Understanding and Managing Natural Gas Development on your Property

A program for farmers and landowners

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What is Cornell Cooperative Extension and What is its Role in Natural Gas Development?

- Outreach arm of the Cornell University
- Brings applied research from Cornell to communities
- Bring the problems of communities to Cornell for research
- Helping communities prepare to make the most of the pros and to mitigate the cons of shale gas development
Program Outline

1. New York Shale Gas Development Basics
2. Some Problems Associated with Shale Gas Development
3. New York Ag and Markets Ag Land Recommendations
4. Leasing Considerations
5. Some Other Considerations for Landowners
Why is Shale Gas a Big Deal?

• Each acre of the Marcellus contains about $30,000 dollars worth of producible gas. This is why companies can offer leases of a few thousand dollars per acre.

• A Marcellus well taping 80 acres will yield the energy equivalent of 3 million gallons of gasoline.

• The Marcellus gas resource is the same size as the oil and gas resource of the North Sea. The ultimately producible resource is expected to be 500 trillion cubic feet which is equivalent to 83 billion barrels of oil. The North Sea reserve is 98 billion barrels of oil equivalent. The economic impact of North Sea oil on the economies of Norway and England provides some measure of the potential impact of the Marcellus gas resource on our area.

• The Marcellus could sustain current US gas consumption (23 tcf/yr) for 21 years. Gas supplies about 1/3rd of the total US energy, oil ~1/3rd, and coal 1/3rd.

• The Marcellus could reduce our oil imports by $170 billion per year for 50 years. The yearly energy harvest would be the equivalent of 1.7 billion barrels of oil each year. If this were used to replace oil in our heavy vehicle (trucks) fleet, at $100 per barrel, the savings would be $170 billion per year.

The Marcellus is just one of many gas deposits in New York

Figures from L.M. Cathles Cornell Department of Earth and Science
Why is Shale Gas a Big Deal?

- Recent NY Times article describes natural gas as perhaps our best current energy option
- Natural gas is a clean fuel—no acid rain, no particulates, no smog
- Potentially smaller greenhouse impact (if methane leakage is controlled)
- Low cost, domestically produced fuel
- Large amount of job creation
- Can create great wealth for farmers and other landowners (many, many, many millionaires)
- New York State a huge landowner in this region
- Billions in tax revenue to New York State Governments
Just exactly what is natural gas?

- Mostly methane - CH4
- Odorless, colorless, tasteless
- Methane is non-toxic (you have it in your body every day)
- Lighter than air
- Formed by decaying organic matter (swamp, ocean, your gut)
- Common component of well water
There are multiple gas formations throughout much of upstate NY

- Marcellus is currently focus of development in Pennsylvania
- Utica may be more important in New York
- Many other New York formations as well
Marcellus Shale Gas Fairway

Subsurface Marcellus Shale at reasonable reservoir depths

Marcellus Shale Gas Potential

Marcellus Shale high probability fairway

Courtesy of Bruce Selleck
Colgate Department of Geology
Utica Shale Gas Fairway

Subsurface Utica Shale at reasonable reservoir depths

Utica Shale high probability fairway

Courtesy of Bruce Selleck
Colgate Department of Geology
High Probability Utica and Marcellus Fairways

Utica, Herkimer and Marcellus high probability fairways

Courtesy of Bruce Selleck
Colgate Department of Geology
What has happened to date in NY?

- First gas well in the country was dug in 1821 near Fredonia, NY.
- Tens of thousands of gas wells drilled in NYS since then (few in shale) - mostly in western NY
- Most gas wells in NY since 1950s have been hydraulically fractured with low volumes (less than 80,000 gallons) of fracturing fluid
- Hundreds of millions of gallons of fracturing fluid have been used in the state over the decades
- Horizontal drilling in Trenton and Black River, and Herkimer formations in the 2000s brings sporadic drilling to the Southern Tier.
- Some Drilling Companies are giving up on their leases in New York.
Vertical Well Structure

- Layers of steel casing and cement
- Largest diameter first, next drilled inside that, etc.
- More layers in first few hundred feet
- Process the same in both vertical and horizontal wells
How is Marcellus Shale Different Than Previous Gas Development in NY?

- Accessing a large formation, not a pocket of natural gas
- Length of well increases because of horizontal drilling
- For gas to flow, requires fracturing with large volumes of high-pressure water = **hydrofracking**
- Takes longer, requires more people, more resources
- Permitting process being updated
Marcellus Shale has numerous vertical fractures from repeated mountain-building events on the east coast. The purpose of hydrofracking is to pry open these fractures and hold them open with sand.

Around the Marcellus, other rock units can contain brine (ancient salt water), which have high concentrations of dissolved solids, sometimes containing radium and other naturally occurring radio active materials.
• 3-5 million gallons of water, sand and chemicals forced into cracks
• Some water comes back out with chemicals, salt and sometimes some radioactive material
Shale Gas is Pretty Much Everywhere in the Regions Where it Occurs

- Map of British Columbia Wells
- Shows that the shale gas is typically pretty much everywhere
- If gas is under your neighbor it is probably under you.
What has happened to date in NY?

