



AgEcon SEARCH
RESEARCH IN AGRICULTURAL & APPLIED ECONOMICS

The World's Largest Open Access Agricultural & Applied Economics Digital Library

This document is discoverable and free to researchers across the globe due to the work of AgEcon Search.

Help ensure our sustainability.

Give to AgEcon Search

AgEcon Search
<http://ageconsearch.umn.edu>
aesearch@umn.edu

*Papers downloaded from **AgEcon Search** may be used for non-commercial purposes and personal study only. No other use, including posting to another Internet site, is permitted without permission from the copyright owner (not AgEcon Search), or as allowed under the provisions of Fair Use, U.S. Copyright Act, Title 17 U.S.C.*

September 2003

EB 2003-15

Leasing of Natural Gas Drilling Rights on Public and Private Land in New York

Katherine E. Ziegenfuss and Duane Chapman

**Department of Applied Economics and Management
College of Agriculture and Life Sciences
Cornell University
Ithaca, New York 14853-7801**

It is the Policy of Cornell University actively to support equality of educational and employment opportunity. No person shall be denied admission to any educational program or activity or be denied employment on the basis of any legally prohibited discrimination involving, but not limited to, such factors as race, color, creed, religion, national or ethnic origin, sex, age or handicap. The University is committed to the maintenance of affirmative action programs which will assure the continuation of such equality of opportunity.

SUMMARY

The U.S. demand for natural gas, a cleaner-burning fossil fuel, is projected to rise over the next decade. The import supply of natural gas is tight, so the growing demand will likely intensify domestic production. Pressure to drill on U.S. public and private lands will continue to grow. Landowners and stakeholder groups will need to make informed decisions about whether to lease the mineral rights on these lands. Therefore, access to full information about drilling is critical.

This paper uses New York State to illustrate the natural gas drilling process and to examine the issues surrounding drilling on public and private lands. Seneca and Schuyler Counties were chosen to represent the drilling situation in New York due to their mixture of private, state and federal land, including the only national forest in New York. Recent experiences of private landowners and stakeholder groups – the Bureau of Land Management, U.S. Forest Service, national and state forest managers, conservation groups and local citizens – are presented.

The paper discusses the benefits of natural gas drilling, primarily landowner royalty payments, and the costs, which include soil erosion, noise, recreational, and aesthetic impacts, and added land management responsibility. For private landowners, the greatest uncertainties in the drilling process center on contract negotiation and the unpredictable nature of royalty payments. The paper provides a discussion of negotiable lease terms, and an explanation of how royalty payments are estimated, including the method for determining wellhead prices. The most difficult issues in gas leases involve siting: wells, staging areas, pipelines, and roads.

On federal land, conflict between national energy policy objectives and environmental objectives creates controversy about drilling. Public involvement in federal land leasing can strongly impact the decision-making process.

TABLE OF CONTENTS

CHAPTER I. INTRODUCTION	1
A. Natural Gas Industry: National, State and Local	1
B. Finger Lakes National Forest: Description	2
C. State Lands in Seneca and Schuyler Counties: Description.....	4
D. Schuyler and Seneca Counties: Description	4
CHAPTER II. NATURAL GAS DRILLING: BENEFITS AND COSTS	6
A. Leasing and Drilling: Overview of the Process	6
B. Environmental Impacts of Drilling	8
1. Physical Footprint	8
2. Natural Environment.....	12
3. Social Environment.....	13
C. Flow of Revenues	13
1. Consumer Price Trends for Natural Gas	13
2. Contracts	16
a. Public land contracts	16
(1). Federal Land.....	16
(2). State Land.....	17
b. Private land contracts.....	18
3. Method of estimating royalty payments	19
a. Public land contracts	19
(1). Federal Land.....	19
(2). State Land.....	19
b. Private land contracts	20
c. Wellhead Price: Basis for Royalties	20
CHAPTER III. EXPERIENCE ON PRIVATE AND PUBLIC LANDS	23
A. Public Land	23
1. Bureau of Land Management/U.S. Forest Service: Stakeholder Perspective	23
2. Conservation Groups: Stakeholder Perspective.....	24
3. Finger Lakes National Forest: Stakeholder Perspective	24
4. 2001 Environmental Impact Statement.....	25
5. Forest Plan	26
B. State Land	26
C. Private Land	27
CHAPTER IV. CONCLUSION	29
APPENDIX A: SAMPLE OIL AND GAS LEASE	30
REFERENCES	39

LIST OF FIGURES

Figure 1.	New York Natural Gas Consumption, 1980-2000.....	15
Figure 2.	Average Price of Natural Gas Delivered to Consumer, by Consumer Type, New York, 1967-2001	15
Figure 3.	New York Average Wellhead Prices, 1967-2001	21

LIST OF PHOTOS

Photo 1.	Pipeline marker.....	7
Photo 2.	Blowout Preventer	7
Photo 3.	Active well site	9
Photo 4.	Active well site	10
Photo 5.	Access road.....	11

CHAPTER I. INTRODUCTION

A. Natural Gas Industry: National, State and Local

Natural gas, a colorless, odorless gas composed primarily of methane, is produced from wells drilled into underground reservoirs of porous rock (EIA 2003b). The gas is extracted, refined, and then piped to its point of use. Approximately 23 percent of United States energy consumption comes from natural gas. More than one-half of U.S. homes use natural gas as their main heating fuel. Natural gas is the cleanest fossil fuel; in comparison to oil and coal, the combustion of natural gas releases much smaller amounts of sulfur dioxide, nitrous oxides and particulates, and lower levels of carbon dioxide and carbon monoxide (EIA 2003b).

The U.S. natural gas industry was largely deregulated in the 1980's and early 1990's. Today, only pipelines and local distribution companies (LDC) are directly regulated; producers and marketers are not directly regulated (NGSA 2003). The Federal Energy Regulatory Commission (FERC) oversees regulation in the natural gas industry.

In 2001, U.S. natural gas consumption was 22.2 trillion cubic feet (Tcf). The U.S. Energy Information Administration predicts that by 2020, domestic natural gas consumption will range between 28 Tcf and 32 Tcf, with most of the increase due to electricity generation (EIA 2003b). Currently, approximately 84% of natural gas consumed in the U.S. is produced domestically and 16% percent is imported, mostly from Canada. The level of proved reserves has not changed substantially in the U.S. in the last ten years.

New York has a small amount of total national dry production¹ (.14%), and 5.7% of national consumption (EIA 2001). More than 12,000 oil and gas wells, including active, inactive, and storage wells, were reported in New York State in 1999. Gas wells are located in twenty-three New York counties, including: Allegany, Broome, Cattaraugus, Cayuga, Chautauqua, Chemung, Delaware, Erie, Genesee, Livingston,

¹ Dry production is marketed production less extraction loss.

Madison, Niagara, Oneida, Onondaga, Ontario, Oswego, Schuyler, Seneca, Steuben, Tioga, Wayne, Wyoming and Yates (DEC 2003c).

In this report, Seneca and Schuyler Counties are used to illustrate the process of natural gas drilling and the issues surrounding drilling on public and private lands. The two counties contain a mixture of private land, state land and national forest land. Some private land and state forestland within the two counties is currently leased for drilling. The Finger Lakes National Forest (FLNF), located on the border of the two counties, was under lease for oil and gas exploration from 1974 to 1984. However, the leases expired without any successful production.

Until the 1990's, Schuyler and Seneca Counties did not appear to have favorable conditions for natural gas production. During the early 1990's, seismic surveys of the region revealed that pockets of natural gas may exist deeper than areas previously tested, and recent drilling in the region has confirmed these results.

In 2002, 147 wells with some production were reported for Seneca County (DEC 2003c). Most of these wells have been drilled in the north-central part of the County. No wells have been drilled in the FLNF, although several wells have been drilled adjacent to the Forest near Trumansburg, New York. Five wells with some production were reported for Schuyler County, and some gas storage wells are located in the northwestern portion of the County.

B. Finger Lakes National Forest: Description

The Hector Ranger District, Finger Lakes National Forest (FLNF) is located between Seneca and Cayuga Lakes in Schuyler and Seneca Counties, New York. The FLNF, the second smallest of the 156 national forests, encompasses 16,032 acres and has more than 30 miles of trails (FLNF 2002). Approximately 40,000 visitors use the forest each year (Dobbin 2001). The FLNF is the only National Forest located in the state of New York, and the only public land in the state that has an explicit philosophy of multiple-use land management (FLNF 2002).

Management of the FLNF is coordinated from the Hector Ranger District Office in Hector, NY. The FLNF employs a District Ranger, Assistant District Ranger, Forest Planner, Forest Technician, and an Office Manager. Three part-time Department of

Labor employees from a senior citizen employment program assist with office management. Seasonal volunteers also play an important role in the management of the Forest.

Within the Forest Service, the FLNF is administratively managed as part of the Green Mountain National Forest (GMNF), which has its office in Rutland, Vermont. Specialists from the Rutland office, including a biologist, hydrologist, and a soil scientist, visit the FLNF for one week each year to monitor the health of the forest and evaluate current programs. The FLNF and GMNF are part of District 9 of the Forest Service.

