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DEPARTMENT OF ENVIRONMENTAL PROTECTION

Bureau of Safe Drinking Water

Safe Drinking Water Program
Public Water System Permitting

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PA Safe Drinking Water Program

- The Safe Drinking Water Program implements the 1984 Safe Drinking Water Act

- The Safe Drinking Water Act sets forth water quality, treatment and permitting requirements for safe, potable water

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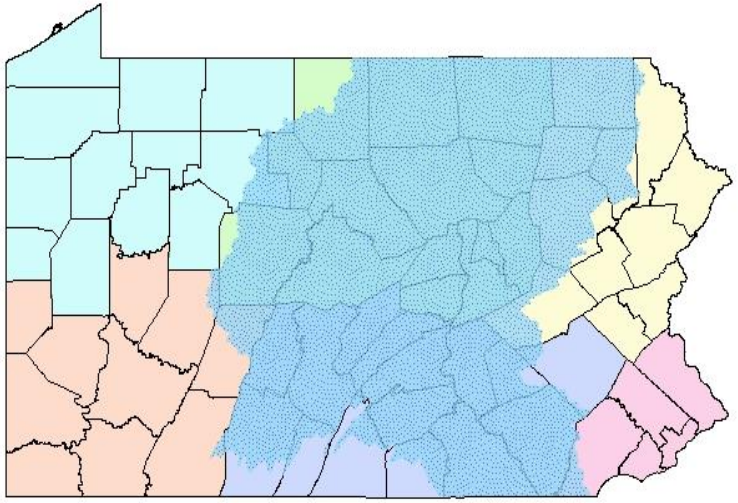
DEP Regions in the Susquehanna Basin

SCRO handles 15 counties in the basin: Adams, Bedford, Berks, Blair, Cumberland, Dauphin, Franklin, Fulton, Huntingdon, Juniata, Lancaster, Lebanon, Mifflin, Perry & York

SWRO handles 3 counties in the basin: Cambria, Indiana & Somerset

SERO handles 1 county in the basin: Chester



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NCRO handles 14 counties in the basin: Bradford, Cameron, Center, Clearfield, Clinton Columbia, Lycoming, Montour, Northumberland, Potter, Snyder, Sullivan, Tioga, & Union

NWRO handles 2 counties in the basin: Elk & McKean

NERO handles 6 counties in the basin: Lackawanna, Luzerne, Schuylkill, Susquehanna, Wayne & Wyoming

Definition of Public Water System

- What is a public water system?

According to the Safe Drinking Water Act: A system which provides water to the public for human consumption which has at least 15 service connections or regularly serves an average of at least 25 individuals daily at least 60 days out of the year…

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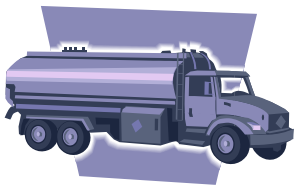
Definition of Public Water System

- Are there different kinds of public water systems?
  - **Community** – serves year round residents
  - **Nontransient, noncommunity** – serves the same 25 people at least 6 months per year
  - **Transient, noncommunity** – serves different people at least 60 days per year
  - **Bottled, vended, retail or bulk**



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Definition of Public Water System

- The 15-county South-central PA region has 2,435 public water supplies.

- ➢520 community
- ➢377 nontransient, noncommunity
- ➢2,447 transient, noncommunity
- ➢30 bottled, vended, retail or bulk

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Regulation of Public Water Systems

- PA SDWA Program elements include:
  - Protection of source waters and aquifers
  - Water quality standards
  - Operational requirements
  - Monitoring and reporting
  - Design and treatment standards
  - Permitting

- Emphasis on multiple barrier protection

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Regulation of Public Water Systems

- Permitting is required of all community systems and any noncommunity system providing treatment to meet a Primary MCL
  - DEP must review and approve any proposed changes before construction is started
  - PA law requires the public water supply to use licensed Professional Engineers to design public water supplies and obtain SDWA permits
  - DEP must also review constructed facilities and issue a SDWA permit authorizing use before any modified facilities may be used

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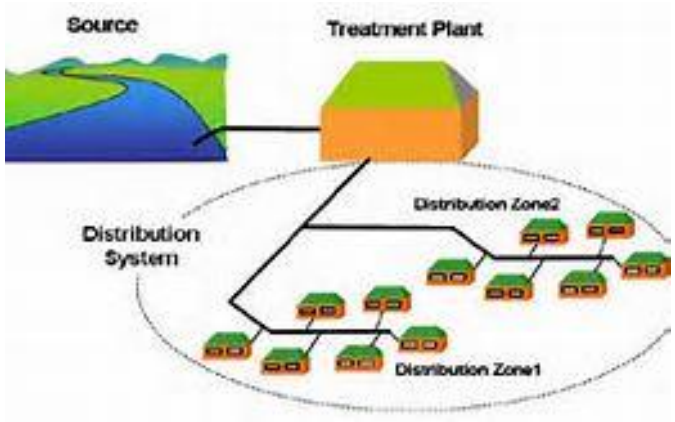
Regulation of Public Water Systems

