Managing Impacts, Balancing Tradeoffs

- Consistent with Ecosystem Management principles
- FSC Certification standards
- Compatibility with other uses

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DCNR Oil & Gas Program

Managing Impacts, Balancing Tradeoffs

- Aesthetics and recreational impacts
- Wild and Natural Areas excluded
- Forest fragmentation, water quality, plant and animal habitats of concern
- Environmental Review
- Comprehensive lease, provides optimal control

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• AREAS OF SPECIAL CONSIDERATION:
  * **New** to 2008 Lease Agreement
  * “**Special**” Areas Delineated **Before** Sale
  * **Areas Include** – Recreation, Slope, Viewshed, Ecological, Timber

<table>
<thead>
<tr>
<th>Area</th>
<th>Acres</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECO</td>
<td>1,522</td>
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<tr>
<td>TIMBER</td>
<td>728</td>
</tr>
<tr>
<td>VIEWSHED</td>
<td>1,404</td>
</tr>
<tr>
<td>REC &amp; SLOPE</td>
<td>1,628</td>
</tr>
<tr>
<td><strong>Total AoSC</strong></td>
<td><strong>5,282</strong></td>
</tr>
</tbody>
</table>

TRACT 356
3,901 acres
• SETBACKS/BUFFERS:
  Streams: 200 Ft (300 Ft Exceptional Value)
  Roads, Trails, ROW: 300 Ft
  Buildings: 200 Ft
  Lease Boundary: 300 Ft
  State Parks/Wild and Nat Areas: 600 Ft

• WELL PAD SITES:
  Approval of District Forester (location & size)
  Pre-Allocated # of Maximum Pad Sites

• PIPELINES, ROADS, RIGHTS-OF-WAY:
  Approval of District Forester
  Standard Department Agreements (Off-Lease)
• DCNR LEASE AGREEMENT (70 Pages in Length)
• SURFACE USE AGREEMENT (Severed Ownership - similar to lease agreement)
• SURETY BONDS (Performance and Plugging)
• COMPREHENSIVE OVERSIGHT (Forest Management & Geology)
• WELL LOCATION APPROVALS (Forest Management & Geology)
• TIMBER DAMAGES (2x FMV)
• PLUGGING CLAUSE (1 Mcf/d avg)
FUTURE LEASE SALE CONSIDERATIONS

• Proposed Tracts Submitted to Forest District(s) For Analysis
• On-The-Ground Analysis
• GIS-based Analysis
• Areas of Special Consideration
• Non-Development Areas

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(AAPG 2008)
TYPICAL MARCELLUS DEVELOPMENT PLAN

Horizontal Well Path

Well Pad

TRACT 730 - 3,901 ACRES
11 Well Pads out of 15 Allotted
(4.5 acres per pad & average 6 wells)
50 Wells Drainage Pattern
HISTORIC LEASED ACREAGE

ANNUAL CUMULATIVE LEASED ACREAGE AS OF DECEMBER 31 OF EACH YEAR FOR PRIMARY OIL AND GAS DEVELOPMENT & GAS STORAGE

End 2008: 345,565 Total Acres Under Lease
16.4% of State Forest Lands PA
HISTORIC WELL COUNT

HISTORICAL SUMMARY OF WELLS DRILLED ON STATE FOREST LANDS
ADMINISTERED THROUGH A COMMONWEALTH LEASE AGREEMENT
(Total of 1,437 Wells Over 60 Years)

- Wharton Gas Field Development
- Leidy Gas Field Development
- Council Run Gas Field Development
- Driftwood-Benezette Gas Field Development
- Gifford Run Gas Field Development
- Grugan Gas Field Development
- Greenlick Gas Field Development
- Tamarack Gas Field Development

**Primarily Deep Drilling**

**Primarily Shallow Drilling**

Spike Result of Recent Energy Price Increases

YEARS
NUMEROF WELLS

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PROJECTED LEASE ACREAGE

ANNUAL CUMULATIVE LEASED ACREAGE AS OF DECEMBER 31 OF EACH YEAR & PROJECTED ACREAGE TRENDS FOR PRIMARY OIL AND GAS DEVELOPMENT & GAS STORAGE
PROJECTED WELL COUNT

PROJECTED & HISTORIC WELLS DRILLED ON STATE FOREST LANDS
ADMINISTERED THROUGH A COMMONWEALTH LEASE AGREEMENT
(Total of 4,303 Wells Thru 2018)

YEARS

NUMBER OF WELLS

0 100 200 300 400 500 600

MINERALS SECTION

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MARCELLUS TYPE WELL

MOST LIKELY CASE
ESTIMATED ULTIMATE RECOVERY 2,500,000 MCF

NOTE:
Low Case EUR is 1,500,000 MCF
High Case EUR is 3,500,000 MCF

Hyperbolic Decline vs. Exponential Decline

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PROGRAM IMPACTS

• Large Numbers of New Wells (less than ANF’s 10,000)
• Small Number of Pad Sites (477 at 5 Acres Each – 2,385 Acres Initial Total)
• Large Production Increase on SF Lands
• Assumed Revenue Increase
• Necessary Reorganization of Staff Resources to Manage Program