AMD Treatment
New Stanton District Mining Operations

Mining and Reclamation Advisory Board
Meeting of April 19, 2018

Tom Wolf, Governor       Patrick McDonnell, Secretary
• Tentative Schedule
  o 9:00 Depart New Stanton DMO
  o 10:30 Arrive at Mount Morris Passive Treatment System
  o 12:15 Lunch in Washington, PA
  o 2:00 Arrive at Mathies H2O2 Treatment System
  o 3:45 Approximate return to New Stanton DMO
Mt. Morris Passive Treatment System

Patriot Mining Company
Mt. Morris Surface Mine
SMP 30010101
Perry and Dunkard Townships, Greene County
Gated Outlet Structures
Mt. Morris Water Quality

**Average Raw Water**
- pH 5.5
- Acidity 100 mg/L
- Alkalinity 20 mg/L
- Iron 40 mg/L
- Manganese 30 mg/L
- Aluminum 3 mg/L
- Sulfate 1500 mg/L

**Average Treated Water**
- pH 7.7
- Acidity 0 mg/L
- Alkalinity 150 mg/L
- Iron 0.1 mg/L
- Manganese <0.1 mg/L
- Aluminum <0.2 mg/L
- Sulfate 600 mg/L
Downstream Water Quality

DOWNSTREAM MANGANESE (mg/L)
Hydrogen Peroxide Treatment System

Mathies Mine

Union Township, Washington County

Tom Wolf, Governor
Patrick McDonnell, Secretary
Mathies Mine Treatment System Overview

- Mine Opening
- Peroxide Tank
- Injection Site
- Pond 1
- Pond 2
- Pond 3 With Wetland
- Treated Water Outfall
## Mathies Mine Water Quality

<table>
<thead>
<tr>
<th>Parameter</th>
<th>1992 - 2010</th>
<th>2011 - 2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flow</td>
<td>1344.2 est. gpm</td>
<td>1196.1 est. gpm</td>
</tr>
<tr>
<td>pH</td>
<td>6.9</td>
<td>7.0</td>
</tr>
<tr>
<td>Alkalinity</td>
<td>294.1 mg/L</td>
<td>376.7 mg/L</td>
</tr>
<tr>
<td>Acidity</td>
<td>-294.6 mg/L</td>
<td>-310.4 mg/L</td>
</tr>
<tr>
<td>Iron</td>
<td>27.5 mg/L</td>
<td>46.1 mg/L</td>
</tr>
<tr>
<td>Manganese</td>
<td>1.8 mg/L</td>
<td>1.6 mg/L</td>
</tr>
<tr>
<td>Aluminum</td>
<td>2.2 mg/L</td>
<td>4.7 mg/L</td>
</tr>
<tr>
<td>Sulfates</td>
<td>1120.3 mg/L</td>
<td>862.3 mg/L</td>
</tr>
<tr>
<td>Total Suspended Solids</td>
<td>49.1 mg/L</td>
<td>89.5 mg/L</td>
</tr>
</tbody>
</table>
Originally, the Mathies Mine discharge was treated with hydrated lime. In order to lower treatment costs and prolong the life of the treatment trust fund the Department converted the system to hydrogen peroxide.
# The Use of Hydrated Lime

## Hydrated Lime – used prior to 2011

<table>
<thead>
<tr>
<th>Pros</th>
<th>Cons</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cheap to purchase</td>
<td>Produces a heavy sludge</td>
</tr>
<tr>
<td>Alkaline</td>
<td>Not 100% calcium bicarbonate</td>
</tr>
<tr>
<td>Quicker settling times</td>
<td>Higher maintenance</td>
</tr>
</tbody>
</table>

# The Use of Hydrogen Peroxide

## Hydrogen Peroxide – used after 2011

<table>
<thead>
<tr>
<th>Pros</th>
<th>Cons</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low maintenance</td>
<td>Expensive to purchase</td>
</tr>
<tr>
<td>Produces a very fine particle</td>
<td>Longer settling times</td>
</tr>
<tr>
<td>Diluted with distilled water</td>
<td>Highly reactive</td>
</tr>
</tbody>
</table>

**Pros**
- Low maintenance
- Produces a very fine particle
- Diluted with distilled water

**Cons**
- Expensive to purchase
- Longer settling times
- Highly reactive

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**Image Descriptions**

- **Image 1:** A bottle labeled **Hydrogen Peroxide 50%** with hazard symbols indicating it is a DANGER STRONG OXIDIZER CORROSIVE material.
- **Image 2:** A label with symbols indicating **HYDROGEN PEROXIDE 50%**, showing health and safety warnings.
- **Image 3:** A label with symbols indicating **HYDROGEN PEROXIDE 50%**, showing fire fighting instructions and storage instructions.

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**References**

- Somogyi, Matthew (2011)
- Somogyi, Matthew (2018)

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**Somogyi, Matthew (2011)**

**Somogyi, Matthew (2018)**
Installation of the Hydrogen Peroxide System

Beginning in 2011:

- A synthetic linear was installed in Pond 1
- Pond 3 and the wetland was constructed
- A concrete pad was poured to house the hydrogen peroxide tank and peristaltic pump
- Stainless steel injection lines were installed
Pond 1

135’ x 100’

Somogyi, Matthew (2018)
Pond 2

370’ x 50’

Somogyi, Matthew (2018)
Pond 3

325’ x 50’

Somogyi, Matthew (2018)
Wetland

310’ x 50’
## Treated Water

<table>
<thead>
<tr>
<th></th>
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<th></th>
</tr>
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<tbody>
<tr>
<td>Flow</td>
<td>1344.2 est. gpm</td>
<td>1196.1 est. gpm</td>
</tr>
<tr>
<td>pH</td>
<td>8.0</td>
<td>7.4</td>
</tr>
<tr>
<td>Alkalinity</td>
<td>262.9 mg/L</td>
<td>366.4 mg/L</td>
</tr>
<tr>
<td>Acidity</td>
<td>Negative</td>
<td>-323.5 mg/L</td>
</tr>
<tr>
<td>Iron</td>
<td>2.8 mg/L</td>
<td>2.8 mg/L</td>
</tr>
<tr>
<td>Manganese</td>
<td>.6 mg/L</td>
<td>1.4 mg/L</td>
</tr>
<tr>
<td>Aluminum</td>
<td>.5 mg/L</td>
<td>.5 mg/L</td>
</tr>
<tr>
<td>Sulfates</td>
<td>1093.9 mg/L</td>
<td>887.7 mg/L</td>
</tr>
<tr>
<td>Total Suspended Solids</td>
<td>69.2 mg/L</td>
<td>23.3 mg/L</td>
</tr>
</tbody>
</table>
Since the implication of the hydrogen peroxide system, the Department has saved an estimated $150,000 annually in chemical, electrical, and maintenance costs! Paired with a highly competitive hydrogen peroxide industry, our chemical costs continue to decrease.
New Stanton District Mining Office
724.925.5500

For information on the Monview Mathies Trust Fund please visit
Monview Mathies Trust CO&A | Monview Mathies Trust Participation Agreement