

**Oil and Gas Report
Finger Lakes National Forest Plan
Revision**

**Lucille Tamm
Geologist
BLM Milwaukee Field Office
November 2003**

Nature and extent of previous exploration and development activities in the Finger Lakes Area

Successful oil and gas exploration depends on knowledge of the geologic history of a region. Deposition of sediments (stratigraphy), movements of the earth (tectonics), and structures preserved in the rocks dictate where petroleum may be trapped and accumulate in economic quantities. Petroleum is found in places where there is a hydrocarbon source (rocks such as shales or carbonates), a place within the rocks where the hydrocarbon can accumulate (a reservoir, typically sandstones or carbonates) and a mechanism for keeping the hydrocarbon confined within the reservoir (a trap).

Portions of central Seneca and Cayuga counties (the Auburn and Fayette-Waterloo gas fields) have produced natural gas since the early 1960's from shallow reservoirs (2000-3000 feet deep) in the Queenston formation, but the structure and stratigraphy in the immediate area of the Finger Lakes National Forest was not considered favorable for production. Of the 140 wells with some production in Seneca County in 1997, 135 of them are gas wells in the Fayette-Waterloo Field. The remaining wells are one-well gas pools called the Neilson Road Pool, Reeder Creek Field, Rose Hill Field, Seneca Falls Field, and Whiskey Hill Field. The attached map of Seneca County shows the concentration of development in the north-central part of the county.

The Finger Lakes National Forest is in the southernmost portion of Seneca County. Wells are now being drilled to the deep Trenton-Black River⁰ gas reservoirs on private lands in the vicinity of the Finger Lakes National Forest. According to New York State regulations, the companies drilling the wells have the right to withhold the data submitted to the Department of Environmental Conservation in completion reports for a total of 5 years (1 year with successive extensions). The companies are exercising this right.

Schuyler County shows a similar distribution of wells, with neither shallow drilling nor production in the northeast quadrant of the county. There are gas storage wells in the northwestern part of the county, but none in the Finger Lakes National Forest area. As in Seneca County, drilling to the Trenton-Black River formations is taking place and industry interest in leasing is high.

Exploration and Production in Nearby Fields

In many areas, exploration and production operations from adjacent locations are very similar. In this case, there are both differences and similarities between the current exploration and previous drilling. There are also slight variations between what is currently happening on private lands through out central New York and what can be expected on the Finger Lakes National Forest. As in the past, most of the drilling is being done with air or mist. It is different from previous activities in that it is to a deeper horizon which means slightly longer drilling times (an additional 10 to 15 days) and a greater distance between wells. Furthermore, drilling and production techniques have improved since the last flurry of activity in the late 1970's and early 1980's. The differences between current activities in the area anticipated for the Finger Lakes National Forest are primarily the depth to the prospective horizon. Regional dip indicates

that the depth to the formations which are anticipated to be the target is in the middle of the range of current drilling. It will probably be neither as deep as some tests to the south of the Forest nor as shallow as others to the North. The primary affect of this will be in the time required for drilling the wells, that is, normally, it will be in the middle of the range of the times rather than more to the extremes. The production anticipated is still natural gas, but since it is from a deeper zone, the pressure will be higher and the production rates and volumes are higher. There seems to be very little or no condensate or water production associated with the production from the Trenton- Black River. The Trenton - Black River wells in fields near the FLNF are being drilled in 14 to 21 days to depths of 6000 to 9000 feet. If directional holes are needed to reach the resources, an additional 10 to 15 days of drilling time may be needed. Completion is taking another couple of days of actual working time but may be delayed up to several months after drilling due to frost laws and equipment availability.⁴

Wells drilled in the vicinity of Finger Lakes National Forest to the Trenton/Black River targets have been extraordinarily productive. Table 1 shows the annual and monthly production from publicly available data on wells in the vicinity of Finger Lakes National Forest. The wells listing no production are those which have been determined to be commercial gas wells but are not producing yet because production facilities are not in place (pipelines, wellheads, etc.) .

