

Southern Tier East Technical Paper # 08-07

This Technical Paper is one in a series of brief papers on specific subjects which has been prepared by the Southern Tier East Regional Planning Development Board with the financial support of the Appalachian Regional Commission and the Board's member counties. Opinions presented in this paper do not necessarily reflect positions of either the Commission or the Board but rather are solely those of the author.

OBSERVATIONS CONCERNING THE ROLE OF LOCAL GOVERNMENT IN RELATION TO NATURAL GAS EXPLORATION AND PRODUCTION IN THE MARCELLUS SHALE IN THE SOUTHERN TIER EAST REGION OF NEW YORK STATE

by
Robert Augenstern



Southern Tier East Regional Planning Development Board

375 State Street • Binghamton, NY 13901 • Phone: (607) 724-1327

Fax: (607) 724-1194 • E-mail: ste@steny.org • www.steny.org

Robert Augenstern, Director Richard E. McCormick, Deputy Director

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INTRODUCTION

This technical paper has been prepared by the Southern Tier East Regional Planning Development Board to assist local governments within its region in responding to recent activity concerning natural gas exploration on the Marcellus Shale which underlies large portions of the Southern Tier East Region of New York State.¹

The role of the Regional Planning Board in this matter is informational. The Regional Planning Board has no authority to adopt or administer any land use controls. However, the Regional Planning Board does have a role in gathering and disseminating information concerning topics relating to community development and planning.

The focus of this brief paper is to explore the various roles which local government may play in responding to issues that may emerge in the exploration for and development of the natural gas resources of the Marcellus Shale formation. This paper will NOT go into issues such as mineral rights, leases, and royalty payments involving individual property owners except to observe that the formation of community groups of those property owners who are being approached by drillers have been successful in negotiating agreements in various counties within the Region.

While the expertise of the Regional Planning Board on this topic is principally in the field of local governmental administration, community development, and land use regulation, it is desirable for this paper to provide at least some brief overview of the geology of the Marcellus Shale and the techniques expected to be used in recovering it as an economically viable energy resource.

Special Notes – This document is not intended to provide any legal or scientific advice. This report is based upon a number of independent sources which are cited as appropriate in the text and in footnotes, however, no warranty is provided concerning the accuracy of such cited statements. In addition, this paper provides observations concerning the roles and responsibilities of various agencies which merely represent the author's opinions, and not necessarily those of the Regional Board or its member counties. Where a regulatory function is cited, it is critical that the regulatory agency be consulted directly regardless of any statements contained herein, this is especially true because of the rapidly changing status of some of these regulations or policies.

Efforts have been made to provide sources of information and illustrations, either through footnotes or accompanying text. However, a few illustrations have appeared in numerous sources without citation as to original source and therefore only a secondary reference can be made.

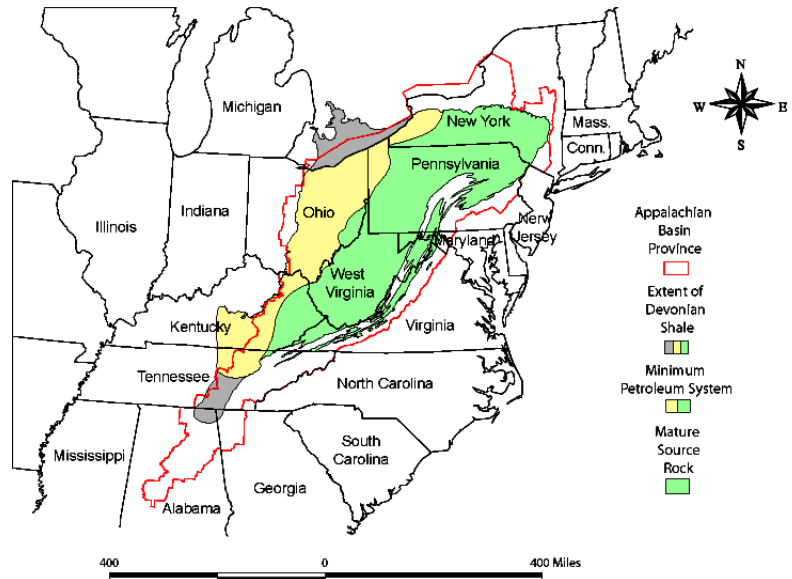
¹ At this time there is also some interest in harvesting natural gas from the Utica Shale which is a somewhat similar formation but which is found at locations significantly deeper than the Marcellus Shale. Many of the observations offered in this paper with regard to the impact of shale drilling on local government should be applicable to the Utica Shale as well.

BACKGROUND ON THE MARCELLUS SHALE²

While we don't usually think of the northeastern United States as a location with large oil or natural gas resources, it is important to remember that the first commercial discovery of natural gas in the United States was in the community of Fredonia in southwestern New York, in 1821³. That early harvesting of oil resources involved geologic formations associated with the Appalachian Mountains. As recently as 2005, there was very little interest in leasing properties for Marcellus Shale gas production. The Marcellus was not considered to be an important gas resource and a technology for tapping it had not been demonstrated. At that time the level of uncertainty in the minds of the buyers was very high and the signing bonuses were a few dollars per acre.

Location and Characteristics

GEOLOGY - The accompanying map shows that the Marcellus Shale (highlighted in green) is an extremely large geologic formation which underlies seven states extending from New York southward along the heart of the Appalachian Mountains to southwest Virginia and eastern Kentucky – a distance of almost 800 miles.⁴



The Devonian black shale⁵ which we now refer to as the Marcellus Shale has been well known for a number of years.

The shale formation was known for its dark black color and slightly radioactive signature. It was not uncommon for wells drilled through the formation to encounter some gas but these releases were not

² Much of the following discussion is based upon material published by the U S Geological survey, or reported on the geology.com website. See especially [Marcellus Shale – Appalachian Basin Natural Gas Play](#). New research results surprise everyone on the potential of this well known Devonian black shale. It should be noted that gas drillers in New York are also seeking the rights to access the Utica Shale. Like the Marcellus, the Utica shale is a “black shale” capable of producing natural gas. The Utica Shale is of the Ordovician Period which was deposited between 488 and 443 million years ago. This formation is older than the Devonian, and therefore the Utica shale is found somewhat below the Marcellus. It has been reported by some land owners that drilling companies are referring to the Utica Shale in their lease negotiations, perhaps as a ploy to offer less of a signing bonus on the ground that the Utica Shale is deeper than the Marcellus and therefore more costly to harvest. For additional discussion of the geology of shale, see also Hill, David G, and Tracy E Lombardi of TICORA Geosciences, and John P Martin of N Y S Energy Research and Development Authority, [Fractured Shale Gas Potential in New York](#).

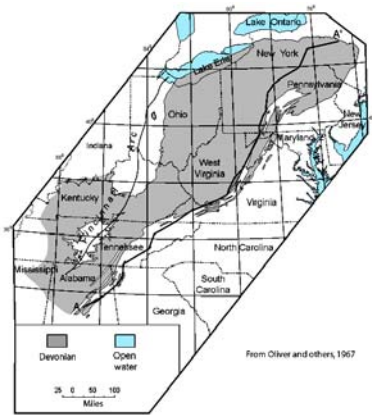
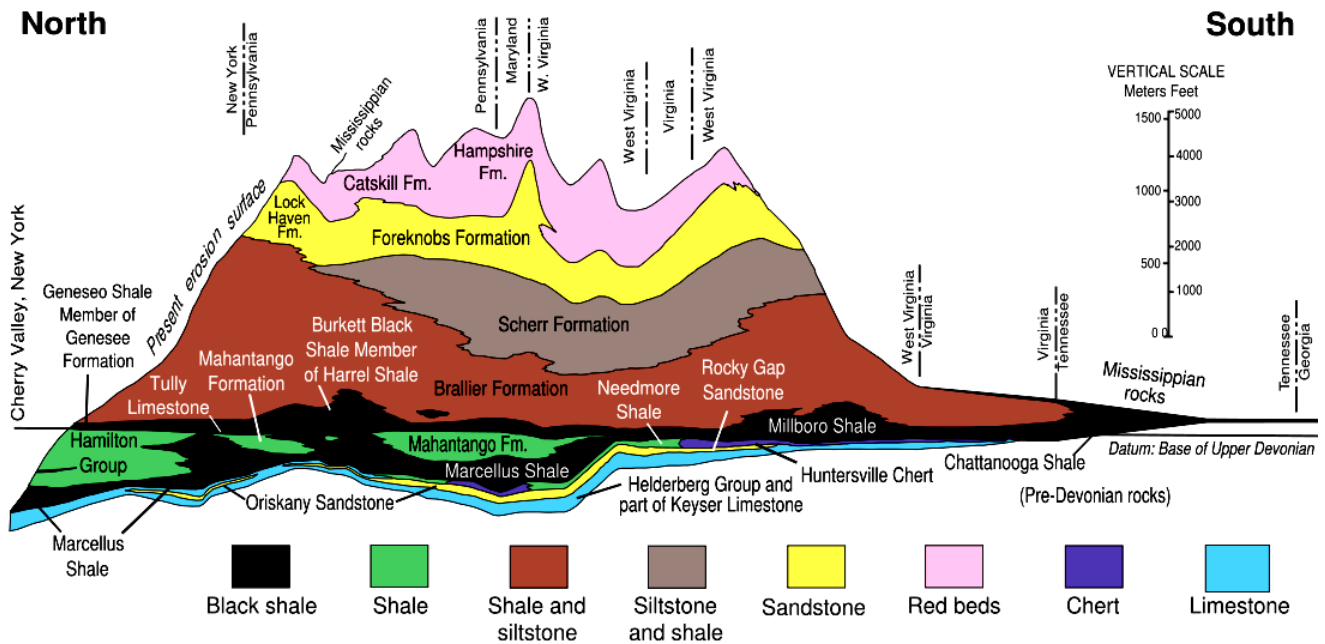
³ As reported on the NaturalGas.org website, maintained by the Natural Gas Supply Association, the first well specifically intended to obtain natural gas was dug in 1821 in Fredonia, New York, by William Hart. After noticing gas bubbles rising to the surface of a creek, Hart dug a 27 foot well to try and obtain a larger flow of gas to the surface. Hart is regarded by many as the ‘father of natural gas’ in America. Expanding on Hart’s work, the Fredonia Gas Light Company was eventually formed, becoming the first American natural gas company.

⁴ The accompanying map is a part of a power point presentation prepared by Robert C. Milici, [Assessment of Undiscovered Natural Gas Resources in Devonian Black Shales, Appalachian Basin, Eastern U.S.A.](#), US Geological Survey Open File Report 2006-1268 published in 2005

⁵ The Devonian period is a geologic period of the Paleozoic era spanning from about 416 million years to 359 million years ago million years ago. Shale is defined as a rock formation formed by the consolidation of clay, mud, or, silt, which has a finely stratified or laminated structure, and is composed of minerals essentially unaltered since deposit. The formation is easily fractured along its sedimentary grain.

thought to be of great commercial value – first because of the depth to the formation, and second due to the limited area of fracture which could be made through traditional vertical drilling.

People do not normally think of gases in rocks. However, that is the case in the Marcellus formation. The natural gas occurs within the Marcellus Shale in three ways: 1) within the pore spaces of the shale; 2) within vertical fractures (joints) that break through the shale; and, 3) absorbed on mineral grains. Most of the recoverable gas is contained in the pore spaces. Natural gas has difficulty escaping through the pore spaces within the shale because they are very tiny and poorly connected. This feature of the shale limited the yield which could be obtained when the formation was pierced by the traditional vertical drilling. As is typical for shale, historically, most wells in the Marcellus produced gas at a very slow rate because of the low permeability. The most successful historic wells in the Marcellus share a common characteristic: they intersect numerous fractures. Thus, an extensive fracture network allows one well to drain gas from a very large volume of shale. A single well can recover gas from many acres of surrounding land.



