today a dramatic sea change has occurred in Pennsylvania on this as we have virtually overnight gone from millions of gallons being delivered to those facilities and discharged to virtually none. Of course we are still in the process of verifying both from the supply side and the demand side and we will continue to do so as we are seeing full cooperation all of the time. In that regard we sent a letter in July 2011 to approximately 88 drilling operators seeking their certification that they are no longer using any of the "grandfathered" facilities for wastewater from deep gas production. On the demand side, several NPDES permits are in-house for renewal and those renewed permits, if appropriate, will contain specific numerical limits for total dissolved solids.

Some Monday morning quarterbacks questioned DEP's method saying that it should have "ordered" compliance back in April. But any orders would have likely resulted in protracted litigation. We got compliance in 28 hours instead of 28 months.

Air Quality Protection

Natural gas holds great promise as a clean burning fuel which could greatly reduce air emissions associated with electricity production and transportation. It has been recognized that combustion of natural gas as either a fuel for generating electricity or a transportation fuel can have very beneficial impacts on air quality. With that being said, Pennsylvania is proactive in minimizing any potential adverse air impacts from extracting this resource.

Pennsylvania has ample authority under our Pennsylvania Air Pollution Control Act and our air regulations to regulate air emissions from Marcellus Shale gas extraction and processing operations and that is exactly what we do. We focus on minimizing emissions of, for example, nitrogen oxides, carbon monoxide, particulate matter, hazardous air pollutants, and volatile organic compounds (VOC) during the drilling, fracturing, gas collection and processing stages.

DEP took the proactive step of launching a short-term ambient air quality sampling initiative in the southwest, northeast and northcentral regions of Pennsylvania in April 2010. This initiative focused on natural gas extraction stages including drilling operations, fracing operations where wastewater was being produced, the flaring of gas for production and gas compression facilities. While concentrations of certain natural gas constituents were detected during these studies DEP did not identify concentrations of any compound that would likely trigger air-related health issues associated with Marcellus Shale activities. DEP also tested for carbon monoxide, nitrogen dioxide, sulfur dioxide and ozone, but did not detect concentrations above National Ambient Air Quality Standards at any of the sampling sites. DEP is currently developing a protocol for a long-term sampling effort to examine the potential chronic impact of emissions from natural gas operations.

Additionally, DEP intends to develop a comprehensive emissions inventory for natural gas operations under its existing statutory and regulatory framework. This data will allow the Department to develop an accurate inventory to support air quality planning activities including revisions to the Commonwealth's State Implementation Plan (SIP) to achieve and maintain the health-based federal national ambient air quality standards including ozone, fine particulate matter and the recently promulgated 1-hour nitrogen dioxide and sulfur dioxide standards.

Pennsylvania's air quality regulatory program has been in effect since 1972. Our air quality program includes various tools such as Plan Approvals, Operating Permits and General Permits. A Plan Approval is a permission to construct a particular source. The compliment to the Plan Approval is the Operating Permit. An operator must obtain an Operating Permit for the source covered by the Plan Approval once the source is actually constructed. To obtain an Operating Permit the operator must demonstrate that the facility was constructed pursuant to all the terms and conditions of the Plan Approval. In some cases, such as what our regulations refer to as "source of minor significance" or where the source's operations can be regulated under standard conditions (what we call a General Permit), an individual Plan Approval or Operating Permit is not required. Many operations are still regulated under one or more General Permits. A General Permit is used for sources that the Department determines can be regulated under standardized specifications or conditions applicable across the board.

DEP's air regulatory program for this industry has been in effect for over a decade. Currently, certain oil and gas exploration and production activities are not subject to individual Plan Approval/Operating Permit requirements. On February 26, 2011, the Department provided a 90-day public comment period on the proposed revisions to list of exemptions currently in effect that would make the current exemption for certain oil and gas exploration and production activities conditional. We are in the process of reviewing the stakeholder comments to this proposal.

Owners and operators of natural gas-fired production or recovery operations, which includes compressor stations and their components such as internal combustion engines, gas dehydration units, crude oil or brine storage tanks, vents and other equipment, which

are non-major sources, are subject to regulation under what we call the GP-5. The formal title of the GP-5 is General Plan Approval and General Operating Permit for “Natural Gas, Coal, Coal Bed Methane or Gob Gas Production or Recovery Facilities”.

The Department’s written approval is required before construction of any operation which is subject to the GP-5 requirement. The applicant is required to submit in advance detailed information regarding every piece of equipment covered by the permit. The serial number and specific design parameters of each piece of equipment is required. The applicant also must identify the compliance demonstration methods to be used for engines, dehydrators/reboilers and tanks. We also require estimates of fugitive VOC and hazardous air pollutant (HAP) emissions from connectors, flanges, open-ended lines, pump seals, valves, compressor seals, relief valves, diaphragms, drains, meters and other components. In addition, the holder of the GP-5 authorization is subject to comprehensive performance testing, verification and monitoring, recordkeeping and reporting requirements.

The GP-5 itself requires the operation of the facility to be in compliance with the prevailing Best Available Technology for air emissions control so as to be in compliance with certain emissions limits which are contained in the GP-5 for NO_x, VOCs, CO, visible emissions, and malodors. The GP-5 applies to smaller engines, those between 100 and 1,500 horsepower. Engines which are larger would need to obtain a Plan Approval and Operating Permit.

DEP has issued authorizations for the construction and operation of approximately 260 natural-gas fired compressor stations across the Commonwealth. DEP just recently, on March 26, 2011, published minor GP-5 revisions which will encourage owners and operators to install and operate cleaner burning and more efficient engines and/or limit hours of operation to lower emissions.

DEP, in consultation with outside experts, is considering proposed revisions to GP-5 which would expand the applicability of the general permit to cover additional sources and activities including wellheads and other emissions units located at natural gas production and processing facilities. The revised GP-5 could cover spark ignition internal combustion engines, condensate tanks, storage vessels, glycol dehydrators, reboilers, de-propanizers, and equipment leaks. It would make sense to harmonize the GP-5 with the newly promulgated federal EPA proposed and soon to become final New Source Performance Standards (NSPS) applicable to the oil and gas exploration and production sector. The proposed NSPS was published at the end of July 2011 and EPA is under a court ordered deadline to issue the NSPS in final form in early 2012. Thus, we hope to have a proposed revision to our GP-5 published for public comments by sometime in the fall to be able to issue it in final form after EPA issues its final NSPS Regulations.

If the circumstances will not support coverage by the GP-5 (larger facilities or engines larger than 1,500 horsepower) an Air Quality Plan Approval and Operating Permit is required for new sources or modifications to existing sources. For what the law labels

“major sources,” those that emit 100 tons or more per year of a regulated parameter, they are subject to the “New Source Review” permitting process which the Department administers. Air emissions from different physical locations can be “aggregated” together for calculation of applicability of the threshold if such locations are owned by the same company and are located “contiguous and adjacent” to each other.

Nonroad truck mounted internal combustion engines are frequently used in this industry, especially in association with actual drilling operations. These engines are frequently moving from one site to another. These sources can emit NO_x and VOCs. Nonroad engines are subject to federal standards. In 2005, the Department issued the General Plan Approval and/or General Operating Permit for Nonroad Engines (GP -11). The GP-11 is the Commonwealth’s embodiment of the federal requirements for nonroad engines and authorizes construction, modification, operation and the subsequent relocation of such engines. On February 26, 2011, DEP solicited comments on a proposed revised GP-11. The revision is aimed at having the GP-11 cover operation of nonroad engines at multiple temporary locations. Stakeholder comments on the proposed GP-11 revisions are currently under review.

