Can Natural Gas Drilling Be Done Safely?

Paul Swartz
SRBC Executive Director
Major Types of Power Generation in SRB
- Total 15,134 Megawatts (MW) -

- Nuclear: 37.5%
- Coal: 31.0%
- Natural Gas: 15.5%
- Hydroelectric: 12.0%
- Other: 4.0%
Relicensing of Hydroelectric Facilities within the Basin

- **Exelon – Conowingo**
  - Cecil/Harford Counties
  - Hydroelectric Dam; 573 MW
  - Relicensing Currently Under Review

- **Exelon – Muddy Run**
  - Lancaster County
  - Hydroelectric/Pumped Storage; 800 MW
  - Relicensing & Water Withdrawal Currently Under Review

- **York Haven**
  - York County
  - Hydroelectric Dam; 19.7 MW
  - Relicensing Currently Under Review
## Estimated Consumptive Water Use by Source within the Basin

<table>
<thead>
<tr>
<th>Energy Sources</th>
<th>Gal per MW</th>
</tr>
</thead>
<tbody>
<tr>
<td>Municipal Solid Waste</td>
<td>29,000</td>
</tr>
<tr>
<td>Wood</td>
<td>23,000</td>
</tr>
<tr>
<td>Coal</td>
<td>19,000</td>
</tr>
<tr>
<td>Nuclear</td>
<td>18,000</td>
</tr>
<tr>
<td>Landfill Gas</td>
<td>13,000</td>
</tr>
<tr>
<td>Natural Gas</td>
<td>6,000</td>
</tr>
<tr>
<td>Ethanol</td>
<td>3-5 gal H₂O per</td>
</tr>
<tr>
<td></td>
<td>gal Ethanol</td>
</tr>
</tbody>
</table>

Maximum Approved Daily Consumptive Use

Maximum Approved Daily Consumptive Use (in mgd)

- Water Supply
- Power Generation
- Recreation
- Gas Drilling
- Manufacturing
- Other
- Mining
- Education

Current Estimate
Natural Gas Industry 
Actual Water Use Data*

- **Total Water Withdrawn:** 716.0 Million Gallons (mgal)
  - 209.2 mgal from public water supply (29%)
  - 506.8 mgal from surface water sites (71%)

- **Average Total Vol. of Fluid Used per Well:** 3.3 mgal
  - Average fresh water used per well: 2.8 mgal
  - Average flowback reuse per well: 0.5 mgal

- **Average Flowback per Well:** 11% of injected fluids in first 30-days

*220 wells reported (June 1, 2008 - May 21, 2010)
“The Commission’s vision for the Susquehanna River Basin is healthy ecosystems that provide groundwater and surface water of sufficient quality and in adequate supply to support abundant and diverse populations of aquatic, riparian, and terrestrial organisms, as well as human uses and enjoyment. Through enlightened planning for and management of the basin’s water resources, the health, safety and welfare of the its citizens are safeguarded during times of flooding and drought, a vibrant economy is sustained, the Chesapeake Bay’s water quality and living resources are improved, and an informed public is involved in resolving water resource issues. The Commission provides the necessary leadership and coordination of efforts among its member jurisdictions and with the private sector to make this vision a reality.”
Comprehensive Plan
Priority Management Areas

1. Water Supply
2. Water Quality
3. Flooding
4. Ecosystem
5. Chesapeake Bay
6. Coordination, Cooperation and Public Information
Requires SRBC to adopt a water resources program:

- Annually
- Based on Comprehensive Plan
- Listing programs and projects of SRBC and other authorized governmental and nongovernmental entities.
Priority Management Areas

**Water Supply, Goal A.**
Support and encourage the sustainable use of water for domestic, industrial, municipal, commercial, agricultural, and recreational activities in the basin.

**Water Quality, Goal D.**
Protect the quality of the basin’s biological resources and sources of public drinking water supply.