The FLNF has relatively few land use restrictions. A wide variety of recreation activities are permitted within the forest, including hunting, fishing, hiking, camping, blueberry picking, auto travel, cross-country skiing, horseback riding and snowmobiling. Livestock grazing is also permitted under a lease agreement between the Forest Service and the non-profit Hector Cooperative Grazing Association.

Two federal laws, the National Environmental Policy Act of 1969 (NEPA) and the National Forest Management Act of 1976 (NFMA), guide decision making for the FLNF. NEPA requires federal government agencies to assess the environmental impacts of any proposed action. Agencies have a responsibility to avoid, minimize and mitigate negative impacts to the natural and social environment. Depending on the scale of the action, agencies complete an Environmental Assessment (EA) or Environmental Impact Statement (EIS) in which they evaluate feasible alternatives, including a no action alternative, and select the alternative that has the least impact on the environment. Small-scale decisions can be documented in a decision memo.

NFMA requires each national forest to create a forest plan that “translates national laws, regulations, and policies into guidance for natural resource activities on a national forest” (FLNF 2002). The forest plan sets goals and objectives for land management, proscribes what land uses are allowed and how they may occur, and sets monitoring and evaluation requirements (FLNF 2002). National forests are required to update their forest plan every 10-15 years.

C. State Lands in Seneca and Schuyler Counties: Description

State lands cover four million acres, or 13 percent of the total land area in New York State. Different types of lands – forests, forest preserves (i.e. Adirondack and Catskill), parks, and wildlife management areas – have different land use restrictions. State forests, comprised largely of abandoned agricultural land purchased for reforestation purposes in the 1930’s, have three management purposes. The Bureau of Public Lands within the New York Department of Environmental Conservation (DEC) manages state forests to: 1) produce forest crops, 2) maintain diverse wildlife habitat, and 3) provide recreational opportunities. State forests play an important role in New York’s economy by providing wood for the forest products industry (DEC 2003a).

Almost a third of Schuyler County consists of forested public land, including three state wildlife management areas, one state park and six state forests. Four of the state forests in Schuyler County – Sugar Hill, Cinnamon Lake, Goundry Hill, and Coon Hollow – cover almost 12,000 acres west of the village of Watkins Glen. This area contains the 45-mile Six Nations Trail System and a portion of the 553-mile Finger Lakes Trail. Seneca County has five state parks and two wildlife management areas (DEC 2003a).

D. Schuyler and Seneca Counties: Description

Schuyler and Seneca Counties are located within the rural fourteen-county Finger Lakes Region of Upstate New York. The counties’ economies are primarily based on agriculture and tourism (Chamber of Commerce 2003). The two counties are administered by elected Boards of Supervisors/Legislatures.

Schuyler County has a total land area of 342 square miles, of which 110 miles is forested. Approximately 24 wineries are located in or near Schuyler County on the Seneca Lake Wine Trail. The two largest villages in Schuyler County are Watkins Glen and Montour Falls, with a combined population of approximately 5,000 persons (Chamber of Commerce 2003).

Seneca County’s total land area is 325 miles. The largest village in Seneca County is Seneca Falls, located in the north of the county with a population of 6,861

persons (Census Bureau 2000). The FLNF is situated on the southern edge of the county, and stretches south into Schuyler County.

Population growth in the two counties is fairly stable. Schuyler County, with a population of 19,224, has experienced 3% population growth since 1990. Seneca County is slightly more populated (33,342 persons) and has experienced a 1% decline in population since 1990. In comparison, New York State's population growth was approximately 5% from 1990-2000. The median ages in Schuyler and Seneca Counties are 38.8 and 38.2 years, respectively. Median age in the two counties is slightly older than New York State's median age of 35.9 years (Census Bureau 2000).

Approximately 80% of persons in the two counties have completed a high school education, and approximately 16% have completed a bachelor's degree. The majority of persons in the two counties are employed in the manufacturing, retail trade, and educational, health and social services industries. The unemployment rate was low in both counties in 2000. Schuyler County's unemployment rate of 4.6% and Seneca County's unemployment rate of 3.6% were similar to New York State's 2000 unemployment rate of 4.3% (Census Bureau 2000).

Median household incomes in Schuyler and Seneca Counties were \$36,010 and \$37,140 respectively, lower than New York State's median household income (\$43,393), but similar to neighboring counties. Per capita income in the two counties follows the same trend; lower than the state average, but similar to surrounding counties. In 2000, Schuyler and Seneca Counties had a lower percentage of persons living below the poverty level (11.8% and 11.5%) than New York State (14.6%) (Census Bureau 2000).

CHAPTER II. NATURAL GAS DRILLING: BENEFITS AND COSTS

A. Leasing and Drilling: Overview of the Process

Drilling companies first study seismic maps to determine the probable location of natural gas reservoirs. Natural gas reservoirs do not divide neatly by property lines, but mineral owners have rights to a proportionate share of the natural gas in a common reservoir. These “correlative rights” are protected by DEC through well-spacing, voluntary and compulsory lease integration, and other actions. Because reservoirs exist in defined pockets, and because of correlative rights laws, drilling on public land does not impact private landowners’ ability to extract resources from their properties (and vice versa).

After studying seismic mapping, company representatives approach individual landowners (or government agencies in the case of public land) and lease thousands of acres of land. In accordance with New York compulsory lease integration laws, the leased land is organized into (maximum) 640-acre units. Each unit represents one gas reservoir, as determined by seismic mapping. Every landowner (public or private) within a unit shares the royalties from gas production anywhere in the unit.

After the land is leased, the company then conducts further seismic studies, and may drill wells in the most promising locations. The gas is piped to larger pipelines owned by a company (e.g., Dominion) that transports the natural gas to New York State Electric and Gas (NYSEG) or other distribution companies. NYSEG also owns transportation pipelines in some areas. Pipeline locations are indicated as shown in **Photo 1**.

DEC requires a drilling permit to begin the extraction process, and then monitors environmental impacts. A drilling company well tender visits the well site every day to monitor well meters, valves and filters. Each well is equipped with a blowout preventer, or a container in which the well automatically releases sludge that sometimes clogs filters and prevents gas from reaching the pipeline. **Photo 2** shows a typical blowout preventer.

When the container fills, it is emptied by pump (similar to a septic system), and trucked to a DEP-approved disposal facility. If the container fills to capacity or the well



Photo 1. Pipeline marker, Schuyler County, NY.



Photo 2. Blowout Preventer, Schuyler County, NY.

fails to divert the sludge to the container, no explosion occurs. The well simply does not produce gas until the filter is unclogged.

A reclamation plan for the drilling site is included as part of the original lease. When the site is abandoned, the drilling company follows New York water quality and mining regulations to reclaim the area. Reclamation includes removing the equipment, sealing the well, and grading and seeding the well site. DEC conducts inspections to insure that regulations are followed and has the power to require additional reclamation work as necessary. If the drilling took place on federal land, the Bureau of Land Management (BLM) would also conduct inspections.

B. Environmental Impacts of Drilling

1. Physical Footprint

The physical footprint for drilling includes a well pad, reserve pit, and access road. Two well sites are shown in **Photos 3 and 4**. A single well pad has a footprint of approximately two acres, and a pad with multiple wells has a footprint of approximately three acres. The drilling mast, located on the well pad during drilling, is between 120-130 feet tall. Reserve pits, used to hold drilling fluid, are approximately 12-15 feet in depth and range from 0.02 to 0.2 acres in size.



Photo 3. Active well site, Schuyler County, NY



Photo 4. Active well site, Schuyler County, NY

The area of disturbance for the access road construction is approximately 30 feet wide. The road itself is 15-18 feet wide, and the length depends on the location of the well in relation to the existing road network. **Photo 5** shows an example of a well site access road. When completed, the roads are constructed of an all-weather base, crowned and ditched, and runoff control devices may be installed.

According to New York law, wells must be spaced at least 320-640 acres apart to allow for efficient reservoir drainage and to maximize economic recovery of the natural gas. In addition, New York law (6 NYCRR 553.2) states that wells must be located no less than 100 feet from private homes, 150 feet from public buildings, and 50 feet from any stream, river or public body of water (USFS 2001a).



Photo 5. Access road for well site, Schuyler County, NY.

2. Natural Environment

The major natural environmental impacts resulting from drilling are vegetation removal and resulting soil erosion. At the drilling site, earth-moving equipment is used to clear vegetation, including trees and shrubs, from the area used for the well pad, reserve pit, and access road. The cleared vegetation is either removed, or could be left adjacent to the drilling site to provide wildlife habitat. The topsoil removed from the drilling site can be saved for use during reclamation of the area (USFS 2001a).

During drilling, wetland and riparian areas are specifically protected by buffers and no wells can be located within 100 feet of any water body. Surface waters in the vicinity can be impacted by erosion and sedimentation from drill site construction runoff. Runoff impacts would be minor, and the risk of spills or contamination of surface water, groundwater or drinking wells would be very minor, according to the USFS (2001a).

