OVERVIEW OF REGULATORY STRUCTURE FOR AIR EMISSIONS FROM OIL AND GAS SOURCES IN PENNSYLVANIA

USEPA Oil & Gas Summit
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Research Triangle Park, NC
Julie McDill
Production Rate Increasing Rapidly

Marcellus Natural gas production

Gas +247 million cubic feet/day month over month
Production Methods Changing Rapidly

Marcellus
New-well gas production per rig
thousand cubic feet/day

- new-well gas production per rig
- rig count

Rig count
rigs

2007: 160
2008: 140
2009: 120
2010: 100
2011: 80
2012: 60
2013: 40
2014: 20
## Marcellus Shale Oil & Gas 2011 Air Emissions

### State Prepared Oil & Gas Inventory Submitted to USEPA for the 2011 Inventory

<table>
<thead>
<tr>
<th>State</th>
<th>CO  [tons/yr]</th>
<th>NOX [tons/yr]</th>
<th>VOC [tons/yr]</th>
<th>SO2 [tons/yr]</th>
<th>PM10 [tons/yr]</th>
<th>PM2_5 [tons/yr]</th>
</tr>
</thead>
<tbody>
<tr>
<td>New York</td>
<td>747</td>
<td>605</td>
<td>8,205</td>
<td>95</td>
<td>17</td>
<td>17</td>
</tr>
<tr>
<td>Pennsylvania</td>
<td>34,198</td>
<td>40,563</td>
<td>18,607</td>
<td>1,952</td>
<td>1,581</td>
<td>1,507</td>
</tr>
<tr>
<td>West Virginia</td>
<td>27,454</td>
<td>21,472</td>
<td>46,863</td>
<td>1,279</td>
<td>32</td>
<td>31</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>62,399</strong></td>
<td><strong>62,640</strong></td>
<td><strong>73,675</strong></td>
<td><strong>3,326</strong></td>
<td><strong>1,630</strong></td>
<td><strong>1,555</strong></td>
</tr>
</tbody>
</table>
Proximity of Nonattainment to Marcellus Shale Plays
Oil and Natural Gas Operations

- **Producing Wells**
- **Gathering Lines**
- **Gathering and Boosting Compressors**
- **Gas Processing Plant**
- **Transmission Compressor Stations**
- **City Gate Regulators & Meters**
- **Distribution Mains**
- **Large Volume Customer**
- **Residential Customers**
- **Commercial Customer**
- **Transmission Pipeline**
- **Regulators & Meters**

**Sources:**
- Adapted from American Gas Association and EPA Natural Gas STAR Program
- Pennsylvania General Permit (GP-5)
- Pennsylvania Exemption 38
- Pennsylvania Minor or Major source (Title-V) permit
- Crude Oil to Refineries (not in this sector)
• General Plan Approval for:
  • Non-major natural gas compression
  • Gas processing facilities
• Well pads & drilling exempted from permitting, including GP-5 general permit via Exemption 38
• Current GP-5 issued on February 1, 2013
GP-5 similar to a Synthetic Minor Permit

To qualify actual facility emissions must be less than:
• NOx, CO, SOx, PM10 or PM2.5 – 100 tons/Yr
• VOCs – 50 tons/Yr
• Individual HAP – 10 tons/Yr
• Total HAPs – 25 tons/Yr
• Greenhouse gases (CO2e) – 100,000 tons/Yr

Actual, NOT potential-to-emit (PTE) emissions.

Source specific emission limits.
## GP-5 – Source Applicability

<table>
<thead>
<tr>
<th>NG-fired engines located at a <strong>non-major</strong> facility – Beyond NSPS &amp; NESHAPS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Glycol Dehydrator and associated equipment (excluding re-boiler) – Beyond NSPS</td>
</tr>
</tbody>
</table>

- Natural gas-fired simple cycle turbines. – Beyond NSPS
- Centrifugal compressors. – NSPS only
- Natural gas fractionation process units (such as De-propanizer, De-ethanizer, De-butanizer). – Equipment leaks – NSPS only
- Storage vessels/tanks. – State storage tank rule
- Pneumatic controllers. – NSPS only
- Sweetening Units. – NSPS only
- Equipment leaks. – Beyond NSPS
GP-5 Advantages

ENVIRONMENTAL
• More equipment covered by limits
• Limits below NSPS & NESHAPs
• Periodic LDAR reporting below major source threshold
• Testing and verification of rates every 2500 hours of operations
• The terms and conditions cannot be modified

OPERATIONAL
• Certainty of limits
• Authorization in 30 days
• Can install lower emitting equipment and maximize operational flexibility
Exemption 38

Exempts wells pads from GP-5

Intended to minimize permitting administrative burden but not from emissions control.

VOC & HAP emissions limits set equal to or better than New Source Performance Standards (NSPS)

Quarterly leak detection: Entire well pad/facility.

However, PA DEP receives no notice of intent to install emission unit
Page 4 & 5 of the regulatory comparison sheet PA, CO, OH, WV

“States are precluded from establishing any emission limitations other than those required by 40 CFR Part 89”

Federal rules

Tiers

15 ppm ultra-low sulfur fuel
PA O&G Emissions Reporting

• 2011 - Unconventional Drilling, development, production sources required to report emissions

• 2012 – Both unconventional & conventional sources to report emissions
  – Coal Bed Methane exempted
QUESTIONS?

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