Understanding Natural Gas Pipeline Infrastructure and Impacts

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MARCELLUS EDUCATION TEAM

Penn State Extension
Pipeline Infrastructure & Impacts

- Pipeline Background
- Pipeline Construction
- Pipeline-Related Infrastructure
- Impacts in the Landscape
- Pipeline Safety Considerations
- Landowner Role and Needs
Position Statement:

“The Penn State Marcellus Education Team helps individuals, families, businesses, public officials, and communities throughout Pennsylvania better understand and act upon the opportunities and challenges arising from shale energy development.

We are committed to providing unbiased, research-based information.”
Meeting Ground Rules

1. Please respect our presenters and each other.

2. Questions will be via comment cards.

3. Please write or print your questions neatly.

4. This is not a public hearing or debate.
Pipeline Infrastructure Background

• Shale gas production is changing gas markets and pipeline flows across the country.
• PA became a net exporter of natural gas in 2011.
• Natural gas production in PA may double in the next 5 years. (Bentek Dec. 2012)
• Shale development is bringing substantial pipeline development to the Commonwealth.
Natural Gas Production & Consumption in PA

<table>
<thead>
<tr>
<th>Period</th>
<th>Production (Billion Cubic Feet)</th>
<th>Consumption (Billion Cubic Feet)</th>
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<tbody>
<tr>
<td>July - December 2010</td>
<td>374</td>
<td>426</td>
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<tr>
<td>January - June 2011</td>
<td>561</td>
<td>532</td>
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<tr>
<td>July - December 2011</td>
<td>757</td>
<td>431</td>
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<tr>
<td>January - June 2012</td>
<td>991</td>
<td>537</td>
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<tr>
<td>July - December 2012</td>
<td>1242</td>
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Types of Natural Gas Pipelines

• Gathering System
  – PA DEP – E&S regulation
  – PA PUC - safety

• Interstate Pipeline System
  – FERC – sighting and E&S
  – US DOT (PHMSA) – safety

• Distribution System
  – PA PUC - safety
What About Eminent Domain?

- Generally only applies to federally regulated projects (interstate pipelines) and PA public utilities (distribution lines).
- Does not apply to local Marcellus gathering lines.
Marcellus & Utica Shale Projects

Source: FERC

Approved or Pending Projects

- Appalachian Expansion (NiSource)
- Line 300 Exp (Tennessee)
- NiSource/MarkWest & NiSource
- N Bridge, TIME 3, TEMAX (TETCO)
- Appalachian & Natrium (Dominion)
- Line N & N, R & I Projects (NFG)
- Tioga County Extension (Empire)
- NSD (Tennessee) & (Dominion)
- Rose Lake (Tennessee)
- Northern Access (NFG & Tennessee)
- The Constitution Pipeline
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Northeast Supply (Williams)*

- Appalachian Expansion (NiSource)
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Potential Projects

- NYMarc (Iroquois)
- New Penn (NiSource)
- Marcellus to Manhattan (Millennium)
- Appalachia to Market Expansion
- TEAM 2013 & U2GC Project (TETCO)
- Ohio Pipeline Energy Network & Appalachia to Midwest (TETCO)
- West & East Expansions (NiSource)
- Keystone (Dominion/Williams)
- NiSource & UGI
- Northeast Supply (Williams)*
- Commonwealth Pipeline (UGI Service, Inergy, WGL)
- Northeast Expansion (Tennessee)

* Combined Transco’s Rockaway Lateral and Northeast Connector Projects
# Summary of Natural Gas Facilities in the Marcellus & Utica Shale Basins

<table>
<thead>
<tr>
<th>Natural Gas Basin</th>
<th>Status</th>
<th>Company/Project</th>
<th>Capacity (MMcf/d)</th>
<th>Miles of Pipe</th>
<th>Compression (HP)</th>
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<tr>
<td>Marcellus</td>
<td>Prior-Notice In-Service</td>
<td>Columbia Gas Trans., LLC (Majorsville Compressor/ MarxWest Upgrade)</td>
<td>250</td>
<td>4</td>
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<td>Tenn. Gas Pipeline Co. (NE Supply Diver. Project)</td>
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<td>7</td>
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<tr>
<td>Marcellus</td>
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<td>Texas Eastern Trans., LLC (TEAM 2012 Proj.)</td>
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<td><strong>Total</strong></td>
<td></td>
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<td><strong>4,017</strong></td>
<td><strong>419</strong></td>
<td><strong>306,947</strong></td>
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</table>

