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E N V I R O N M E N T A L L A W

## Environmental Requirements in Place for Marcellus Shale Development

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*Special to the Legal*

The extraction of natural resources has been an integral part of the economic fabric within Pennsylvania since colonial times. Pennsylvania is the cradle of the modern oil and gas production industry, with production covering more than 150 years since Edwin Drake drilled the first commercial oil well near Titusville in 1859. Oil, coal, natural gas, and a wide array of non-fuel minerals have been successfully brought to market by Pennsylvania industry, supplying the state, the nation and the world with fuel supplies for energy production and important raw materials that are integral to a variety of manufacturing operations.

Pennsylvania is again poised to play a leading role in energy production with the potential to unlock the vast natural gas reserves that are present in the Marcellus Shale formation that lies beneath more than 60 percent of the commonwealth. As the oil and gas industry implements new technologies and advanced extraction methods to tap these reserves of vital natural resources, the environmental requirements that govern these activities have kept pace.

### COMPREHENSIVE ENVIRONMENTAL REQUIREMENTS

The statutory matrix that exists in Pennsylvania, including the Oil and Gas Act, the Clean Streams Law and the Dam Safety and Encroachments Act, have armed the Pennsylvania Department of Environmental Protection (PADEP) with broad mandates to craft and enforce regulatory requirements and establish environmental standards designed to protect human health and the environment.



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and management, solid waste management, site development and the requirements applicable to the natural gas industry in Pennsylvania.

Throughout the past several decades, these regulatory programs and associated agency guidance have been modified and expanded to enhance the level of protection afforded to Pennsylvania's residents and its environment. The result of these efforts is a well-defined legal framework of requirements that are applicable to the extraction of natural gas found in the Marcellus Shale formation.

Regulations previously promulgated pursuant to these and other environmental statutes now govern every element of the planning, construction, operation, completion, decommissioning and plugging of the facilities used for natural gas production and transmission. While a myriad of issues are addressed by the commonwealth's current comprehensive oil and gas program, two of the most highly publicized areas of ongoing concern relate to water usage and management and hydraulic fracturing — issues that in many respects are interrelated.

### A BREAKTHROUGH

About six years ago, the potential for extracting natural gas from the Marcellus Shale formation became feasible through

advances in horizontal drilling and hydraulic fracturing technologies. The Marcellus Shale formation is typically found at depths of more than a mile below the ground surface in Pennsylvania. Like other types of shale formations in which significant amounts of natural gas are present, the Marcellus Shale formation is a "tight" geologic formation with limited natural vertical and horizontal permeability that can significantly restrict the ability of natural gas to flow into a natural gas well. Hydraulic fracturing activities involve technically complex and highly specialized operations in which pressurized fluids are used in a highly controlled manner to induce small cracks to form in the rock formation in which the natural gas is present, thereby increasing the permeability of the rock formation and facilitating the movement of natural gas from the formation into a collection pipe.

Hydraulic fracturing is a technology that has been used safely and successfully in Pennsylvania since the 1950s. Based on information compiled by PADEP, the hydraulic fracturing process for a typical well installed in the Marcellus Shale formation involves the injection of between three and five million gallons of water together with small amounts of specific sands or ceramic "proppants" and certain additives that are used to reduce fluid friction, control bacterial growth, inhibit corrosion and scale, and clean well components. The "proppants" serve to hold open the small cracks that are formed during the hydraulic fracturing process to allow for the collection of natural gas in the well for recovery. Well construction procedures and protocols are designed to protect and isolate the relatively shallow groundwater zones that exist many thousands of feet above the depths where the Marcellus Shale formation typically is

encountered. Hydraulic fracturing enhances the recovery of natural gas from the well and, because of the lateral reach of horizontal drilling techniques, fewer natural gas production wells are needed.