DEC's Oil, Gas and Solution Mining Regulatory Program is responsible for enforcing regulations designed to prevent "pollution, waste, escape, migration, and commingling of oil, gas, brine, and fresh water (USFS 2001a)." These regulations are in place for both private and public lands. Blowouts, or uncontrolled flows of brine, natural gas, and oil which reach the surface and which can result in explosions or fires, would be prevented by hydraulic "blowout preventers" and routine inspections by DEC on public and private lands. On federal land, BLM would also conduct inspections.

Naturally Occurring Radioactive Materials (NORM) can be found in many geological formations and may be brought to the surface during oil or natural gas drilling exploration. 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 (DEC 1999). In 1996, concern about public exposure to radioactive material prompted DEC to conduct a study of NORM concentrations in New York State drilling operations. DEC measured radioactivity at well sites and analyzed samples of scales, sludges, sediments, soils, water, rock, brine, waxes and oils were taken and analyzed using gamma spectrometry.

The DEC study found that New York oil and gas production equipment and wastes are not significantly contaminated. The concentrations of NORM found pose no threat to the public health and the environment. The study only included wells on state

land, but was representative of areas where drilling occurs throughout the state. The State of Pennsylvania found similar results during a 1994 NORM investigation (DEC 1999).

3. Social Environment

Drilling would impact community noise levels and aesthetics. Noise and aesthetic impacts from drilling vary depending on what buffer requirements are established for noise and visually sensitive areas. In the short term, the 130-foot drilling rig is present for 2 to 3 months at each well site. The drilling process causes a substantial increase in noise levels (USFS 2001a). After the well is drilled, no further noise is caused by the natural gas extraction. Over the longer term, the well pad, reserve pit and access road are present.

Private and public land drilling may differ in terms of aesthetic impacts. Within the FLNF and state forests, the several acres of vegetation clearing at each well site would alter the look of the Forest. Drilling would disturb the quiet atmosphere, and disrupt the scenic vistas appreciated by recreationists who hike, ski and horseback ride on the many trails. In contrast, drilling on private land usually causes less of a visual impact, since the land is often partially developed. In addition, since Seneca and Schuyler Counties are primarily agricultural, private land drilling often occurs in a field, minimizing vegetation clearing.

County emergency services would be responsible for responding to any emergencies, e.g. fires or hazardous materials spills, which might occur at the drill sites. County emergency services may need additional funding to be fully prepared for these types of emergencies.

C. Flow of Revenues

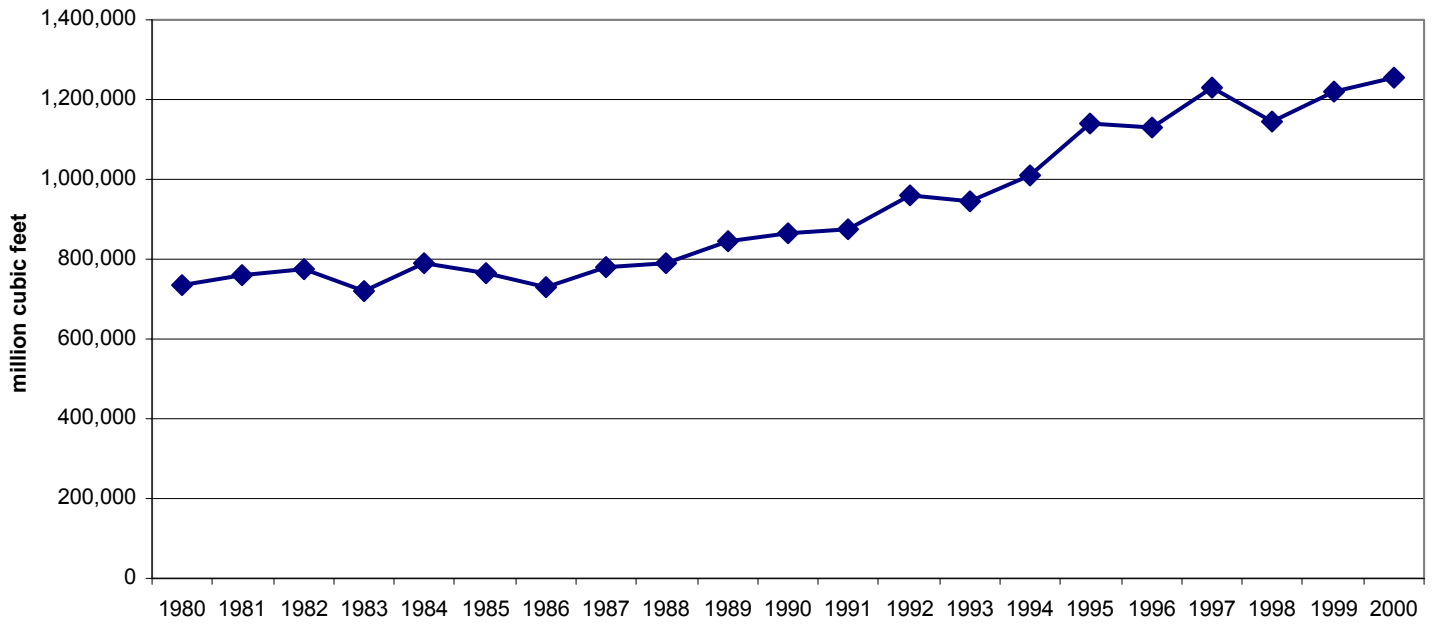
1. Consumer Price Trends for Natural Gas

Although natural gas has a nationwide distribution and transmission system, gas produced in New York is usually sold within the state. Therefore, prices are determined by regional, rather than global, markets. The retail price of natural gas to the customer is based on transmission costs, distribution costs, and the wellhead price of the gas. Prices often fluctuate: transmission and distribution costs are fixed, so when the amount of gas

consumed declines, these fixed costs are spread over a smaller amount of units, and can raise prices. Wellhead prices vary seasonally according to demand, and are usually lower in non-peak summer months in New York. Although New York wellhead prices are usually lower in the summer, the per unit cost to consumers is often higher because of the reduced demand.

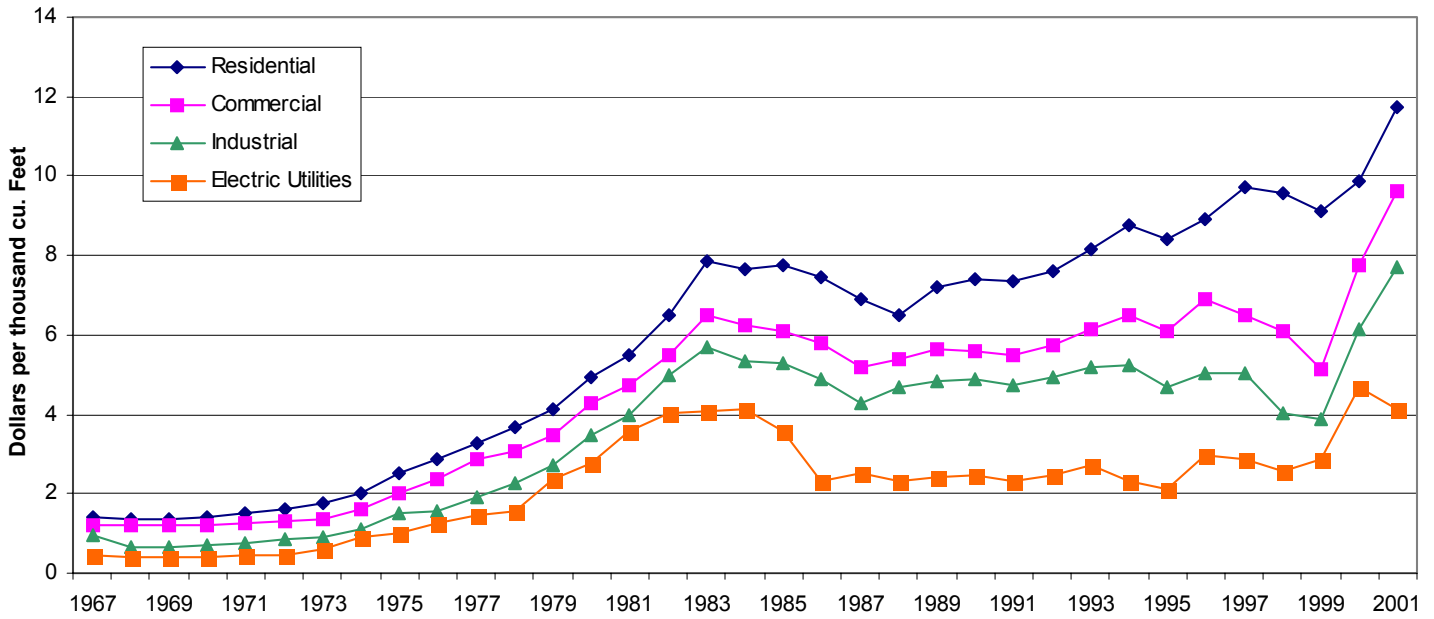
During the 1980's, the consumption of natural gas in New York remained largely constant, as shown in **Figure 1**. Consumption has risen fairly steadily during the 1990's. The price of natural gas in New York has more than doubled since 1970, and has fluctuated during the past two decades, as shown in **Figure 2**. Residential consumers pay the highest prices, and the residential price has risen more than prices paid by commercial, industrial or electric utility customers over the past twenty years. The overall price spike shown in 2000 and 2001 is likely connected to market manipulation by Enron and other energy corporations (Romero 2003). Preliminary data for 2002 shows that national average wellhead prices decreased by 27% between 2001 and 2002 (EIA 2003a).

