Water Management Planning
Shale Gas/Oil Development

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Who Is American Water

We are the largest publicly traded water and wastewater utility in the United States

- Broad national footprint and strong local presence
- Services to an estimated 14 million people in more than 1,500 communities in more than 30 states and parts of Canada
- Approx. 6,700 dedicated and active employees
- Treats and delivers more than one billion gallons of water daily
Our Company

- Subsidiary of American Water Works Co., Inc.
- Roots date back to early 1800s, Incorporated in 1904
- Largest regulated water and wastewater service provider in PA
- Serving approximately 2.2 million people in 36 counties
- More than 1,000 employees
- Customer base:
  - 640,000 water customers
    - 92% residential
    - 7% commercial
    - 1% industrial/other
  - 17,000 wastewater customers
Pennsylvania American Water Service Area

Serving 17 percent of the Commonwealth’s population
Shale Development In the Northeastern United States

Lower 48 states shale plays

Source: Energy Information Administration based on data from various published studies. Updated: May 9, 2011
Unconventional Gas Well Development in Pennsylvania
Hydraulic Fracturing Overview

Water Acquisition

Chemical Mixing

Well Injection

Flowback and Produced Water

Storage tanks

Wastewater Treatment and Waste Disposal

Aquifer

Hydraulic fracturing often involves the injection of more than a million gallons of water, chemicals, and sand at high pressure down the well. The depth and length of the well varies depending on the characteristics of the hydrocarbon-bearing formation. The pressurized fluid mixture causes the formation to crack, allowing natural gas or oil to flow up the well.

Water Use in Hydraulic Fracturing Operations

Water Acquisition - Large volumes of water are transported for the fracturing process.

Chemical Mixing - Equipment mixes water, chemicals, and sand at the well site.

Well Injection - The hydraulic fracturing fluid is pumped into the well at high injection rates.

Flowback and Produced Water - Recovered water (called flowback and produced water) is stored on-site in open pits or storage tanks.

Wastewater Treatment and Waste Disposal - The wastewater is then transported for treatment and/or disposal.

Source: Draft EPA Hydraulic Fracturing Study Workplan
Water Usage - Unconventional Gas Well Development

- Preparation of drilling fluids requires 100-200,000 gallons per well.
- During “completions” or hydraulic fracturing, needs vary by company and well, typically between 3 MG and 6 MG per well in total.
- Generally, approximately 20-25% of the water used to complete a well is recycled (treated) flowback water from a nearby well.
- Energy companies must track and report water usages.
Water Type and Quality Needs

• Ground Water
  ▪ Wells and springs

• Surface Water
  ▪ Ponds
  ▪ Lakes
  ▪ Streams
  ▪ Rivers

• Public Water Supplies

Well Site during Fracking

• Suspended solids ~ < 10
• Dissolved Solids - varies
• Low relatively iron, barium, sulfates and chlorides quantities
• Water for drilling fluids usually requires higher quality
The “Water Management Plan” (WMP)

• Energy companies must have all water sources to be used in gas well development approved
  ▪ Pennsylvania Department Of Environmental Protection (PA DEP)
  ▪ Susquehanna River Basin Commission (SRBC) central PA
  ▪ Delaware River Basin Commission (DRBC) eastern PA

• Managed through PA DEP Bureau of Oil and Gas (BO&G)

• Energy developing company files a water management plan application (PWS does not need to supply separate WMP)

• BO&G reviews for completeness and coordinates with PA DEP Bureau of Safe Drinking Water (BSDW) to complete review

• BSDW at Regional Office may contact the Public Water Supplier with questions or for clarity

• BO&G coordinates the correspondence with Energy Company including WMP Approval letter
Best Practices When a PWS Serves Shale Development

- Modeling and field testing to ensure adequate supply and pressure is available
- Work within PA DEP Allocation permits and SRBC and DRBC docket limits
- Document conditions of commitment to supply water to energy company
- Do not overextend water systems capability
Best Practices (continued)

- Make the “commitment to supply” to energy companies an interruptible supply during times of water system stress (fires, main breaks, droughts)
- Standardized connections with backflow prevention
- Do not use hydrants
- Documents operating protocols
- Communication/coordination plan with energy companies
What PA DEP BWS review when PWS supply is involved

- Volume and rate of withdraw will not adversely impact water quality or quantity available to other permanent users
- Ensuring all necessary permits are obtained
- Cross connection/backflow prevention is meets drinking water standards
- Security of connection is provided to prevent unauthorized access (intentional or unintentional)
- Ensuring compliance with all SDWA and Water Allocation permit conditions
- Water loading instructions supplied, control, monitoring record keeping plan
- Specific bulk sales agreements are in place as applicable
- Bulk loading stations require a separate permit
In Summary

- Energy companies need to have proper approvals to use water from public water systems
  - PA DEP and/or SRBC or DRBC
- Use best practices in order to assess system’s water availability
- Have good security and operational control plans in place
- Recommend that supply is interruptible under water system stress
- Document “commitment to supply” to energy company
- Do not use hydrants for supply connections
Questions?