



# Schuylkill Action Network (SAN) Abandoned Mine Drainage (AMD) Treatment Systems Monitoring Plan

*Adopted: September 2019*

*Revised: March 2023*

## I. Introduction

### A. Background

*Abandoned mine drainage* (AMD) is water that becomes polluted after being in contact with abandoned coal mines. AMD is created deep below the ground where water fills mining tunnels that were once kept dry by active pumping operations. Water and oxygen react with lingering iron sulfide (pyrite) producing metal-laden and sometimes highly acidic discharges that exit the tunnels in orange and silver plumes, easily visible in waterways.

AMD interferes with plant growth and reproduction of aquatic animals by leaving deposits of iron and other metals on the streambed. Acidity and metals impair drinking water resources and quickly corrode pipes and other infrastructure. Waterways affected by AMD can hinder tourism and recreational opportunities like fishing, boating, and swimming.

The [Schuylkill Action Network](#) (SAN) AMD Workgroup was formed to provide support and coordination among partners working to address AMD. SAN AMD Workgroup projects restore and protect waterways, providing eco-based economic development and recreational enjoyment for present and future generations.

### B. Purpose

Over the years, SAN AMD partners have implemented a variety of passive treatment systems to remove heavy metals before entering the headwaters of the Schuylkill River. Some of these treatment systems are over 10 years old and the workgroup seeks to understand how they are functioning years later.

The AMD workgroup is conducting sampling at the inflow and outflow of the treatment systems listed in Section III. A. By comparing water quality entering and exiting the systems, the workgroup is able to assess the functionality of the systems. Additionally, this data may be helpful in understanding and prioritizing systems that need retrofitting and/or maintenance.

II. **Partners** - The partners involved with this monitoring plan include, but are not limited to, the following organizations and agencies.

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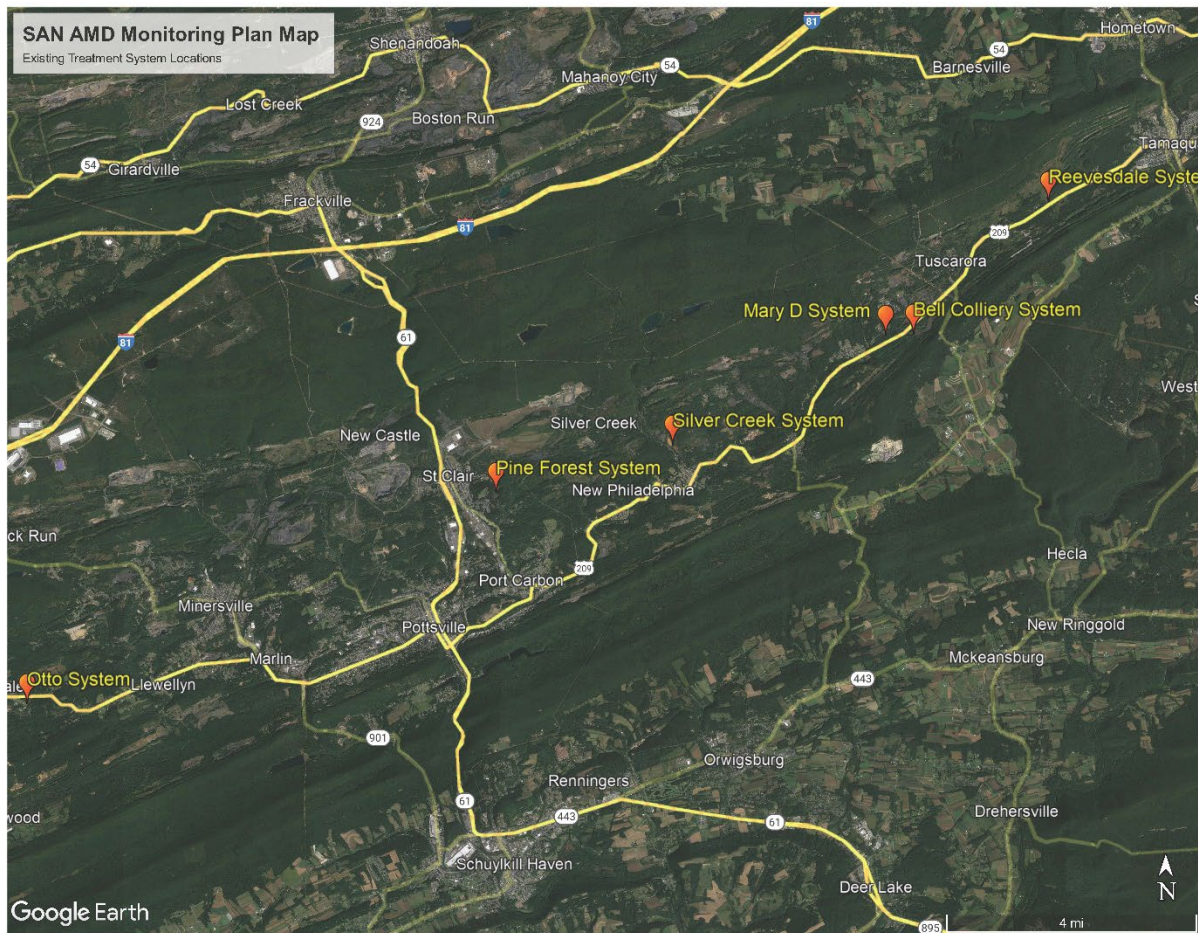
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### III. Monitoring Details