## REGULATORY REVISIONS

Faced with the enormous pressure to properly regulate rapidly expanding shale gas drilling activities in Pennsylvania and the associated infrastructure development, PADEP has embarked on an ambitious program to modify and upgrade the applicable regulatory schemes. Much of this effort was accomplished with active collaboration from multiple stakeholders, including the oil and gas industry. A comprehensive regulatory program is currently in place in Pennsylvania governing all aspects of the development of natural gas reserves from the Marcellus Shale formation and continues to evolve.

Most recently, on Oct. 12, the Pennsylvania Environmental Quality Board approved sweeping revisions to 25 Pa. Code Chapter 78, which contains Pennsylvania's oil and gas well regulations. These revisions include very specific and stringent requirements for well casing and cementing, well inspection and reporting, water supply protection and response to any suspected gas migration incidents. If the new regulations do not encounter resistance during consideration by the Independent Regulatory Review Commission and the environmental standing committees of the General Assembly, the new regulations will become effective upon publication in the Pennsylvania Bulletin, which may come as early as the end of this year.

PADEP's efforts to work with a wide range of stakeholders have been viewed favorably. For example, in September 2010, a report titled "Pennsylvania Hydraulic Fracturing State Review" was issued by STRONGER — State Review of Oil and Natural Gas Environmental Regulations Inc. — a multi-disciplinary stakeholders group with significant expertise in the oil and gas industry. The review of Pennsylvania's hydraulic fracturing program by STRONGER was voluntary as it appears that PADEP continues to look outside for input to assure that Pennsylvania's oil and gas program is protective of public health and the environment. The STRONGER report contains several recommendations, some of which appear to be addressed in the recent revisions to Chapter 78. In addition, the

STRONGER report concluded that there has been no reported incidents of groundwater contamination from hydraulic fracturing in Pennsylvania. Such a conclusion is contrary to the allegations of certain stakeholders and interest groups that continually press the assertion that hydraulic fracturing causes groundwater contamination.

In addition to management of hydraulic fracturing, water use and management is an important issue that must be addressed in conjunction with Marcellus Shale development. Water is needed to develop shale gas wells in order to open fractures in the shale to facilitate natural gas collection and recovery. The Susquehanna River Basin Commission (SRBC) has applied its comprehensive pro-

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gram to manage water withdrawals, use and recovery to the water use issues posed by the expanding drilling activity in the Marcellus Shale formation. (The Delaware River Basin Commission, on the other hand, has imposed a moratorium on drilling both exploratory and product wells until new regulations, which have not yet even been proposed, are adopted, although docket applications for water withdrawals are still being accepted and processed.) Within the Susquehanna River Basin, each element of the water use cycle is controlled and detailed reporting tracks water use and disposition. Consumptive water use determinations are generally made by the SRBC through an "approval by rule" process

that is predicated on the submission of a notice of intent, appropriate public notice and the demonstration that the applicable criteria are met.

PADEP does not have the same type of authority as the SRBC, but has developed a requirement for the submission of detailed Water Management Plans through an interpretation of its enabling legislation. These Water Management Plans trace water usage and management from extraction to disposal. Focusing on the potential adverse impacts from the diversion of water for use by the oil and gas industry, PADEP has established specific standards that must be met depending on the source of the water that is proposed to be used and has promulgated stringent treatment and discharge standards.

## ENVIRONMENTAL PROTECTION

As PADEP is poised to implement Pennsylvania's revised oil and gas regulations and water use rules are being implemented by PADEP and SRBC, the oil and gas industry continues to make progress in refining technologies, and working in collaboration with PADEP and other stakeholders to define appropriate best management practices to guide oil and gas operations in compliance with applicable requirements. On Oct. 1, the Marcellus Shale Coalition, the leading group of natural gas producers in the state, released a set of core principles. Among them is a commitment to "implement state-of-the-art environmental protection across our operations."

At the end of the day, because of the collaborative efforts among stakeholders, PADEP and other regulatory agencies to adapt existing environmental laws to natural gas drilling advances, Pennsylvania is poised to reap the benefits of a game-changing economic boom with a world class industry generating environmentally friendly fuels while continuing to protect the environment. •

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