Enforcement

Pennsylvania DEP has been very strong on enforcement of rules and regulations in this industry. DEP has shown just this calendar year its agility and decisiveness on the enforcement front in issuing two cease and desist orders as a team within hours when it was appropriate to do so. In one case we issued a “cease drilling order” for non-Marcellus well drilling and in the other case we ordered a stop to pre-drilling well pad preparatory activities which were resulting in sediment being released into a nearby stream upstream of one of the various water intakes of a local water authority. In the latter case we received a letter of thanks from the local water authority for DEP’s “immediate” and “prompt response” in doing so. The water authority went on to write “[t]his situation has reinforced our belief that the interest and importance of our water source is of utmost importance to all and that Pennsylvania Department of Environmental Protection works hard to sustain this valuable resource”.

In response to the April 20, 2011 well equipment failure and resultant loss of control of a well in LeRoy Township, Bradford County DEP issued an NOV just two days later dated April 22, 2011 in which it required the operator to answer many questions about the incident itself and its root cause and insisting that the company remain on stand-down from well development activities until it could provide DEP technical personnel sufficient assurances that there would be no repeat of the event there or elsewhere. DEP also asked the following important question: why it took nearly 12 hours to address the uncontrolled release of fluids from the well. After three weeks in which the company was in stand-down our technical staff did report to me that they had been provided adequate assurances and the company then did restart well development operations. However, we have more. We have a commitment by the operator that it will from now on engage and use local well control professionals in the very unlikely event that a future well control incident at one of its wells would occur in Pennsylvania. DEP had not asked

for that particular measure in its April 22, 2011 NOV but we insisted on this during subsequent discussions and we achieved it.

In May 2011 DEP announced more than \$1 million in penalties against an operator to address violations in Bradford and Washington Counties. Through two Consent Orders and Agreement (COA) with Chesapeake, DEP collected \$900,000 for contaminating private water supplies in Bradford County, \$200,000 of which must be donated to the department's well plugging fund; and another \$188,000 for the February 23, 2011, tank fire at a drilling site in Avella, Washington County. The Bradford matter was the highest single penalty ever assessed against any oil and gas operator in the history of the program. In the Washington County matter the fines assessed were the highest allowed by the Oil and Gas Act.

The Pennsylvania Marcellus Shale Advisory Commission Report

I was honored to be a member of the Governor's Marcellus Shale Advisory Commission and co-chair of its Public Health, Safety & Environmental Protection Subcommittee. The Commission assembled experts from within the environmental, conservation, state and local government, academic and natural gas industry communities and its charge was to identify, prioritize and craft a set of comprehensive strategic recommendations regarding the safe, efficient and environmentally responsible extraction and use of unconventional gas reserves in Pennsylvania.

I can testify personally that the process itself was remarkable. The Commission's approach was grounded in sound science, data and facts, not fiction, emotion or profits. I witnessed an amazing consensus building exercise among representatives of different backgrounds outlooks and opinions. The Commission was transparent in its business. There were 5 full Commission public meetings and 16 work group public meetings. There were 60 expert presentations and 100 citizen presentations. There were hundreds of communications to the Commission from the public.

The final report of the Commission is 137 pages long and contains 96 recommendations.

Conclusion

The Marcellus Shale play along with other domestic unconventional resources can transform world energy markets. This potential will only be realized by avoiding the mistakes of the past. I believe that Pennsylvania will prove that the balance between environmental protection and the development of this world class resource is possible.

Testimony of John Hanger

Hosted by
PA House Democratic Policy Committee

October 12, 2011, at 10:00 a.m.

Delaware County Community College, Media, PA

Mr. Chairman and members of the Committee, thank you for having a hearing on this important topic and inviting me to testify. My testimony has two parts. Part I discusses how gas can help to reduce pollution in Pennsylvania's air. Part 2 addresses air emissions from gas production, transmission and distribution and why they must be controlled and reduced so that natural gas is a solution to and not a cause of air quality violations.

I. Natural Gas Can Help To Reduce Air Pollution In Pennsylvania

First let's be clear about two, critical points. First, natural gas is a substantially cleaner fuel than coal and oil. Using more gas to substitute for coal and oil reduces significantly the total pollution in our environment. Denying that gas is cleaner than coal or oil is the equivalent of denying that our temperatures have already risen and putting huge amounts of heat trapping gas into the atmosphere will raise temperatures and change our climate further.

Second, the practices used to produce and transport gas to homes and businesses make a big difference in the environmental impact of gas. Simply put, the production and distribution of gas can be done in significantly cleaner or dirtier ways. This hearing appropriately focuses on air impacts from gas drilling and production that could either be small or big, again depending on the rules required by the Environmental Protection Agency and the practices and equipment used by the industry.

Here are some details about how gas is a cleaner fuel than coal or oil.

Using natural gas to make electricity, heat homes, and run vehicles emits no mercury, arsenic, or lead. But burning coal without modern pollution controls pours huge amounts of toxics into the environment and caused one out of six women to have mercury levels that endanger fetal development. Old coal-fired power plants with little or no pollution controls are responsible for about 90 per cent of the toxic air pollution that comes from power plants.

No pending health rule is more important than the proposed EPA Air Toxics Rule that will prevent up to 34,000 premature deaths per year. Natural gas plants meet this rule's requirements, because burning gas does not emit toxic air pollution. To comply with the proposed EPA Air Toxic Rule, coal plants must install expensive equipment to prevent mercury, arsenic, lead, and other toxics from going into the environment. Currently about a third of the nation's coal fired power plant capacity does not have the necessary pollution control equipment to comply.

Beyond toxics, gas is cleaner than coal in other ways. Gas emits virtually no soot, while burning coal, oil, and wood without modern pollution controls pumps large quantities of soot into the air that sicken and kills tens of thousands. Soot in the air is a major killer of people.

Unlike soot, sulfur dioxide, nitrogen oxide, and air toxics for which modern pollution controls exist, no commercially available pollution control technology is available to control carbon dioxide or heat trapping pollution. Today the amount of carbon dioxide pollution in the atmosphere can only be controlled by two general means: first, using zero carbon fuels or lower carbon fuels to replace higher carbon fuels and, second, using carbon fuels more efficiently.

A high mileage gasoline car that gets 40 miles per gallon emits about half as much carbon dioxide to make the same trip as a low mileage car that gets 20 miles per gallon. In turn a car running on natural gas instead of gasoline or diesel will emit 22% to 29% less carbon dioxide pollution for the same trip, according to calculations of the California Air Resources Board.

Three studies all reach the conclusion that gas emits about 50% of the carbon pollution as coal or coal emits twice the carbon pollution of gas when coal and gas are used to make electricity. Those studies are;

1. The Carnegie Mellon University study of Marcellus gas production that was published in August and financed in part by the Sierra Club, finding that burning coal emits on a life cycle basis twice the amount of heat trapping pollution as gas does, though the researchers make clear that their findings are their own only and they do not speak for the Sierra Club;
2. The Worldwatch Institute study also published in August that reaches essentially the same conclusion that burning coal emits twice the heat trapping pollution as gas does.
3. The National Energy Technology Laboratory, one of the United States Department of Energy's energy labs, also found that burning coal emits twice the heat trapping pollution as gas does.

A fourth study from still more researchers at Cornell University will be published shortly and will contradict the discredited study done by Professor Howarth that unfortunately received enormous media attention, while these other studies received very little.