#### A. Map of Treatment Systems



## B. Treatment Systems

### 1. Bell Colliery



- a) **Goal:** Increase alkalinity/reduce acidity; remove heavy metals, primarily iron
- b) **Date Installed:** Phase I in 2002; Phase II in 2006; Phase III in 2009; Retrofit in 2013
- c) **Location (Nearest Street Address):** Valley St. & Route 209, Tamaqua, PA 18252
  - (1) **Access Info:** Private property. Access is off of Route 209, across from the intersection of Valley St. There is a yellow gate that is locked. SHA and SCD have key for gate access. Follow gravel road to system.
- d) **Location (Latitude, Longitude)**
  - (1) **Inflow:** 40.753332, -76.048804
  - (2) **Outflow:** 40.753192, -76.050302
- e) **Watershed/Subwatershed:** Upper Schuylkill
- f) **More Information:** <http://www.schuylkillcd.org/documents/Watershed/Bell%20Colliery.pdf> & <https://www.schuylkillwaters.org/projects/bell-colliery-treatment-system>

## 2. Mary D



- a) **Goal:** Increase alkalinity/reduce acidity; remove heavy metals, primarily iron
- b) **Date Installed:** 2013
- c) **Location (Nearest Street Address):** Valley St. & Coal St. Mary D, PA 17952
  - (1) **Access Info:** Access is right off of Valley St, can pull off the road and park in front of yellow/tan gate. Intake to system is reached by Coal St where there is a box inlet that intakes water from the borehole.
- d) **Location (Latitude, Longitude):**
  - (1) **Inflow:** 40.755491, -76.057105
  - (2) **Outflow:** 40.753094, -76.057244
- e) **Watershed/Subwatershed:** Upper Schuylkill
- f) **More Information:** <http://schuylkillheadwaters.org/projects/watershed-restoration-projects/> & <https://www.schuylkillwaters.org/projects/mary-d-borehole>

### 3. Pine Forest



- a) **Goal:** Increase alkalinity/reduce acidity; remove heavy metals, primarily iron
- b) **Date Installed:** 2007
- c) **Location (Nearest Street Address):** Caroline Ave., Pottsville, PA 17901
  - (1) **Access Info:** Private property. Access is off of Burma Road. If traveling north on Burma Road, entry is on right. There is a gate that is now open, follow gravel road to system.
- d) **Location (Latitude, Longitude)**
  - (1) **Inflow:** 40.718875, -76.176495
  - (2) **Outflow:** 40.715127, -76.176887
- e) **Watershed/Subwatershed:** Upper Schuylkill / Mill Creek
- f) **More Information:** <http://schuylkillheadwaters.org/projects/watershed-restoration-projects/> & <https://www.schuylkillwaters.org/projects/pine-forest>

#### 4. Reevesdale



- a) **Goal:** Increase alkalinity/reduce acidity, remove heavy metals
- b) **Date Installed:** Phase 1 in 2006; Phase 2 in 2019
- c) **Location (Nearest Street Address):** Old 209 Road, Tamaqua, PA 18252
  - (1) **Access Info:** Private property. Access is off of Old 209 Road. If traveling northeast on old 209, entry is on the left. There is a gate that is locked, SHA and SCD have key for gate. Walk on dirt/stone road up hill to the system.
- d) **Location (Latitude, Longitude)**
  - (1) **Inflow:** 40.784340, -76.007695
  - (2) **Outflow:** 40.783816, -76.007501
- e) **Watershed/Subwatershed:** Upper Schuylkill / Wabash Creek
- f) **More Information:** <http://schuylkillheadwaters.org/projects/watershed-restoration-projects/> & <https://www.schuylkillwaters.org/projects/reevesdale-south-dip-tunnel>