Source: FERC
Commonwealth Pipeline

- Project currently suspended.
- 120 mile, 30” interstate pipeline. (Inergy Midstream, UGI Energy Services, WGL Holdings)
- Starts at southern terminus of Marc 1 line in Lycoming county, extending into Baltimore/DC metro.
- Capacity: 800,000 dekatherms/day (0.8 bcf)
- More direct, cost effective route to bring Marcellus and Utica gas to SEPA and Mid-Atlantic.
TEAM 2014 Project

- Texas Eastern Appalachia to Market Expansion 2014 (Spectra Energy)
- 33.5 mile upgrade, 36” interstate pipeline.
- 16 Mmcf/day capacity.
- Berks County: 5.6 miles of pipeline generally within or adjacent to existing Texas Eastern pipeline in Bern, Ontelaunee, Muhlenberg, Ruscombmanor, and Alsace Townships
TEAM 2014 Project

• FERC Docket Number: CP 13-84-000
FERC Process

Use of the Pre-Filing Environmental Review (PF) Process is Approved (voluntary)

Conduct Scoping to Determine Environmental Issues and Attempt to Resolve Issues

 Applicant files FERC Application

 FERC Issues Notice of Application

Conduct Scoping (if the PF Process is not used)

Issue EA or Draft EIS

Respond to environmental comments / Issue Final EIS

Commission Issues Order
Company Open Houses

• Sponsored as part of the Company's community outreach during FERC pre-filing process.

• Held in the vicinity of proposed project area to share information with the public.

• FERC often sends staff to open houses to answer questions & discuss pre-filing process.
FERC Scoping Meetings

• Sponsored by FERC to define scope of environmental impact statement and the alternatives.
• Typically held during pre-filing process.
• FERC scoping meetings are open to the general public
• Structured for people to make statements to FERC about the project.
How to Follow a Project

• FERC will assign a docket number when the project application is filed.
• FERC eLibrary: http://elibrary.ferc.gov/
• FERC Online: eSubscription & and other services: https://ferconline.ferc.gov/
• Project Sponsor Websites.
Pipeline Construction Process

- Acquiring the right of way (ROW).
- Planning route, surveying.
- Permitting.
- ROW is cleared.
- Topsoil removed, trench dug.
- ‘Stringing Pipe’
- Pipe is welded and contoured.
- Pipe Lowered into trench.
- Pipe buried & site restored.
Photo courtesy of FERC
BEGIN
TOPSOIL
STRIPPING
2100'

Inches Depth
DO NOT MIX TOPSOIL AND SUBSOIL
Soil Management in Ag Land

- Strip & stockpile topsoil, double ditch.
- Replace subsoil.
- Rough grade then deep-till subsoil.
- Replace topsoil, rough grade & deep till.
- Soil test, lime and fertilize.
- Final tillage & re-seeding.
- Limit off-ROW traffic.
Pipeline Related Infrastructure

- Valves
- Pigging Launchers & Catchers
- Drying and Metering Facilities
- Compressor Stations
- Cathodic Protection Equipment

Valve  Pig Launcher

Source: Wikipedia.org
Disguised Compressor Site

Source: Patrick O’Dell, National Park Service
Pipeline Impacts

- Erosion/Sediment Loading.
- Habitat Fragmentation.
- Invasive Weeds.
- Impact on View-Sheds.
- Air Quality.
- Safety Concerns.
Fragmentation Issues

• Increase in edge, decrease in core forest.

• Habitat generalists will likely adapt and thrive. (crows, deer, raccoon, blue jay)

• Habitat specialists may struggle to adapt. (forest raptors, some songbirds, woodland amphibians)

• Affect on View-sheds.

• Work by Dr. Brittingham, PSU and The Nature Conservancy.
Reducing Pipeline Impacts

• Locate new pipelines in or along existing rights of way and/or use existing boundary areas (roads, fence rows, property lines, forest edges).

• Manage ROW and forest edge to encourage game and non-game species.

• Maintain ROW to reduce spread of invasive weeds.
Reducing Pipeline Impacts

• Boring under streams and wetlands – the best approach? (trenchless technology)

• Are there opportunities to avoid or re-establish forest cover in sensitive areas (riparian areas, critical viewsheds, etc)?

• Better planning of pipeline corridors?

• Managing residential development near existing pipelines?
Landscape Issues

Roadways are the corridors that connect the people and places of northern Pennsylvania with the surrounding regions. In the past the rural roads of this area were quiet, but the natural gas industry requires heavy road use to operate. The presence of this industry has led not only to effects on the roadways themselves, but also has in some areas damaged the scenic views that can be seen from roads. Because roadways are used by a majority of the region’s residents as well as industry, it is necessary to balance the needs of each to maintain economic growth yet retain the rural beauty that we associate with northern Pennsylvania.