**Ecosystems, Goal A.**
Perform ecosystem monitoring and assessment to provide data needed for effective watershed management.
Planning and Legal concepts are related.
SRBC and municipalities have legal tools to achieve the ends.
Framers of SRB Compact would likely view locally crafted comprehensive plans as extension of SRBC Comp Plan.
Current SRBC Comp Plan embraces notion that this plan is for water managers at all levels of government.
MPC links water resource planning to river basin commissions.
The Commission recommends that Pennsylvania municipalities in the Susquehanna River Basin make full use of the authority contained in the Pennsylvania Municipalities Planning Code and related authorities to adopt comprehensive plans, local zoning and subdivision ordinances containing standards for ensuring that new developments incorporate adequate provisions for a reliable, safe and adequate water supply.”
SRBC Meetings and SRBC Staff
SRBC’s Marcellus Shale web page
www.srbc.net/programs/projreviewmarcellus.htm

Project Review
Susquehanna River Basin Commission

What’s New
About Us & Meetings
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Marcellus Shale and Natural Gas Well Development

Regulatory

Effective June 23, 2010, Post-Hydraulicfracture Reports are to be submitted online by the natural gas industry. The purpose of the Post-Hydraulicfracture Report is to track the volumes of water associated with the hydraulic fracturing process. To submit a report, login to the SRBC’s Monitoring Data Website using your previously assigned username and password. Under the “Hydraulicfracture” heading, choose “Review/Submit Reports” to access the Post-Hydraulicfracture Report. If you need assistance, please contact Jennifer Reese at (717) 238-0423, ext. 208 or jreese@srbc.net.

Project Review Regulations and Project Fee Schedule
Finance and Applications (includes Approval by Rule procedures for 18 CFR 905.22(f))

Standard SW Docket Conditions for Gas Wells
Standard OU Docket Conditions for Gas Wells

Projects Scheduled for Action
Final Rulemaking: Natural Gas Well Development Projects
On December 4, the commissioners approved final rulemaking regarding the
Geographic Location of Marcellus Shale within Susq. River Basin

72% of Basin (20,000 Sq. Miles) Underlain by Marcellus Shale
Recoverable Gas in Marcellus Shale

- Marcellus Shale: Recoverable Gas Reserves = 50-200 TCF
- 5,000-6,000 Wells to Be Drilled in SRB in 2009-2010
SRBC Water Withdrawal and Use Regulations

- Normal thresholds 100,000 gpd withdrawals and 20,000 gpd consumptive use.
- All water related to natural gas is regulated regardless of quantities.
- 100% of water use for natural gas is consumptive.
- Use “Approval by Rule” for consumptive use.
Concerns About Low-Flow Events
- Environmental Concerns -

- Water Quality
- Loss of Fishery Habitat
- Impacts on Recreational Uses
- Cumulative Impact of Consumptive Uses on Chesapeake Bay
SRBC’s Low Flow Planning and Management Roles

• Passby Requirements Imposed on Surface Withdrawals
• Mitigation of Cumulative Losses through Consumptive Use Requirements
• Consumptive Use Mitigation Plan
Coordination Challenges

- Critical Need for Interagency Coordination

- Critical Need for Understanding Applicable Laws and Requirements
Transmission Lines

- Water Involved in Pipeline Construction

- FERC Coordinates Issuance of Federal Authorizations for Natural Gas Infrastructure
### Shale Gas Well Development

<table>
<thead>
<tr>
<th>Year</th>
<th># Pads Approved by SRBC</th>
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<tr>
<td>2008</td>
<td>~50</td>
</tr>
<tr>
<td>2009</td>
<td>321</td>
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<tr>
<td>2010</td>
<td>(est.) ~1,200</td>
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<tr>
<td>Future</td>
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Susquehanna River Basin Commission  www.srbc.net
### Notice of Intents (NOIs) Submitted & ABRs Approved

<table>
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<tr>
<th></th>
<th>2009</th>
<th>2010 to Date (Sept. 24, 2010)</th>
<th>Total to Date (Sept. 24, 2010)</th>
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</thead>
<tbody>
<tr>
<td>NOIs Submitted</td>
<td>443</td>
<td>749</td>
<td>1,192</td>
</tr>
<tr>
<td>ABRs Issued</td>
<td>321</td>
<td>776</td>
<td>1,097</td>
</tr>
</tbody>
</table>
Remote Water Quality Monitoring Network

- Establish baselines.
- Verify whether or not natural gas and other activities are impacting streams.
- Allow for timely response.
- Enhance water supply protection.
- Use advanced technology to reduce cost of data collection.
- Form collaborative partnerships.
Our Precious Water Resources