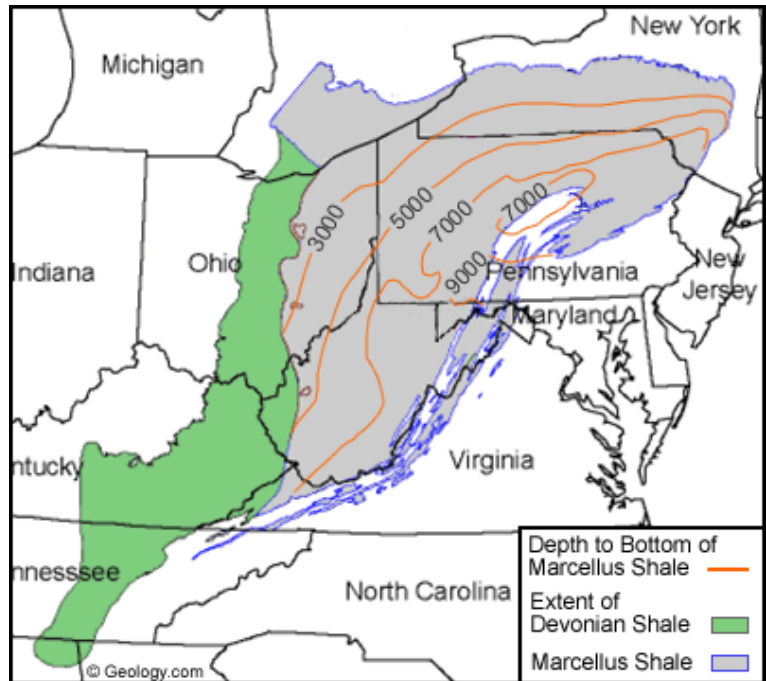
The accompanying diagram provides a general cross section of the geological formation along the eastern side of the Appalachians, along the path outlined on the accompanying insert map.⁶ From this cross section it can be seen that much of the Marcellus Shale formation is very deep beneath the Appalachian Mountain chain. The Southern Tier in New York appears at the left side of the diagram. On this diagram the Marcellus Shale formation appears as a black strata near the bottom. The overall formation has multiple names at various locations. In several locations other formations intrude into the Marcellus formation. This is particularly true in the case of the Hamilton Group which divided the Marcellus formation into upper and lower components.

⁶ Geologic cross section of upper to middle Devonian strata from Cherry Valley, New York southwest across the Allegheny Plateau and then along the Ridge-and-Valley Appalachians to Tennessee. Note the Marcellus grades up to the Millboro and Chattanooga black shales. This was taken from Boughton, Carol J.; McCoy, Kurt J. (2006). "Hydrogeology, Aquifer Geochemistry, and Ground-Water Quality in Morgan County, West Virginia". U.S. Geological Survey. Scientific Investigations Report 2006-5198.

The cross section diagram suggests that for much of its area the Marcellus Shale is overburdened by multiple formations which represent the Appalachian Mountains. It would appear that all other features being equal, it would be most cost effective to try to reach a formation which is naturally as deep as this one is where this overburden is the thinnest.

DEPTH TO FORMATION - The accompanying map reports the estimated depth to the bottom of the Marcellus Shale formation. As depicted on the map the depth to bottom of the shale formation decreases from a deep point in southwestern Pennsylvania where it is shown as being at a depth of 9000 feet from the surface to areas along New York's Southern Tier where depths decline to 3,000 to 5,000 feet.⁷

It can be surmised that one of the attractions of the eastern Southern Tier of New York to natural gas drillers is the relative shallowness of the gas bearing formation from the surface. It is important to stress the term relative in the foregoing statement because the formation remains at a considerable depth.

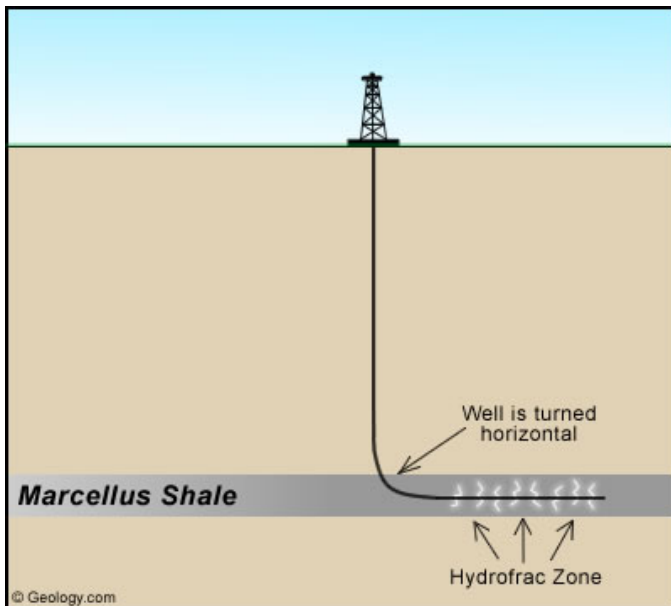
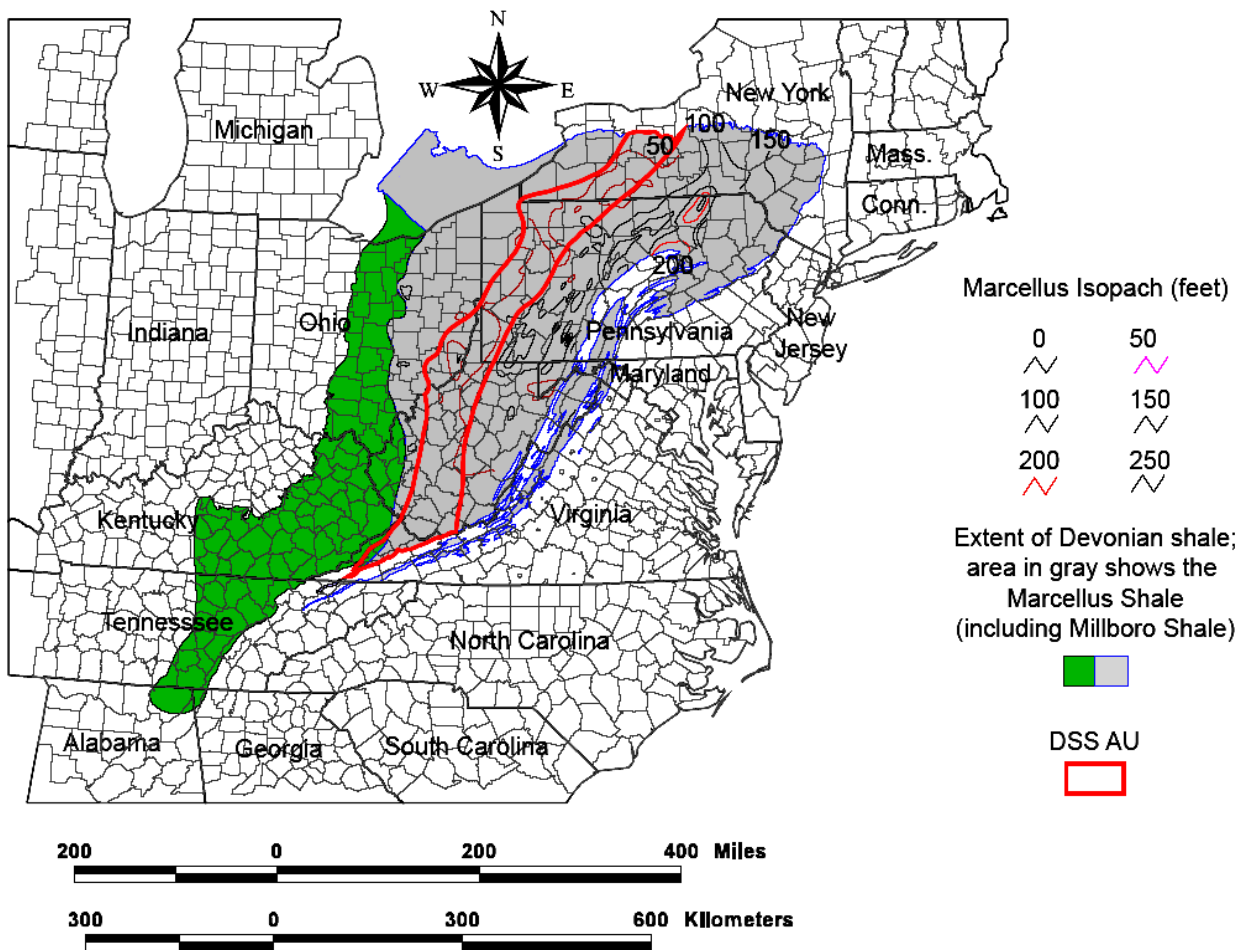


FORMATION THICKNESS - The map which appears at the top of the next page shows the relative thickness of Marcellus Shale deposits and suggests that some of the thickest and therefore potentially most lucrative formations could be found in the eastern Southern Tier of New York and Northeast Pennsylvania.⁸

The maximum thickness of the Marcellus Shale ranges from 900 feet in New Jersey, to 40 ft in Canada. In West Virginia, the Marcellus Formation is as much as 200 feet (60 m) thick while in extreme northeastern Pennsylvania, just south of Broome and Delaware Counties, it is estimated to be 800 feet thick. The formation thins as it moves westward, becoming only 50 feet (15 m) thick along the Ohio River. The thinning, or stratigraphic convergence, from east to west is caused by decreasing grain size in the clastic deposits, which entered the basin from the east. The beds finally "pinch out" westward. Where the formation is relatively thick, it is divided into several members, and as the formation continues to thicken to the east, these members are further divided. Some workers chose to classify the Marcellus as a subgroup, and classify some of the members as separate formations.

⁷ Thickness map of the Marcellus Shale. Modified after: United States Geological Survey, Open-File Report 2006-1237, Assessment of Appalachian Basin oil and gas resources: Devonian Shale-Middle and Upper Paleozoic Total Petroleum System, by Robert Milici and Christopher Swezey. [3] 3] Milici, Robert C.; Swezey, Christopher S. (2006). Assessment of Appalachian Basin Oil and Gas Resources: Devonian Shale-Middle and Upper Paleozoic Total Petroleum System. Open-File Report Series 2006-1237. United States Geological Survey.

⁸ This map is from the 2006 USGS report previously cited, and is based on data from deWitt and others (1993). Distribution of the Marcellus Shale includes the Millboro Shale in Virginia and West Virginia. The U.S. Geological Survey's assessment was based upon the distribution of the relatively thick shale in Pennsylvania and West Virginia. The discussion concerning the thickness of the Marcellus Shale is largely adapted from the Wikipedia article on this subject.



As noted before, the process of recovery of the natural gas contained within the Marcellus Shale involves fracturing the shale so that the gases trapped in the formation, its pores and fractures can be captured and extracted.

The fractures (also known as "joints") in the Marcellus Shale are vertical. So, a vertical borehole would be expected to intersect very few of them, which is why the formation had not been commercially attractive until recent years. In contrast, a horizontal well which would be drilled perpendicular to the most common fracture orientation should intersect a maximum number of fractures. However, until recently the technology needed to drill horizontally had not been sufficiently developed.

The accompanying diagram illustrates the concept of a horizontal well. High yield wells in the Marcellus Shale have been built using the horizontal drilling technique. Some horizontal wells

in the Marcellus Shale have initial flows that suggest that they are capable of yielding millions of cubic feet of gas per day, making them some of the most productive gas wells in the eastern United States.

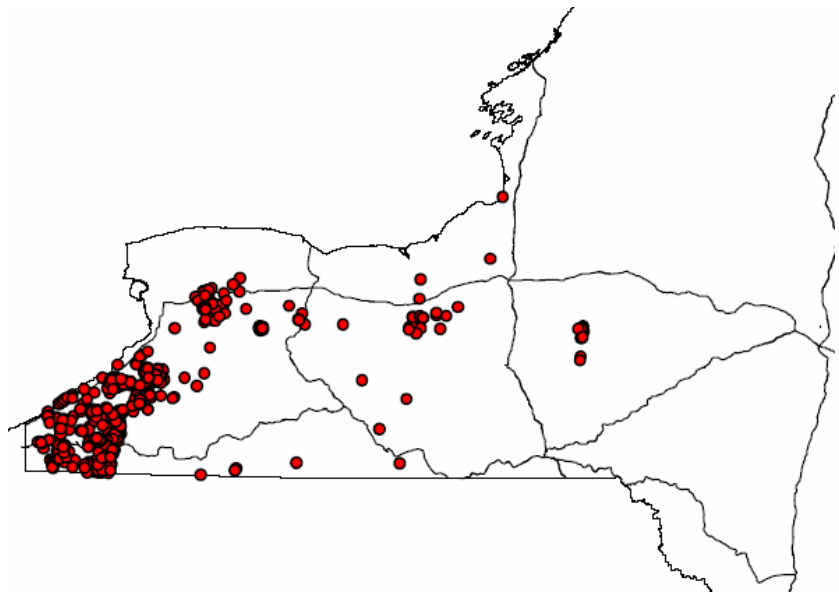
Although some experts are very optimistic on the long-term production rates of these wells, it is too early to determine their productive life or long-term yield.