- PADEP permits Public Water Systems: source, treatment, storage, pump stations and distribution system components
- PADEP Does not permit individual sources



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Regulation of Public Water Systems

- Activities which require a PWS permit include construction, operation and substantial modification of a PWS:
  - **Major Modifications**: New sources, Additions or deletions of treatment techniques, Pumping Stations and Storage Reservoirs.
  - **Minor Modifications**: Changes in treatment chemicals, Replacement of storage tank or reservoir linings, Covering of reservoirs, Construction for prefabricated storage tanks, Transmission mains, Interconnections and Permit Transfers.

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Public Water System Permitting

Two-part PWS permitting process:

- PWS Construction Permit: The applicant must obtain a PWS construction permit issued by DEP prior to initiation of construction activities
- PWS Operation Permit: The applicant must obtain a PWS operation permit issued by DEP prior to initiation of operation of PWS facilities approved under the PWS construction permit
- PWS permits are subject to DEP's Permit Review Process (PRP) and Permit Decision Guarantee (PDG)

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Public Water System Permitting

Permit Review Process (PRP) for PWS Permits:

- PWS Construction Permit:
  - New PWS system construction permits and major amendments for construction: 120 business days
  - Minor permit amendments for construction: 60 business days
  - Transfer of ownership: 60 business days
- PWS Operation Permit:
  - New and amended operation permits: 20 business days

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Public Water System Permitting

Public Water Supply Operation Permits

- Issued with a instantaneous maximum rate

- Not Renewable:
  - Valid until conditions in the permit change
    - Examples: Additional treatment is needed, PWS wants to increase the yield of the well, The source is impacting adjacent users or resources

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Permitting a New Source

Typical wellhead with submersible pump

A water supply shall engage the services of a licensed professional engineer who is legally qualified to practice in Pennsylvania, and who is competent in the design and construction of water supply facilities. When the proposed source is a groundwater source, the party shall also engage the services of a licensed professional geologist who is legally qualified to practice in Pennsylvania. The geologist shall be competent in groundwater source siting and hydrogeologic investigations.

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Hydrogeologic Requirements

- **Steps involved in permitting a new well:**

- ✓ Site Survey
- ✓ Pre-drill Plan Approval
- ✓ Aquifer Test Monitoring Plan Approval
- ✓ Pre-application Meeting (Recommended)
- ✓ Submission of Application – Planning Modules, Engineer's Report, Geologist's Report, Detailed Plans and Specifications and New Source Sample Results

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Site Survey

An on-site meeting with the Water System, their Professional Geologist and DEP

- Purpose of project including quantity needed
- Best Source Available
- Review of proposed well locations
- Zone I Wellhead Protection Area Requirements
- Discussion of Surface Water Influence (SWIP)
- Review of Potential Sources of Contamination
- Preliminary review of geologic/drilling conditions
- Preliminary identification/discussion of adjacent water resources and users
- Discuss aquifer test monitoring locations
- Pennsylvania Conservation Explorer (Pennsylvania Natural Diversity Index)

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Zone I Wellhead Protection Area

- **The Zone I WHPA is defined as a 100-400 ft radius around the source.**

- Must own or control through deed restriction the Zone I WHPA
- Must preserve the natural state of the Zone I WHPA and prohibit activities that could have the potential to adversely impact the source's quantity or quality
- Only chemicals and materials used in the production or treatment or both of drinking water are allowed.

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Zone I Wellhead Protection Area

