Broome County, New York
Marcellus Shale
Geologic Summary

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Broome County
Request for Proposal (RFP)

• Broome County has published a RFP for natural gas and oil leases of municipal property. The RFP pertains primarily to land owned by the County and the Town of Maine including the County owned airport and landfill— all parcels totaling approximately 2,200 acres.

• This presentation contains a geologic summary of these parcels.

• The RFP and the geologic summary may be accessed at www.gobroomecounty.com/gasresources
The geologic and financial data in the following presentation was gathered from public and private sources including state and federal imposed filing requirements. Broome County, the Town of Maine, Zaengle Geoscience LLC and Don Zaengle make no warranty as to the enclosed data. It is recommended that interested individuals and businesses consult with their own experts to review this information.
Geologic Map New York

Broome County

12,000,000 acres
Broome County, New York

456,000 ac
34 wells drilled

Sanford, Deposit NY
- XTO, Whitmar
- $90 million, 37,000 ac
- $2,411/ac, 15% RI, 5 yr, 3 yr ext., 5/08.

Chesapeake / Statoilhydro
- $283 million, ~117,000 ac, 11/11/08

Airport Landfill

Inflection / South Maine
- $18 million, 3,000 ac, 20% RI, 2/5/10

Fortuna/Friendsville Group
- $165 million, 30,000 ac, $5,500/ac, 20% RI, 5yr, 3yr ext., 9/09

Cabot / SWOGG
- $5,750/ac, 21% RI
- 10/15/09

Hess / N. Wayne Cnty.
- $3,000/ac, 20% RI
- 9/10/09

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Broome County, NY
County Acreage
3,589 acres

- Greenwood 415 ac
- Landfill 1,200 ac
- Airport 890 ac
- Cole Park 317 ac
- Hawkins Pond 307 ac
- Aqua Terra 460 ac
- Beagel B-2
- Herceg #1

● = Oil & Gas wells
● = Marcellus Wells

Millennium Pipeline
# Geologic Section Broome County.

<table>
<thead>
<tr>
<th>Period</th>
<th>Group</th>
<th>Unit</th>
<th>Lithology</th>
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<tbody>
<tr>
<td></td>
<td>Upper</td>
<td>Genesee</td>
<td>Genesio Shale Tully Limestone</td>
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<tr>
<td>Devonian</td>
<td>Middle</td>
<td>Hamilton</td>
<td>Marcellus Shale Onondaga Lst Oriskany Sst</td>
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<tr>
<td></td>
<td>Lower</td>
<td>TriStates</td>
<td>Manlius Lst Rondout Dol Akron Dol</td>
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<tr>
<td></td>
<td></td>
<td>Heldeberg</td>
<td>Salina Bertie Shale Syracuse Salt Vernon Dol</td>
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<tr>
<td>Silurian</td>
<td>Upper</td>
<td>Lockport</td>
<td>Lockport Dol Rochester Sh Irondequoit Lst</td>
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<td></td>
<td>Lower</td>
<td>Clinton</td>
<td>Sodus Shale</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Medina</td>
<td>Oneida Sst</td>
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<tr>
<td>Ordovician</td>
<td>Oswego Sst</td>
<td>Oswego Sst</td>
<td>Queenston Sst Lorraine Slst Utica Shale</td>
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<tr>
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<td>Trenton/Black River</td>
<td>Trenton Lst Black River Lst</td>
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<td></td>
<td>Lower</td>
<td>Beeman-town</td>
<td>Tribes Hill Lst Theresa Sst Little Falls Dol</td>
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<tr>
<td></td>
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<td>Cambrian</td>
<td>Potsdam Sst</td>
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Modified D. Zaengle 10/2008

- **Gas pay/shows**: Marcellus Sh Cafferty Hill field Genegantslet
- **Oriskany (Heldeberg)** SS, Wicks #1 22807 Stage Coach field
- **Medina SS, Triangle field**
- **TBR LS Beagell #2 22995 Merrill #1 22984**