The presence of an enormous volume of potentially recoverable gas in the eastern United States has a great economic significance. This will be some of the closest natural gas to the high population areas of New Jersey, New York and New England. This transportation advantage will give Marcellus gas a distinct advantage in the marketplace.

According to the NYS Department of Environmental Conservation and the Pennsylvania Department of Environmental Protection several companies are actively drilling, leasing or planning activity on Marcellus Shale properties. Range Resources, North Coast Energy Inc., Chesapeake Energy, Chief Oil & Gas LLC, East Resources Inc., Fortuna Energy Inc., Equitable Production Company, Cabot Oil & Gas Corporation, Southwestern Energy Production Company, and Atlas Energy Resources are all involved. Shares of most of these companies are up strongly over the past two years.

Existing Well Activity

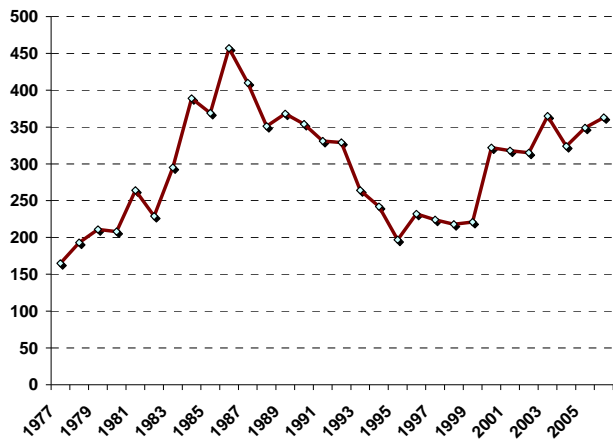
According to the Energy Information Administration (EIA) of the US Department of Energy, in 2006 there were 5,985 natural gas and gas condensate wells in active production in New York State. This is one eighth the number of producing gas wells in the neighboring State of Pennsylvania and represents a little over 1.3% of the almost half million producing gas wells in the United States.



Concerning the most recent drilling activity, the accompanying map, which was developed from the NYSDEC geodatabase, shows the location of the 706 “active” wells which had been drilled between 2000 and 2008.⁹ As is illustrated by the map, most of the active gas wells in New York State continue to be in the western part of the state. However, the map begins to show the production wells in southern Madison and northern Chenango Counties. Information concerning permits and exploratory wells suggests that the most recent activity is along an arc which lies between NYS Routes 12 and 26 in Madison and Chenango Counties, and then southward through eastern Broome and then into northern Susquehanna County, PA along the New York-Pennsylvania border.

⁹ According to NYSDEC there were 9,148 records for “gas development permits of which 5,957 files involved “active” gas wells in New York State as of May 2008. Of these, the map shows the 706 which were drilled after January 2000. Each red dot on the map represents a permitted active well. The map also shows the interstate highway system for the purpose of reference.

**DRY NATURAL GAS PROVED RESERVES
IN NEW YORK STATE IN BILLIONS OF CUBIC FEET**
(Based on Report from U S Energy Information Administration)



The accompanying chart shows that in 2006 the proven dry natural gas reserves in New York State amounted to approximately 363 billion cubic feet (bcf) which represented 0.17% of the total national reserves according to recent information obtained from the U S Energy Information Administration.

As shown on the graph the proven reserves in New York State have increased somewhat over recent years, but remain significantly lower than the peak of 457 bcf reported for 1986.

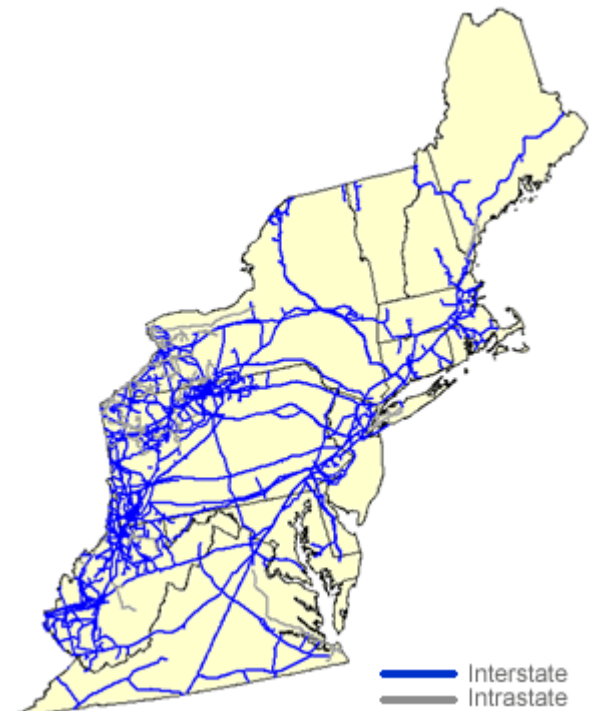
According to the EIA the national dry gas reserves were about 211 trillion cubic feet (tcf) in 2006, while representing a sizable increase over the levels reported throughout the 1990's, still

represents only a little more than two-thirds the proven reserves report during the late 1960's. It should be noted that the most recent available data is mostly before the recent major increases in the cost of petroleum products which has accelerated the rate of oil and gas exploration.

Access to Markets

While most attention has been given to the impact of well drilling and operation it should also be noted that natural gas is of economic value only if it can reach a market. This means that a network of natural gas pipelines will be required through which the gas harvested in the region is transported to the customer – in this case the major markets of the east coast.

According to the U S Energy Information Administration, in 2008 there were 19 interstate natural gas pipeline systems operating within the Northeast Region of the United States. These systems are illustrated on the accompanying map reproduced from the EIA website. These interstate pipelines deliver natural gas to several intrastate natural gas pipelines and at least 50 local distribution companies in the region. In addition, they also serve large industrial concerns and, increasingly, natural gas fired electric power generation facilities.



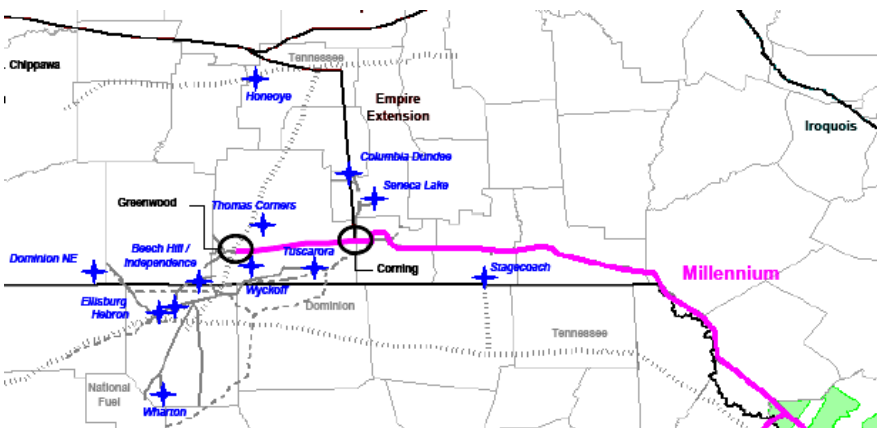
The natural gas pipeline and local distribution companies serving the Northeast also have access to supplies from several major domestic natural gas producing areas and from Canada. Almost all of the interstate gas pipelines operating within the Northeast terminate there as well, including several very large long-distance natural gas pipeline systems that deliver supplies to the region from natural gas producing areas in the U.S. Southwest. The largest of these pipelines is the Transcontinental Gas

Pipeline Company system (8.2 billion cubic feet (Bcf) per day system-wide), which extends from South Texas to the New York City area. The Tennessee Gas Pipeline Company (6.3 Bcf per day) and Texas Eastern Transmission Company (6.7 Bcf per day) natural gas pipeline systems also bring supplies to the Northeast.

A notable feature shown on the pipeline map is the extensive network of pipelines in the western parts of New York, Pennsylvania, and West Virginia. This appears to reflect portions of these systems which function as a collectors, connecting to previously developed well fields with transmission lines. There is only a limited access to the pipeline grid in the eastern half of New York State with one line running through the Southern Tier and another along the Mohawk Valley. This limited access would suggest that while the present focus of debate has been on the exploration phase of development of this resource, there will be a follow-up phase in which the pipeline infrastructure will be developed.

It is within the context of expanding the connection between the producing wells and the major commercial markets that the Millennium Pipeline makes sense. As illustrated on the map to the right this is a new underground, natural gas pipeline traversing New York's lower Hudson Valley and Southern Tier. It is the centerpiece of a larger NE-07 Project involving expansion of the existing Empire Pipeline, Algonquin Pipeline and Iroquois. As described, this pipeline is intended to bring much needed energy infrastructure to the region as well as access to diverse gas supplies.

The Millennium Pipeline consists of a new compressor station in Corning, New York and pipeline facilities following primarily the existing route of Columbia Gas Transmission's A-5 line in Steuben, Chemung, Tioga, Broome, Delaware, Sullivan, Orange and Rockland counties of New York.



The map also shows, as blue crosses, the major natural gas storage fields - principally in salt domes.¹⁰ As with the newer producing wells, these storage facilities are predominantly located in the western portion of the state – only the Stagecoach facility in the Town of Owego in Tioga County is in the eastern southern tier. Because of the seasonal nature of the use of natural gas, it can be anticipated that development of the Marcellus Shale will be accompanied by an effort to increase the number of these underground storage facilities. The pipeline project consists of 182 miles of 30 inch diameter steel pipeline and related compressor stations.

According to its website the Millennium Pipeline Corporation is owned by subsidiaries of NiSource, National Grid and DTE Energy and has long term transportation agreements with ConEd, KeySpan Energy, Central Hudson Gas and Electric and Columbia Gas Transmission. Columbia, in turn, will serve its existing customers including, Orange and Rockland Utilities, Central Hudson, NYSEG, and Corning Natural under a long term lease agreement with Millennium.

¹⁰ There can be competing interests between developers who are seeking to create producing well fields and others whose interest involves the creation of underground storage spaces, as noted in a recent letter to the editor from two individuals representing the Clearville Landowners Property Group to the Somerset County (PA) *Daily American* (July 29, 2008) which reported that while one group was seeking approval to recover natural gas from the Marcellus Shale another company was seeking to establish an underground natural gas storage field in the Oriskany formation which lay only 111 feet above the Marcellus. Clearville is in southwestern Pennsylvania.

EXISTING REGULATORY ENVIRONMENT AND RECOMMENDATIONS FOR LOCAL ACTION

The regulatory environment within which the drilling and operation of gas wells takes place involves several different levels of government or private organizations, each of whom has a certain set of obligations and responsibilities. This section will review the assistance which might be found through participation in private negotiating groups and the regulatory protections and options available to regional, county, and local governmental organizations.

Private Negotiating Groups

While the principal focus of this paper is how local governments should prepare for the impact of natural gas well drilling and operation, some comment should be offered regarding the impact on individual property owners. Many landowners are being approached with offers to lease the rights to the minerals (which include oil and gas) under their land. Others are approached for easements to allow drillers and pipelines to cross their lands.

When the economic potential of the Marcellus was first suspected in 2006, a small number of speculators began leasing land - paying risky signing bonuses that were sometimes as high as \$100 per acre. In late 2007, signing bonuses of a few hundred dollars per acre were common. Then, as the technology was demonstrated and publicized, signing bonuses began to rise rapidly. By early 2008, several wells with strong production rates were drilled, numerous investors began leasing and the signing bonuses rose from a few hundred dollars per acre up to over \$2000 per acre for the most desirable properties. Most recent signing bonuses have been lower than the highest numbers reported several months ago.