Figure 1. New York Natural Gas Consumption, 1980-2000



Energy Information Administration, 2000 and 2001.

Figure 2. Average Price of Natural Gas Delivered to Consumer, by Consumer Type, New York, 1967-2001



Energy Information Administration 2000 and 2001.

2. Contracts

a. Public land contracts

(1). Federal Land

The Bureau of Land Management (BLM), Department of the Interior (DOI), is responsible for oil and gas leasing on National Forest land, according to the Mineral Leasing Act of 1920 and the Mineral Leasing Act for Acquired Lands of 1947. Leases cannot be issued however, without the approval of the U.S. Forest Service (USFS), according to the 1987 Federal Onshore Oil and Gas Leasing Reform Act (FOOGLRA). The USFS has established a “staged” decision making process (published in the Federal Register in March of 1990 and revised as of July 2001 36 CFR Parts 228 and 261). “The stages include: 1) the determination of lands available for leasing; 2) the decision to consent to lease particular lands; 3) an Application for Permit to Drill for exploratory wells; and 4) field development (USFS 2001a).” These stages are conducted in accordance with the National Environmental Policy Act (NEPA).

Federal environmental protection laws are included in the standard lease stipulations. Standard Lease Terms state that, “operations must be conducted in a manner that minimizes adverse impacts to the land, air, water, cultural, biological, and visual elements of the environment, as well as land uses or users.” The leases are also subject to special terms and conditions, which can be used to mitigate adverse environmental impacts.

Both competitive and noncompetitive drilling leases may be obtained for federal lands. Competitive leases are first offered through an oral auction, and if no bids are received, noncompetitive leases may be issued. Both types of leases are offered for ten years, but automatically continue as long as a productive well exists on the leased land (USFS 2001a).

Federally owned oil and gas resources are sometimes located on privately owned lands. These lands are known as “split estates.” Common law dictates that the federal mineral lease has dominance over the privately owned surface lease. The private owner cannot deny the federal government the right to use as much of the surface as necessary

to extract the mineral resource. In Seneca and Schuyler Counties, this special situation pertains to 47 acres of land (USFS 2001a).

The USFS estimates that development of natural gas operations in the FLNF would take between 8 and 15 years. Leases could then produce for approximately 10 to 25 years. In total, approximately 7.5 to 16 billion cubic feet (Bcf) of natural gas reserves would likely be produced from the FLNF natural gas reservoirs, enough energy to meet the energy demand of the 33,000 residents of Seneca County for 20 years (Kingsley 2003).

(2). State Land

DEC is authorized under Article 23, Title 11 of the Environmental Conservation Law to lease state lands for oil and gas exploration and development. State park lands and certain other lands, including forest preserves, are excluded from leasing. The DEC's Division of Mineral Resources (DMR) acts as the leasing agent for state lands.

Most state land leases are awarded through a public competitive bid process, although small tracts of land may be leased non-competitively in order to consolidate drilling and production units. Companies nominate areas for future leasing and must accompany the nomination with a bid guarantee of \$500 plus \$1.00 per acre (DEC 2003c).

Prior to a state lease sale, DMR conducts public workshops and publishes advertisements (in websites, local newspapers, and other publications) about the sale to gather comments and provide information. When a sale is planned, all nominated areas are publicly posted and companies may bid. The mineral rights are awarded to the highest cash bonus bidder (a bonus bid is the lump sum up-front payment for the land). If the company that originally nominated the land is not the highest bidder, the bid guarantee is returned. Leases are usually awarded for a five-year period, and extend throughout the life of any productive well (DEC 2003c).

DMR must obtain approval of the state land surface manager before any areas are offered in a lease sale. DMR and the surface owner jointly assess the environmental suitability of the area for leasing and develop special lease conditions to protect or

exclude sensitive areas from surface impacts. The special conditions are included in the proposed lease for each specific area.

After a bid is awarded, DMR and the surface manager conduct a site inspection to determine the location of the well site, access roads, and required mitigation measures. Decisions made at the site inspection are written into the conditions for receiving the drilling permit. Finally, before a drilling permit can be issued, operators must post a bond or other financial security to guarantee that the well will be plugged and the site reclaimed.

On some occasions, a company may lease land where no surface entry is allowed, referred to as a “No Entry” lease. Surface entry may be restricted due to roads, steep slopes, wetlands, cultural resources, public recreation or simply at the request of the surface manager (DEC 2003c). A drilling company might lease land without surface entry rights: 1) as part of the special conditions of a lease (e.g., wetlands); 2) to preserve future options; and/or 3) to prohibit other companies from leasing the land.

b. Private land contracts

Private land leases are usually negotiated for a five-year period (see **Appendix A** for a sample leasing contract). Many private land leases also include a provision allowing the drilling company to renew the lease for an additional five-year period, or even indefinitely. In addition, the lease may grant the company the right to sell or assign the lease to other companies (DEC 2003b). Once a company drills a productive well, the lease extends until the end of the well’s production, usually about 10-15 years (Crane 2003). In some cases, the lease may extend past the productive life of the well. Companies occasionally include a clause allowing underground gas storage in the empty reservoir in return for an annual rental payment. Gas storage could extend the life of the lease indefinitely (DEC 2003b).

The standard contract offered by drilling companies reserves for them the authority to determine the location of pipelines, wells, and access roads. This is the case with the sample contract in the Appendix. However, negotiated contracts may vary. Contracts may state that: 1) the company determines the location; 2) the company

determines the location, and the landowner may review the company's decision; or 3) that the landowner and the company must both agree to the location.

Some contracts also include a provision allowing the landowner to have free natural gas for heating and other uses provided to their home if a productive well is drilled on their property. However, the landowner is responsible for the installation cost, and all maintenance of the pipe to their home.

3. Method of estimating royalty payments

a. Public land contracts

(1). Federal Land

The Minerals Management Service of the DOI collects annual rent and royalty fees from all leases. Annual rental rates for both competitive and noncompetitive leases are \$1.50 per acre, or a fraction thereof, for the first five years of the lease, and \$2.00 per acre after the fifth year. Royalties on production equal 12.5% (USFS 2001a). In other words, 87.5% of the revenue from drilling accrues to the drilling companies, and 12.5% is divided between federal, state and local governments.

If the natural gas resources in the FLNF were fully developed, the USFS estimates that \$3.2 to \$11.7 million in gross receipts would be produced annually over a 25-year production cycle. According to the revenue sharing formula, the Federal government (General Treasury and USFS), and any state and local entities involved would then jointly receive between \$0.4 and \$1.4 million per year. This revenue would be divided according to a contract authored by the BLM. No revenue would accrue directly to the FLNF.

(2). State Land

In the case of state land, rental fees and the 12.5% share of drilling royalties are deposited into the General Fund for State Reforestation and Multiple Use Areas, the Conservation Fund for Wildlife Management Areas, and to any other appropriate state agency through a DEC exchange account. Typically, New York generates between \$150,000 and \$400,000 per year from natural gas drilling revenues, although in 1999, a competitive lease sale for state land generated \$3 million dollars in bids (DEC 2003c).