Well Name	TOWN	Total Gas Production	Gas Production per month actually producing	Total Water Production	Water Production per month
Hill 1	Dix	0.00000		0.00000	
Grand Prix 624065	Orange	0.00000			
SRA 2 #1	Orange	232349.00000	116174.50000	0.00000	0
Purvis 1	Dix	155151.00000	25858.50000	0.00000	0
Rebecca 2	Fayette	0.00000		0.00000	
Evangelos 21436-T	Pulteney	862.00000	71.83333		0
Gray 21625	Pulteney	8448.00000	704.00000		0
Levandowski 623088	Prattsburg	9299.00000	774.91667		0
Covert 622302-A	Prattsburg	16613.00000	1384.41667		0
Pizura 623143	Pulteney	12033.00000	1002.75000		0
Smith 1	Pulteney	70652.00000	5887.66667		0
Fox 1 (623217)	Pulteney	74069.00000	6172.41667		0
Bergstresser 1	Pulteney	131452.00000	10954.33333		0
Kozak 1	Prattsburg	6112.00000	509.33333		0
Faber 1	Prattsburg	43082.00000	3590.16667		0
Smith 1	Pulteney	177609.00000	14800.75000		0
McAllister 1	Pulteney	650502.00000	54208.50000		0
Snyder 1	Pulteney	765452.00000	63787.66667		0
S & D Farms 623144-B	Cohocton	0.00000			
Peck 1 (623516)	Cohocton	47916.00000	3993.00000		0
Covert 623222	Prattsburg	250648.00000	20887.33333		0
Ballam-Carter 1	Pulteney	166578.00000	13881.50000		0
Jimerson 1240	Hornby	869071.00000	72422.58333	1645.00000	137.0833
Egresi 1	Pulteney	0.00000			
Howe 1300-A	Hornby	1509882.00000	125823.50000	1161.00000	96.75
Rice 1301	Hornby	156968.00000	13080.66667	5578.00000	464.8333
Van Vleet 1355	Hornby	702259.00000	58521.58333	855.00000	71.25
Henkel 1359-A	Corning	87276.00000	10909.50000	176.00000	22
Fratarcangelo 1371-A	Hornby	1505332.00000	125444.33333	1406.00000	117.1667
Corning Game Club 624460	Corning	1063245.00000	88603.75000	1095.00000	91.25
Hartman 624546-A	Corning	776148.00000	64679.00000	1063.00000	88.58333
Gray 624468	Prattsburg	0.00000			
Pace 1460	Corning	0.00000		0.00000	
Youmans 1511	Hornby	0.00000		0.00000	
Crissey 623697	Dryden	0.00000			
Hill 1	Dix	0.00000		0.00000	
Matusik, J #1	Arcade	7739.18000	644.93167	0.00000	0
Folts 624464	Jerusalem	0.00000			
Boudinot 623968	Starkey	0.00000			
TOTAL		9496747.18000	31239.29993	12979.00000	42.69408

Table 1: Production Reported From Trenton/ Black River Gas Wells in the Finger Lakes Region

Much of the lands in the Finger Lakes National Forest were leased in the early to mid 1970's. These leases expired in the mid 1980's without any activity on the leases themselves. This is primarily due to the absence of the shallow target formations and/or the type of structure which was the target at that time.

Lease	County	Lessee	Tracts	Status
NYES 9550	Seneca	Bruce Anderson Houston TX	91, 92, 93, 104, 253, 250, 83, 84, 85, 89, 90, 94, 95, 255, 93A, 94A, 97, 98, 102, 260, 103, 205	expired
NYES 9551	Seneca	Bruce Anderson Houston TX	105, 112, 57, 59, 59a, 60, 61	expired
NYES 9552	Seneca	Bruce Anderson Houston TX	23A, 34, 35, 36, 35A, 33, 32	expired
NYES 9553	Seneca	Bruce Anderson Houston TX	91, 93, 149, 147, 152, 8, 4, 1A, 7A, 12, 10, 11, 7, 20, 185, 22, 17, 19, 24, 100, 13A, 23, 30A, 15, 14, 25	expired
NYES 9555	Seneca	Bruce Anderson Houston TX	Not available	expired

Table 2: Previous leases of the Finger Lakes National Forest

Current Exploration Interest

The Finger Lakes National Forest area is located in a region that is in the early stages of development of a productive natural gas trend. Until recently, it did not appear to have favorable conditions, based on unsuccessful historic exploration activities in the immediate area. In the late 1980's and early 1990s, seismic surveys of the region indicated that hydrocarbon reservoirs might exist in rock strata generally deeper than those tested. Recent drilling has confirmed the results of those surveys, indicating that there is good potential in the area for natural gas from reservoirs deeper than those previously tested. The prospective rock horizon believed to contain these reservoirs is the Trenton- Black River which is approximately 6,000 to 9,000 feet below the surface. The State of New York recently (5/4/99) offered state lands in this region for lease to oil and natural gas operators for development of these gas resources. This sale brought bids as high as \$300 per acre.

Letters expressing interest in leasing have been received by the Bureau of Land Management from two companies. There are currently 9 companies actively exploring for Trenton- Black River prospects in New York⁵. In general, when entire areas are suggested for leasing, it is not because the operator intends to lease every possible tract or place a well at every possible location. When nominating government tracts, whole areas may be requested for various reasons including the following:

- Industry has a specific tract targeted however competitive pressures and protection of proprietary exploration concepts make it in the companies interest not to indicate specific tract(s);
- Exploration is anticipated in the general area but specific targets have not yet been identified;
- Requested acreage is in the general trend of an existing play. Then, based on many factors including the local geology and surface uses, development will occur on only a portion of the tracts which the landman leased

It has been the experience of the BLM- Milwaukee Field Office that only portions of the total requested acreage listed in project-wide lease requests are eventually developed, mirroring what occurs on private lands. Of all Federal and Indian Leases,

nation-wide, 68% of the total number of leases are currently not producing⁶. This does not include lands nominated but not leased, lands which were included within leases and later dropped by the lessee, lands which were held for the primary term of the lease and never developed, or lands which were requested but not offered by the government for lease (due to title, surface concerns, or other issues). Data for these categories is not available but would increase the proportion of lands which had some interest at one point but never saw any development activities.