The size of the signing bonuses that have been paid in transactions between informed buyers and informed sellers is directly related to two factors: 1) the level of uncertainty in the mind of the buyer, and 2) the number of other buyers competing to make the purchase.¹¹ These factors have changed significantly in a very short time.

Although signing bonuses generate an enormous amount of interest because they are guaranteed one-time income, royalties can be significantly higher. A royalty is a share of a well's income. The customary royalty rate is 12.5 percent of the value of gas produced by a well. Higher royalty rates are sometimes paid by aggressive buyers for highly desirable properties. The royalties paid to eligible property owners from a well yielding over one million cubic feet of natural gas per day can be hundreds of thousands of dollars per year. These royalties are divided by all eligible property owners within a production unit (an area of land that is thought to contribute gas to a producing well - typically 640 acres). The amount paid to each eligible property owner is based upon their ownership share. If the Marcellus Shale holds up to the optimistic expectations of some natural gas experts, Pennsylvania, Ohio, New York and West Virginia could temporarily have an enormous boost in income that might be sustained for a few decades.

¹¹ There have been anecdotal reports that some land men have been negotiating for gas rights but citing the deeper Utica Shale in order to claim that they can only offer lower signing bonus because of the greater cost of drilling.

There have been several successful efforts by local land owners to band together to form negotiating groups.¹² These appear to have been successful and have often been able to bring together significant numbers of property owners who collectively have been able to obtain expert and legal counsel to assist in their negotiations. For example, in late July 2008 a group of property owners in the Deposit area signed over about 10,000 more acres to XTO Energy for mineral rights. According to reports in the Binghamton Press¹³, to date, the company is paying \$110 million in lump sums to more than 500 property owners in the towns of Sanford and Deposit for the right to drill on their land. Meanwhile, thousands of property owners across the Southern Tier are following Deposit's lead by forming coalitions to maximize their bargaining power. In Broome County alone, at least 10 groups have formed with the potential of leasing 200,000 acres or more.¹⁴ Groups also are organizing in Tioga and Chenango counties, while an untold number of individual property owners bargain on their own.

The extensive coverage of the Marcellus Shale makes large land deals more attractive for energy companies, which have to piece together units of 600 acres or more for a single well. Property owners have each other and the keys to the riches. If they are patient and organized, they will get a fair deal, advocates say. If not, they may regret it. So far, the groups have been working with elected officials, the state farm bureau and with each other researching impact on landowners, the economy, the environment and their communities at large. As they meet a recurring theme emerges – it is critical that landowners understand the rules under which energy companies operate, and negotiate contracts to minimize problems and capitalize on benefits. There is more at stake than money; signing for a bonus without reading and understanding the fine print could result in a catastrophe when a drilling rig is planted outside a bedroom window and control over land is lost for generations to come.

Private leases are not subject to DEC's jurisdiction, nor are local governmental intervention typically involved. Recent local news articles have stressed the importance of including protective provisions in lease agreements.¹⁵ These provisions may include the requirement for independent groundwater testing before, during, and after the drilling process; the specification of emergency response plans; the procedures for wastewater disposal; and the description of the drilling technique to be used. Some agreements also specify the location and type of any access roads and clearance between wells and any buildings.

Federal Responsibilities and Regulations

FEDERAL ENERGY REGULATORY COMMISSION (FERC) - The Federal Energy Regulatory Commission (FERC) regulates many aspects of interstate gas transmission pipeline operations, including approval, permitting and siting for new pipeline facilities, and regulating transmission rates that pipelines are permitted to charge for interstate shipments.

The **Natural Gas Act of 1938** empowers the FERC to review proposed interstate natural gas pipelines. It may coordinate environmental and land user permitting with other federal and state agencies, and determine with a proposed pipeline meets the “public convenience and necessity.” As

¹² See Binghamton Press and Sun Bulletin, August 10, 2008, page 9A which listed 16 landowner groups in Broome, Chenango, and Tioga Counties

¹³ See Binghamton Press and Sun Bulletin, August 3, 2008

¹⁴ Among groups active in this area are perhaps as many as a dozen groups formed among property owners in the Deposit area of eastern Broome and western Delaware County, and the Friendsville Group in Susquehanna Pennsylvania, which recently closed its membership. Some of these groups, in particular the Friendsville group maintain their own websites.

¹⁵ See Binghamton Press and Sun Bulletin, August 10, 2008, page 1.

part of approving a pipeline application, FERC can specify the conditions under which the pipeline can be constructed, including the route used.

Once an interstate natural gas pipeline is built, the FERC has the authority to ensure that pipeline rates are “just and reasonable.” These rates include operating and maintenance expenses and an allowed return on investment set as a percentage of the capital invested in facilities used to serve customers. Pipelines must go through a lengthy, public process whenever they request rate increases, regardless of the supply/demand balance in the underlying commodity. The FERC sets rates on a pipeline-by-pipeline basis, and approves for each pipeline what amounts to a maximum allowable rate, or a rate cap. However, pipelines customers can and often do demand discounts from these maximum rates, with the net outcome being that many pipeline customers pay less than the maximum rate a pipeline has been given permission to charge by the FERC.

ENVIRONMENTAL PROTECTION AGENCY (EPA) - National Environmental Policy Act of 1969 (NEPA) requires federal agencies, such as FERC, to integrate environmental values into their decision-making processes by considering the environmental impacts of their proposed actions and reasonable alternatives to those actions.

A detailed environmental impact statement or EIS is typically prepared which sets forth the anticipated environmental impact of the proposed action, any adverse environmental effects which cannot be avoided should the proposal be implemented, and alternatives to the proposed action. If a proposed interstate pipeline activity will significantly impact the human environment, FERC may directly proceed to prepare an EIS, but it may also issue an environmental assessment (EA) when it is unsure of whether there are significant environmental impacts associated with the proposed activity.¹⁶

Under the **Clean Waters Act** a national pollutant discharge elimination system (NPDES) permit may be required for the discharge of process or test water during construction or operation of pipeline facilities. 33 U.S.C. § 1342. The EPA Administrator may transfer the administration of the Section 404 permit program for discharges into certain waters to qualified states. 33 C.F.R. § 323.5 and in New York such authority has been delegated to the NYS Department of Environmental Conservation.

EPA recently promulgate regulations pursuant to the Energy Policy Act of 2005 to exempt storm water discharges associated with construction of natural gas pipelines from NPDES permit coverage, except in situations when the discharge of a pollutant other than sediment contributes to a violation of an applicable water quality standard. 40 C.F.R. § 122.26(a)(2)(ii).

The element of pipeline infrastructure projects that most commonly triggers the need for a **Clean Air Act** permit for operations is compressor stations. Such stations may trigger requirements under several CAA programs, including the New Source Review (NSR) and Prevention of Significant Deterioration (PSD) program and the permitting program for major stationary sources under Title V of the CAA. The NSR program applies to new source construction and proposals to conduct major modifications of existing industrial facilities that are located in “non-attainment” areas (i.e., regions with poor air quality that do not satisfy the National Ambient Air Quality Standards), while the “Prevention of Significant Deterioration” requirements apply to project proposals that are located in

¹⁶ An overview of the process is available on the FERC website, see also 40 Code of Federal Regulations (CFR) § 1503.1. The Energy Policy Act of 2005 amended the Natural Gas Act to provide that FERC shall act as the lead agency for purposes of complying with NEPA with respect to an application for a certificate of public convenience and necessity under Section 7 of the Natural Gas Act (NGA). 15 U.S.C. § 717n(b)(1). As the lead agency, FERC is to supervise the preparation of the environmental impact statement if more than one federal agency is involved in the same action. 40 C.F.R. § 1501.5(a).

areas which are in “attainment” with applicable National Ambient Air Quality Standards (i.e., ambient air quality in the region surrounding the new or modified source complies with the national standards).

The construction of pipelines and related infrastructure can also trigger a variety of CAA requirements due to air emissions – principally diesel emissions – from equipment used in the construction of the project.

In addition, a pipeline may require a review for general conformity with a State Implementation Plan (SIP), i.e., a state plan for achieving compliance with various CAA requirements governing overall air quality. These SIPs may establish enforceable emission limitations for particular emission sources, permitting programs for the construction of new or modified air pollutant-emitting facilities, and other control measures applicable to emission sources within the state to ensure that the National Ambient Air Quality Standards will be achieved and maintained within each air quality control region within a state.

U S DEPARTMENT OF THE INTERIOR – FISH AND WILDLIFE SERVICE (FWS) - Section 7 of the **Endangered Species Act (ESA)** requires federal agencies to ensure that their actions are not likely to jeopardize the continued existence of any endangered species or threatened species or result in the destruction or adverse modification of critical habitat of such species. Procedurally, Section 7 of the ESA requires an agency proposing to take an action to inquire of the Fish and Wildlife Service (FWS) regarding whether any threatened or endangered species “may be present” in the area of the proposed action. Unless the FWS indicates that the proposed project is not likely to affect adversely a specific listed species or its designated critical habitat, the project sponsor must prepare a “biological assessment” and if it is determined that an endangered species “is likely to be affected,” the permitting agency must formally consult with FWS. 16 U.S.C. § 1536(a)(2).

The formal consultation results in a biological opinion issued by the FWS which may conclude that: (1) the proposed action does not jeopardize endangered or threatened species or destroy or adversely modify critical habitat; (2) the proposed action does jeopardize endangered or threatened species or adversely modify critical habitat, but that there are reasonable and prudent alternatives that will avoid jeopardizing the species or adversely modifying critical habitat; or (3) the proposed action jeopardizes endangered or threatened species or adversely modifies critical habitat without alternatives. 50 C.F.R. § 402.14(h)(3). If the FWS determines that the project can go forward as proposed or as modified by a reasonable and prudent alternative, the biological opinion will include an “Incidental Take Statement” which sets forth terms and conditions for the agency action. 16 U.S.C. § 1536(b)(4). Any taking that is in compliance with the Incidental Take Statement “shall not be considered to be a prohibited taking of the species concerned.” 16 U.S.C. § 1536(o)(2).

US DEPARTMENT OF TRANSPORTATION - The **Pipeline Safety Improvement Act of 2002**, which applies to natural gas transmission pipeline companies requires each pipeline operator to prepare and implement an “integrity management program,” that among other things requires operators to identify so-called “high consequence areas” (HCA) on their systems, conduct risk analysis of these areas, perform baseline integrity assessments of each pipeline segment, and inspect the entire pipeline system according to a prescribed schedule – using prescribed methods. Companies were required to identify all HCAs by December 17, 2004, and submit specific integrity management programs to the Office of Pipeline Safety (OPS), the Research and Special Projects Administration and the U.S. Department of Transportation. All pipeline segments within HCAs must be inspected and remediation plans (if required) completed by December 17, 2008, while non-HCA segments must be inspected by 2012. All segments must be re-inspected on a 7-year cycle, with

certain exceptions. Other provisions of the law include a provision for government mapping of the pipeline system and assembling pipeline operator contact information for public dissemination.

The **Pipeline Inspection, Protection, Enforcement, and Safety Act of 2006** confirms the commitment to the Integrity Management Program (“IMP”) and other programs enacted in the 2002 legislation. The 2006 legislation includes provisions on:

1. minimum standards for IMPs for distribution pipelines (including installation of excess flow valves on single family residential service lines on the basis of feasibility and risk);
2. standards for managing gas and hazardous liquid pipelines to reduce risks associated with human factors (e.g., fatigue);
3. authority for the Secretary to waive safety standards in emergencies
4. authority for the Secretary to assist in restoration of disrupted pipeline operations;
5. review and update of incident reporting requirements;
6. requirements for senior executive officers to certify operator integrity management performance reports; and,
7. clarification of jurisdiction between states and PHMSA for short laterals that feed industrial and electric generator consumers from interstate natural gas pipelines.

One of the primary focuses in the 2006 legislation is on preventing excavation damage to pipelines though the enhanced use and improved enforcement of state “One-call” laws, i.e., laws that preclude excavators from digging until they contact the state One-Call system to locate the underground pipe and from digging in disregard of markings. Excavators must report any damage or gas escape caused by the digging.