b. Private land contracts

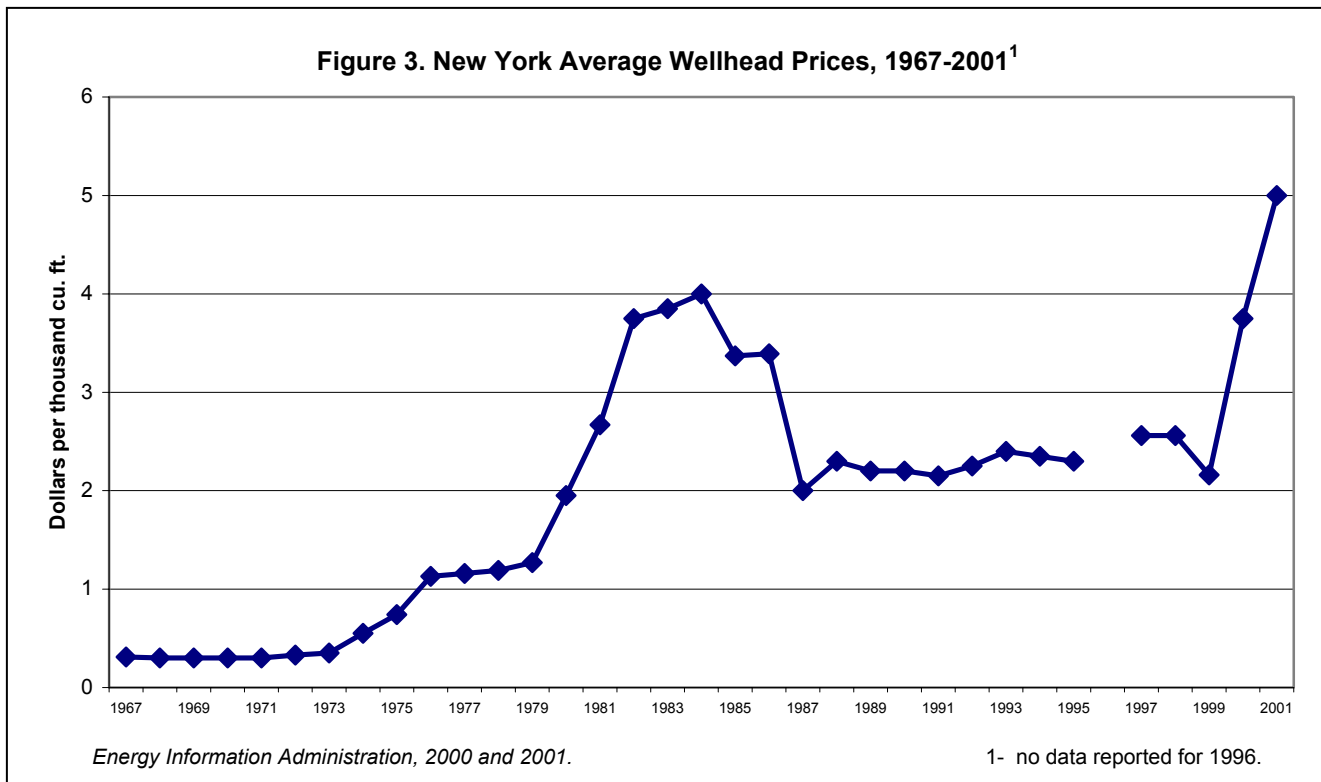
The landowner share of total royalties is the same for private or public leases (12.5%). Royalties are divided by the percentage of land owned by an individual within a unit. For example, a landowner with a 64-acre property located within a 640-acre unit would be entitled to 10% of the landowner share of royalties generated from anywhere within the unit. Landowners also receive rental fees. Typically, these approximate \$25 per acre for the first year of the contract, and \$5 per acre for the second through fifth years of the contract. All revenue from privately owned lands reserved by municipal, state or federal governments for road right-of-way accrues to the private landowner.

c. Wellhead Price: Basis for Royalties

In accordance with New York law, drilling companies must monitor and report the amount of gas produced for each well, so that landowners receive an accurate share of royalties. Royalty payments are based on the wellhead price the company receives for the gas. Average New York wellhead prices for the past three decades are shown in **Figure 3**. The individual wellhead price used to calculate a landowner's royalty payment often follows the average New York trend, but not always.

Individual wellhead prices vary depending on how a drilling company decides to sell the gas. The company can sell the gas either by contract or on the spot market. Contracts are negotiated as a fixed price for a fixed period of time. The spot market is based on regional supply and demand, and varies daily. A company may sell all of its gas by contract or all in the spot market, but usually sells gas through some combination of the two sales methods (Glenn 2003).

The marketing division of a drilling company responds to supply and demand when making sales decisions. In other words, the company often does not know in advance how much gas they will sell by contract vs. on the spot market. Multiple spot markets exist, with varying prices. Spot prices are published in the *Wall Street Journal*, and online on various commodity price websites.



As an example of a company’s decision-making, suppose that a company faces a current price of \$4 per 1000 cu. ft. If the company predicts that the price will fall in the future, they may try to fix the \$4 price into a contract. However, if they feel that prices are likely to rise, they may sell gas today in the spot market, and wait for prices to rise before entering into a contract. Or they may hedge their bets by contracting some amount of gas, and selling the remaining amount on the spot market.

Since a drilling company may choose to sell any amount of gas to any spot market, and may, in addition, enter into multiple contracts, a landowner has no practical way to monitor the wellhead prices they receive (short of daily visits to the marketing division of the drilling company). Therefore, when a landowner signs a leasing contract with a drilling company, they have to trust that the company is making sales decisions that maximize royalties.

Marketing divisions, of course, are fallible, and the market may not always follow the best predictions. However, drilling companies have a strong incentive to maximize royalties, since they receive 87.5% of all royalties. The wellhead price is used to determine the total royalties, so the company's profit and the landowner's profit are equally dependent on the wellhead price for which the gas sells.

Because companies make individual sales decisions, two next-door neighbors contracted with different companies could conceivably receive different wellhead prices. In addition, two landowners selling to the same company in different regions of New York could also receive different wellhead prices (Glenn 2003).

During periods of high supply and low prices, companies may choose to stop production at some wells. The companies' rationale is that selling the gas at a later point, when supply has decreased, will bring a higher price. While the well is not producing, the landowner may receive a "shut in" royalty payment, usually a set figure agreed to in the lease. As more and more companies decrease production, and other factors (i.e. season) change, supply eventually decreases, prices rise, and the companies open the closed wells for production again.

CHAPTER III. EXPERIENCE ON PRIVATE AND PUBLIC LANDS

A. Public Land

1. Bureau of Land Management/U.S. Forest Service: Stakeholder Perspective

As a federal agency, BLM has a national perspective on natural gas drilling on public lands. Therefore, BLM policies with regard to drilling reflect macro-level policy goals. To some extent, BLM must consider each drilling situation on an individual basis to be in compliance with NEPA, but BLM's main agenda is to achieve macro-level policy goals. Since BLM is a federal agency, these policy goals are strongly influenced by the president.

At the macro-level, the U.S. demand for energy, especially in the form of natural gas, increases every year. Natural gas has been promoted as a cleaner alternative to oil and coal, and as a result, residential and commercial demand for gas is growing, and “nearly all the electric plants built since 1998 are designed to be fired mainly by natural gas (Romero 2003).” Fear that supplies of natural gas will not match the growing demand has raised macroeconomic concerns. Alan Greenspan, Chairman of the Federal Reserve, stated in a June 2003 speech to the House Energy and Commerce Committee,

“Today's tight natural gas markets have been a long time in coming, and futures prices suggest that we are not apt to return to earlier periods of relative abundance and low prices anytime soon. And I have no doubt that if it continues and we stay at these very elevated prices, we're going to see some erosion in a number of macroeconomic variables (NPR 2003).”

Increasing supply could be accomplished by increasing the amount of domestic and/or imported natural gas. However, Canada, by far the largest import supplier to the United States, has been reducing its exports as demand grows at home (Romero 2003). Alaska has a rich supply of natural gas, but the Department of Energy (DOE) estimates that constructing a gas pipeline between Alaska and the continental United States would take approximately two decades. Natural gas could also be imported by ship in a liquefied form, yet only a few ports are equipped with terminals to process liquefied natural gas. Building new terminals is expensive and a very unpopular proposition in coastal areas (Romero 2003). Also, many exporters of liquefied natural gas, e.g. Nigeria, Algeria, and Venezuela, tend to be politically unstable, and could cause price fluctuations if supply were interrupted.

Therefore, the Bush Administration is focused mainly on domestic natural gas production. President Bush's 2001 National Energy Policy Report recommends that the Secretary of the Interior increase oil and natural gas development on federal lands.

The USFS has strong incentives to favor drilling on public land as well, since they are also influenced by presidential policy goals, and are committed to the concept of multiple use land management (as mandated by the *Multiple Use Sustained Yield Act of 1960*). Further, the USFS is a sub-agency of the U.S. Department of Agriculture. The USDA has an interest in keeping natural gas prices low and supplies abundant, since natural gas is used in making many fertilizers. High natural gas prices hurt the fertilizer industry and raise input prices for farmers (Romero 2003).

2. Conservation Groups: Stakeholder Perspective

Many conservation groups oppose natural gas drilling on public lands (Elmer 2001, Levendosky 2002). These conservation groups feel that to ensure U.S. energy security, the Administration should invest in and/or regulate: 1) improved energy efficiency technologies (e.g. fuel efficiency standards for automobiles); 2) energy conservation measures; and 3) renewable energy (e.g. wind and solar power). Drilling opponents also note that the amount of fossil fuels extractable from federal lands can only meet a small fraction of the nation's long-term energy needs (Elmer 2001). Therefore, opponents feel that the cost of environmental degradation to these areas vastly outweighs the benefits of extracting the limited amount of fossil fuels available. Whether or not the fuel is extracted, the nation will remain dependent on foreign supplies of fossil fuel.

3. Finger Lakes National Forest: Stakeholder Perspective

Potential natural gas drilling is only one of many diverse land uses for which the FLNF has responsibility. The FLNF is accountable both to local citizens and to the USFS. As they plan for the future, FLNF employees must weigh these groups' opinions, as well as the benefits and costs of drilling. The benefits from gas drilling are primarily landowner royalty payments, and the costs are the soil erosion, recreation, noise and aesthetic impacts, and added land management responsibility. The FLNF would bear these costs of drilling, but would not share in the benefit of federal government royalty

payments. The FLNF and local citizens might have more incentive to support drilling if the FLNF received a direct share of the royalty payments, since this money could be invested in improving or expanding the Forest.