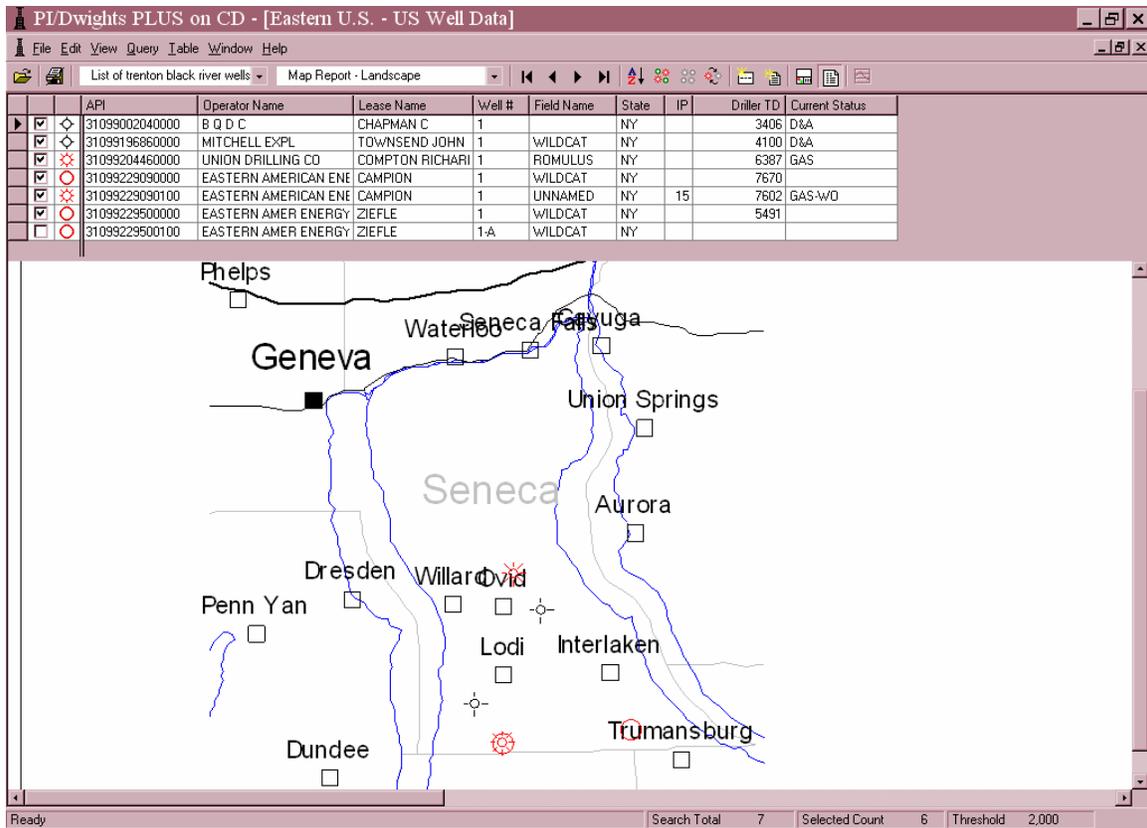
Number and location of wells

There have been no wells drilled on the Finger Lakes National Forest. A table of some of the wells in the Finger Lakes vicinity which are producing or are capable of production (waiting on pipeline connection or other facilities) is in Table 1. These wells are probably representative of what production can be expected, if the well is actually productive. There is a certain probability that a well can be drilled without actually ever becoming a producing well. This results when geologic or engineering conditions vary from the predicted model. The gas may not have accumulated, there may be excessive quantities of water coming from the formation or the production rates and pressures are too low to make a commercial gas well.

Most permits and completion reports in the area are still confidential as of October 2003, but as they are released, they are supposed to be published on the NY DEC web site at : <http://www.dec.state.ny.us/website/dmn/ogdata.htm>

Should leasing occur, selections of drilling sites on the Finger Lakes National Forest will be subject to surface use restrictions placed by the Forest Service in conformance with their Forest Plan. Potential drilling sites will be determined from the results of geophysical (primarily seismic) surveys. Once the target is established from the geologic/geophysical data, the actual surface location is determined by considering all surface (including surface uses, access to that surface, and environmental concerns), and subsurface concerns (including the primary target location and the anticipated downhole conditions).