Violations are enforceable by DOT, including civil penalties. Civil penalties are also available against any pipeline operator who fails to respond to a location request or fails to take steps, in response to such request, to ensure accurate marking of the pipeline location. The legislation also authorizes state grants to improve the effectiveness of damage prevention programs, and grants to organizations that develop technologies for prevention of third party excavation damage.

Interstate Compacts and Rules

The Southern Tier East Region lies at the headwaters of three major river basins. Although the county boundaries and the limits of the drainage basins are not an exact fit, most of Schoharie County lies within the Hudson-Mohawk River Basin. Most of Delaware County lies within the headwaters of the Delaware River, while most of the counties of Broome, Chenango, Cortland, and Otsego lie at the headwaters of the Susquehanna River basin. Two of these river basins (the Delaware and the Susquehanna) are subject to interstate compacts which govern the withdrawal of water resources and the maintenance of water quality. In addition, portions of the Region lie within the Catskill Watershed which includes several of the larger reservoirs serving the City of New York.

SUSQUEHANNA RIVER BASIN COMMISSION - As outlined on its website the Susquehanna River Basin Commission monitors current water resource data to determine potential flood or developing drought conditions. Commission personnel gather, process, and record water withdrawal information and maintain the information for planning and project review decisions. The Commission also monitors stream flows, groundwater levels, precipitation, soil moisture, reservoir levels and other hydrologic factors throughout the basin. The SRBC responsibilities include notifying the public of hydrologic conditions such as the potential for floods or droughts and implementing the coordinated drought management plan for the basin.

The Commission is required to review and approve certain types of water resource projects as prescribed in Article 3, Section 3.10 of the Compact. The procedures for reviewing and approving projects are outlined in the Commission's Regulations and Procedures for Review of Projects. Most project applications involve surface water or groundwater withdrawals of 100,000 gallons or more and consumptive water uses of 20,000 gallons or more, as per the Commission's project review regulations.¹⁷ The Commission also has "approval by rule" over large bulk purchases of water from public water supplies. After projects are approved by the Commission, staff monitors the projects' activities for compliance with approvals. The Commission also reviews state NPDES/SPDES permit applications for potential interstate impacts and compliance with watershed restoration and protection efforts in the Susquehanna River Basin.

DELAWARE RIVER BASIN COMMISSION - The Delaware River Basin Commission was formed in 1961 by the States of Delaware, New Jersey, New York, and Pennsylvania, and the United States. Under the compact these parties agreed to share the responsibility of managing the water resources of the Basin. Since its formation, the Commission has provided leadership in restoring the Delaware River and protecting water quality, resolving interstate water disputes without costly litigation, allocating and conserving water, managing river flow, and providing numerous other services to the signatory parties. In its mission statement the Commission is charged with providing comprehensive watershed management, and acting as a steward of the Basin's water resources particularly with respect to surface and ground water quality, including both point and non-point sources of pollution and water demands, water withdrawals, water allocations, water conservation, and protected areas.

As with the Susquehanna Basin Commission, the authority of the Delaware River Basin Commission focuses on regulation of the water resources of the basin and most particularly with regulation of withdrawal of water from the basin and the preservation of the quality of surface and ground waters. The threshold for involvement of the Delaware River Basin Commission is somewhat higher than that of its cousin on the Susquehanna, with permits required when consumption exceeds 100,000 gallons. The Commission also monitors and regulates wastewater discharges from industrial and community facilities.

CATSKILL WATERSHED [New York City Department of Environmental Protection] - The regulatory environment within Catskill Watershed is a unique situation because in effect it is governed extraterritorially by the City of New York through the use of authorities of the State of New York. The regulations controlling certain types of development are administered and enforced by the New York City Department of Environmental Protection. The Watershed Agreement rules and regulations

¹⁷ On August 14, SRBC notified natural gas operators that as of October 15, 2008 any amount of water withdrawn or consumptively used to develop wells in the Marcellus, Utica or other shale formations in the Susquehanna watershed will require prior approval from SRBC. SRBC regulations – 18 CFR, Section 806.5 – allow its executive director to make a determination when water-use activities, regardless of the amount of water, have the potential to affect the water resources of the Susquehanna basin.

Under its proposed rulemaking the Commission the following provision is added to ***§806.4 Projects Requiring Review and Approval***:

"(8) Any natural gas well development project in the basin targeting the Marcellus, Utica, or other shale formations for exploration or production of natural gas involving the withdrawal or consumptive use of waters of the basin, regardless of the quantity of such withdrawal or consumptive use ..."

Under the proposed rules (§806.22 Standards for consumptive uses of water) a project sponsor is required to file a notice of intent (NOI) with the commission at least 60 days before undertaking a project. A copy of that NOI is also to be sent to appropriate in the state, county and municipality in which the project is to be located. As part of its proposed regulations the SRBC will require that the project sponsor comply with metering, daily use monitoring and quarterly reporting. Daily use monitoring shall include amounts delivered or withdrawn per source, per day, and amounts used per gas well, per day, for well drilling, hydrofracture stimulation, hydrostatic testing and dust control.

There will be a separate accounting for flowback fluids used for hydrofracture stimulation, which are not included in the daily consumptive use amount. The project sponsor must demonstrate to the satisfaction of the SRBC that all flowback or produced fluids, including brines, have been treated and disposed of in accordance with all applicable state and federal requirements.

describe restrictions applicable to activities undertaken within the watershed. These regulations are intended to ensure the long-term protection of the City's water supply, while minimizing the adverse economic impacts on Watershed communities. Among other things, the watershed regulations control sources of pollution including wastewater treatment plants, sewer systems, septic systems and stormwater pollution. Selected Catskill watershed regulations include:

Construction of new wastewater treatment plants is prohibited in certain basins, and the City of New York has upgraded existing wastewater treatment plants with sophisticated wastewater treatment technology. Wastewater plants are not allowed to discharge effluent into wetlands and may only discharge into intermittent streams subject to NYSDEC standards.

All septic systems installed, repaired or replaced in the Watershed require prior approval by the City, and no septic systems are allowed within 100 feet of a watercourse or wetland or within 300 feet of a reservoir.

No new impervious surfaces are permitted within 300 feet of a reservoir, or 100 feet of a watercourse or wetland. Some exemptions to this rule exist for villages, hamlets, commercially zoned areas, and single family home construction.

Construction of new roads is prohibited within 50 feet of intermittent streams or wetlands, 100 feet of perennial streams or 300 feet of a reservoir. Access roads to subdivisions are allowed within the 100 foot buffer subject to approval by the City of a stormwater pollution prevention plan.

No new registered hazardous substance storage tanks are permitted within 100 feet of a watercourse or 500 feet of a reservoir.

In addition many new projects within the Watershed now require the preparation of a "Stormwater Pollution Prevention Plan" (SPPP), which must be reviewed and approved by the City before final project approval may be granted.

The protection of the watershed is an issue of major importance to the City of New York. A recent article in the New York Times reported that there was a big local angle to the notion of major energy companies descending on upstate New York to drill for natural gas in the Marcellus Shale formation. A large part of that area is the watershed where New York City gets its water, which comes unfiltered through the city's reservoirs and aqueducts to nine million people, or roughly half the state's residents.

The *Times* raises the obvious questions: "Should there be gas drilling in the watershed and, if so, can it be done without imperiling the federal waiver that has allowed New York to avoid building a filtration plant that would cost \$10 billion to \$12 billion?"

Mr. James Gennaro, chairman of the New York City Council's Environmental Protection Committee, who is also a geologist who has studied petroleum engineering, said the answers are an emphatic "no" and "no", quoted the *Times*. And he said that the State Legislature and Gov. David A. Paterson, dazzled by the prospect of gas-industry riches, have been negligent in not ruling out development in the watershed. Sophisticated new wells using hydraulic fracturing use a million gallons of chemically treated water to break up subterranean shale and release the gas inside. Over the next two decades, there could be thousands of wells upstate.

"This is an activity that is completely and utterly inconsistent with a drinking water supply... This cannot happen. This would destroy the New York City watershed, and for what? For short-term gains on natural gas? We're not saying no exploration for natural gas anywhere in New York State. We're

saying the part of New York State that is the New York City reservoir system should be off limits to this kind of activity” said Mr. Gennaro, who appeared with officials from the environmental groups Riverkeeper and the Natural Resources Defense Council. He seems intent on ringing the bell loudly over an issue that so far has been the subject of quiet, low-profile discussion between city and state agencies, but of very little public discussion. He is calling for a yearlong moratorium on gas drilling in and around the watershed and plans to hold public hearings on the issue in early September. He has also asked the Environmental Protection Agency to render a formal opinion on whether gas drilling could put the city’s filtration waiver at risk.

According to the Times article there are many dimensions to this issue. First, there is the prospect of a lucrative gas boom coming at a time when New York is desperate for new revenue, and upstate is equally desperate for new economic activity. There is the national energy crunch to push for domestic exploration. There is the eternal conflict between upstate and downstate over water issues and land rights. There are conflicting instincts among landowners: hope of winning the gas lottery versus fear about the consequences for the environment and on the quality of life in their communities. Industry officials, who have largely kept a low profile, say that they welcome state oversight and that the industry has a track record of being environmentally responsible. But they also warn that a drilling moratorium or undue regulation could discourage production.

“New York has to be careful how it deals with these issues so it doesn’t send a negative signal to the industry that chills the interest in the play in New York State,” said Tom West, an Albany lawyer who represents several gas companies. “These companies have limited investment dollars, and they’re going to invest them where the natural gas opportunities exist and where there’s a regulatory climate that promotes it.”

This is all early. State officials say there are only six drilling proposals on file, none of them in the watershed. No one knows how much gas will be found upstate. Most of the gas-rich areas are outside the watershed, so companies may just avoid areas where the environmental bar is highest. And Judith Enck, Mr. Paterson’s deputy secretary for the environment, said an updated environmental impact review demanded by the governor would ensure that all drilling proposals get a thorough analysis. But asked about declaring the watershed off limits, she said: “We’re not willing to say that a large piece of geography should be off the table. The governor agrees that the New York City watershed is absolutely critical and must be protected, but he also believes you can have economic development and protect the watershed at the same time.” Mr. Gennaro said that’s too much to take on faith. “Unlike natural gas, which we can get from other places in the Marcellus Shale, we have no other place to go for our drinking water. This is it. We have one and only one drinking water system.”¹⁸

State Responsibilities and Regulations

There are several New York State agencies which have some role in regulating the drilling of gas wells and the construction of the pipelines by means of which natural gas is transported from the wellhead to the customer.

NYS DEPARTMENT OF ENVIRONMENTAL CONSERVATION - In New York State the principal regulatory authority over the siting and operation of gas wells rests with the NYS Department of Environmental Conservation, Division of Mineral Resources, which administers regulations and a permitting program to mitigate potentially adverse environmental impacts from drilling and well

¹⁸ Peter Applebome, “Putting Water Ahead of Natural Gas”, [New York Times](#), August 9, 2008

operation.¹⁹ The two principal tools used by NYSDEC to regulate gas wells are its drilling permits and the SEQRA reviews.

The state **Oil, Gas and Solution Mining Law** requires drillers to apply sound environmental principles, returning areas affected by minerals development to a condition that allows continued productive use of the land. A well drilling or plugging permit is required before site preparation and drilling/plugging can begin on a gas, well of any depth. The State Environmental Conservation Law (ECL) authorizes the Department to require that wells be drilled, constructed, operated and plugged, and the surrounding land reclaimed, to prevent or remedy "the escape of oil, gas, brine or water out of one stratum into another" and "the pollution of fresh water supplies by oil, gas, salt water or other contaminants" and also provides authority to "order an immediate suspension of drilling or production operations whenever such operations are being carried on in violation ..."²⁰

NYSDEC drilling permit requirements are intended to inhibit oil spills, prevent ground water contamination and require proper disposal of highly saline brines and other wastes in order to protect the land environment during and after oil and gas extraction,. The permits also require that land impacted by drilling be properly reclaimed for productive use. To protect the environment during drilling, each permit includes conditions designed to prevent the escape of gas from wells. Drilling permits protect groundwater by mandating a casing and cementing program for each well. Casing and cementing prevent the flow of oil, gas or salt water between underground formations. In addition, drilling rules and regulations require setbacks from municipal water wells, surface water bodies and streams. Permits also require proper disposal for all wastes and proper containment of drilling fluids. Department staff monitors drilling sites for compliance with these conditions, and the department brings enforcement actions against violators.²¹

The **State Environmental Quality Review Act** (SEQRA) requires the applicants for most permits, including those for drilling gas wells, to conduct an assessment of the environmental impact of the activity for which the permit is being sought. These environmental reviews vary considerably from the simple completion of an Environmental Assessment Form to the completion of multi-volume complex scientific studies.