4. 2001 Environmental Impact Statement

In 1998, two natural gas drilling companies submitted a proposal to lease the FLNF's mineral rights. In addition, the 2001 National Energy Policy Report included a DOI plan to lease the drilling rights on about 13,000 acres of FLNF land (81 percent) to private companies (Perez-Pena 2001). "As many as 32 wells, each encircled by three acres of temporary clearing and linked to pipeline and newly paved roads, could be sunk (Dobbin 2001)." To evaluate the proposal to allow natural gas drilling in the Forest, a programmatic EIS was prepared in accordance with NEPA.

Public controversy about the proposal became heated almost immediately. The Finger Lakes Forest Watch Congress (FLFWC), a local citizen group, spearheaded local outcry over the proposed drilling. Opponents of the plan felt that drilling would impact wildlife habitat, pollute surface water, negatively impact tourism at local wineries, and degrade the recreational value and aesthetic quality of the Forest (Dobbin 2001). Opponents noted that the energy yield from the project – equivalent to 91 days of power from the Oswego power plant – did not justify the negative impacts (Elmer 2001). In addition, opponents felt that royalty payments were unequally distributed.

The project attracted state and national attention as well. In July 2001, Governor George Pataki issued a statement opposing the proposal, and Senators Hillary Rodham Clinton, D-N.Y., and Charles Schumer, D-N.Y., successfully sponsored legislation to ban exploring or drilling for oil and gas in the FLNF during fiscal year 2002 (Ferguson 2001).

The USFS issued a Final EIS and a Record of Decision (ROD) in December 2001. The USFS chose the no action alternative, which allows no leasing of mineral rights in the FLNF for the foreseeable future (USFS 2001b). According to the Forest Service, the decision to choose the no action alternative was:

“... based entirely on public input, comments made on the Draft EIS, and is not based on environmental effects. The Final EIS shows that the environmental effects of oil and gas leasing on the Finger Lakes National Forest would be minimal especially when various measures are taken to mitigate potential environmental harm (2001).”

In spite of their support for multiple use land management, the Forest Service decided that recreation and natural gas drilling could not occur simultaneously. The ROD also noted that “the vast majority of those responding to the Draft EIS were strongly against any leasing” . . . “many concerns were expressed regarding a ‘value of place,’ speaking in particular to social, personal and economic values attributed to the Finger Lakes National Forest (2001b).”

5. Forest Plan

The 1987 FLNF Forest Plan made lands within the FLNF available for oil and gas leasing, subject to BLM approval. According to the USFS, the public has expressed interest in revising the oil and gas availability decision in the 1987 Forest Plan (USFS 2002).

The FLNF is currently updating their Forest Plan. During this planning process, the Forest Service must decide whether land within the FLNF will remain available for oil and gas exploration, subject to environmental approval, as in the 1987 plan, or whether to remove the land from availability altogether. FLNF staff estimate that the new plan will be completed in 2005 (Dockry 2002).

B. State Land

DEC currently administers 83 leases on 58,800 acres in Allegany, Cattaraugus, Chautauqua, Erie, Ontario, Chemung, Schuyler, Steuben and Yates Counties. On March 27, 2003, DEC conducted an oil and gas lease sale for an additional 26,000 acres of state lands in Steuben and Schuyler Counties. This sale included land in Sugar Hill, Texas Hollow, and Cinnamon Lake State Forests. Specifically identified acreage within the forests has been excluded from the sale because of its importance to recreation, environmental quality or cultural resources (DEC 2003c).

Horseback riders, snowmobilers and hikers populate the trails in the three state forests. However, unlike the Forest Service, DEC has experienced little opposition to the sale. Possibly the lack of opposition is related to different expectations for state and national forests in New York. State forests have been actively managed as a source of revenue since their inception, whereas the FLNF has a stronger focus on recreation and

returning the land to a more pristine condition. Further, state lands directly benefit from drilling since revenues accrue to the General Fund for State Reforestation and Multiple Use Areas and the Conservation Fund for Wildlife Management Areas.

C. Private Land

Approximately half a million acres of land have been leased in Seneca and Schuyler Counties. When approached, the majority of landowners in the region have agreed to lease. Drilling companies, which have created some jobs in contracting and pipeline operation and brought money into the local economy through royalty and land rental payments, have faced little opposition. If natural gas prices remain high and demand for gas continues to grow, as predicted, drilling in the region will likely increase.

The average experience of a landowner leasing their mineral varies greatly. Some landowners may collect a very small amount of money, while others may collect as much as several thousand dollars a month. The amount of money a landowner receives depends on whether or not productive wells are drilled, and how much land within a productive unit belongs to the individual owner.

Agriculture, and therefore land-based income, is a primary economic base for Seneca and Schuyler Counties. For the Counties' residents, taking full advantage of land-based revenue sources is important. Royalty payments from gas drilling help some landowners pay mortgages, property taxes, or other expenses. In one local example, a third generation farmer, struggling to remain profitable, leased his land for gas drilling and was lucky in that he owned the majority of a highly productive 640-acre unit. The farmer was able to use the gas royalties to secure the future of his farm (Crane 2003).

However, because of the many uncertainties in drilling – the amount of gas present, how long a well will produce, and fluctuations in wellhead prices and demand – many landowners never receive a single royalty check, receive checks for a short time, or receive checks intermittently in an unpredictable cycle. As landowner Jennifer Howe stated in an *Ithaca Journal* interview, “It’s basically a business deal. You get what you can out of it and you run with it (Bonisteel 2001).”

Perhaps the most controversial aspect of the drilling process for landowners is that leases vary, and landowners may not have full information when signing. A landowner

has the option of hiring an attorney to review the lease before signing; DEC as well as several landowners interviewed for this study recommended using an attorney. Landowners can also obtain information on lease terms from their regional DEC offices.

Many lease terms are standard and difficult to negotiate, such as the 12.5% landowner share of royalties. However, many important lease terms are negotiable, depending on the stipulations landowners seek, and how interested the company is in acquiring the land in question. Some of the negotiable terms include: 1) whether the company retains the option to renew or sell the lease; 2) whether the lease includes provisions for a residential gas line; and 3) whether underground gas storage occurs when well production ends.

The landowner could also negotiate for the company to provide fences or other safeguards if necessary to protect people or livestock. Terms can be included in the lease that make the drilling company responsible for any damage to crops, livestock, buildings and other personal property resulting from natural gas extraction (DEC 2003b).

The construction and reclamation processes are other areas in which landowners may benefit by having input. DEC's involvement in both construction and reclamation is limited to enforcing water quality and mining safety laws. The landowner may wish to include specific provisions that construction workers take steps to minimize soil erosion and compaction (compaction inhibits regrowth and increases runoff). For example, runoff control devices can be constructed on access roads. Also, landowners could specify that topsoil be replaced during reclamation. If not specified in the contract, topsoil may or may not be replaced, since preserving and redistributing topsoil is an extra cost for a contractor. In some cases, instead of replacement, contractors will sell topsoil removed from a construction site to a landscaping company.

Landowners should also consider the issue of access roads before signing a lease. Drilling companies do not include the removal of access roads as part of the standard reclamation process. A landowner on a large property may welcome a new permanent access road, which could facilitate building a second residence or the sale of lots. However, if a landowner wishes the access road to be removed, and the land to be restored to its original condition, this must be stated explicitly in the lease.

Location and siting of wells, pipelines, roads, and storage facilities can be the most difficult to negotiate, as discussed above on pages 18 and 19.

CHAPTER IV. CONCLUSION

The demand for natural gas, a cleaner-burning fossil fuel, will likely rise over the next decade among New York residential, commercial, industrial and electric utility consumers. As demand increases, drilling companies will have more incentive to lease mineral rights. On public land, stakeholder groups – BLM, USFS, the FLNF, and local citizens – will need to balance national energy policy objectives with environmental objectives. For private landowners, access to full information about the leasing process is a critical issue.