If all of the Finger Lakes National Forest lands had been geologically favorable, 15 to 32 wells **might** have been drilled into federally owned minerals; this figure depends on the spacing assigned to each well by the state. The spacing for the Trenton Black River production is ranging from 320 acres to 640 acres.⁷ The current exploration indicates that only a small portion of the Finger Lakes National Forest is likely to be prospective for deep gas. Based on the location of recent exploratory wells, there is a high probability that only one or two structural features favorable to the accumulation of gas exist in this area. The existing gas well in the northern part of Hector Township probably indicates that one such structure may transect the Finger Lakes National Forest in an east west direction at approximately this latitude. Wells on the border of Seneca and Schuyler Counties may indicate a location of another productive area on the very southern fringes of the Forest.



Many of the National Forest lands could be developed from wells drilled directionally from adjoining private lands. A detailed discussion of directional drilling and its limitations is in the Oil and Gas Leasing EIS prepared by the Finger Lakes National Forest. Directional drilling is possible where the expected return on the well justifies the added expense of this technique. If initial drilling is unsuccessful, it is possible that far fewer wells will be drilled. If no production is established, the leases would expire after 10 years or the leases could be released before that by the lessee. This is exactly the situation which occurred in the previous lease cycle. If production is established, the leases can be held by production as long as they are capable of production in paying quantities. When the leases can no longer produce in paying quantities, the wells would be plugged and the surrounding area reclaimed according to Forest Service specifications.

Lands under lease or agreement

No lands administered by the Finger Lakes National Forest are currently leased, nor have any Federal minerals within the Finger Lakes National Forest been included in production agreements.

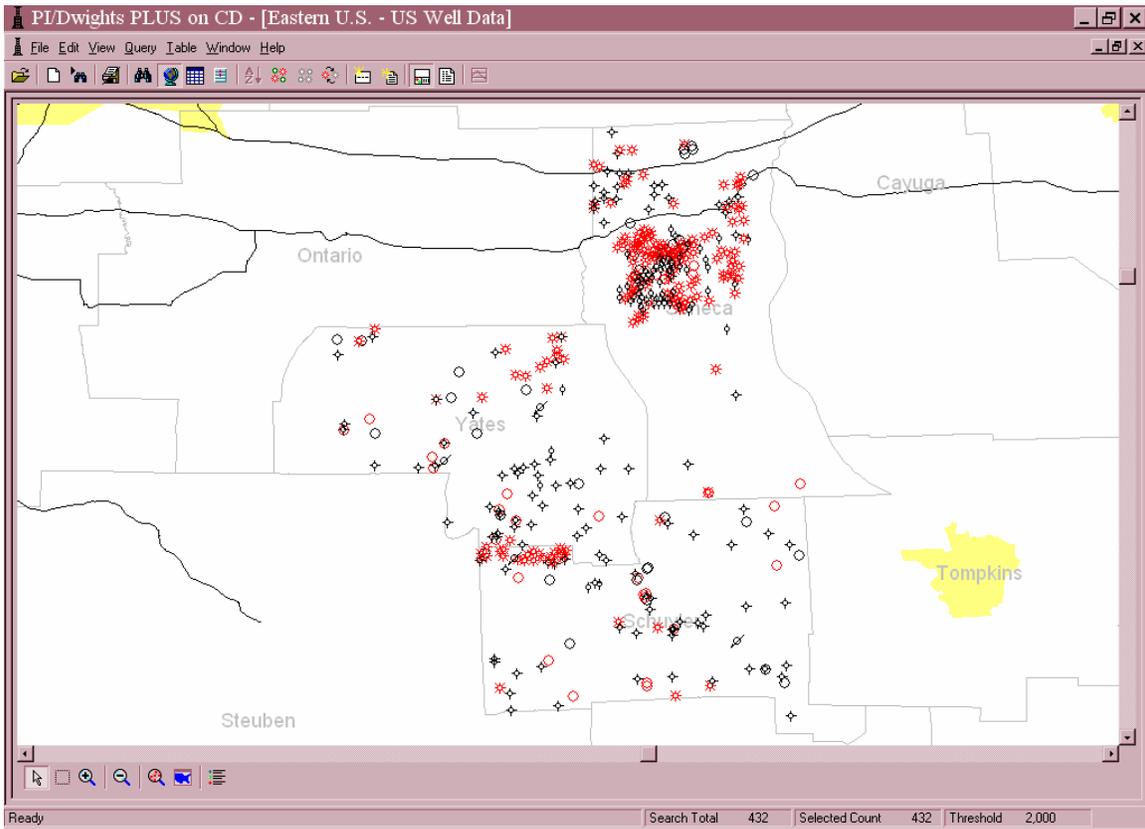
Details of Local Structures:

Before the details of the Trenton Black River production became public, the most likely structural target of exploration activity was the Fir Tree Anticline. This is an East-

west trending anticline across the Hector Land Use area. At the surface it has a very low structural relief with the flanks dipping a mere 2 or 3 degrees. It is thought that the structure will become more clearly defined at depth. A map made by Brayton Foster shows the anticline as being approximately 3 miles wide. This anticline is has produces gas to the east of Cayuga Lake in the Groton Field and in the Wayne Dundee Field, west of Seneca Lake. Five unsuccessful holes have been drilled over twenty years ago in attempts to find similar accumulations in the Oriskany sandstone.