- December 2010 – Governor Paterson signs executive order that suspends large-volume hydraulic fracturing pending SGEIS.
- SGEIS expected by Summer, 2011.
- Many leases are currently expiring, but some companies are trying to extend leases through “force majeure” clauses that cite “government restrictions”
- Some companies have given up on New York and are letting their leases here expire
View of NY & PA Residents in the Marcellus Shale Region

“Considering everything, how do you feel about natural gas extraction from the Marcellus Shale region?”

• Both NY and PA residents were more likely to support than to oppose development

• But sizable percentages neither support nor oppose indicating that many residents were undecided
Views, cont.

• Neither NY nor PA residents felt that they had much first-hand knowledge about the potential impacts.

• Frequently respondents were “neutral” when asked statements about possible risks & benefits.

• 70% respondents reported some or great deal of trust in scientists and researchers.

• Findings suggest need for continued information and education.
Local Officials/Task Forces
Mitigation, Monitoring, Minimizing, Maximizing

• View activity as part of long-term comprehensive plan
• Coordinate information among all parties though task force
• Pay attention to well and rig locations; company statements; trends
• Pay close attention to local stats
• Educate the public on what is known
• Train local businesses to take advantage of industry, but plan for the future
• Train local workers for the long-term jobs or transferable skills
• Gov. can invest in long-term solutions that help short term (economic dev.; infrastructure; growth planning; coordination; education)
Municipalities to consider/prepare for

- Growth Management
- Increased pressure on emergency services
- Opportunities for job creation (and competition)
- Impacts on real estate and property tax revenue
- Opportunities for existing and new businesses
- Economic two-sided coin (high wages but also increases in cost of living)
- Impacts on Non-Gas Field Businesses and Residents
- “Boom and Bust” Cycle
Water Well Contamination

- Most likely source of contamination is through surface spills and initial drilling through the aquifer; not hydraulic fracturing.
- Hydraulic fracturing can shake wells, releasing sediment for 2-3 days; not ‘contamination’.
- Problems have been primarily methane gas and suspended sediment (neither are toxic).
- Properly installed, intact well casing will prevent most occurrences.
- Leaks are rare but will happen.
- Natural gas leaks are non-toxic but can yield damage (such as in Dimock, PA).

Photo: Sediment in water well in Dimock, PA (Tim Shaffer / Reuters)
Economic Cons

- Higher cost of workers
- Competition for resources
- Higher cost of living
- Less appealing living environment
- Competition for permitting and other government services
- Long-Term energy boom economies tend to bust
Social Cons

- Haves versus have-nots, neighbor vs. neighbor
- Incredibly high housing costs for some - homelessness
- Bad traffic
- Rapid community change
- Higher emergency service demand
- Aesthetic impacts on the landscape
When will shale gas drilling happen in NY?

No one can say for sure, there are some important things to keep in mind...
Managing Natural Gas Development on your Property

- You can and should manage natural gas development on the surface of your property
- The standard lease will not provide adequate protection of your property
- Very little protection in regulations for agricultural resources
- Addendums to the lease are your only certain protection
- If you rent Ag land, you may need to get those from whom you rent land to sign leases with ag protection
New York State Department of Ag & Markets

Guidelines for Protection of Agricultural Resources at gas well drilling sites

- Sighting of access roads and well pads
- Construction
- Remediation
- Monitoring
Ag & Markets Sighting

Recommendations

- Locate Access Roads and well pads along field edges and in non agricultural areas where possible.
- Locate Access Roads along ridge tops and follow field contours where possible.
- Permanent width of Roads should be no more than 16 feet.
- Existing drainage and erosion control structures should be avoided.
• Topsoil and subsoil graded from the drill site should not block drainage;
• Provisions for drainage tile repair should be included in the easement agreement;
• Materials from brine pits should be removed from agricultural areas;
• Brine pits should be covered with several feet of subsoil and the original depth of topsoil;
• Drilling mud should be hauled off site, not mixed with topsoil
• Topsoil must be stripped from well pads and areas used for vehicles and equipment
• Topsoil must be stockpiled separately from other material
• Access roads constructed through agricultural fields should be level with adjacent field surface
• Culverts and ditches should be installed along access roads to maintain natural drainage pattern
Ag & Markets Restoration Guidelines

- All disturbed agricultural areas must be de-compacted to a dept of 18 inches
- Topsoil is replaced
- All rocks 4 inches and larger must be removed from soil surface prior to reseeding
- All access roads must be re-graded level with adjacent fields
Ag & Markets Restoration Guidelines

- All agricultural areas reseeded to the specifications of the landowner
- All surface and subsurface drainage structures must be repaired
- All construction debris must be removed from the site
New York Ag and Markets Guidelines for Monitoring Drilling and Pipeline Restoration

- The project sponsor needs to monitor agricultural areas for two years following restoration.