Visual Impacts

People are more apt to notice the negative visual effect of natural gas industry if it can clearly be seen from the road. This industrial development often clashes with the pastoral landscape around it, further highlighting its presence.

Iconic Landscapes

Special (or iconic landscapes) and viewsheds should be saved from negative visual impacts. These places often do not hold a formally recognized status, but efforts to protect these places from insensitive development activities may reduce negative effects.
**Landscape Solutions**

Planning efforts should pay special attention to views from the roadways and the experience of driving across the countryside. Transportation management plans may help reduce the amount of traffic on and damage to scenic roads. The presentation of views from the road can be accomplished by understanding how people look at the landscape around them. Carefully obscuring natural gas industrial development from view may even make its presence less disturbing to those who live in or travel through northern Pennsylvania.

**Visual Preference**

Visual preference refers to the way people look at and perceive the landscape around them. Elements that may usually be considered unattractive can sometimes be "hidden in plain sight" simply by adjusting their orientation to the road.

**Vegetative Screens**

In rural areas, trees and plant life are a common sight across the countryside. Planting trees or placing vegetation between roadways and natural gas development activities, such as well pads, may hide them from the view from the road.

- Placing the pipeline clearing at an angle to the roadway's view makes it less noticeable.
- Compressor stations can be built to look like farm buildings.
- A vegetative screen almost completely obscures the well pad from view.
- Iconic village and countryside are now dominant visual elements.
- Traffic studies can determine where trucks are most impactful, and may result in rerouting efforts to keep on highways and off scenic roads.
Reducing Pipeline Impacts

• Good soil management during the process goes a long way.

• Re-seeding - often the project time-line dictates the seeding date.

• Follow-up assessment of ROW – settling, seeping, vegetative cover, etc.

• Landowner/property owner education.
Landowner Role and Needs

- Right-of-way and surface use agreements are perhaps best place to protect the look, feel and safety of the community.
- Range of knowledge and negotiating skills.
- Host of pipeline easement considerations.
- Right-of-way do’s and don’ts.
Financial Considerations

• Payment Terms
• Is it an option for an agreement?
• Easement income and damage payments may be taxed differently.
• Consult with an accountant.

Legal Council

• Always have an attorney review any contracts or agreements before you sign them.
Pipeline Safety Background

• Gas pipeline incidents in San Bruno, CA, Allentown and Philadelphia bringing attention to importance of pipeline safety.

• Aging infrastructure and increasing residential development nation wide.

• In PA, ‘line hits’ and old (cast iron and unprotected steel) pipe account for majority of incidents.
National Gas Transmission Incidents – 1993-2012

Source: PHMSA Significant Incidents Files, February 28, 2013
Pipeline Inspection & Maintenance

• Install and maintain pipeline markers.
• Periodically maintain ROW to control weeds and brush.
• Ground and aerial inspections of ROW.
• Leak detection survey’s.
• Pipeline Pigging.
• Gas Sampling.
Code of Federal Regulations

• www.eCFR.gov

• Title 49, Section 192 - TRANSPORTATION OF NATURAL AND OTHER GAS BY PIPELINE: MINIMUM FEDERAL SAFETY STANDARDS
Pipeline Marker

- Lists contents of pipeline.
- Lists Operator.
- Emergency contact info.
- Indicate general location of line.
- PA One Call - 811
Pipeline Pigs

- Clean pipe.
- Check thickness & roundness of pipe.
- Check for corrosion.
- Detect leaks.
Class Locations

- Determined by number of buildings within 220 yards on each side of pipeline per sliding mile.
- **Class 1 location** - 10 or fewer buildings.
- **Class 2 location** - more than 10 less than 46.
- **Class 3 & 4 locations** – more than 46 buildings and buildings with high occupancy (churches, schools, etc).
- Added layers of regulation in higher consequence areas.
Development Near Existing Pipelines

Figure 1 - 1990
USGS DOQQ 1990 Aerial Photo

Washington State

Figure 2 - 2002
NGA 2002 Aerial Photo
Addressing Pipeline Safety Issues

- Standards for new development near existing gas pipelines.
- Street opening standards to reduce line hits.
- Standards for placement of pipeline related surface structures (noise, odor, visual, etc).
- First responder and community education and training.
Summary

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• Impacts in the Landscape
• Pipeline Safety Considerations
• Landowner Role and Needs
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