While gas is a cleaner fuel than coal or oil and using gas to substitute for coal and oil reduces pollution to the environment, gas drilling and production is industrial activity that must be strongly regulated and should be reasonably taxed. Pennsylvania must adopt a reasonable drilling tax, and it can finance important public needs like education and environmental needs. Tax proceeds can fund open space and farmland preservation, cleaning waters polluted by acid mine drainage, building riparian buffers to stop nitrogen, phosphorus, and sediment running off from lawns and agricultural fields from polluting streams, and much more. Gas drilling reasonably taxed can fund important environmental improvements.

It is also true that the specific practices and technologies used to produce and transport gas make a difference in the air and other environmental impacts of gas. Strong rules and adoption by the entire industry of the best practices of some companies can minimize air emissions and other environmental impacts from gas drilling.

The same can be said for all means of producing energy, including wind and solar, both of which I strongly support and want to grow rapidly, but both of which have drawn sometimes intense opposition, including litigation, as a result of land use, wildlife, and view issues.

At this point the 4 biggest environmental issues associated with gas drilling that require more action are the problem of gas migrating to water wells as a result of poor drilling; the threat of

gas drilling in Pennsylvania's state parks; methane leaking to the atmosphere; and air pollutants that result from drilling gas wells and moving gas to market.

II. Air Emissions From Gas Production, Transmission, and Distribution Must Be Controlled and Reduced

Though natural gas can help to clean our air, emissions from gas production, transmission, and distribution could cause or contribute substantially to air quality violations, unless gas emissions are controlled and reduced. Look to Wyoming to see what can go wrong where gas drilling caused smog that endangered health in parts of the state.

The current federal EPA standard for ground level ozone is 75 parts per billion, a standard that was set in 2008 by the Administration of President Bush, even though the EPA Science Advisory Board supported a lower standard of not higher than 70 parts per billion. Readings of 120 or 130 parts per billion for ground level ozone or smog have been recorded in parts of Wyoming where gas drilling has been concentrated.

Gas drilling and production did cause serious levels of smog in parts of Wyoming. Since it has happened in Wyoming, it could happen in Pennsylvania. Indeed the risks are higher in Pennsylvania than in Wyoming, because air pollution blows into Pennsylvania from the South and west and because industry and transportation operates here and emits pollution that already does cause air quality violations.

I remain concerned that the cumulative emissions from drilling rigs, gas processing plants, compressor stations, and storage tanks from the entire Marcellus shale development could create smog and other localized issues in Pennsylvania, unless rules are adopted that require best practices across Pennsylvania. The equipment and practices exist to prevent the drilling industry from causing or contributing to air quality violations but the best technology must be widely used to keep total emissions below levels where human health is impaired.

My main concern is not the emission from anyone compressor engine or other facility, though those emissions should be controlled and located away from homes. My main concern is the cumulative impacts of all the engines and production equipment.

If the cleanest options and best practices are utilized at all or most sites, the cumulative emissions will not create air quality violations. But if the dirtiest options are widely used, air quality violations may well result.

For example, the difference between the cleanest options and the least clean option for a compressor engine on nitrogen oxide emissions is substantial. A compressor engine running on diesel and poorly controlled could emit 60 to 80 tons of nitrogen oxide per year but the same engine running on electricity or using the best pollution controls would emit less than 10 tons per year. This individual difference multiplied by hundreds of units can lead to a large difference in total pollution. Deploying at individual sites or not doing so the cleanest options can be the difference for counties and regions between complying with air quality standards or not.

The EPA on July 28th proposed rules that would substantially reduce air pollutants from gas drilling and production. The EPA is under a court order to complete this rulemaking by February 2012.

The proposed EPA rule would reduce by 95% methane leaking from gas wells during the drilling and well completion phase. Implementing this rule would make gas even a lower carbon fuel on a life-cycle basis than it is now. It would add to climate advantages of using more gas to substitute for coal and oil.

The proposed EPA rule would also reduce by 25% volatile organic compounds that can result from engines and equipment used to produce, store and transport gas by requiring the installation of the best pollution control equipment. Volatile organic compounds can cause smog. The EPA asserts that the specific requirements like green completions and vapor recovery units in the proposed rule are already adopted by some companies or are required by some states. The EPA also states that the cost of the measures that it seeks to require would have quick paybacks in some cases because they prevent leakage of gas to the environment that can then be sold.

The proposed EPA July 28th rule, however, does not address emissions from internal combustion engines and combustion turbines that power compressors in the gas industry. The rule states: “in addition there are significant emissions associated with the reciprocating internal combustion engines and combustion turbines that power compressors throughout the oil and natural gas sector. However, emissions from internal combustion engines and combustion turbines are covered by regulations specific to engines and turbines and, thus, are not addressed in this action.” As a result, the July 28th proposed rule by itself will not and does not resolve all of the important gas drilling air issues facing Pennsylvania.

The EPA also operates the Gas Star program, a voluntary best practices programs for gas drilling, transmission, and distribution companies. Some of the companies doing business in Pennsylvania are part of the Natural Gas Star program but others are not. I would hope that all companies doing gas production, transmission and distribution business in Pennsylvania should join the EPA Natural Gas Star program. See www.epa.gov/gasstar/.

Important decisions must be made to ensure that gas indeed part of the solution to air pollution. Those decisions must be made now. Thank you for the opportunity to testify.

**Testimony of Jay Duffy
Staff Attorney and Marcellus Shale Program Coordinator, Clean Air Council**

On Marcellus Shale Air Issues

**Before the Pennsylvania House Democratic Policy Committee
Wednesday, October 12, 2011**

As prepared for delivery.

Members of the Pennsylvania Democratic Policy Committee: Thank you for inviting the Clean Air Council to testify on the important air quality issues related to the Marcellus Shale industry. My name is Jay Duffy and I am a Staff Attorney and the Marcellus Shale Program Coordinator at the Clean Air Council. The Clean Air Council is a non-profit environmental organization headquartered in Philadelphia, Pennsylvania. The Council has members throughout Pennsylvania. For more than 40 years, the Council has fought to improve the air quality across Pennsylvania. The Council's mission is to protect everyone's right to breathe clean air.

Oil and gas operations, including exploration, production and processing operations, consist of many pieces of equipment and activities that release air pollutants known to be harmful to public health and welfare. In 2008 the Pennsylvania Department of Environmental Protection issued 195 permits to drill wells in the Marcellus Shale, between January and August of this year PA DEP issued 1,840. Each well is connected to miles of pipeline and associated compressor stations, processing plants and other industrial equipment, which emit air pollution. The impact on air quality includes emissions of volatile organic compounds, nitrogen oxide, particulates and hazardous air pollutants. VOCs and nitrogen oxides mix with air and sunlight to produce ground-level ozone, which causes a variety of respiratory problems. While the emission of hazardous air pollutants is linked to elevated levels of cancer and neurological health issues. Complaints from citizens living near natural gas operations include respiratory infections, headaches, neurological impairment, nausea, skin rashes and sometimes even more serious issues including miscarriages, tumors, benzene poisoning and cancer.

The environmental and health impacts associated with natural gas drilling are just beginning to emerge in Pennsylvania as the fracking boom only began in earnest in 2008. However, a look west paints a grim picture for the future of air quality in the already-compromised Northeast Corridor. A 2009 Southern Methodist University study found that summertime emissions of smog-forming pollutants from the oil and gas sector in the Dallas-Fort Worth area exceed emissions from motor vehicles. A 2008 analysis by the Colorado Department of Public Health and Environment concluded that the smog-forming emissions from Colorado's oil and gas operations exceed vehicle emissions for the entire state. In 2009, for the first time in its state's history, Wyoming failed to meet federal health-based standards for air pollution primarily due to the emissions from the state's oil and gas sector. In northeastern Utah, unprecedented ozone levels in the Uintah Basin were recorded last year, the Bureau of Land Management has identified the multitude of oil and gas wells in the region as the primary cause of the ozone pollution.