APPENDIX A

SAMPLE OIL AND GAS LEASE

OIL AND GAS LEASE

THIS LEASE, entered into this _____ day of _____, _____ by and between

_____, hereinafter referred to as LESSOR,

AND

Drilling company name and address

WITNESSETH:

RIGHTS GRANTED. That the LESSOR, for and in consideration of one dollar (\$1.00) and other good and valuable consideration in hand paid by LESSEE, the receipt of which is hereby acknowledged by LESSOR and the covenants and agreements hereinafter contained, does hereby lease and let the exclusive right necessary, convenient and incident to LESSEE for the purpose of exploring, drilling, and operating for producing and taking possession of the oil and natural gas, including casinghead gas, casinghead gasoline, condensate and other related hydro-carbons and all other products associated with the production therewith, hereinafter referred to collectively as "said product" and for the further purpose and with the exclusive right in the LESSEE, as it may see fit to store said product therein by pumping or otherwise introducing the same into any sand or sands, substrata or horizon in and under said land, and the right to remove the same by pumping or otherwise through any well or wells on said land or other lands together with the right to make surveys on this leasehold hereinafter referred to as "said land", lay pipelines, establish and utilize facilities for surface and subsurface disposal of production wastes, construct roads, set tanks, set or construct buildings and maintain same, and install equipment and appliances necessary or useful in LESSEE'S operations in exploring, drilling for, producing, treating, storing, and transporting said product produced from said land covered herein and other lands, regardless of the source or for introducing, storing or withdrawing gas from this land or other lands. The said land covered hereby is situated in the Township of _____, County of _____, State of _____ bounded and identified substantially as follows: Tax map # _____

Bounded to the North by land N/F of: _____

Bounded to the East by lands N/F of: _____

Bounded to the South by lands N/F of: _____

Bounded to the West by lands N/F of: _____

Containing _____ (_____) acres, more or less, and being further identified by TAX ASSESSMENT MAP # _____

TERM. It is agreed that lease shall remain in force for the term of _____ years hereinafter referred to as "primary term", from _____ and so long thereafter as the said land or any portion thereof is pooled, unitized or consolidated therewith as provided for hereinafter, while being operated by LESSEE in the search for or production of said product or as long as gas is being stored, held in storage, or withdrawn from the premises by the LESSEE.

DELAY RENTAL. This lease, however, shall become null and void and all rights of either party hereunder shall cease and terminate without declaration from LESSEE unless, within One Year from _____ the LESSEE, with due diligence commences to construct a well site on said land and upon completion thereof, does begin drilling operations or until any sand or sands under the leases premises is utilized for the storage of gas and rental for said storage becomes payable as hereinafter provided, or unless _____ for the first Dollars (\$_____) LESSEE shall hereinafter mail a delay rental check to LESSOR for _____ for the remaining Dollars (\$_____) per acre each year, payment to be delivered annually until commencement of drilling operations. Should during the primary term hereof, a well be drilled and is non-productive and is plugged according to law, then LESSEE may continue the primary term by commencing operations for drilling a subsequent well or by resuming the delay rental payments as agreed therein. In the event a non-productive well is plugged beyond the primary term hereof and no other production holds this lease in full force and effect, LESSOR agrees to extend the primary term one year beyond the completion of plugging operations to permit LESSEE to recomplete said well or commence operations for the drilling of another well. It is agreed that the cessation of production from wells on the leased premises or upon other land unitized therewith after the expiration of the original term, shall not terminate this lease whether the pooling units have been dissolved or not, if the land is used for the storage of gas prior to the plugging or abandonment of wells from which oil or gas has

been produced. It is understood that a well need not be drilled on the premises to permit the storage of gas, and it is agreed that the LESSEE shall be the sole judge as to whether gas is being stored within the leased premises and that its determination shall be final and conclusive.

ROYALTIES. As additional consideration for said land, LESSEE covenants and agrees to deliver to LESSOR one-eighth (1/8) of the gross proceeds as royalty payment for all of said product produced and marketed from said land. Payment for said product exclusive of natural gas shall be computed at the prevailing market rate of said product for like grade and gravity on the date said product is released into the purchaser's tanks or pipeline. Payment for natural gas shall be computed at the wellhead rate paid to LESSEE for such natural gas so marketed and used. Payments for said product shall be delivered to LESSOR by check mailed within thirty days after LESSEE receives payment for said product. LESSOR agrees that LESSEE may withhold monthly royalty payments accrued to LESSOR that does not total (\$10.00) dollars but must deliver any royalties in full regardless of amount when LESSEE drafts to its LESSORS their last annual monthly payment.

PAYMENT FOR STORAGE PRIVILEGES. In full compensation for the storage rights herein granted and in lieu of all delay rental or royalty due or to become due for the right to produce or for the production of oil or gas from the sands, strata, or horizons where gas may be stored as herein produced, LESSEE covenants and agrees to pay LESSOR, when no wells on said land are utilized for the storage of gas, an annual storage rental of _____ Dollars (\$_____), payable quarterly in advance, beginning at the next payment date after gas shall have been stored under the terms of this agreement and continuing until the leased premises shall no longer be used for storage purposes, or until wells on said land are utilized for the storage of gas, in which event LESSEE shall cease paying storage to LESSOR and pay in lieu thereof, a storage well rental or royalty of _____ Dollars (\$_____), per well quarterly in advance, as long as such well shall be so utilized; subject to the right of cancellation or surrender hereinafter provided. Any storage rental paid for time beyond the date of such utilization of a well yielding storage well rental or royalty shall be credited upon the first storage well rental

or royalty due upon the same. LESSEE agrees to give LESSOR written notice of the use of said land and any wells drilled thereon for the storage of gas.

SHUT-IN ROYALTIES. The LESSEE shall upon completion of the first productive well upon said land make diligent effort to obtain a pipeline connection, but any delay shall not be held as a violation of this lease by LESSEE provided LESSEE shall resume delay rental payments beginning one year from the date that the first productive well was completed and shall continue delivering such payments until said product is marketed. In the event said product is shut-in for any reason after initially producing from said land in paying quantities, LESSEE shall deliver shut-in royalty payments in the same amount as the delay rental payments as hereinbefore provided, beginning six months from the date said product is shut-in and shall continue such payments until production of said product is marketed again.

DIRECTION OF PAYMENT. All payments herein may be directed to the LESSOR or deposited to LESSOR'S credit, or to the credit of LESSOR'S respective heirs or assigns by check payable to the order and address of:

The LESSEE shall not be obligated to alter payments as directed above unless with written notice LESSOR or LESSOR'S heirs or assigns directs LESSEE otherwise. Irrespective of any provision of this lease indicating to the contrary, this lease shall not be terminated or forfeited for LESSEE'S failure to make timely and sufficient payment of any rental, royalty or shut-in royalty until LESSEE receives, by registered mail, written notice of such failure and shall have failed for a period of fourteen days after receipt of such notice to make the proper payment.

FREE GAS. The LESSOR excepts and reserves natural gas for fuel not to exceed 300,000 cubic feet per annum, while the pressure is adequate, for one dwelling on said land. LESSOR shall supply, lay and maintain the line leading from one well (except for wells used for storage) to one dwelling and furnish regulators and other necessary equipment at LESSOR'S expense. If the LESSOR shall take excess natural gas as aforesaid in any year and fails to pay for same, LESSEE may deduct payment for

such excess gas from any rentals or royalties accruing to LESSOR. LESSOR acknowledges that he has been advised as to the risk inherent in taking as in this manner and LESSOR agrees to assume all such risks caused by LESSOR'S line and equipment. LESSOR also agrees to hold LESSEE and or well operator and all parties of interest in any well on said land harmless of any claims of any nature whatsoever which may arise by the usage of said natural gas by LESSOR.

UTILIZATION. The LESSOR hereby grants to LESSEE the right at any time to consolidate, pool or unitize said land or any portion thereof with other lands in the general proximity; whether owned or leased by LESSEE or not to create a drilling or production unit, hereinafter referred to as "said unit" of no more than 640 acres or such larger unit as may be required to conform to the rules and regulations of any lawful governing authority having jurisdiction, for the purpose of drilling a well thereon. LESSEE shall immediately after the completion of a well, record a copy of its unit designation in the county wherein the said land is located and mail a copy to the LESSOR. LESSOR agrees to accept, in lieu of the one-eighth (1/8) royalty hereinbefore provided, that proportion of such one-eighth (1/8) royalty which the acreage to said land bears to the total number of acres comprising said unit and provides further that only the LESSOR of the said land on which such well is located within said unit may take gas for use as fuel in accordance with the provision hereinbefore provided. In the event, however, that only a portion of said land is included in said unit, then that proportionate part of the delay rental pertaining to the remaining acreage left out of said unit shall be delivered to LESSOR as hereinbefore provided so as to retain said land in its entirety beyond the primary term.

WARRANTY OF TITLE. The LESSOR hereby warrants and agrees to defend the title to said land and agrees that for the protection of the LESSEE'S interest herein, LESSEE at LESSEE'S option may pay and satisfy any adverse claims or liens existing, levied or assessed on or against the said land to become subrogated to the right of such lien holder or claimant and in the event LESSEE exercises such options, LESSEE may be reimbursed from any royalty or rentals accruing to LESSOR from said land herein. All payments of rental or royalties are to be made according to LESSOR'S respective interests therein, in accordance with the foregoing rental or royalty provision of this

lease. In case LESSOR owns a lesser interest in said land than the entire undivided fee simple estate therein, then the rentals and royalties herein provided for shall be delivered to LESSOR only in the proportion which LESSOR'S interest bears to the whole and undivided fee.