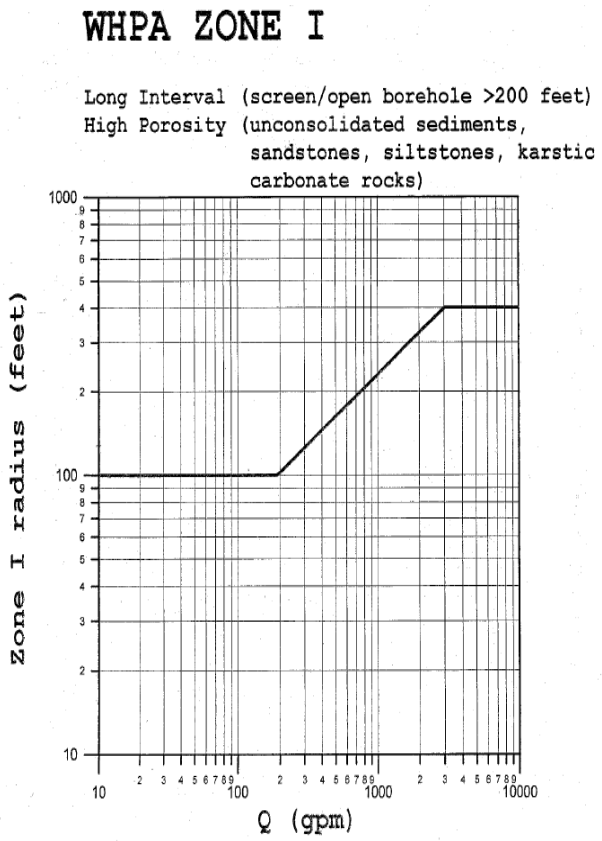
- **Calculating the Zone I WHPA**

  - **The Zone I WHPA radius is dependent on site-specific source and aquifer characteristics**

  - **Can be calculated using the volumetric flow equation or using DEP's Compliance Assistance Document *Recommended Wellhead Protection Area Zone I Delineation Methodology***

$$r = \sqrt{(Qt/\pi nH)} \qquad \text{(Equation 1)}$$

where Q = pumping rate of well (ft^3/day)
t = time of pumping (days)
π = pi (~3.1415926)
n = porosity (dimensionless; percentage expressed as a decimal)
H = saturated thickness (feet; typically open interval or length of well screen).



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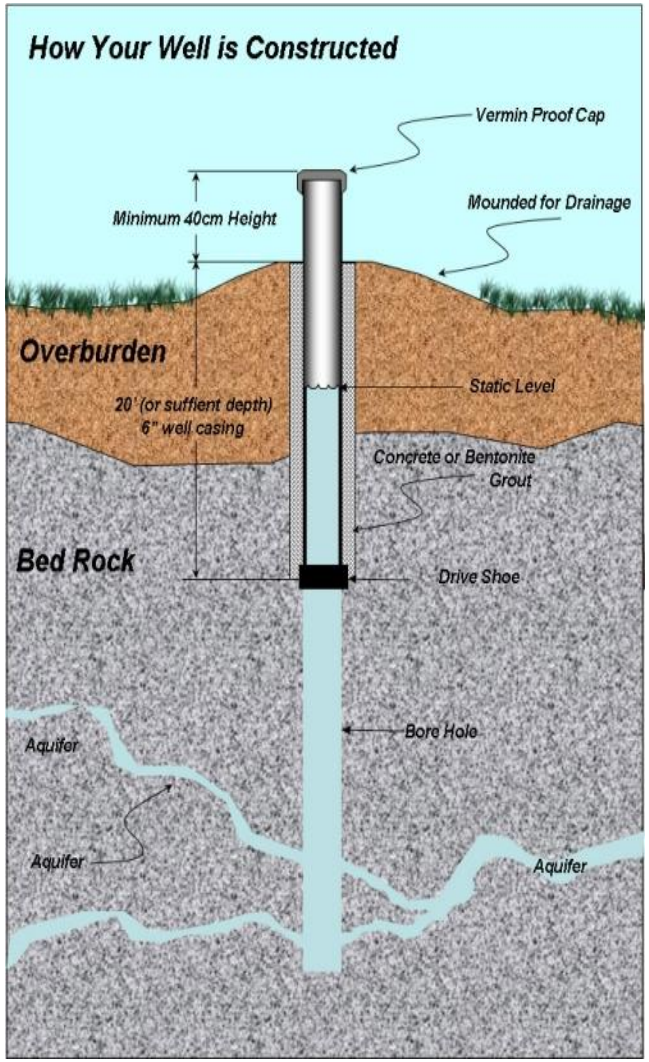
Well Construction Standards



- The well should be tested for plumbness and alignment
- Shall be constructed to be watertight and meet minimum protected depths
  - **In consolidated rock formations casing shall be equipped with a drive shoe and seated into competent bedrock**
  - **In unconsolidated rock formations the permanent casing and grout shall extend at least 50 ft below original or final ground elevation**
- Well Casing Material must meet AWWA's Standard A100 for Water Wells for minimum weights and thickness
- Well Screens should have the maximum amount of open area and have sufficient diameter to prevent the entrance velocity from exceeding 0.1 ft/sec
- All permanent well casings shall be surrounded by a minimum of 1.5 inches of grout the entire length of the casing
- Upper Terminal Well Construction
  - **Shall extend 18 inches above final grade**
  - **At least 3 feet above highest know flood elevation.**
  - **Shall not be constructed in pits**