The Trenton Black River play is a very different situation. It is primarily formed by dissolution and dolomitization of the limestones and the resulting collapse and fracturing of the formations involved. Since we do not have access to the recent detailed geophysics in the area we are uncertain where and whether this is occurring in the Finger Lakes National Forest area. We are assuming that such a feature, running approximately east west does intersect some parts of the Finger Lakes National Forest. Since this feature would occur at a depth of approximately 7000 to 8,000 feet below sea level, and since there is a lot of complexity in the rocks overlying these structures, a surface expression of the structure is very unlikely. A diagram of what these reservoirs might be like is found in Figure 1.

Figure 2 shows all the wells drilled in Seneca and Schulyer Counties as reported in Dwights Petroleum Information data base. Figure 3 shows those wells drilled to the Trenton and Black River formations. In comparison to fields in shallower formations, the



Trenton/Black River wells are not only deeper, but also will drain a larger area, hence the

spacing between wells can be much greater and directional drilling of these wells becomes both technically and economically feasible. Details of what this would entail can be found in the EIS prepared for leasing decisions in 2001.

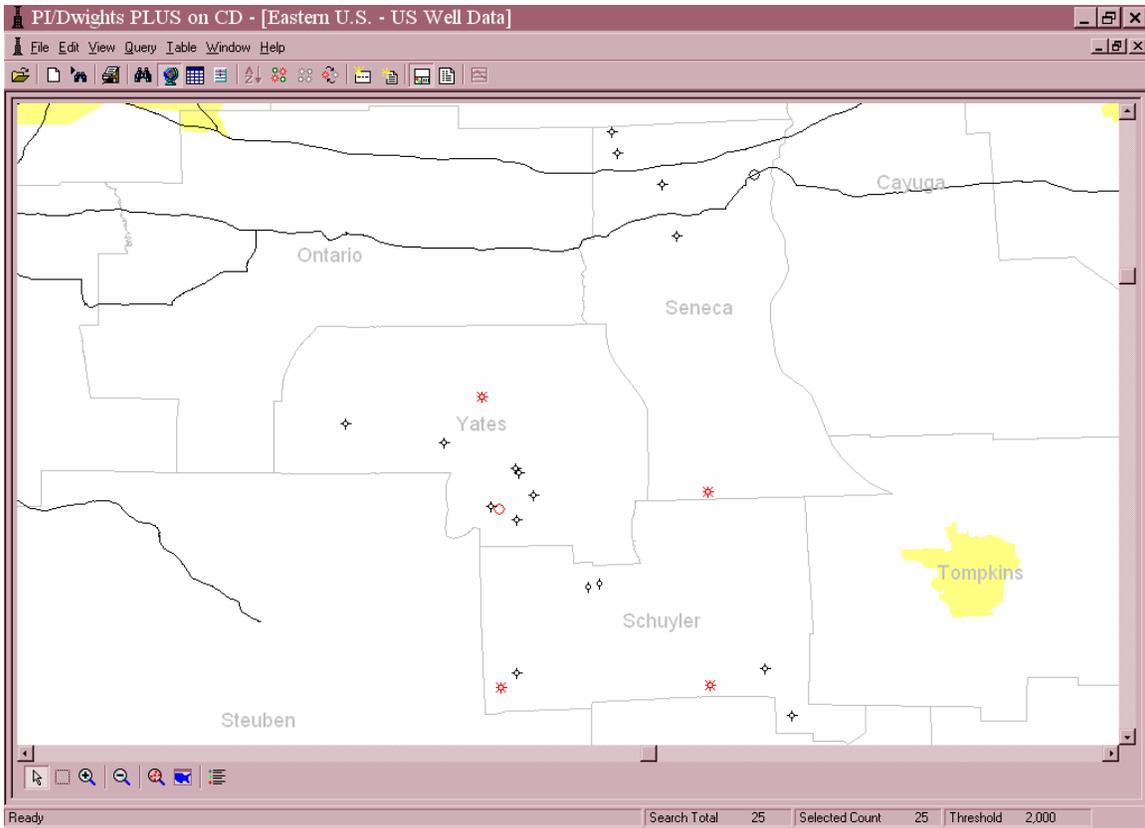


Figure 2 : Wells reporting penetration of Trenton and Black River Formations in Seneca, Schuyler and Yates Counties