DEC's Division of Mineral Resources reviews all oil and gas drilling permits in accordance with the State Environmental Quality Review Act (SEQRA) to ensure that the environmental impact of resource extraction will be mitigated to the greatest extent possible. NYSDEC records indicate that more than

¹⁹ Pursuant to §§23-0305(8)[9] of the Environmental Conservation Law of New York State, the NYS Department of Environmental Conservation has promulgated a set of Rules and Regulations governing activities relative to the natural resources of oil and gas within the State. The Bureau of Oil and Gas Regulation in the Division of Mineral Resources oversees permitting, compliance and enforcement of all regulated wells in New York. The bureau is also responsible for leasing of land owned by New York State (other than state parks) for oil and gas exploration and development. The permits section is responsible for conducting monthly compulsory integration hearings, well spacing and production allocations, underground gas storage, well permitting and field inspections, enhanced recovery, solution salt mining, and production waste handling the compliance and enforcement section is responsible for program, enforcement, regional enforcement support, state land leasing and audit, and well abandonment's. The Bureau maintains offices in Albany and Rochester.

²⁰ New York State Environmental Conservation Law, Article 23, Title 3, and especially § 23-0305(8)(d) and (g)

²¹ ECL Article 71, Title 13, grants the Department broad authority to address violations of Article 23 or any regulation, order or permit condition. The statute provides for administrative sanctions, including civil penalties of up to \$5,000 for a violation or offense and up to \$1,000 for each day a violation continues. The Commissioner has the power to "direct the violator to cease the violation and reclaim and repair the affected site . . ." [ECL 71-1307(1)]. Article 71 also provides for civil sanctions through the Attorney General and criminal sanctions for misdemeanors with penalties or fines up to \$1,000 per day for continuing violations and up to one year imprisonment, or both. The Department, acting through the Attorney General, may also seek injunctions against violations or threatened violations of Article 23.

70,000 wells have been drilled in New York State since the late 1800's. Extraction of oil and gas contributes half a billion dollars to the state's economy each year. DEC's Division of Mineral Resources strives to work cooperatively with all customers and stakeholders to achieve the mission of ensuring the environmentally sound, economic development of New York's non-renewable energy and mineral resources for the benefit of current and future generations.²²

In late July 2008 NYSDEC announced that it had initiated a process to supplement the generic environmental review for horizontal natural gas drilling activity in the Marcellus Shale formation. Published in 1992, the existing Generic Environmental Impact Statement (GEIS) guides the review of NYSDEC's oil, gas, and solution mining regulatory program and covers a wide range of issues and addresses the potential environmental impact of drilling operations, including the hydraulic fracturing process which is used to recover the natural gas in the Marcellus Shale.

While the process of scoping and preparing the Supplemental GEIS is ongoing, any entity that applies for a drilling permit for horizontal drilling in the Marcellus Shale and opts to proceed with its permit application will be required to undertake an individual, site-specific environmental review. That review must take into account the same issues being considered in the Supplemental GEIS process and must be consistent with the requirements of State Environmental Quality Review Act and the state Environmental Conservation Law.

The purpose of a Generic Environmental Impact Statement (GEIS) is to address the common traits and impacts of certain types of activity. A GEIS does not relieve a permit applicant of their obligation to address unique features relating to specific sites or operations, but rather allows the applicant to focus on such unique features rather than replicating already known research. This concept is not uncommon and is sometimes used by communities in addressing the environmental impact of large scale phased development such as shopping centers and industrial parks.

Under its regulations NYSDEC is involved in assuring public safety and enforcing various standards relating to gas wells. The discussion which follows relates to several of these issues including the "compulsory integration" of properties which are part of a spacing unit, but which are not under lease, the "self use" of wells by property owners when they still produce some gas, but are no longer in commercial production, and well spacing requirements.

COMPULSORY INTEGRATION – It is the policy of New York State to protect what is known as a "correlative right" to an opportunity to receive the benefits of oil or gas beneath any given property acreage. For unleased owners, this opportunity is ensured by the compulsory integration process. Before compulsory integration proceeds, the operator must attest to control of oil and gas rights on at least 60% of the acreage in a spacing unit. The spacing unit is established when DEC issues the well permit.

Since August 2, 2005, an applicant for a permit to drill an oil or gas well in New York State has been required to include in the permit application, a map showing the area that will be assigned to the well. This area, called a "spacing unit", may include some acreage which has not been covered by a lease. After the Department of Environmental Conservation (DEC) issues a well permit, owners of unleased land will be required to elect an option for how their unleased acreage in the spacing unit will be integrated with other properties in the unit. The elected options of the various unleased properties will be finalized by issuance of a compulsory integration order after a public hearing. If no permit is issued, then unleased acreage will not be affected.

²² Much of this description of the DEC role is based upon material obtained from the NYSDEC website.

If DEC issues a well permit based on a spacing unit that includes unleased tracts, it will assign a hearing date when the permit is issued and the well operator (not DEC) will identify each owner of unleased property which provides information concerning the owner's acreage to be included as a proportion of the spacing unit, the estimated well costs (including plugging costs), and an election form which outlines the three options under the law. In most cases, this choice will be made before the well is drilled and before it is known whether the well will be a success that pays for itself, a marginal producer that never pays for itself, or a dry hole.

The following is a summary of the options and some of their consequences as set forth by the NYSDEC on its website:

Integration as a Royalty Owner

Costs – Property owners are not liable for any charges or fees associated with well operation. A dry hole costs the owner nothing. This is the default option if you do not make a selection.

Compensation - If the well produces, the well operator will begin paying a royalty shortly after production starts. The royalty will be no less than one-eighth (12.5%) of the revenue received by the well operator for the share of production attributable to the owner's acreage. An integration order is not a "forced lease" and will not award you a signing bonus, nor does it authorize a well driller to enter a property.

Integration as a Non-Participating Owner

Costs – Under this option, the owner will have the same responsibilities as a Participating Owner, but does not risk any money by paying a share of any up front costs. A dry hole costs the owner nothing.

Compensation - You will not receive any compensation from the well operator, not even a royalty, until the well operator has, through the sale of the owner's share of production, recovered the owner's share of the costs plus a "risk penalty" of 200% of the owner's share of costs, for a total of 300%. After the well pays for itself three times over, or if the owner buys out of the risk-penalty phase by making a payment, you will receive a share of production and be treated as a Participating Owner. If you have leased to someone other than the well operator, then your lessee may owe you a royalty during the risk-penalty phase. This is determined by your lease, and the well operator has no obligation to you. If your lessee elects to be integrated as a non-participating owner, then the well operator must make royalty payments to your lessee during the risk penalty phase. These payments will be on a graduated scale from 1/16 up to 1/8, based on the percentage of the lessee's costs that have been recovered through sale of production.

Integration as a Participating Owner

Costs - If you elect this option, you must pay your share of estimated well costs by the time of the integration hearing. This money will not be refunded if the well is a dry hole or does not pay for itself.

Compensation- You will receive your full share of production. However, the well operator will have a lien on your share of production to pay any outstanding amounts that you owe.

Responsibilities of Integrated Participating and Non-Participating Owners

A decision to be integrated as a participating or non-participating owner subjects you to obligations that do not enter the picture if you elect to be integrated as a royalty owner. Some of the additional considerations are as follows:

Actual well costs. The actual cost to drill or plug the well may exceed the estimate that was provided before the hearing. You will be held liable for your share of the additional costs.

Completion and operating costs. If the well is successful, it will cost money to complete and operate. You will be liable for your share of these costs for the life of the well.

Gathering line costs. If the well is a producer, the well operator will provide you with the estimated costs to install a gathering line to bring the gas to market. You will have the option of paying your share up front or having your share plus 100% withheld from your share of production proceeds.

Subsequent operations. The law defines certain operations in the spacing unit, including additional work on the existing well or drilling of another well, when you again must decide to either pay up front or be subject to a risk penalty. Subsequent operations may cost as much as or more than the original drilling.

Other liabilities. As an integrated participating or non-participating owner, you are liable for your proportionate share of taxes and third-party claims related to drilling and operation of the well.

It is important to understand that DEC's integration order will not give a well operator the right to enter anyone's property.

SELF-USE WELLS - Oil and gas companies sometimes offer to sell or give a well to the landowner when it is no longer productive enough for commercial purposes but may produce enough gas to heat a house. The landowner may pay a small fee for the well or may acquire it without cost. Production for self-use may be beneficial to the landowner and makes use of a non-renewable resource that would otherwise be left in the ground. The landowner will become responsible, however, for maintenance of the well, compliance with all environmental and reporting regulations, and plugging of the well when it is depleted.

Before well ownership can be transferred, the new owner must file an Organizational Report and may be required to post Financial Security. A Request for Transfer of Plugging Responsibilities must be signed by both the buyer and seller and approved by the Division of Mineral Resources after a site inspection. The change in ownership will not be recognized until the new owner has filed the Organizational Report and any required financial security, and Division of Mineral Resources staff has determined that the well is in compliance with all applicable state regulations. Annual Well Reports must be filed until the well is plugged, and the well must not be plugged until the Division of Mineral Resources has issued a permit to do so.

Finally, when acquiring a well for self-use, a landowner must learn and follow safe procedures for well operation and maintenance, and file a non-routine incident report if a spill, leak, fire or other problem occurs at the wellhead. Before filing a non-routine incident report, contact the appropriate Division of Mineral Resources regional minerals manager (oil and gas) to determine if one is necessary.

WELL SPACING – Title 5 of the Environmental Conservation Law provides for certain minimum spacing of wells. As presented on the accompanying Table the requirements vary based upon the well depth. The law specifies different requirements for several specific geologic formations and then makes a general provision for all others. It should be noted that this standard has been amended recently.

Depth	Conforming Unit Size in Acres	Well and Boundary Distance Requirements (See 2008 Amendments in text, below)
above 4,000'	72 to 88	Well bore within the target formation no less than 660 feet from any unit boundary
4,000' to 6,000'	144 to 176	Well bore within the target formation no less than 660 feet from any unit boundary
6,000' to 8,000'	288 to 352	Well bore within the target formation no less than 1,000 feet from any unit boundary
below 8,000'	608 to 672	Well bore within the target formation no less than 1,500 feet from any unit boundary

However, on July 21, 2008 Governor Paterson approved Chapter 376 of the Laws of 2008 which amended the 2005 standards which appeared above and created three categories of shale unit development:

- (1) vertical wells (40 acres with 460-foot setbacks);
- (2) single-well horizontal units (40 acres plus acreage necessary to maintain a 330 foot setback); and
- (3) multi-well horizontal units (up to 640 acres with 330-foot setbacks, allowing operators with smaller acreage positions to develop smaller units).

The provision for multi-well shale units allows operators to drill several wells from a centralized location, reducing the extent of surface environmental disturbance. Infill drilling necessary to fully develop the acreage is required in multi-well units, and failure to drill infill wells would be good cause for DEC to initiate a unit modification.

Proposals which do not meet this criteria but which DEC staff determine may meet the policy objectives of the statute are subject to the public review process set forth in ECL S23-0503(3). This ensures that affected owners are aware that a non-abutting or non-uniformly shaped unit has been proposed and have the opportunity to be heard. The stated unit sizes will only be expanded if the length of the proposed horizontal well bore is such that the minimum required setback cannot be met within the specified number of acres.

At the time of permitting, when the spacing unit is set, only the acreage necessary and sufficient to maintain minimum setbacks for the entire length of the well bore in the target formation and at both ends of the well bore in the target formation will be allowed. Thus, the bill provides protection to ensure that both the single-well and multi-well horizontal units are regularly shaped and will not create "islands" of undrillable acreage.