There are many steps that the State of Pennsylvania and PA DEP, in particular, can take to ensure that our air quality is not degraded to a similar extent.

First, a long-term air monitoring study, which assesses the cumulative impact of air emissions associated with natural gas operations, is necessary. PA DEP indicated in their series of short-term ambient air sampling reports that, “Due to the limited scope and duration of the sampling and the limited number of sources and facilities sampled, the findings only represent conditions at the time of the sampling and do not represent a comprehensive study of emissions.” The studies focused on determining whether there was a health risk if you were breathing the air for a short period of time, but it is imperative that PA DEP assess the effects on human health to those citizens that live and work in around natural gas operations as well as downwind counties.

Second, an adequate source determination is an absolute prerequisite to an adequate demonstration that PA DEP is in compliance with New Source Review, Prevention of Significant Deterioration and the Title V Permit Program. When determining whether a source is major or minor and should be permitted as such, PA DEP must aggregate all sources that are under common control, that are part of the same industrial grouping and are contiguous or adjacent. Because of the very nature of natural gas operations, which can cover many miles, single source determinations are complex but crucial. The Council has reviewed well over thirty Plan Approval files in 2011 alone, and has found a mere tip of the cap to a single source analysis three times, with each leading to a failure to properly aggregate the sources. Among other things a Title V, major source permit requires stricter control technologies as well as increased monitoring, reporting and recordkeeping requirements.

Third, PA DEP’s Air Program has a blanket exemption from permitting requirements for oil and gas exploration and production facilities and operations, except for gas compressor station engines equal to or greater than 100 horsepower. A narrowing of this exemption was initially proposed in April of 2010 but PA DEP has yet to act on it. This blanket exemption is inconsistent with the Clean Air Act and allows for unpermitted emission of air pollution throughout Pennsylvania.

Fourth, PA DEP has for the first time been issuing Title V, major source permits for compressor stations due to the new phase of the greenhouse gas tailoring rule which began on July 1, 2011. As of July 1st, a source can become a major source just by virtue of its emission of greenhouse gases. However, our initial inquiries indicate that PA DEP is only looking at carbon dioxide emissions and not fugitive methane emissions. Because methane emissions are twenty times more powerful a greenhouse gas than carbon dioxide it is imperative that these emissions be taken into account to comply with the greenhouse gas tailoring rule.

Finally, various regions of the PA DEP are failing to comply with the State Implementation Plan public comment requirements. On May 24, 2008, the PA DEP published in the Pennsylvania Bulletin, “Air Quality Permit Streamlining.” It greatly reduces the public notice requirements for minor source permits, which is especially important because, improperly or not, the PA DEP is generally issuing minor source permits to natural gas operations. PA DEP submitted this revision to the Environmental Protection Agency, however the EPA has not yet approved the revision and therefore PA DEP is required to conform to the current State Implementation Plan. Regions of PA DEP are merely providing the public with the application from the natural gas company for review and comment. This does not even conform to the limited requirements of the submitted revision.

There are critical issues facing public health and the environment in Pennsylvania due to the air emissions from natural gas operations and I thank you for this opportunity to outline some of them and look forward to your questions.



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**Testimony of Joe Osborne
Legal Director
Group Against Smog & Pollution
Marcellus Air Issues Policy Committee Hearing
October 12th, 2011**

Good morning, and thank you for inviting me to participate in this hearing. I'm Joe Osborne and I'm the legal director of the Group Against Smog and Pollution (GASP). GASP is a Pittsburgh-based environmental organization that has worked on air quality issues for over 40 years. In recent years an increasing amount of our work has focused on air pollution from Marcellus Shale activity.

When most people think of potential environmental or human health impacts of this industry, they think of water. This industry's potential threat to our air is no less significant. It's true that natural gas produces less pollution than coal when burned, but combustion isn't the whole story. Before natural gas can heat a home or generate electricity, wells must be drilled and fracked, and gas must be extracted, processed, compressed, and transported. Air pollution is generated at every step—diesel emissions from trucks, drill rigs, and frac pumps; volatile organic compounds (VOCs) from equipment venting and leaks; and nitrogen oxides (NOx) from compressor engines and flares.

When any one of these pollution sources is considered in isolation, its emissions may seem relatively small. In fact, in Pennsylvania many of these sources are permitted as minor sources or are entirely exempt from permit requirements as “sources of minor significance.”¹ However, this isn't a case of perpetually dissatisfied environmentalists finding something inconsequential to whine about: When emissions from these sources are combined the impact can be enormous. For example:

- A 2009 Southern Methodist University study found emissions of NOx and VOCs from the oil and gas sector in the Dallas-Fort Worth area exceed emissions from motor vehicles.²
- A 2008 analysis by the Colorado Department of Public Health and Environment concluded that NOx and VOC emissions from Colorado's oil and gas operations exceed vehicle emissions for the entire state.³

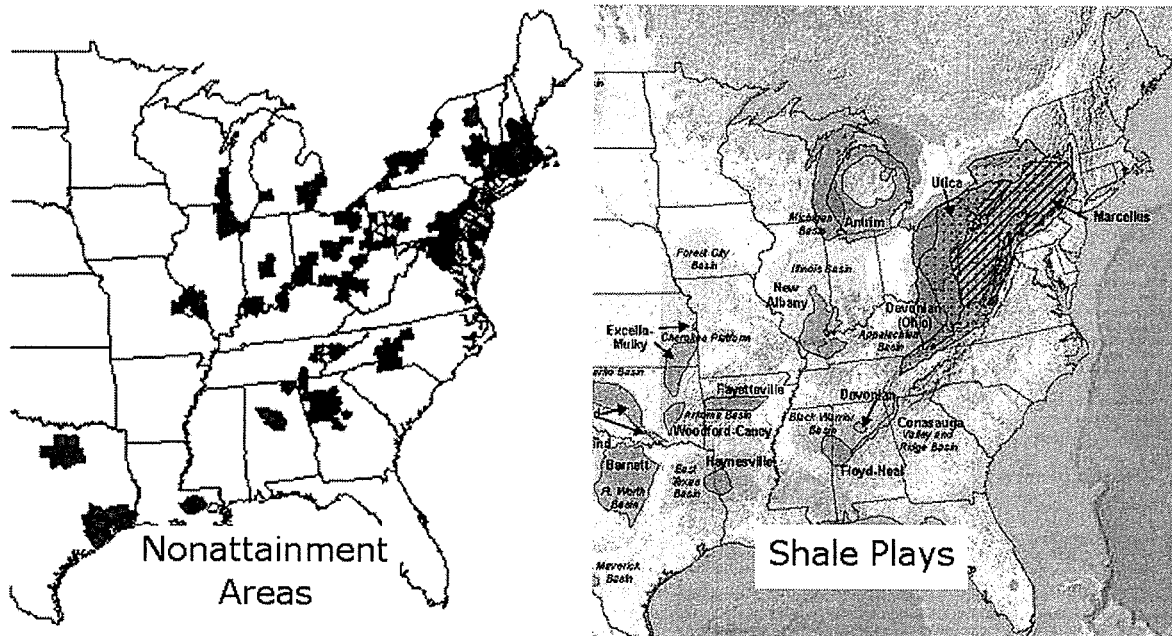
¹ PADEP, Air Quality Permit Exemption List, Category 38, pp. 6-7 (DEP ID#: 275-2101-003) (Jul. 26, 2003) *available at*: <http://www.elibrary.dep.state.pa.us/dsweb/Get/Document-80104/275-2101-003.pdf>.