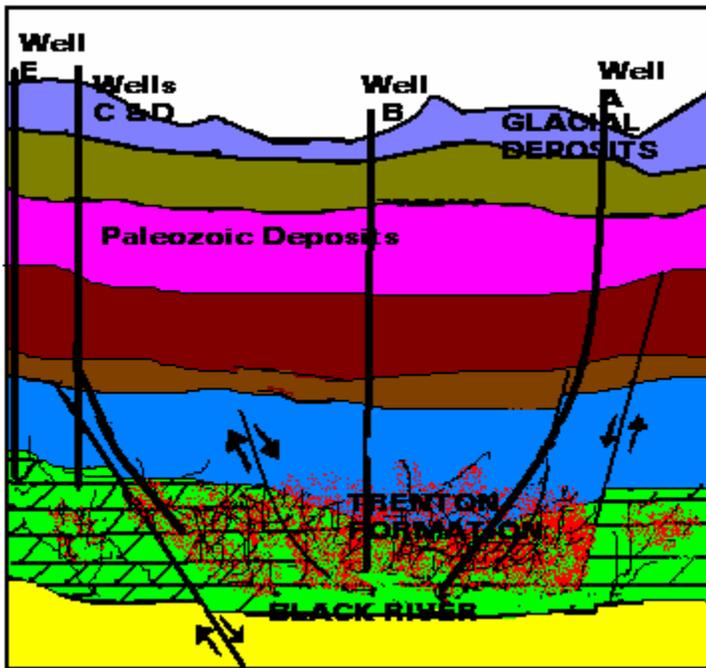
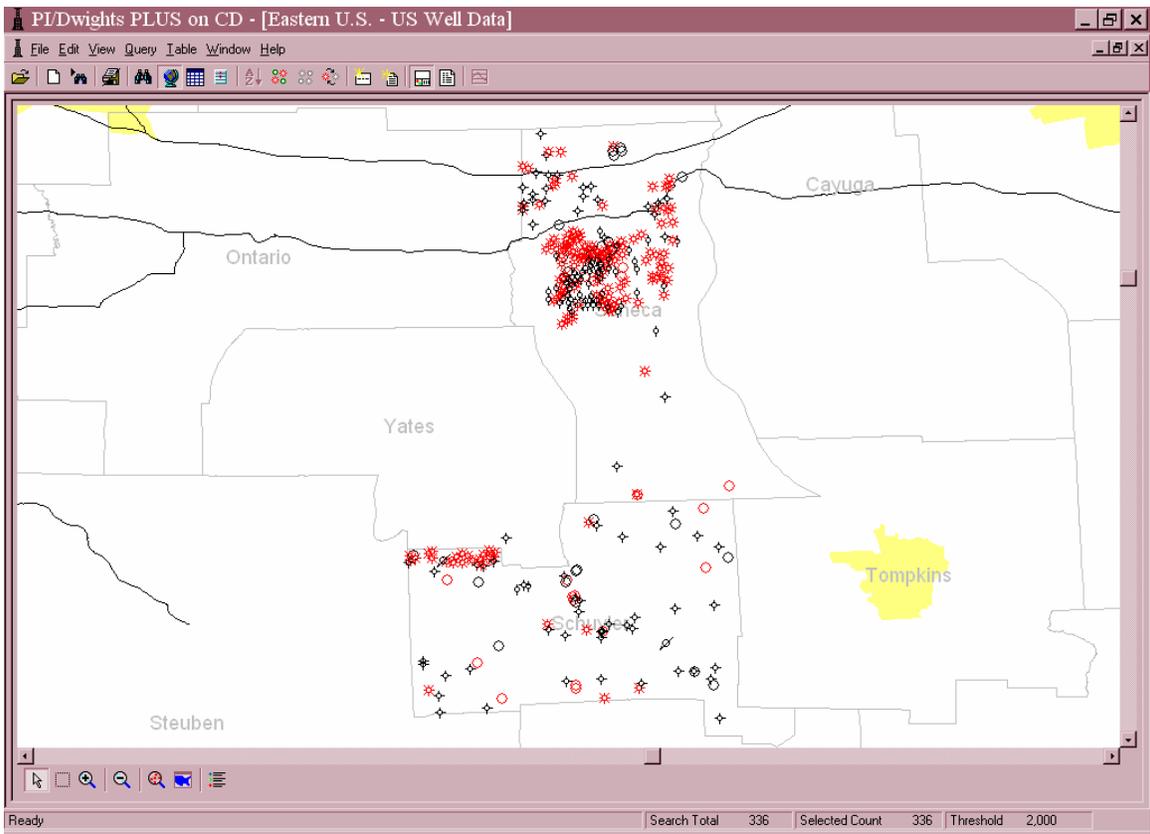


Figure 1 Diagram of Trenton Black River Gas accumulations. Dots indicate location of gas within the rock and fractures