Studies by the New York State Department of Environmental Conservation (NYSDEC) have found that New York State oil and gas production equipment and wastes are not significantly contaminated by naturally occurring radioactive materials (NORM). NYSDEC concluded that the identified concentrations posed no threat to the public health and the environment.²³

NORM can be found in many geological formations and may be brought to the surface during oil/gas drilling and abstraction. Once at the surface it may accumulate in scales and sludges on and within drilling and processing equipment and may also accumulate in brines and sediments within holding tanks or ponds.

During the 1980's, elevated concentrations of NORM were found on oil and gas mining equipment in the North Sea and in the Southern United States (Escott, 1984) generating concern about radiation exposure to drilling personnel. Concern was also raised about public exposure to people through the recycling of radioactively contaminated equipment or from the application of radioactive brines to roads for snow and ice removal.

In 1990, NYSDEC performed an initial survey to determine if elevated concentrations of NORM existed at any of 17 western New York State oil and gas wells or on the related equipment. No significant contamination (defined as more than twice background levels) was found. The State of Pennsylvania found similar results during a 1994 NORM investigation of oil and gas well waste. However, since the 1990 New York State investigation was limited, a more extensive survey was conducted in 1996. The 1996 surveys took 101 samples from a total of 74 oil and gas well sites in eleven counties. Samples included water, brines, separator pit sediments, pipe scales, soils adjacent to oil/gas operations, and scales and sludges from tank bottoms. For comparison, background readings were taken near each selected survey site. Samples were analyzed for 10 NORM isotopes including Radium-226 (Ra-226) and radium-228 (Ra-228) which were of primary concern because of their relative solubility which has been shown to accumulate in oil/gas production equipment and wastes. Ninety-one percent (71 out of 80) of samples from oil/gas equipment and wastes showed radium concentrations that were within twice the background concentration of local soils and rock. Even these samples were deemed by NYSDEC, supported by an analysis of road disposal of the brine with the U.S. Department of Energy's (USDOE) Residual Radioactive Material Guideline

²³ This section is summarized and abridged from *Investigation of Naturally Occurring Radioactive Materials* - Executive Summary, as presented on the website of the NYS Department of Environmental Conservation.

computer model (RESRAD), to pose no threat to public health or the environment. The survey instrument readings taken at well heads, pipe exteriors, tank exteriors, soil beneath drains and spigots, drainage pits, and ditches revealed no radioactivity more than twice background.

The concentrations of NORM generated by New York State gas/oil production were slightly greater than those found in a 1994 Pennsylvania study of sediments in brine holding ponds. The amount of thorium found in this investigation was in approximate agreement with that of the Pennsylvania investigation. The amounts of radium isotopes were somewhat higher but, as stated above, neither in a location or in a sufficient quantity to pose a hazard.

Given the NORM concentrations identified in the 1996 survey the NYSDEC concluded that there were no plausible exposure scenarios that will yield annual standard dose rates at New York State oil and gas wells. In fact, 91 percent of sample concentrations did not appear elevated above and/or were indistinguishable from background. The low survey instrument readings (within twice background) are consistent with the sample concentrations taken from the sites. Hence, NORM contamination at oil and gas mining sites poses no threat to the public or the environment.

Modeling by NYSDEC also showed that the most common method of brine disposal in New York State, spreading it on the roads to control ice and snow, does not present significant doses to the public. This is true even if it is assumed that all brines contain the highest concentration of radioactivity detected. While NORM-contaminated equipment has been a concern in North Sea oil well drilling, the NYSDEC concluded that NORM contamination of New York State equipment is insignificant and does not constitute a health risk for the State's residents.

PUBLIC SERVICE COMMISSION -

The New York State Department of Public Service is the staff arm of the Public Service Commission. The Commission regulates the state's electric, gas, telecommunications, steam and water utilities. The Commission also oversees the cable industry.



As its principal mission, the Commission is charged by law with responsibility for setting rates and ensuring that adequate service is provided by New York's utilities. In addition, however, the Commission exercises jurisdiction over the siting of major gas and electric transmission facilities and has responsibility for ensuring the safety of natural gas and liquid petroleum pipelines. It is in that latter category, the siting of gas transmission lines, that the Public Service Commission has an impact upon the development of Marcellus Shale. It is expected that most producing well heads will be connected to pipelines for delivery of natural gas to the ultimate customer.

Several community groups have expressed concern that more regulators will likely be needed to oversee the surge of drilling activity and related environmental issues expected to accompany the development of the Marcellus Shale, according to state officials. This situation has been complicated by the recently enacted state hiring freeze. A local newspaper has quoted Judith Enck, Gov. David A. Paterson's top environmental adviser, as saying the state would either find a way to staff the

Department of Environmental Conservation to handle the expected rush of drilling permits and a comprehensive review of the impacts from drilling or the process will simply take longer. "We are looking at various options," said Enck, declining to be more specific. "We understand the concern about staffing."²⁴

According to some local and state government leaders, one of the issues which should be addressed in the review of both the Generic Environmental Impact Statement and the site specific environmental assessments is the inclusion of local governments on the list of "involved agencies" for SEQRA proceedings relating to natural gas permit applications for proposed sites on the Marcellus Shale within their boundaries; and that local governments' views be sought and given significant weight when determinations relating to natural gas permit applications are made.²⁵

OFFICE OF REAL PROPERTY SERVICES (ORPS) – While real property tax assessment and collection is usually a function of either county or local government in New York State, the Real Property Tax Law (RPTL), administered by the State Office of Real Property Services, provides a uniform State-wide method of valuing oil and gas producing properties for real property tax purposes. The ORPS website highlights a key feature of the Law which it mandates the assessment of oil and gas properties in production separately from all other interests in the property (e.g., land, buildings).

The State Office of Real Property Services is responsible for determining and certifying the appropriate unit of production value to each assessor for use in the assessment of gas rights. Gas producing properties are assessed as economic units. Economic units include all the real property subject to taxation and assessed in accordance with the RPTL. Gathering lines are included in determining economic units; however, transmission lines are not.²⁶ ORPS provides unit of production values for each category listed. According to ORPS the gas producing "economic unit" is taxed directly while the non producing unit is taxed in the traditional way according to current use.²⁷

Under the state system there are separate real property tax assessments and bills for the producing "economic unit" (the producing well and its covered accessories which are billed to the well producer) and the traditional real property assessment for all other lands and buildings (which are billed to the property owner).

²⁴ Binghamton (NY) *Press & Sun-Bulletin*, August 11, 2008, Page 1

²⁵ In particular, State Senator Jim Seward (R/I/C Oneonta) from New York's 51st Senatorial District has circulated a draft resolution for local governments seeking this local government participation. Copies of a draft resolution for local governments can be found at the Senator's website.

²⁶ As defined by ORPS gathering lines are pipes used to transport oil or gas from the producing area to the main pipeline in the area. For gas the flow is continuous from the wellhead to the ultimate consumer or point of purchase. Gathering lines would presumably be regulated under the DEC drilling permit. In contrast transmission lines are pipelines extending from a producing area to a refinery terminal or connecting to gathering lines or delivery point of purchase. These lines are used for longer distance transportation of gas and are regulated by the Public Service Commission.

²⁷ As defined by NYS Office of Real Property Services, State Valuation Services, Oil & Gas Unit, an "economic unit" includes all real property subject to taxation and assessed pursuant to Title 5, including oil and gas reserves, oil and gas rights, all equipment, fixtures and pipeline, which is necessary to drill, mine, operate, develop, extract, produce, sell or deliver the oil or gas to a point of sale to a commercial purchaser or the pipeline or equipment of a user, including wells, well-head equipment, pipes, compressor stations, related equipment and buildings used to store equipment.

Each economic unit may include either a single well or a group of wells and the associated property under common ownership and operated as a unit. Physical structures and buildings designated by the producer and accepted by the assessor to be part of the economic unit shall be assessed within the economic unit and not separately.

County Government Role

Because county governments in New York State have only very limited involvement in or authority over local land use regulations they have only a limited role in relation to gas drilling. The two major exceptions are the county agricultural districts which have been created over the past several decades to provide a degree of protection from increasing real property to active farmers, and the coordinative reviews of certain zoning and subdivision activities by the County Planning Board under §239 of the NYS General Municipal Law.

AGRICULTURAL DISTRICTS - Article XIV, Section 4 of the New York State Constitution, added in 1970, provides that it is the policy of the State to encourage the development and improvement of its agricultural lands through adequate provision for the protection of agricultural lands. A year later, the Agricultural Districts Law, Agriculture and Markets Law (AML) Article 25-AA, was enacted implementing that policy. That law provides that local governments, when exercising their powers to enact and administer comprehensive plans and local laws, ordinances, rules or regulations, shall not unreasonably restrict or regulate farm operations within agricultural districts.

Unlike most other forms of land use control, agricultural districts are formed at the request of individual farmers. Article 25-AA of the Agriculture and Markets Law authorizes the creation of local agricultural districts pursuant to landowner initiative, preliminary county review, state certification, and county adoption. As of April 2002, 341 agricultural districts existed statewide, containing approximately 21,500 farms and 8.6 million acres (about 30 percent of the State's total land area).

The purpose of agricultural districting is to encourage the continued use of farmland for agricultural production. The Program is based on a combination of landowner incentives and protections, all of which are designed to forestall the conversion of farmland to non-agricultural uses. Included in these benefits are preferential real property tax treatment (agricultural assessment and special benefit assessment), and protections against overly restrictive local laws, government funded acquisition or construction projects, and private nuisance suits involving agricultural practices.

Under Section 308(4) of the Agricultural Districts Law, the State Commissioner of Agriculture and Markets is authorized to issue an opinion on whether particular land uses are agricultural in nature. When examining all agricultural practices, the Commissioner uses the Agriculture and Markets Law – Article 25AA to determine whether or not the practice under review is agricultural.

COUNTY PLANNING BOARDS – All of the Region's counties have County Planning Boards or Departments. Created under Article 12-A of the General Municipal Law, these County Planning Boards have a role in coordinating local development but do not directly exercise land use controls. Under GML §§239 authority, County Planning Boards review most local zoning and subdivision activities involving property along state or county highways or within 500 feet of public lands or municipal boundaries. In addition to this limited regulatory role the planning boards provide extensive technical support to town and village planning boards in performing their local review authority, and provide educational services to local governments and the public at large on planning related topics.

Local Government Responsibilities and Roles

The principal authority over land use regulation in New York State rests, for the most part, with local town and village governments. In the case of gas drilling, however, the fact that the State, through the

Department of Environmental Conservation, has assumed responsibility for issuing permits for the drilling activity preempts direct local government control, for the most part.

However, while towns and villages might not have authority to control the location or daily operation of natural gas drilling operations, it appears that it could exercise controls in several areas to protect public facilities and the community environment. Specific issues which may require local government involvement include the provision of water to the drilling operation and the disposal of wastewater, stormwater runoff from drilling sites and access roads, weight limits and size restrictions on vehicles using town roads.

CONTROL OF STORMWATER RUNOFF – Relative to gas drilling operations under the Clean Waters Act the construction site may require the preparation of a “Stormwater Pollution Prevention Plan” (SPPP), which must be reviewed and approved by the NYSDEC. These developments would include the construction involving the disturbance of land greater than 5 acres in size, or construction of a project that will create more than 40,000 square feet of impervious surfaces.

While NYSDEC is the signatory for the permit under which New York meets runoff requirements of the US Environmental Protection Agency, these regulations have usually been administered under agreements by local code officers. Many urban communities have adopted their own stormwater regulations, based upon state models, which govern construction sites as well as other places which may contribute to stormwater related pollution.

The construction of access roads, drainage ditches, and the location of other facilities which may be associated with but not officially a part of the drilling site may come under local authority for the control of stormwater runoff.

CONTROL OF OVERSIZE VEHICLES ON TOWN ROADS – Although a remote location is not a prerequisite for drilling natural gas wells, the size requirements for drilling sites, usually 40 acres or more, pretty much guarantees that well sites will be in very rural settings. This means that site access will usually be by town roads. As is illustrated by the accompanying photograph, even though drilling rigs will come to a site in pieces, the individual parts never-the-less will be long and heavy.



Usually the more remote town roads are built for light duty use and may not be able to accommodate oversized loads.

Heavy loads can damage culverts and small bridges while tall loads may damage overhanging trees. Where very long loads are involved the “swing” of the load around corners might be obstructed by roadside features including fences and telephone poles.