² Al Armendariz, Emissions from Natural Gas Production in the Barnett Shale Area and Opportunities for Cost-Effective Improvements (Jan. 26, 2009), *available at*: http://www.edf.org/documents/9235_Barnett_Shale_Report.pdf.

³ Attachment 1 - Colorado Dept. of Public Health & Environment, Air Pollution Control Division, Oil and Gas Emission Sources Presentation for the Air Quality Control Commission Retreat (May 15, 2008) at pages 3-4.

NOx and VOCs are pollutants in their own right, but they're of even greater concern because they transform into ozone in the ambient air. In 2009, for the first time in the state's history, Wyoming failed to meet the federal health-based standard for ozone. The Wyoming Department of Environmental Quality determined emissions from the state's growing oil and gas sector were to blame.⁴ Parts of Wyoming now experience higher ozone concentrations than Los Angeles.⁵

Unlike Texas, Colorado, or Wyoming, much of Pennsylvania has struggled to meet federal ozone standards even without significant oil or gas activity. We are now watching the



development of an industry here in Pennsylvania that managed to turn pristine Wyoming air into air that's worse than Los Angeles'—only here, we're adding this air pollution burden on top of an existing ozone problem. If air emissions from Marcellus operations are not subjected to more rigorous control, the human health consequences will be dire—not just for Pennsylvanians, but also for the many individuals living downwind in the high ozone areas stretching from D.C. to Boston.

It's a serious problem, but it's not a hopeless one. Newer compressor engines emit less NOx and VOCs; new proposed federal rules, if finalized, would require additional emission reductions from the oil and gas sector; and because many of the pollution control measures available to this industry reduce emissions by increasing the amount of natural gas that is recovered and sold, pollution controls are remarkably cost effective. Many even pay for themselves after just a few months of operation.

⁴ WYDEQ, Technical Support Document I for Recommended 8-Hour Ozone Designation For the Upper Green River Basin, WY, p. viii (Mar. 26, 2009), *available at*: http://deq.state.wy.us/out/downloads/Ozone%20TSD_final_rev%203-30-09_jl.pdf.

⁵ USA Today, Wyoming's smog exceeds Los Angeles' due to gas drilling (March 9, 2011), *available at*: <http://content.usatoday.com/communities/greenhouse/post/2011/03/wyomings-smog-exceeds-los-angeles-due-to-gas-drilling/1>.

However, while EPA is doing its part, and in many instances natural gas producers are voluntarily employing some of these pollution control measures, Pennsylvania is responding to this obvious, urgent problem by doing essentially nothing.

Among the problems with the existing regulatory scheme, DEP currently includes well sites on its list of “sources of minor significance” and exempts them from air permitting requirements. The exemption list is intended to allow DEP to avoid wasting its limited resources on permits for equipment that produces little pollution. In general it's a reasonable policy, and for conventional wells (which is what DEP had in mind when it created the well site exemption) the exemption probably still makes sense. But Marcellus wells are not conventional wells: Marcellus wells produce larger volumes of gas, production is more equipment intensive, and a single Marcellus well site often includes multiple wells. As a result Marcellus well sites are capable of producing far more pollution than conventional wells, but can continue to take advantage of the conventional well air permit exemption. There are currently over 1500 of these air-permit exempt Marcellus well pads in Pennsylvania.⁶

Because there is no air permit or notification requirement, well sites are effectively invisible to DEP's Bureau of Air Quality. The air quality program does not inspect these sites, does not know what equipment is present, what condition that equipment is in, or how much pollution it generates. DEP has no way to determine if these sources are operating in compliance with applicable state and federal requirements, including whether the well site actually meets the permit exemption requirements.

In May of 2010 DEP published a proposal to narrow the well site exemption.⁷ In February of this year DEP reopened the comment period.⁸ To date DEP has not taken any additional action on this proposal. Well sites are a significant source of air emissions, and currently these emissions are almost entirely unregulated. DEP should act as expeditiously as possible to narrow the well site permit exemption. DEP could follow Ohio EPA's lead by developing a well site general permit or incorporate well sites into GP-5—the general permit for natural gas compressor engines.

In the absence of a permit requirement, DEP could, at a minimum, require these sources to provide air emissions information on an annual basis.⁹ In the absence of such information, DEP must rely on general emission estimates to determine whether areas will meet or exceed health-based air pollution standards and when crafting control strategies to bring areas into compliance with these standards. Despite DEP statements that it has or will request this emissions information, which date at least as far back as September 2010,¹⁰ to my knowledge DEP has yet to do so.

There are other issues I could discuss, such as the lack of sufficient DEP air program inspectors, and the Department's failure to conduct appropriate major source aggregation analyses; however I don't want to take up too much time and will leave these topics to other speakers. Again, thank you for providing this opportunity to speak.

⁶ Jim Ladlee and Jeffrey Jacquet, *The Implications of Multi-Well Pads in the Marcellus Shale* (Sept. 2011), *available at*: http://devsoc.cals.cornell.edu/cals/devsoc/outreach/cardi/publications/upload/Policy_Brief_Sept11-draft02.pdf.

⁷ 40 Pa. Bulletin 2822.

⁸ 41 Pa. Bulletin. 1066.

⁹ 25 Pa. Code § 135.3.

¹⁰ PADEP Air quality Technical Advisory Committee, Meeting Minutes (Sept. 15, 2010) at 12, *available at*: http://www.dep.state.pa.us/dep/subject/advcoun/aqtac/2010/10-21-10/Minutes_AQTAC_09-15-2010.pdf.



**Statement of
Kevin M. Stewart
Director of Environmental Health
American Lung Association in Pennsylvania**

**Before the
Pennsylvania House Democratic Policy Committee
Regarding Air Quality Issues Related to the Marcellus Shale Industry**

**Delaware County Community College Academic Building
Media, Pennsylvania**

October 12, 2011

Good morning, Mr. Chairman. I thank the Committee for your invitation to address you and for your work here today.

I am Kevin Stewart and I serve as Director of Environmental Health for the American Lung Association in Pennsylvania. Since 2007, it has also been my privilege to represent the Lung Association on the Department of Environmental Protection's (DEP's) Air Quality Technical Advisory Committee (AQTAC), where I advocate on behalf of well over a million people in the Commonwealth who suffer from chronic lung disease, but also for the millions more who desire to breathe clean air and so protect their good health.

Our oldest predecessor agency was founded in nearby Philadelphia in 1892 to fight tuberculosis. We are now dedicated to our broader mission of improving lung health and preventing lung disease. We have been fighting for relief from ambient air pollution since the middle of the last century.

Members of the Committee may be aware that in my role with the American Lung Association of the Mid-Atlantic, I testified two weeks ago in support of the Environmental Protection Agency's (EPA's) proposed set of national standards to reduce the amount of ozone-smog-forming volatile organic compounds (VOCs), air toxics (hazardous air pollutants or

HAPs), and methane that are released from production wells, processing plants, transmission pipelines, and storage units within the oil and natural gas industries.

This naturally subsumes the Marcellus gas industry, therefore much of what I have to say here today underscores the messages I delivered before the EPA hearing panel.

We are here today to put four main messages into the record:

- We support EPA's proposal to reduce oil and natural gas sector emissions, a proposal that includes the first – and much needed – federal air standards for hydraulically fractured wells.
- We urge that air pollution rules, whether by the EPA or by DEP be adopted or strengthened to further reduce the emissions of these pollutants, and we will describe several specific ways of doing so.
- We stress that DEP be provided with adequate resources of personnel and funding in order to achieve environmental and health protections now and into the future.
- Finally, our purpose is to remind everyone about the reason why we advocate for these measures – public health is at stake.