DIVISION OF INTEREST. The rights of LESSOR and LESSEE under this lease may be assigned or sold in whole or in part. No assignment or sale by LESSOR or change of division in ownership of said land, rentals or royalties however accomplished shall enlarge the obligation or liabilities or diminish the rights, powers, or privileges of the LESSEE. No such assignment, sale, change or division in ownership shall be binding upon LESSEE for any purpose until LESSEE is furnished with a certified copy of the recorded instrument of other legally authenticated written evidence of such assignment, sale, change or division. Should said land be owned in severalty or in separated tracts, the land shall nevertheless be developed and operated as one lease and all rentals or royalties accruing hereunder shall be treated as an entirety and shall be divided among and delivered to such separate owners in the proportion that the acreage owned by each separate owner bears to the entire said land.

OPERATING RIGHTS. No well shall be drilled within two hundred feet of any presently existing buildings on said land unless by the consent of both LESSOR and LESSEE. LESSEE may have the privileges of using from said land sufficient oil, gas and water that LESSEE deems necessary or useful in the drilling, producing, and transporting of said product. LESSEE shall bury, when so requested by the LESSOR, all pipeline used to conduct the transportation of said products on, through and off said land and to pay all damages for growing crops, buildings, fences and timber caused by operations as granted herein. All reclamation of well site, pipeline right of ways and other surface damages shall be completed, weather permitting, within one year of the start of production or the completion of plugging. Any damages if not mutually agreed upon, shall be ascertained and determined by three disinterested persons, one thereof to be appointed by the LESSOR, one by the LESSEE and the third by the two so appointed, and the award of such three persons shall be final and conclusive. Each party shall share equally in the cost of any appraisal or other costs incurred by these three persons in making their determination.

TITLE DISPUTE. If LESSOR'S title shall come into dispute or litigation, LESSEE may withhold, without the obligation to pay interest, any payment of rentals or royalties until final adjudication or settlement of such dispute or litigation, and this lease shall not terminate nor shall the rights of LESSEE be adversely affected during the period of such withholding.

FORCE MAJEURE. In the event the LESSEE is unable to perform any of the acts to be performed by the LESSEE, by reason of force majeure including but not limited to acts of God, strikes, riots, and governmental restrictions including but not limited to restriction on the use of roads, this lease shall nevertheless remain in full force and effect until the LESSEE can perform said act or acts and in no event shall this lease expire for a period of ninety (90) days after termination of any force majeure.

MOTHER HUBBARD. Notwithstanding the particular description of the said land hereinabove set forth, it is nevertheless the intention of the LESSOR to include within this lease and LESSOR does hereby lease, not only the land so described but also any and all land presently owned or claimed by LESSOR adjoining the herein said land up to the boundaries of the abutting landowners.

SURRENDER. The LESSEE may at any time surrender this lease as to all or any part of said land covered herein, by delivering or mailing a release to LESSOR, or by placing on record a release thereof in the county wherein said land is located and if the surrender pertains only to part of said land any delay rental payment or other acreage payment as herein specified shall be reduced proportionately.

ENTIRE CONTRACT. All covenants and conditions between the parties hereto shall extend to their heirs, personal representatives, successors and assigns. It is mutually agreed that this lease contains and expresses all of the agreements and understandings of the LESSOR and LESSEE in regard to the subject matter thereof, and no implied covenant, agreement or obligation shall be read into this agreement or imposed upon the LESSOR or LESSEE. It is also mutually acknowledged that the descriptive headings of the provisions of this agreement are used for convenience only and should not be deemed to affect the meaning of construction of any such provision. See addendum attached to and made part of this lease.

IN WITNESS WHEREOF, and intending to be legally bounded, the LESSOR has set its hand and seal the day and year first above written.

Signed and Sealed in the Presence of

Signature

Social Security No. or Fed. I.D.#

REFERENCES

A. Interviews

Arcangeli, Marge. Private Landowner, Burdett, NY, 14818. *Personal Interview*. 18 June 2003.

Crane, Charles. Land Lease Agent, East Resources Drilling Company. Allegheny, NY, 14706. *Personal Interview*. 18 and 20 June 2003.

Dockry, Michael. Forest Planner, USFS, Finger Lakes National Forest. Hector, NY, 14841. *Personal Interview*. November 2002.

Glenn, Bill. New York Department of Environmental Conservation (DEC), Region 8. Avon, NY, 14414. *Personal Interview*. 1 July 2003.

Peters, Carol. Private Landowner, Odessa, NY, 14869. *Personal Interview*. 15 July 2003.

Zimmer, Chris. Acting District Ranger, USFS, Finger Lakes National Forest. Hector, NY, 14841. *Personal Interview*. November 2002.

B. Publications and Websites

Bonisteel, Sara. "Landowners cash in on leasing gas wells. The Finger Lakes National Forest considers opening land to drilling." *Ithaca Journal*. 16 July 2001.

Dobbin, Ben. "Drilling Started on private land next to FLNF." *Ithaca Journal*. 28 July 2001. Online.

<http://www.ithacajournal.com/news/stories/20010728/localregional/820290.html>. Accessed November 2002.

Elmer, Fred. Conservation Chair, Sierra Club, Finger Lakes Group. "Sierra Club backs Alternative 4." *Ithaca Journal*. 21 July 2001. Online.

<http://www.ithacajournal.com/news/stories/20010721/opinion/797056/html>. Accessed November 2002.

Ferguson, Ellyn. "Senators propose drilling ban." *Ithaca Journal*. 20 July 2001. Online.

<http://www.ithacajournal.com/news/stories/20010720/topstories/794774.html>. Accessed November 2002.

Finger Lakes Forest Watch Congress (FLFWC). Online.

<http://www.rso.cornell.edu/snrc/flnf/> Accessed November 2002.

Finger Lakes National Forest. United States Forest Service. Online. http://www.fs.fed.us/r9/gmfl/new_york/fingerlakes/index.html. Accessed November 2002.

Kingsley, Jennifer. "Oil Drilling in Hector debate continues." *Ithaca Journal*. 1 April 2003.

National Public Radio (NPR). "Analysis: Testimony from Federal Reserve Chairman on Natural Gas Prices and Supply." 11 June 2003.

Natural Gas Supply Association (NGSA). "Overview of Natural Gas." Online. <http://www.naturalgas.org> Accessed March 2003.

New York Department of Environmental Conservation (DEC), Division of Lands and Forests, Bureau of Public Lands. "Index of State Lands." Online. <http://www.dec.state.ny.us/website/dlf/publands/stateforests/> Accessed July 2003a.

New York Department of Environmental Conservation (DEC), Division of Mineral Resources. "A Landowner's Guide to Oil and Gas Leasing." Online. <http://www.dec.state.ny.us/webs.PDF> Accessed July 2003b.

New York Department of Environmental Conservation (DEC), Division of Mineral Resources. "An Investigation of Naturally Occurring Radioactive Materials (NORM) in Oil and Gas Wells in New York State: Executive Summary." April 1999. Online. <http://www.dec.state.ny.us/website/dsh/hazrad/norm.htm> Accessed July 2003.

New York Department of Environmental Conservation (DEC), Division of Mineral Resources. "Minerals, Oil and Gas Leasing Program." Online. http://www.dec.state.ny.us/website/dmn/leasing_index.html. Accessed July 2003c.

Perez-Pena, Richard. "Pataki Objects to U.S. Plan for Drilling in Finger Lakes." *New York Times*. 19 July 2001. Online. <http://www.nytimes.com/2001/07/19/nyregion/19DRIL.html>. Accessed November 2002.

Romero, Simon. "Short Supply of Natural Gas Raises Economic Worries." *New York Times*. 16 June 2003.

Schuyler County Chamber of Commerce. "Schuyler County and Watkins Glen, NY: Demographic Profile." Online. <http://www.schuylerny.com/demog.html> Accessed March 2003.

U.S. Census Bureau. "Quick Tables." 2000. Online. <http://www.census.gov> Accessed March 2003.

U.S. Department of Agriculture, U.S. Forest Service (USFS). *Implementing the FLNF Land and Resource Management Plan: A 15-Year Retrospective*. Hector, NY. June 2002.

U.S. Department of Agriculture, U.S. Forest Service (USFS). *Draft Environmental Impact Statement, Finger Lakes National Forest Oil and Gas Leasing*. May 2001a. Online. http://www.fs.fed.us/r9/gmfl/Oil_Gas/Oil_Gas.html. Accessed November 2002.

U.S. Department of Agriculture, Forest Service. Record of Decision, Finger Lakes National Forest Oil and Gas Leasing. December 2001b. Online. http://www.fs.fed.us/r9/gmfl/Oil_Gas/FLNF_Oil_and_Gas_ROD.pdf Accessed November 2002.

U.S. Department of Energy, Energy Information Administration. Caruso, Guy. "Natural Gas Prices and Supplies in the Northeast-Midwest Region." April 2003a. Online. <http://www.eia.doe.gov> Accessed June 2003a.

U.S. Department of Energy, Energy Information Administration. "Natural Gas." Online. <http://www.eia.doe.gov> Accessed June 2003b.

U.S. Department of Energy, Energy Information Administration. "2001 Natural Gas Quick Stats." 2001. Online. <http://www.eia.doe.gov> Accessed June 2003.

U.S. Department of Energy, Energy Information Administration. "Historical Natural Gas Annual." 2000. Online. <http://www.eia.doe.gov> Accessed June 2003.