Natural Gas Development in the Delaware River Basin

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Delaware River Basin
Delaware River Basin Facts

- Over 15 million people (about 5% of the U.S. population) rely on the waters of the basin for water supply.
- Drains 13,539 mi²
- Daily water withdrawal in the DRB = 8.7 BGD
Delaware River

Longest Undammed River
East of the Mississippi

330 miles
Delaware River Port Complex – Largest Fresh Water Port
Delaware River Basin Commission
DRBC’s Charge

- Manage water resources w/out regard for political boundaries
- Regulate water quantity (equitably allocate, maintain streamflow) and water quality
- Plan and Develop (e.g., Basin Plan 2004; State of the Basin Report 2008; stored water)
- Coordinate between federal, state & local governments and private entities w/ role in managing water resources
- Educate the Basin community about water resources
- Forum for adaptive management
DRBC Value Added

• Manages the watershed holistically
• Provides a voice for individual states and federal agencies on use of the shared resources
• Evaluates benefits and costs of any proposals to all parts of the basin
• Fills in gaps where states do not have authority (water withdrawal)
• Creates a uniform baseline of regulations for the shared waters
• Cost effective allocation of funds
Outstanding Regional Resource

- Undammed River
- Exceptional water quality
- High ecological diversity
- ~75% of the non-tidal river is part of the National Wild and Scenic Rivers System
Water Quality

- Federal Wild and Scenic River Designation – ¾ of non-tidal river

- Total non-tidal river and its watershed designated DRBC Special Protection Waters

- Mainstem = longest stretch of anti-degradation waters in U.S.

- No measurable change in water quality
Marcellus Shale and Special Protection Waters

36% (4,937 mi²) of the Delaware Basin is underlain by the Marcellus Shale.
Two Value Sets

- NG – national, state, local value
  - security, economy
- Environment and Community
  - Sensitive Environments
  - Major Water Supply
  - Tourism Economic Base
  - Very different environment for TX, OK, etc.
Vulnerability of Headwaters

- Headwaters are the most sensitive areas of a watershed

- Existing contiguous forest is critical to water quantity and quality

- Philadelphia Source Water Protection Analysis
  - #1 – Change in Delaware River Headwaters
Regulation Development

• May, 2010 - Commissioners requested staff to develop draft regulations
• December, 2010 – Draft Regulations Posted
  – Started Public Review process with hearings
• April, 2011 – Comment period Closed –
  – 69,000 comments
• Latest Version of Regulations
  – posted November, 2011
Concerns

1. Water Withdrawals, Use, and Tracking

2. Well Pads and Ancillary Infrastructure

3. Wastewater Tracking and Disposal
AREA ESTIMATES

PA 2588 miles $^2$
NY 2348 miles $^2$
NYC Watershed 917 miles $^2$

Structure Line
Water Withdrawals and Use

Projected Needs Over 10-20 Years:

- 5 million gallons per horizontal well stimulated
- 24-90 BG w/ no recycling
- 21-77 BG – assuming 95% reuse of initial flowback water
- Limerick Generating Station
  56 MGD; 1.74 BG/month
Basin water usage

Daily Water Withdrawals, Exports and Consumptive Use in the Delaware River Basin

Total Water Withdrawals
(ground and surface) from the Delaware River Basin: 8,736 mgd

Major Exports from the Delaware River Basin: 736 mgd

Consumptive Use in the Delaware River Basin: 324 mgd

Pie chart values in mgd (million gallons per day)
Wastewater Disposal

Wastewater “Treatment” & Disposal

- Initial Flowback – 15% of frac volume = 0.75 MG per well
- 3.6 - 14 BG over 10-20 years
- Treatment capacity and capability currently lacking
Wastewater Volume Trends

Assumptions:
Flowback: 15% initial return
Produced water:
3.0 % return first year
1.6 % per year during years 2-5
0.8 % per year during years 6-10
0.4 % per year during years 11-30
Flowback Water Quality Trends

Average Flowback TDS Concentration and Discharge Rate vs. Time

Days Since Hydraulic Fracturing Completed

TDS (mg/L)
Flow rate (gpd)
Article 7 Natural Gas Rule Strategy

1. WATER WITHDRAWAL & USE
   - Protect surface and groundwater supplies
   - Preserve ecological flows
   - Ensure assimilative capacity for discharges
   - Monitoring, Tracking & Reporting Source & Usage
   - Manage Wastewater Storage & Discharge

2. NATURAL GAS DEVELOPMENT PLANS
   - Evaluates alternatives to minimize Impacts
   - Siting/setback Limits
   - Mitigation of unavoidable impacts
   - Financial assurance requirements

3. WASTEWATER TREATMENT & DISCHARGE
   - Protect receiving water bodies
   - Track wastewater production, reuse, and disposal
   - Ensure adequate treatment is available for expected waste stream
ARTICLE 7 NATURAL GAS RULE

FOCUS OF RULE

– CONSOLIDATES REQUIREMENTS INTO ONE ARTICLE

– COMPLEMENTS NY/PA NATURAL GAS PROGRAMS

– RELIES ON NY/PA PROGRAMS AND EXPERTISE TO REGULATE WELL CONSTRUCTION AND OPERATIONS

– APPLIES TO ALL NATURAL GAS WELLS & FORMATIONS

– INCLUDES FINANCIAL ASSURANCE REQUIREMENTS
ARTICLE 7 NATURAL GAS RULE

RULE INCLUDES:

– 18 MONTH ADM. AND OPER. ASSESSMENT
  • Commissioners’ Recommendations (6 MONTHS)
  • Bulk Water Use and Management Approvals (BWA) up to 300 wells until Commission approval to resume BWA

– DELEGATES SPECIFIC APPROVALS TO EXECUTIVE DIRECTOR (Approval by Delegated Authority (ADA))
Natural Gas Development Plan

• Purpose – Reduce cumulative impacts; reduce NG development on landscapes important to water resources
• Review “multiple” pads/wells instead of individually
• Evaluate lease holdings (~ 10,000 - 50,000 acres), or smaller units based on location or timing
• Applicant to develop plan using mapping of constraints and developable areas provided by DRBC
• Optimize locations of proposed well pads and infrastructure and establish mitigation requirements.
• Not saying No, but trying to minimize development of lands most valuable to water resources.
These layers are combined in GIS to create High Value Water Resource Landscape.
Working with Our Members

• PA has regulations, NY in the process
• Our regulations required to address concerns of all 4 states and federal gov’t.
• Will work though AAs with PA and NY states to avoid duplication in implementation.
DRBC Ambient Monitoring Framework for Natural Gas Development

- DRBC Monitoring Activities
  - Biological Monitoring
  - HOBO Loggers
  - Reanalysis of archived samples
  - Toxicity Testing
- Partnerships
Partnerships

• DRBC
• U.S. Geological Survey
• National Park Service
• PADEP
• NYSDEC
• Stroud University
• Dickinson University
• Delaware Riverkeeper Network
• Academy of Natural Sciences
Wayne and Delaware County Sub-Watersheds for Spring / Summer 2011 Biomonitoring
In Summary

- Natural gas play is significant and valuable
- Still many unknowns - environmental, community, infrastructure impacts.
- DRBC’s interest is protection of water resources.
- Need to be cautious to protect the existing outstanding resources and economic future of the area.
- DRBC Regulatory Action – Draft Regulations – November 2011 Meeting Postponed
- Commissioners deciding on path forward.