## 5. Silver Creek



- a) **Goal:** Increase alkalinity/reduce acidity; remove heavy metals, primarily iron
- b) **Date Installed:** 2010
- c) **Location (Nearest Street Address):** 112 Furnace Rd., New Philadelphia, PA 17959
  - (1) **Access Info:** Follow township road, Pine Street, to New Philadelphia Road (dirt) which will take you by system. Access gate is on left side if traveling north. Gate is locked, SHA and SCD have key to gate. System can also be reached from Furnace Road. If traveling north, dirt road will be on the right side and will lead to a parking loop with access to system.
- d) **Location (Latitude, Longitude)**
  - (1) **Inflow:** 40.729656, -76.123772
  - (2) **Outflow:** 40.726475, -76.121183
- e) **Watershed/Subwatershed:** Upper Schuylkill
- f) **More Information:** <http://schuylkillheadwaters.org/projects/watershed-restoration-projects/> & <https://www.schuylkillwaters.org/projects/silver-creek-treatment-system>



6. **Otto**



- a) **Goal:** Remove heavy metals, primarily iron and reduce acidity
- b) **Date Installed:** 2005; retrofitted in the fall of 2022
- c) **Location (Nearest Street Address):** Spruce Street, Branchdale, PA 17923
  - (1) **Access info:** Continue on Spruce Street in Branchdale until you come to small park area with playground and ball field. Park here and continue straight on the dirt road until you come to treatment system.
- d) **Location (Latitude/Longitude):**
  - (1) **Inflow:** [40.667566, -76.319724](#)
  - (2) **Outflow:** [40.668507, -76.318508](#)
- e) **Watershed/Subwatershed:** West Branch of Schuylkill River / Muddy Branch
- f) **Other Information:** <https://schuylkillheadwaters.org/projects/watershed-restoration-projects/> & <https://schuylkillwaters.org/projects/otto-treatment-system-optimization>

**C. Parameters** - The following parameters will be monitored in the field, using a YSI Professional Plus handheld multiparameter meter.

**1. Field Parameters**

<b>Parameter</b>	<b>Unit of Measurement</b>	<b>Description (what this parameter indicates)</b>
Dissolved Oxygen (DO)	Percentage (%) and milligrams per liter (mg/l)	Amount of gaseous oxygen dissolved in water.
Flow	Gallons per minute (gpm)	Volumetric discharge, expressed over a certain period of time.
pH	0-14	Measure of acidity or alkalinity.
Specific Conductance (Conductivity)	MicroSiemens per centimeter (uS/cm)	Waters ability to conduct an electric current.
Temperature	Degrees, Celcius (oC)	The degree of hotness or coldness.

2. **Lab Parameters-** The following parameters will be analyzed in Aqua’s lab according to their lab procedures, policies, and QA/QC methods.

<b>Parameter</b>	<b>Unit of Measurement</b>	<b>Description (what this parameter indicates)</b>
Alkalinity	Milligrams per liter (mg/l)	Capacity of water to neutralize acids (resist changes in pH that would make water more acidic).
Aluminum (Al)	Milligrams per liter (mg/l)	The concentration of aluminum (heavy metal) in water.
Iron (Fe)	Milligrams per liter (mg/l)	The concentration of iron (heavy metal) in water.
Manganese (Mn)	Milligrams per liter (mg/l)	The concentration of manganese (heavy metal) in water.
pH	0-14	Measure of acidity or alkalinity.
Sulfate (SO <sub>2</sub> -)	Milligrams per liter (mg/l)	The concentration of sulfate (SO <sub>2</sub> -) in water.
Total Suspended Solids (TSS)	Milligrams per liter (mg/l)	The amount of suspended particles, that are not dissolved, in water.

**Monitoring Frequency** - Monitoring will be conducted biannually in January and July as capacity, weather, and other factors allow.

**IV. Data Use and Management**

The partners listed in Section II will have access to the data compiled and shared after each sampling date. Schuylkill Conservation District will be responsible for merging the lab and field data into a spreadsheet and sharing with SAN AMD partners.

Data will be used to measure effectiveness of current treatment systems and will guide future design decisions of treatment systems. The data will also help in determining and prioritizing which systems need retrofitting and/or maintenance.

**V. Amendments**

The SAN AMD Monitoring Plan may be reviewed and updated as needed by the AMD workgroup.