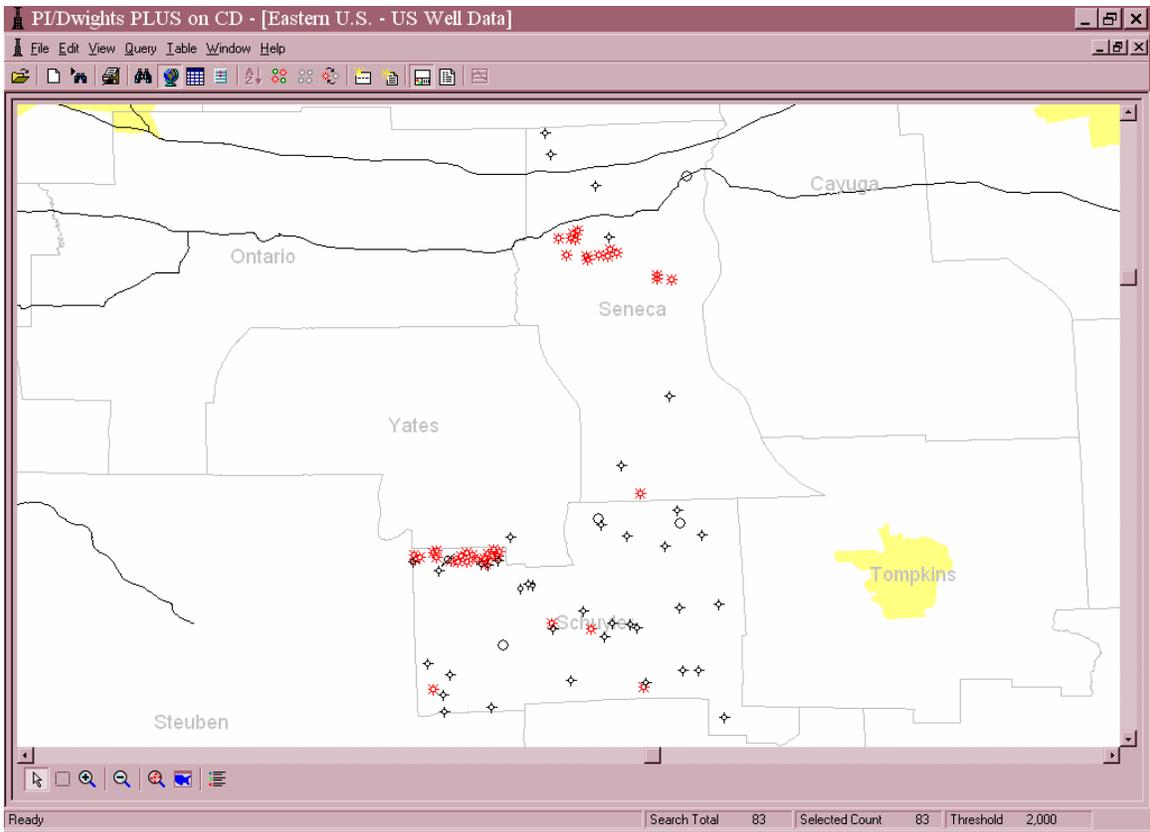


Figure 2 Wells drilled to or below the Trenton Black River Formations

Documents filed with the NY State Department of Environmental Conservation in support of well spacing proposals in the County Line Field and the Quackenbush Field indicate that these features are relatively isolated, long, narrow features. Most appear to be 1000 feet to 2000 feet across and several miles long. One well can be expected to drain 400 to 640 acres. In general these spacing units are set up to give a buffer zone along the length of the feature of several hundred feet.