Support

The American Lung Association is looking forward to the implementation of strong new standards for the oil and natural gas sector that will protect Americans across the country from harmful air pollutants including VOCs, air toxics, ozone and particulate matter (PM).

- Not only will the standards help reduce ozone and PM levels in areas where oil and gas production occurs, but they will contribute to downwind attainment of ambient air quality standards for these pollutants. Ozone, for example, worsens asthma, reduces lung function, increases respiratory hospital visits, and can even result in premature death.
- The standards will reduce the risks from exposure to benzene, a Class A (known human) carcinogen, and other harmful air toxics that affect numerous organs and body systems.
- The standards will reduce exposure to sulfur dioxide (SO₂), a pollutant known not only to exacerbate asthma and increase the need for hospitalization and emergency treatment, but also for its role as a component of fine particle pollution, microscopic particles that cause increases in asthma attacks, heart attacks and premature death.
- Though the standards do not directly target methane, our understanding is that they will result in an annual methane reduction of 3.4 million tons (about 26%). This is good progress, since our primary concerns in this respect have to do with methane's long-term role as a greenhouse gas more than twenty times as powerful as carbon dioxide. Controlling methane helps keep ozone levels from being as high as they would otherwise be. As higher methane emissions contribute to warmer temperatures, pollens and allergens may increase, and along with more ozone, would be expected to contribute to greater asthma prevalence and greater severity of asthma cases.
- Furthermore, according to the EPA, industry-wide implementation of this rule in the United States would amount to an annual reduction by 25% (or 540,000 tons) of

VOCs, and by nearly 30% (38,000 tons) of HAPs. For example, the “Reduced Emission Completion” requirement applied to completion of hydraulically fractured wells is expected to abate most of the VOC emissions from hydraulically fractured natural gas wells, wells that during the flowback period can vent on the order of 200 times more VOCs than conventionally drilled wells.

We observe that the proposed rules are so cost-effective that not only do they provide some protections to human health and air quality, but they also will help the industry conserve so much product currently released or flared off that an annual net savings of at least \$30 million is expected to result. Indeed, given that kind of arithmetic, the industry should already be taking these kinds of pollution-reduction steps of its own accord – doing them out of its own self-interest rather than needing the government’s encouragement in the form of this rule to nudge it along.

We also recognize that there are several instances in which the industry has failed adequately to characterize emissions, or to address potential releases, exposures, and health risks. In addition to obvious concerns about the aggregate releases of nitrogen oxides (NO_x), SO₂, PM, VOCs and air toxics and their impacts on smog formation and health, other issues range from the health impacts of emissions from diesel vehicles and engines that support Marcellus work to questions about the release of radon gas from black marine shales known to be high in uranium. Therefore, we, as a matter of basic principles as well as through our work on AQTAC, have been supporting the prompt establishment of a complete and reliable emissions inventory with respect to the burgeoning Marcellus gas industry in Pennsylvania.

In the absence of such an inventory, and without taking into account the implementation of the EPA’s proposed rule, comparisons with existing data associated with the Barnett play in Texas, taken together with anticipated projections for expanded development of this resource in Pennsylvania appear to lead to a ballpark approximation of on the order of 200,000 tons per year total annual emissions of NO_x and VOCs by the year 2020, an amount that could be a significant fraction of statewide emissions of these pollutants.

Improvements

Therefore, the American Lung Association in Pennsylvania believes that there is an unmet need for the industry to make a further investment in public health, and hence urges the EPA and DEP to adopt or strengthen rules and resources to further reduce the emissions of these pollutants. Specifically, we recommend the following:

- Require cleanup of both new and existing sources, not just new ones – especially compressors and gas-driven controllers and valves, with examples including:
 - implementing measures to reduce compressor station blowdown or shutdown emissions, given that several practical, cost-effective control measures are available for use; and
 - requiring “no-bleed” controllers at all facilities with adequate electrical service;

- Set standards for the reduction of methane, regulating it directly, and not merely as a consequence of the reductions of VOCs;
- Establish an expeditious process for the industry’s elimination of open pit wastewater storage by a date certain, given that EPA itself notes that volatilization from produced water ponds are a “potentially significant source of emissions” – in addition to the potential for the use of these impoundments to result in other adverse environmental impacts;
- Require sufficient monitoring and adequately detailed reporting of emissions to inform affected communities of their air quality and to support enforcement of performance and emission standards, in a manner consistent with the need to consider emissions of air pollution directly and indirectly resulting from life-cycle oil and gas sector operations;
- Establish a third-party verification system that ensures
 - the independence of third-party verifiers (removing the potential for a conflict of interest to threaten impartiality) and
 - a reliable funding stream (as an essential cost of doing business) to pay for such services;
- Ensure that affirmative defense criteria do not unjustly close or impede the means of recourse available to parties claiming harm or undue exposure due to airborne emissions from an operation of the industry;
- Provide incentives that encourage and reinforce good behavior by operators, and disincentives to ensure that irresponsible operators are not afforded such opportunities;
- Provide significant compliance assistance to operators that have need of improvement and demonstrate a commitment to improve their operations; and
- Provide adequate resources of staffing and funding to ensure that DEP will achieve the necessary environmental and health protections – with a view that over time such resources would increase to keep pace with the extent to which the Marcellus industry expands in the Commonwealth. Such deliberate coordination of resources with needs would assure that DEP can
 - process permit applications thoroughly and promptly,
 - carry out the necessary monitoring of air and water resources, and
 - conduct the oversight necessary to enforce air pollution regulations,not only to protect public health,
and not only to create a system commensurate to the task of managing environmental protection in a comprehensive, fair, expeditious, and consistent manner,
but also to ensure that responsible operators in the Marcellus industry are rewarded for their good behavior and not put at a disadvantage by those taking shortcuts.

Our Motivating Reasons

Finally, we emphasize that the populations potentially at risk from exposure to such air pollution as may result from Marcellus gas operations are not a small minority of particularly sensitive persons, but in Pennsylvania are constituted of groups containing hundreds of thousands or even millions of individuals. They include the following:

- 2.8 million infants, children and teens under 18

- 1.9 million persons aged 65 and above
- 290,000 children with asthma
- 890,000 adults with asthma
- 440,000 persons with chronic bronchitis, and
- 230,000 persons with emphysema.
- 3.8 million persons with cardiovascular disease
- 890 thousand persons with diabetes, and
- 1.5 million persons living in poverty.
- Pregnant women, their developing unborn, persons who work or exercise outdoors, and many others with existing health problems are also at risk.

Indeed, far from being a small minority, persons falling into one or more of these high risk groups together comprise more than half the population. And even more important to remember: Every one of these millions is a real person, not a nameless statistic. Every one of these people is a human being worthy of our attention – a neighbor, a coworker, a friend, a family member, maybe even yourself.



**Remarks of the Marcellus Shale Coalition
Before the
House Democratic Policy Committee
Regarding Air Quality
October 12, 2011**

Good morning, I am Andrew Paterson, Executive Vice President of Technical Affairs with the Marcellus Shale Coalition (MSC). Joining me today is Carla Suszkowski, Director of Regulatory Policy, Range Resources, and Vice-Chair of the Coalition's Air Quality Subcommittee.

The MSC is a multi-state association formed in 2008 and currently comprised of nearly 250 exploration and production, midstream, and supply-chain member companies fully committed to developing clean-burning natural gas resources in the Marcellus geological formation. We appreciate the opportunity to appear before you today to discuss air quality and the responsible development of natural gas from the Marcellus Shale formation.