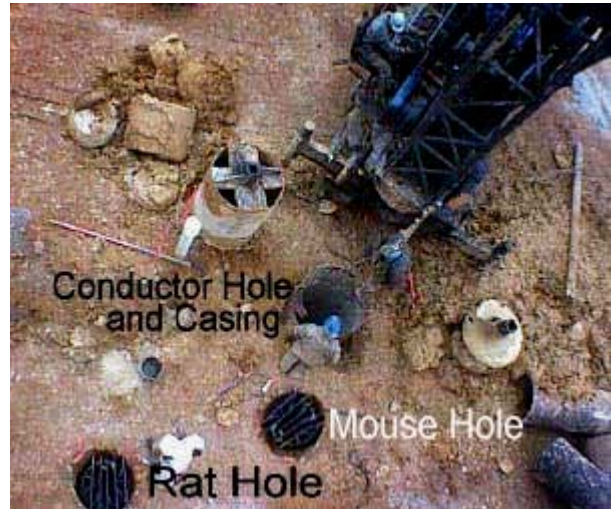


In addition to the public access on town or county highways, most drilling sites will require local access roads or driveways for

direct access. The location and design of such driveways should be reviewed to assure that at the point of entry onto the public highways they do not constitute a traffic hazard or cause storm drainage problems.

It is not unreasonable for a town, in consultation with its highway superintendent, to enact by local law, regulations concerning weight limits and size regulations which require the operator of oversized loads to verify turning clearances at intersections sharp curves or switchbacks, and weight bearing strengths of culverts and bridges along the course their vehicles will travel from main state highways to drilling sites. As part of these regulations there could be provisions requiring suitable protection to roadways and neighboring property which might be affected by the movement of large and heavy vehicles and equipment.²⁸

ENTRAPMENT HAZARDS - The typical drilling operation actually involves three holes: the conductor hole, the rat hole, and the mouse hole. The conductor is a large diameter hole, lined with pipe which may also be called a starter hole. It varies in depth from tens of feet to a few hundred feet depending on the local geology. Some sites do not require a conductor hole. A rat hole is a hole in the rig floor, typically 30 to 35 feet deep, lined with casing that projects above the floor, into which the kelly is placed when hoisting operations are in progress. A mouse hole is a shallow bore hole under the rig floor, usually lined with pipe, in which joints of drill pipe are temporarily placed. Rat holes and mouse holes can be served either by the portable rig that drills the conductor hole or by the drilling rig after rigging-up.²⁹



As is illustrated by the foregoing photograph, the bore shafts for these holes can be quite large – certainly large enough for even an adult to fall into. While NYSDEC regulations require capping of these well heads once production ends, entrapment hazards remain, especially for children, from wells which had been abandoned many years ago and which were not properly capped or where the condition of a cover may have deteriorated. Instead of concrete plugs used today, old bore holes could have been covered by wooden frames or covers made of other materials subject to rot and deterioration. It is important for local governments to be able to identify any older open well heads and cause them to be properly capped. In many communities water wells will be the primary concern.

NOISE POLLUTION – Drilling operations can be noisy especially in areas such as most rural environs where the ambient or background noise is so low that any noise is discernable at a great

28 Member highway superintendents can also consult the Cornell Local Roads Program (CLRP), Local Technical Assistance Program Center which provides training, technical assistance, and information to municipal officials and employees responsible for the maintenance, construction, and management of local highways and bridges in New York State. The Cornell Local Roads Program LTAP is one of 58 Centers established under the Local Technical Assistance Program of the Federal Highway Administration. The CLRP is funded by the Federal Highway Administration, the NYS Department of Transportation, Cornell University, and member and participant fees.

The Cornell Local Roads Program has recently issued a publication *Highway Standards for Low Volume Roads in New York State* (January 2008) which includes a sample local law which sets forth standards for low-volume town roads – roads with traffic volumes of 400 vehicle per day or less.

²⁹ This discussion and the accompanying photograph are from the website of the Occupational Health and Safety Administration Website relating to oils and gas drilling activity.

distance. Clearly if a drilling operation is going on 24-hours a day this can disturb sleep patterns and could have an adverse effect on livestock in any nearby agricultural district. The establishment and enforcement of reasonable noise standards is difficult especially when distances become large. Typically efforts to set standards refer to a specified number of decibel above the ambient noise level to adjust for the differences between almost vacant areas and more community like settings. On a quiet night in a rural area the sound of a back-up warning beeper on a school bus could be heard for miles. Local regulations of noise also require specialized monitoring equipment and a certain degree of expertise.

OUTDOOR LIGHTING – Although rare in rural areas, in suburban areas it is not uncommon for local governments to regulate light emitted by parking lots. Typically the regulations limit the hours when lights may be lit (although this cannot be used to regulate hours of operation) and the amount of light allowed to spill onto neighboring properties. Rather than outright prohibition of outdoor lighting in construction or drilling areas, local regulations can require shields or deflectors which limit the emission of direct light. Local regulations of outdoor lighting require specialized monitoring equipment and a certain degree of expertise.

PERMITS FOR OPENING TOWN ROADS FOR PIPELINES – As has been noted several times in this report, while the initial activity on the Marcellus Shale will be related to drilling, producing wells will require additional local disturbance associated with the opening up of roads and drainage ways to allow the construction of underground pipelines which will be necessary to connect the well heads to markets. It is common for communities to require permits for opening roads and to establish standards for covering, stabilizing, and repaving the roads once the pipelines have been installed. These requirements should apply to both gathering wells which would connect drilling sites with collection points and compressors and other service equipment.

As was discussed before, the design and construction of transmission pipelines is subject to regulation by the NYS Public Service Commission. This is not the case with gather and distribution (local service) lines. Typically all of these lines are installed underground for weather and safety related reasons. When a pipeline crosses a local road it is reasonable for the local government to require permits and inspections by the highway superintendent. The requirement for a permit is justifiable because of the fact that while a road is cut open to install a pipeline it is not available for public and emergency use. A permit allows local service providers to make alternative arrangements for the period during which the road is closed.

In addition to specifying the period of time during which a highway may be closed for construction, provisions for alternative traffic circulation or by-pass routes, and the listing of responsible parties responsible for the road closing and restoration, the permit process can specify the quality of the replacement roadway to be provided upon completion of construction.

SEISMIC TESTING – One of the practices that drillers are reported to follow involves the use of trucks with special equipment to explore the geological structure of an area through vibration or underground sound waves. The principal concern regarding this type of use relates to any restriction to traffic flow while this type of exploration is occurring and the potential for damaging town roads or village streets.

SITE PLAN REVIEW – Under laws adopted in 1976 and amended in 1997 towns and villages may enact local site plan review, regardless of whether or not they have zoning regulations in force.³⁰

³⁰ For enabling legislation see §27-a of the City Law, §274a of the Town Law, or §7-125a of the Village Law of the State of New York. Site plan reviews are subject to the SEQRA provisions of Article 8 of the Environmental Conservation Law and §239 of the General Municipal Law relating to referrals to County Planning Boards.

Although traditionally administered through a local planning board, the enabling legislation allows a town or village board to delegate site plan review authority to any administrative body it deems suitable. The NYS Department of State recommends that site plan review include three steps:

Sketch Plan – A more or less informal initial review which could involve the preliminary review of a “sketch plan” and which is intended to identify major community concerns which will have to be addressed in the formal site plan.

Preliminary Site Plan – This will be the site plan which will undergo formal review including a demonstration of how various local requirements will be met. Before approval there is usually a public hearing where the community has input to the plan requirements.

As-Built Site Plan – A final site plan which reflects the final construction and which is intended as the formal record of boundary lines, building placement, the location of easements and those elements approved or required as part of the preliminary site plan approval. The as-built is necessary because when actual construction occurs physical features may be encountered which prevent or make costly strict adherence to the approved plan.

Features Common to Many Site Plan Local Laws.

Regional and Local Environment	Natural Features	Design and Aesthetics
Compatibility with Surroundings Pedestrian and Vehicle Access Economic Impact Impact on Air, Water, and Noise Visual Compatibility	Geology Topography Soil Characteristics and Vegetation Wildlife Surface Drainage and Erosion Wetlands and Flood Hazards	Site Density Plans and Elevation of Structures Signs and Landscaping Fencing and Buffer Strips Utilities

Adapted from *Site Review Procedure and Guidelines* published by the NYS Department of State

The accompanying Table adapted from the *Site Review Procedure and Guidelines* published by the NYS Department of State³¹ shows the range of considerations which may be addressed as part of the local site plan review.

REQUIREMENTS FOR REGISTRATION OF LANDMEN – Following the precedent established whereby towns and village require the registration of solicitors, it is not unreasonable for a town or village to require that landmen (the representatives of drilling companies or others seeking to lease mineral rights) register before operating in a town. This registration could be helpful in allowing residents to identify individuals who are in effect soliciting the use of land. As a minimum such registration should have the names and business addresses the persons doing the soliciting, the names of any companies they might represent, and contact information (phone numbers, e-mail addresses, etc).



WASTEWATER DISPOSAL – Because of the use of chemicals and other materials in the hydraulic fracturing process, and as a result of contact with a variety of subterranean minerals it appears that water used as part of the drilling process is likely to require treatment before it can be discharged into any surface stream or injected into the ground.

³¹ See *Site Review Procedure and Guidelines*, published by the NYS Department of State in August 1998 as part of the James A Coon Technical Series, reprinted January 2008.

The chemical composition of drilling wastewater may be such that it would require pre-treatment before it could be disposed of either to a water body under a state SPEDES permit from DEC or through discharge into an established wastewater treatment plant operated by a local government. Any pretreatment is typically performed by and at the expense of the entity producing the wastewater.

At the present time there are only a few wastewater treatment facilities within the Region, outside of Broome County and the Region's Cities, which have a capacity of a half million gallons per day or greater. Where wastewater treatment facilities exist in those rural areas most likely to be drilling sites, they typically have fairly small capacities.

While the composition of drilling water is proprietary and therefore not open to the public in general, it can and must be revealed to regulators and local governments which operate local disposal facilities. Local governments should assure that plant operators have the authority to limit use of local facilities until the entity seeking to use such plant to dispose of drilling wastewater demonstrates that any resulting effluent will be able to meet the standards of the existing discharge, at the minimum. This authority may already exist as conditions to the SPEDES permit for the treatment plant itself.

WATER SUPPLY – One issue that is coming up with some regularity is the requirement for large amounts of water for the horizontal drilling procedure which is to be used on the Marcellus Shale. Estimates run to as much as a million gallons or more per well for the fracturing process. There are only a few water systems in the Southern Tier East region which produce over a million gallons of water per day. In addition, the river basin commissions have identified the drilling operations as consumptive uses, permanently withdrawing the water from the basin.

As shown on the accompanying stock photo³², most drilling sites include one or more storage ponds to hold water which is used in their drilling process. Water is typically obtained either from surface or ground waters under any required permits, or is purchased from public water suppliers. Because the drilling operation is considered to be a consumptive use, the withdrawal or purchase of more than 20,000 gallons would require a permit from the Susquehanna River Basin Commission.³³



Because of the remote location typical of drilling sites, water will usually be brought to the drilling sites by truck, although temporary pipelines are also possible when withdrawals are made from nearby streams, ponds, or public water supplies. Typically any freshwater is held on site by either a temporary pond or in tanks.

³² Aerial photo of a gas well site. © iStockphoto / Edward Todd.

³³ The threshold for a permit from the Delaware River Basin Commission is the consumptive withdrawal 100,000 gallons.

It should be noted that the typical well will need about a million gallons of water for the drilling and fracturing operations.³⁴ Some of the fracturing water can be recovered and held for reuse, usually in a lined pond such as that shown on the photo. It should be noted that there are only a few public water supplies in the Southern Tier East Region which can accommodate this amount of water withdrawal even over a multi-day period.

Local governments which operate public water supply system should adopt policies for bulk purchases of water from their supplies to assure that there would be no interruption in the public access to drinking water. Typically such policies would restrict daily withdrawals to a certain percentage of the average daily production.

³⁴ Using a large 9,000 gallon detached tank trailer, it would require 111 trips by a semi-detached truck to transport a million gallon or water to a single drilling site.