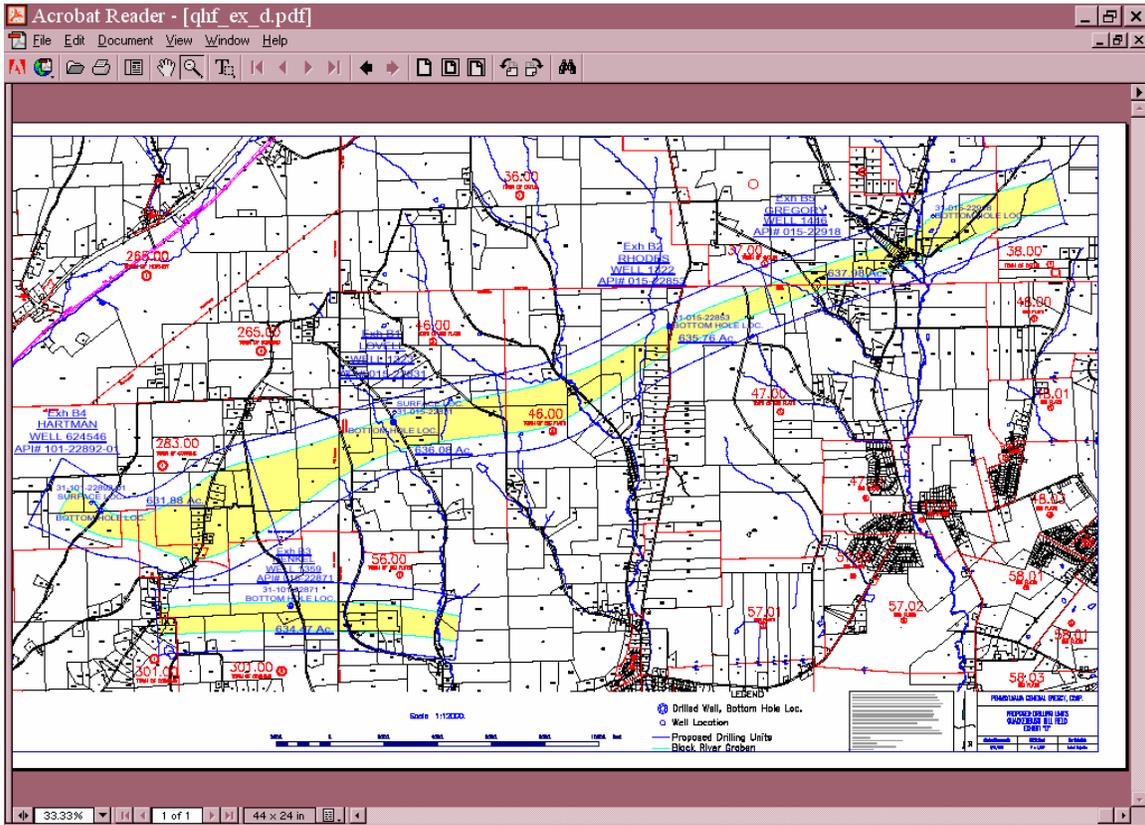


Figure 3 Map of The Quackenbush Field Spacing Units and Wells

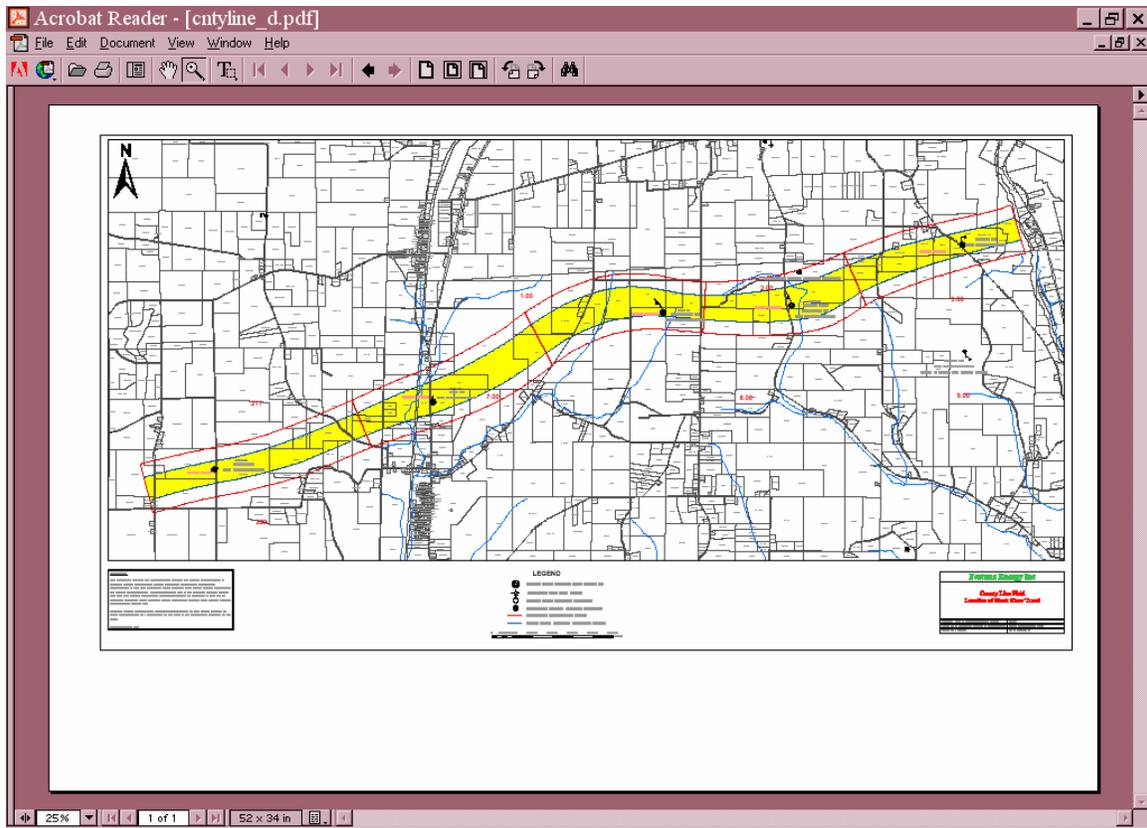


Figure 4 Map of Countyline Field Spacing Unit and Wells

These documents prove both the structural interpretation and the feasibility of directional drilling.

0.1.Appalachian Basin Reports, IHS Energy Group, publisher 2/18/99, 3/18/99, 4/15/99,4/22/99 editions.

4.IHS Energy Group, **Appalachian Basin Report**, Vol 38, no 31, August 5, 1999.

5.IHS Energy Group, **Appalachian Basin Report**, v 39 Number 45, November 8, 2000.

6.MMS, **Statistical Highlights for FY 1999, Royalty Management Program**, <http://www.rmp.mms.gov/Stats/pdfdocs/sh99.pdf>

7.Brad Field, NY DEC, personal communication January 12, 2001.