- Monitoring should include topsoil thickness, stone content, crop production and drainage.
Water Well Testing

*Not a do-it yourself activity!*

- Sample collection/testing **needs to be done by 3rd party, NYS DOH certified lab**
- dSGEIS proposed drilling company responsible for testing domestic water wells w/in 1000 ft of proposed gas well (2000 ft radius if no well w/in 1000 ft)
  - Test before drilling, every 3 mo. after start, and 1 yr after last activity
  - Results go to driller, homeowner, and health dept.
- Find labs at [http://www.wadsworth.org/labcert/elap/comm.html](http://www.wadsworth.org/labcert/elap/comm.html)
A Few Major Highlights of the draft SGEIS

Well Contamination:

• DEC Inspector must be on site during casing process

• Domestic Well Testing within 1000 feet of well before and for 1 year after last activity. 2000 feet if no well within 1000 feet.

• Well Testing Results shared to well owner, State and County Health Dept.
Landowners may be approached for other leases

- Pipeline and utility ROW’s
- Water storage ponds
- Compressor stations
- Gas storage

- Wind farms
- Access roads
- Seismic studies
- Property rentals
Leasing Considerations

• *Contact an Attorney familiar with gas leases!*
• You can change the “Standard Lease”
• You can:
  – Determine locations of wells, pipelines, roads
  – Require closed-loop drilling practices
  – Require setbacks from buildings
  – Require before/after water testing
  – Reclamation/forestry practices to your specifications
  – Require no surface occupancy, or limited occupancy
  – Require liability for all pollution or clean-up
  – Require no gas or equipment storage on your land
  – Require natural gas allotment as compensation
  – Require nontoxic fracking fluid???
Leasing Considerations

- Per-Acre lease payment *may not be* most important consideration
- Royalty will dwarf lease payment if drilling is successful
- If drilling occurs, lease becomes “forever”
- Landowner coalitions can provide advice and leverage when dealing with companies
Regardless of the type of lease...

Leasing is a "seller beware" transaction where the landowner is usually the less knowledgeable party, and consequently at a disadvantage.
So Why Lease?

• Landowners in New York own both the surface and subsurface rights to their properties, unless they have transferred these rights to another party through a lease, easement or conveyance (sale).

• A well-executed lease serves as an operating agreement between two parties to achieve the goals of each.

• As with any important business transaction, you should fully understand the terms of the agreement and research the market before signing!
Tips to Level the Playing Field
1. Join (or form) a Coalition

- “Strength in numbers”
- Promote common interests
- Collective marketing
- Shared expenses and resources (consultant)
- Educational forum, shared experience and knowledge
- Long-term leverage
2. Start with a Sound Lease

• Have the lease reviewed by a qualified attorney to make sure it addresses your own unique situation

• Be patient and persistent if requested terms are initially declined

• Know ahead of time what you’ll concede, and how it may affect you down the road
3. Use a Qualified Consultant

- The lease is only as good as its execution!
- Include a clause in the lease to empower a qualified agent (consulting foresters, engineers, agronomists) to oversee your interests
- Include terms for compliance and personal protection (performance bonds, proper certificates of insurance)

The DEC and NYS Ag and Markets will oversee some aspects of natural gas development, but there are still important gaps that can be covered by the landowner’s authorized agent.
4. Put it in Writing!!!!!!

- Define scope of work and completion dates
- Reasonable (and enforceable) penalties for non-compliance
- Long-term compensation for long-term impacts (royalties, rental payments, expiration or reversion clauses)
5. Confirm Lease Expiration

- Request “Letter of Surrender” 30 days after expiration date under NYS General Obligations Law
- Don’t cash checks if you don’t know what they’re for
- Keep lease terms short, with no renewal clause

Detailed steps to confirm lease expiration: www.tiogagaslease.org
What Happens if I Don’t Lease?

Perhaps nothing, but…

- Individual landowners could have certain rights taken from them through processes known as “compulsory integration” (for gas production), or “eminent domain” (other projects)

- Landowner would be compensated under the purview of the regulatory agency (FERC, PSC, DEC)

Landowner solidarity will improve bargaining position!
Compulsory Integration

- Shale gas “spacing units” can be 36 to 640 acres depending on drilling technique

- If >60% of the spacing unit is leased, your property can be forced into compulsory integration

- Hearing process, you will be involved

- There will be no surface occupancy, but they can drill under your property

- No signing bonus, but you will get a royalty
Can natural gas help you get a conservation easement on your farm?

- Most conservation easements do allow for gas drilling
- In Pennsylvania conserved farmland has increased dramatically with natural gas development
- Ag and Farmland Protection Boards provide local information
- New York American Farmland Trust good source for general conservation easement info.
Three Current Natural Gas Financial Issues from Cornell’s Joe Bennett and Jim Leonard

- All gas lease payments are reportable income
- Purchasing farm equipment will not typically offset gas income as it often does with other forms of income. Farmers are encouraged to speak to a private tax consultant before they make purchases.
- Tax exempt social clubs (501 C7s) like rod & gun clubs, lake associations, private golf clubs will likely lose their tax-exempt status if they sign leases. Clubs that are contemplating signing a gas lease should consult with a qualified professional before signing.
naturalgas.cce.cornell.edu

NYS Water Resources Institute
wri.eas.cornell.edu

www.museumoftheearth.org/outreach