Last year, our Coalition adopted a set of Guiding Principles, which comprise our vision for operating in a responsible, transparent manner in order to maximize the environmental, economic, and energy security benefits of clean-burning, abundant natural gas. Among those Guiding Principles is our focus on implementing state-of-the-art environmental protection across our operations. These are words we live and operate by – our commitment to our neighbors in this region and to the state agencies responsible for tightly regulating this industry.

The Marcellus holds tremendous promise as the second largest natural gas field in the world. It is a significant part of an energy revolution across the US. The availability of an abundant, affordable and domestic supply of natural gas has far reaching economic and energy security impacts for the country.

The responsible development of the Marcellus is bringing with it tremendous economic activity. A study the MSC commissioned this year from economists at the Pennsylvania State University projects that the Marcellus could become the leading supplier of natural gas in the United States within a decade. Furthermore, the Marcellus is increasing the Commonwealth's 2011 economic activity by \$12.8 billion generating \$1.2 billion in state and local taxes and supporting more than 156,000 family sustaining jobs. Additionally, Marcellus producers paid \$1.6 billion in lease and bonus payments to Pennsylvania landowners in 2010 alone. The production of natural gas from the Marcellus has also benefitted Pennsylvanians statewide by reducing utility bills for the residential, commercial and industrial sectors by \$633 million in 2010.

The development of shale gas is also a game-changer in terms of the environment, and in particular air quality. Natural gas is the cleanest burning fossil fuel. With the availability of abundant and affordable domestic supplies, use of natural gas will certainly increase and bring with it opportunities to improve air quality. Increased usage can be anticipated in many sectors of the economy including, transportation, electric generation, combined heat and power applications, general heating and cooling uses and as a feedstock for many industries.

The transportation sector is an area where increased use of natural gas can help reduce air emissions. Many companies, such as Chesapeake Energy, are working to increase the number of natural gas fueled vehicles on Pennsylvania roads and the development of the necessary infrastructure to fuel the vehicles. The many opportunities for the transportation sector are outlined in a recent MSC report titled: "Roadmap for Pennsylvania Jobs, Energy Security, and Clean Air." The Roadmap also details a path – through more robust use of natural gas vehicles on the Commonwealth – for the reduction of nitrogen oxides (NOx) emissions by 702 tons, particulate matter (PM) emissions by 14.5 tons, and greenhouse gas emissions by 21,000 metric tons each year once fully implemented. The National Petroleum Council estimates that increased natural gas use



from fuel switching in sectors other than transportation can also lead to a significant reduction in air emissions. They estimate a potential reduction in CO₂ emissions that would amount to a drop of 2 to 12% of total greenhouse gas emissions from US 2005 levels by the year 2030. It is clear that increased usage of natural gas will be a critical tool to help Pennsylvania and the nation achieve air quality goals.

We understand that the development of this clean-burning resource involves processes that result in various air emissions. The processes themselves and the equipment necessary to carry them out are all under strict state and federal air rules. Thus far, these processes have yielded no adverse impacts on air quality as measured by the Commonwealth. Specifically, the Pennsylvania Department of Environmental Protection conducted short-term ambient air sampling over the past year in three geographically diverse areas of the Commonwealth where Marcellus drilling activities are taking place – in the northeastern, southwestern, and north central regions of our state. The results did not identify concentrations of any compound that would likely trigger air-related health issues associated with Marcellus Shale drilling activities. Furthermore, sampling for carbon monoxide, nitrogen dioxide, sulfur dioxide and ozone, did not detect concentrations above National Ambient Air Quality Standards at any of the sampling sites.

With these important results in mind, the members of the MSC are committed to abiding by existing air rules, and we are consistently involved in seeking out innovative and economic solutions to address air quality concerns. The state and federal governments are working on several rulemaking changes that impact air emissions from the development of natural gas.

The Pennsylvania Department of Environmental Protection is currently in the process of modifying the Plan Approval Exemption List to account for emissions from exploration and production activities to assist in the determination of potential cumulative state-wide



impacts. In addition, the Department is also modifying the General Plan Approval and/or General Operating Permit for Natural Gas, Coal Bed Methane or Gob Gas Production or Recovery Facilities (GP-5). The revised general permit will contain provisions for permitting stationary sources at production locations, tanks, turbines as well as other sources not included in the existing GP-5.

At the Federal level, EPA has proposed a New Source Performance Standard (NSPS) and a modification to the existing National Emission Standard for Hazardous Air Pollutants (NESHAP) for the Oil and Gas Sector. The NSPS, 40 CFR part 60 subpart OOOO, will focus primarily on the reduction of VOC emissions from the hydraulic fracturing process, compressors, condensate and oil storage tanks, pneumatic controllers and processing plants. The modification to the existing NESHAP (40 CFR part 63 subpart HH and HHH) will focus on hazardous air pollutant (HAPs) reductions from glycol dehydrators, condensate and oil storage tanks and valves. EPA has also recently promulgated the Greenhouse Gas Mandatory Reporting rule which requires affected oil and gas facilities to report carbon emissions from combustion and fugitive sources.

The Ozone Transport Commission (OTC) has also recently developed two (2) proposed model rules aimed at emissions reductions for the oil and gas industry. The first model rule is directed at NO_x emissions limitations for existing natural gas fueled prime movers powering compressors used for transmission of natural gas, and to also provide NO_x emissions limitations for existing natural gas fueled prime movers powering compressors used for the storage (injection and extraction) of natural gas. The purpose of the second proposed rule is to reduce diesel engine emissions consisting of criteria pollutants, primarily particulate matter (PM), that result from idling of nonroad engines.

Members of the Policy Committee, we are proud of the manner in which the Marcellus industry is operating here in Pennsylvania and the role it is playing in the shale gas revolution and the promise that the responsible development of shale gas brings to the



areas of economic, energy security and environmental excellence. Likewise, we look forward to working with this committee, your colleagues on both sides of the aisle, state regulators, and other key stakeholders to increase the use of natural gas to promote air quality and ensure that our industry's operations are conducted responsibly and with an eye toward protecting our air, water, and land.

Thank you for the opportunity to appear before you today.



Testimony of George Jugovic, Jr. Before the House Democratic Policy Committee on
the Role of the Department of Environmental Protection in Regulating Air Emissions from
Marcellus Shale Development Operations

Wednesday, October 12, 2011

Summary - Internal combustion gas transmission and production engines are the second largest contributor to NOx emissions in Pennsylvania, behind only coal fired power plants. Air emissions from the Marcellus Shale industry will become a matter of import to Pennsylvanians if not addressed now during development of the industry. The Department of Environmental Protection has the regulatory obligation and authority under the Air Pollution Control Act to ensure that NOx emissions are properly controlled and that this industry can develop in an environmentally sound manner. The Department controls emissions from air contaminant sources such as internal combustion engines by imposing technology-based emission limits on the source prior to granting a plan approval for its construction or installation. This decision, known as a BAT (Best Available Control Technology) determination, is critical to controlling air pollution. The Department currently authorizes installation of IC Engines under a General Permit (GP-5), which incorporates a BAT determination made in 2000. Technological developments to clean air emissions from IC compressor engines have outpaced the emission limits contained in GP-5, such that the BAT determination in GP-5 no longer represents the best available technology to control air emissions from IC compressor engines. While the Department is currently in the process of revising GP-5, it is not known how long that process will take - a year or more would not be unexpected. In the meantime, the Department continues to allow the installation of internal combustion compressor engines under the out-of-date BAT determination contained in GP-5. GP-5 allows applicants to voluntarily comply with a more stringent emission than that contained in the permit. The industry currently takes advantage of that opportunity primarily when it is necessary to allow the addition of engines to a single facility in a manner that prevents the facility from becoming categorized as a "major source" under the air program. The Department should be ensuring that every new IC compressor engine installed in Pennsylvania incorporates current Best Available Control Technology to protect public health and the environment.