~ 11,000’
New York Gas & Oil Fields

- Medina SS Fields
  - 5 - 10 Bcf/yr
- Queenston SS Fields
- Black Shale Fields
  - 1 Bcf/yr
- Trenton Black River Fields
  - 40 Bcf/yr
- Herkimer SS Fields
  - 1 - 5 Bcf/yr
- Genegantslet Marcellus
- Cafferty Hill Marcellus
- Stagecoach Oriskany SS
- Dimock, PA
- Cabot Oil & Gas Corp.
  - Marcellus Shale Field
First 15 vertical wells drilled
30-day average: 1.045 MMcfd
Average EUR: 1.42 Bcf

Horizontal wells

<table>
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<tr>
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<th>IP (Mmcfd)</th>
<th>30-day (Mmcfd)</th>
<th>EUR (Bcf)</th>
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<td>5.3</td>
<td>4.5+</td>
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<td>Black #H2</td>
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<tr>
<td>Black #H1</td>
<td>8.8</td>
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<td>4.5+</td>
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<tr>
<td>Heitzman #H1</td>
<td>9.0</td>
<td>6.5</td>
<td>4.5+</td>
</tr>
<tr>
<td>Teel #H8 7/23/09</td>
<td>10.3</td>
<td>9.8</td>
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10-15-09 Field production (32 wells): 52Mmcfd/d
52,000 Mcfg x $4.75 Mcf = $247,000/day gross

$90,155,000 / yr gross
Marcellus Shale, Cherry Valley, NY

Knapp #1, Belden & Blake Corp., 22906, TD = 5,242', KB=1,720', 7/01, Colesville twp., Broome cnty., NY

- **Chittenango Member (Upper Marcellus)**
- **Cherry Valley LS**
- **Union Springs Member (Lower Marcellus)**
- **Onondaga LS**

**Gross thickness = 745'**

- Marcellus Regional Top
- Marcellus > 200API
- 2.4 g/cc
- Total High Gamma >200 API = 155'

- 200 API
- 2.0 g/cc
- 2.6 g/cc
- 3.0 g/cc
Marcellus: 6.5 – 7.0%

Marcellus: ~ 80’ – 100’

Marcellus: ~ 3,400’ – 3,600’

Marcellus: ?

Marcellus: 5-7%, 0.01 – 1.0 md

Marcellus: 100 Bcf/sec (Engelder)
Marcellus Shale, Union Springs Member, Ro %

(T. Smith, J. Leone, RCG 2009)
**Marcellus Shale, Cherry Valley, NY**

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- **Total High Gamma >200 API = 155’**

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Marcellus Shale, Gross Interval Isopach

(T. Smith, J. Leone, RCG 2009)
Broome County RFP
Real Property Summary

- Property owned by Town of Maine and Broome County, including airport and landfill.
- Stacked Targets (Marcellus shale, Herkimer Sandstone, Utica Shale, Trenton Black River hydrothermal dolomite, high “up side”).
- Marcellus (> 200 API gamma) at reasonable drilling depths (range from 3,400’ to 3,800’)
- Marcellus (> 200 API gamma) ~80’ to ~100’.
- High Marcellus Total Organic Carbon content (6.5–7.0%).
- 30 miles north of Cabot Oil & Gas, Marcellus Shale Field in Dimock, PA (Cum.Prod. 52 mmcfg/d).
- ~3 miles north of Millennium Pipeline.
- Within dry gas window (Ro = 2.95), little if any processing required, high BTU value.
- New York Pricing Premium (Averaged $1.05 to NYMEX).
- Excellent Economics relative to other shale plays.
- Excellent Infrastructure in County (Railways, Roads).
- Abundant Water Resources available on county landfill property.
- Airport and landfill away from population centers, connected to interstate highway by County roads.
- Topography consists of gently rolling hills.