- Well Development to obtain maximum specific capacity

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Pre-drill Plan Requirements

PDP submitted by PG for DEP review and approval prior to drilling

- Purpose of project including quantity needed
- Pennsylvania Conservation Explorer Search Results
- Geologic Description
- Expected depth, anticipated yield and water quality
- Well construction - Drilling technique, casing, grouting and drive shoe
- Proper Erosion and Sedimentation controls for the drilling of the well
- Well logging procedure
- Well development procedure

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Aquifer Test Monitoring Plan

Minimum 72-hour Constant Rate Aquifer Test and monitoring for adverse offsite impacts

- Monitoring Network should allow for the identify and assessment of potential impacts that use of a new source(s) will, or could have, on adjacent wetlands, surface water bodies, public and private wells, springs, or other surface and subsurface water features

- Should avoid heavy rain events, or rapid changes in water table elevation or during a time of groundwater recession.

- Four components of a aquifer test
  - Step Test
  - Background Test
  - Constant Rate Test
  - Recovery Test

Table 5.1:
Recommended Maximum Frequency of Water Level Measurements for the Stepped-Rate Test

Time Since Pumping Began	*Time Between Measurements*
0-10 Minutes	1 Minute
10-20 Minutes	2 Minutes
20-60 Minutes	5 Minutes
60+ Minutes	10 Minutes

Table 5.2:
Recommended Maximum Frequency of Water Level Measurements for the Constant-Rate Aquifer Test

Time Since Pumping Began	*Time Between Measurements*
0-10 Minutes	1 Minute
10-30 Minutes	5 Minutes
30-60 Minutes	10 Minutes
1-6 Hours	30 Minutes
6-24 Hours	1 Hour
24 Hours-Termination	2 Hours

New Source Sampling

Conducted at end of 72-hour Aquifer Test

- Primary Maximum Contaminant Levels (PMCLs) based upon health protection
- Secondary Maximum Contaminant Levels (SMCLs) based upon aesthetics
- Must sample for all 90 health-based standards, 13 aesthetic-based standards
- Must sample for Asbestos, Dioxin and PCB's unless a Wavier is requested
- Contact PADEP at least two Weeks prior to aquifer test to collect a Microscopic Particulate Analysis Sample (MPA)

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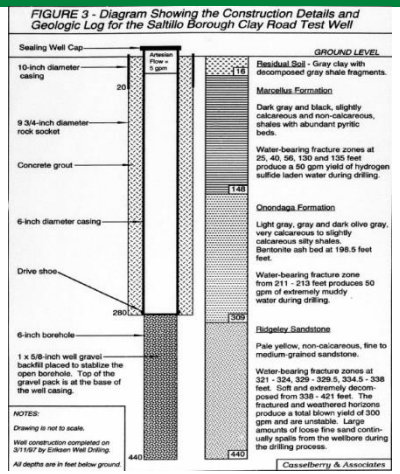
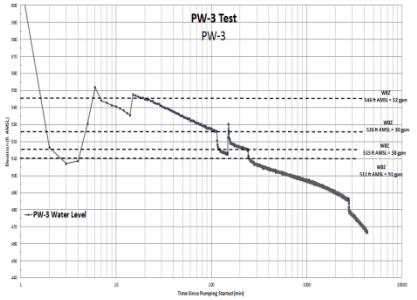
Hydrogeologic Report



- Well and Stratigraphic logs for each well drilled including
  - Formation changes
  - Water Bearing Zones and yields
  - Casing and Drive Shoe
  - Static Water level
- Aquifer Test results
  - Step test results
  - Length and pumping rate
  - Time vs drawdown curves
  - Recovery plots
  - Residual drawdown vs. t/t' recovery analysis
- Aquifer characteristics - **show equations used and calculations.**
  - Hydraulic Conductivity
  - Transmissivity
  - Storage coefficient
  - Specific Capacity
- Dependable Source Yield with Justification
- A description of potential impacts that using the new source will, or could have, on adjacent wetlands, surface waterbodies, private or public wells, springs or other adjacent surface and subsurface water features.
  - How the new source is hydraulically connected to the impacted feature
  - The anticipated extent of impact
  - Any proposed remediation or mitigation



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Summary

- PADEP permits Systems not individual sources
- PADEP permits are nonrenewable and valid until conditions in permit change
- PADEP focuses on water quality and quantity issues
- In Susquehanna Basin PADEP coordinates with the SRBC for permitting. A lot of the permitting process for each Agency is the same but there are differences and not all PADEP requirements fulfill SRBC requirements and vice versa.
    - ✓ Well Construction Standards
    - ✓ Zone I WHPA
    - ✓ New Source Sampling
    - ✓ SWIP Monitoring

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