Introduction

Thank you distinguished members of the Committee for the opportunity to testify before you. I have spent the past twenty-eight years working in the environmental law field seeking to conserve and enhance Pennsylvania's natural environment for this and future generations. In that time, I had the pleasure of serving in the Department of Environmental Protection under four Governor's, beginning with Governor Richard Thornburgh. I also spent six years prosecuting environmental criminal cases for the Commonwealth as a Special Deputy Attorney General for the Attorney General's Environmental Crimes Section, and taught environmental law courses at the University of Pittsburgh School of Law. Until recently, I served as Regional Director for the Department of Environmental Protection's Southwest Regional Office, and am now employed as Senior Counsel for Citizens for Pennsylvania's Future.

Background

Internal combustion gas transmission and production engines are the second largest contributor to NO_x emissions in Pennsylvania, behind only coal fired power plants. In 1977, Congress established National Ambient Air Standards for NO_x as one of six priority pollutants to be met throughout the United States in order to measure and protect human health and welfare. NO_x is also regulated as a precursor chemical, along with VOCs (volatile organic compounds), to the formation of Ozone and PM 2.5 (particulate matter). Pennsylvania is in non-attainment for Ozone. Over 13,000 tons per year of NO_x associated with the Marcellus industry have been permitted by the Southwest Regional Office alone. Air emissions from the Marcellus Shale industry will become a matter of import to Pennsylvanians if not addressed now during development of the industry.

Basic Regulatory Structure

The Department of Environmental Protection has the regulatory obligation and authority under the Air Pollution Control Act to ensure that NO_x emissions are properly controlled and that the shale gas industry develops in an environmentally sound manner. The Department does this by determining whether, and what type, of control equipment must be used to control air contaminants that will be emitted from a particular source that an applicant wants to construct.

The first analysis is to determine whether the source must obtain a plan approval and incorporate any particular technology to control air pollution. If the source is minor and will not prevent the state from attaining NAAQS, then no plan approval is needed. Typical air contaminant sources that are exempt from regulation are small engines (less than 100 hp), and sources emitting less than 6.6 tons per year of NO_x. Significantly, the Department's regulations also exempt all well head activities, meaning engines used on well pads to develop shale wells do not require a plan approval and do not necessarily employ BAT to control air pollutants. This exemption was intended for shallow gas development, and did not envision the types, size and quantities of engines being used to develop Marcellus shale, nor the length of time that those engines are remaining in one location to develop multiple wells on one pad. While the Department is currently reviewing this exemption list, existing development activities are not being approved and monitored for their contributions to possible air contamination issues, such as to ensure compliance with ground level ozone standard. Ground level ozone is created by the combination of NO_x and VOCs, both of which are emitted during Marcellus shale development, in the presence of sunlight.

The Department must approve-- through a pre-construction authorization known as a plan approval-- any installation of a new source of air contaminants that is not exempt. In issuing this approval, the Department must ensure that the proposed source incorporates best available technology to control air contaminant emissions. This BAT determination establishes the control equipment that must be designed into construction of the source in order to control air pollution. The BAT determination is supposed to be a case-by-case analysis that considers, among other things, energy, environmental, economic impact and other costs.

Where a person seeks to install a new “major” source of air contaminants in an area that is not in attainment with NAAQS, then the Department must impose the use of Lowest Achievable Emission Rate (LAER) on the source. LAER may or not be significantly different than BAT, but one difference in making the determination is that LAER does not consider the costs of compliance. LAER is to represent the most effective control technology demonstrated in practice, without regard to costs. In addition, installation (or significant modification) of a “major” source in a non-attainment area requires the use of “offsets” to account for the additional loading of contaminants that will be contributed by the new source.

General Permits and the Major Source Conundrum

The Department currently authorizes installation of IC Engines at compressor stations under a General Permit (GP-5)(natural gas production facilities). General Permits are a way for the Department to efficiently authorize approvals for activities that do not vary significantly from site to site, and operation to operation, and where the source does not constitute a “major” source of air contaminants. Rather than applying for an individual plant approval, the Department issues the General Permit with certain standard conditions. The applicant then need only seek “coverage” under the General Permit. The Department determines whether the activity is the type intended to be covered, and issues a determination of applicability. What the Department does not do on a case-by-case basis is re-evaluate the various terms and conditions contained in the General Permit that authorizes the activity being approved. So while General Permits have obvious advantages from an efficiency perspective, they embody certain risks associated with the inflexibility of the General Permit from an environmental perspective.

For example, the Department continues to approve installation of IC compressor engines under the existing GP-5 issued in 2000. The existing GP-5 incorporates a BAT determination made in 2000. Among other things, that BAT determination fixed 2.0 g/bhp-hr as the emission limitation for NOx.¹ In the last 10 years, emission rates have improved dramatically due to new engine designs, and use of catalytic oxidation to lower emissions of carbon monoxide, formaldehyde and other hydrocarbons. Caterpillar is producing new “lean” burn engines that achieve emission rates of less than 0.30 g/bhp-hr, and Waukesha produces “rich” burn engines with a three-way oxidation catalyst that achieves a rate of less than 0.15 g/bhp-hr. Further, the Department’s issuance of recent individual plan approvals established BAT for IC compressor engines at .28 and .20 g/bhp-hr. Thus, it is apparent that to the Department continues to use the existing GP-5 with its NOx limit of 2.0 g/bhp-hr for installation of IC compressor engines, it is failing in its obligation to the public to ensure that any new source of air contaminant incorporates controls designed to meet the BAT standard.

In March 2011, the Department adopted a “minor” revision to GP5 that allows the Department to enforce any lower emission limit than that contained in the General Permit that was voluntarily proposed by a permit applicant. This revision was primarily designed to allow the industry to

¹ The GP-5 also contains language incorporating any more stringent Federal Standard. The US EPA lowered the allowable emission rate from IC combustion engines to 1.0 g/bhp-hr of NOx for engines manufactured after July 1, 2010. Still, even this more stringent limit has been surpassed by technologic advances.

add additional engines at a single facility in a manner that did not cause the facility to become a “major source” under the air program.

Any source that emits more than 100 tons per year of NO_x is considered to be a “major source”. While an individual turbine may not trigger the major source threshold, several turbines cumulatively can trigger the threshold. For example, the Department calculates that emissions from three 1340 Caterpillar Model 3516 engines would total 78 TPY using the GP-5’s 2.0 g/bhp-hr limit for each engine. The effect of becoming a “major source” is several. First, no additional sources can be added using GP-5, and instead an individual plan approval must be obtained. This will entail an individualized BAT determination and public notice and comment. Second, because Pennsylvania is non-attainment for ozone, a plan approval for a “major source” would require the use of LAER and offsets, rather than BAT. As a result, companies have chosen to take a voluntary reduction in its NO_x emission limit, known as a “synthetic minor” in order to add more engines to various facilities and still remain under the “major source” cap.

Conclusion

The shale industry is adding thousands of tons of NO_x emissions to Pennsylvania’s airshed. The Department has the authority and responsibility to ensure those loadings are not being added unnecessarily. The Department should be assessing the NO_x loadings being added because of the exemption for well development activities in its current regulations, and reporting the effect of that exemption to the public. If necessary, steps should be taken to regulate and reduce emissions from well development activities. The Department should also ensure that every new IC compressor engine installed in Pennsylvania incorporates current best available control technology. The continued use of GP-5 in its current form does not reflect BAT, and as such the Department effectively allows annual NO_x loadings to be added to Pennsylvania’s environment unnecessarily and, very possibly, to the detriment of public health and welfare, and that of the environment.