



Bureau of Mining Programs

# AMD Treatment New Stanton District Mining Operations

Mining and Reclamation Advisory Board  
Meeting of April 19, 2018

Tom Wolf, Governor

Patrick McDonnell, Secretary

# ▶ MRAB Field Trip- July 18, 2018

- Tentative Schedule
  - 9:00 Depart New Stanton DMO
  - 10:30 Arrive at Mount Morris Passive Treatment System
  - 12:15 Lunch in Washington, PA
  - 2:00 Arrive at Mathies H2O2 Treatment System
  - 3:45 Approximate return to New Stanton DMO



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# Mt. Morris Passive Treatment System

Patriot Mining Company

Mt. Morris Surface Mine

SMP 30010101

Perry and Dunkard Townships, Greene County

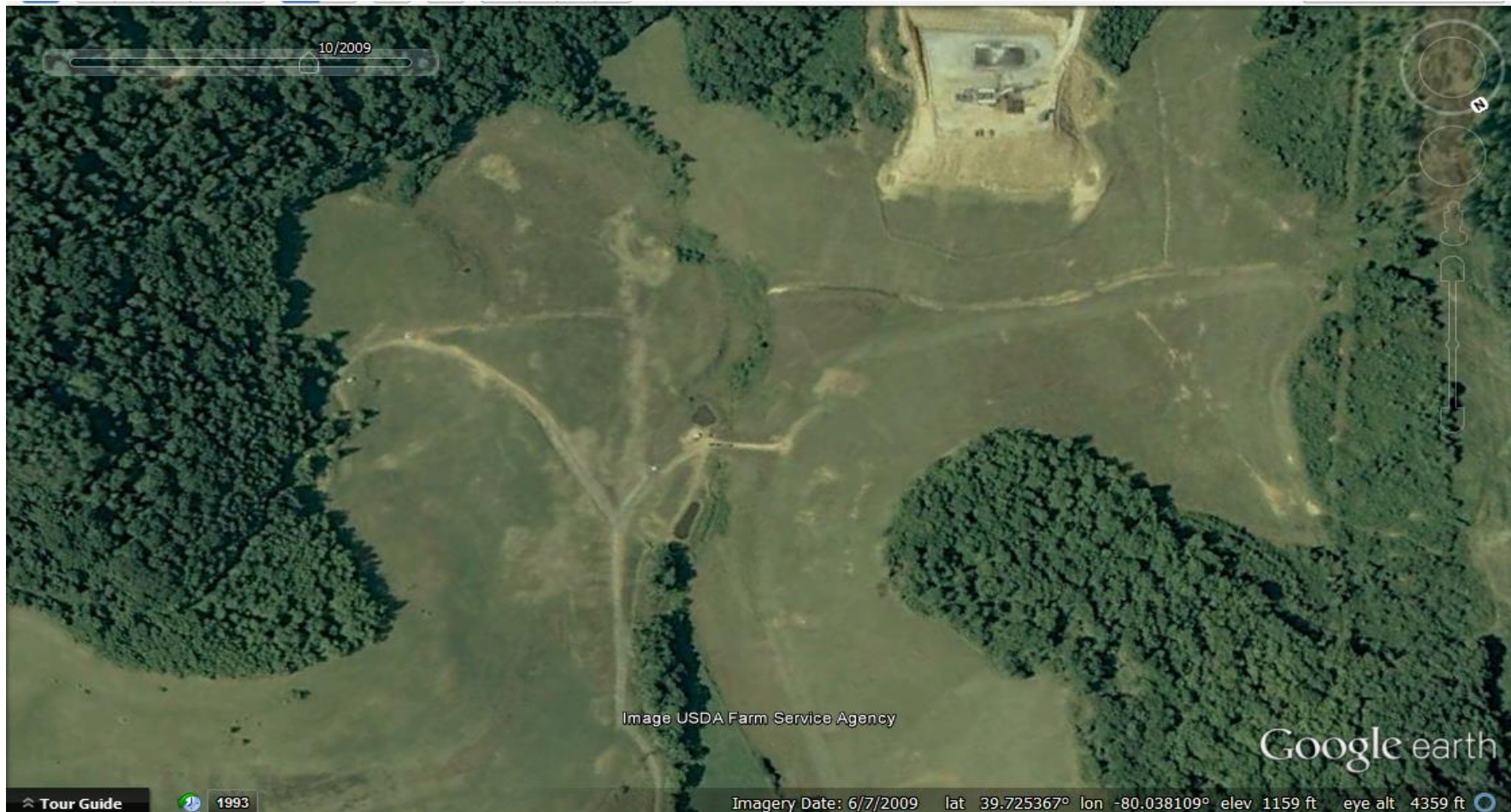
# ▶ Google Earth Tour- 12/31/2002



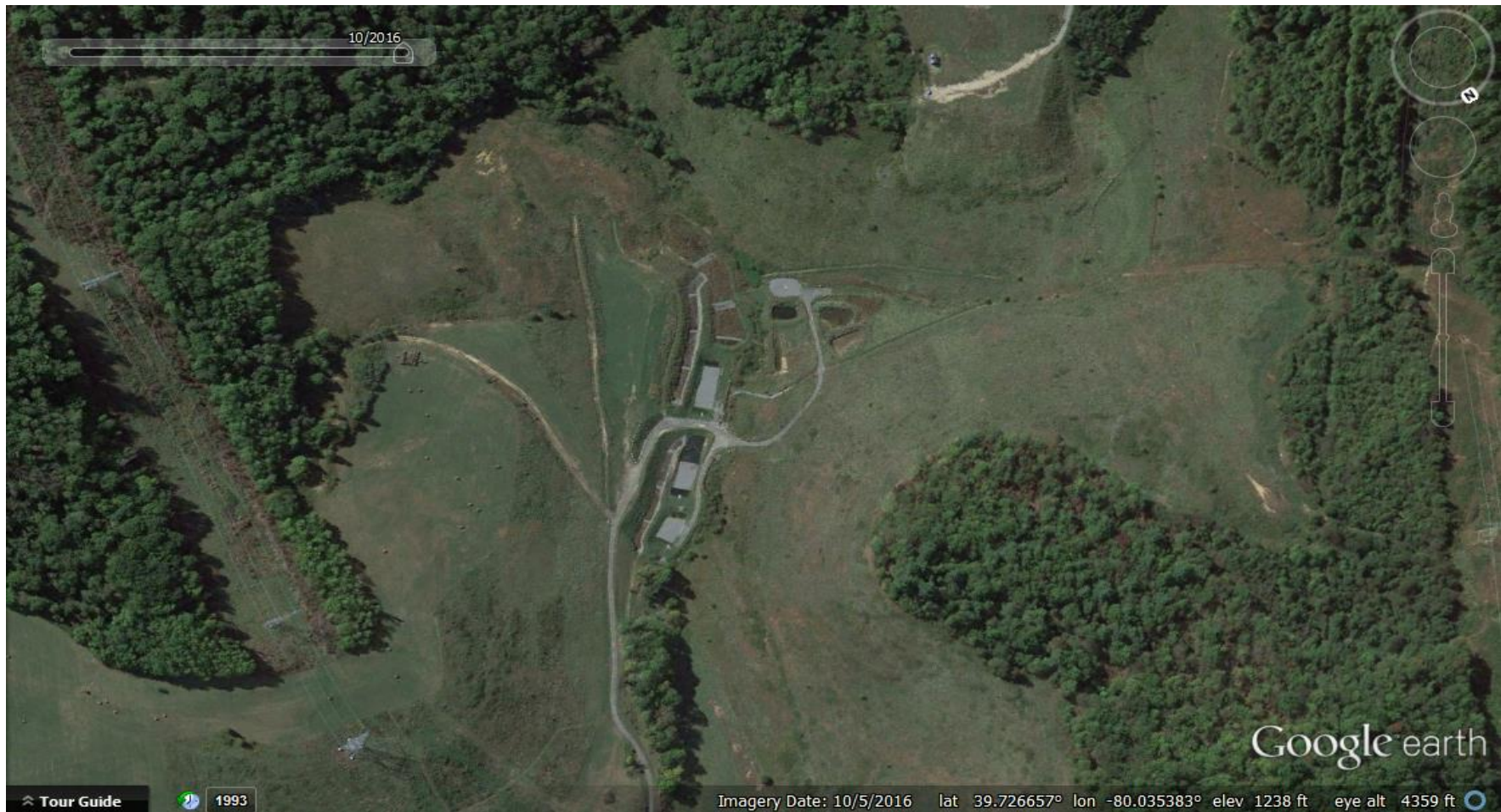
# ▶ Google Earth Tour- 6/6/2005



# ▶ Google Earth Tour- 6/7/2009



# ▶ Google Earth Tour- 10/5/2016





08.05.2015



Drain

112

W Seep

109

Outfall

08.05.2015

# ▶ Gated Outlet Structures



# Mt. Morris Water Quality

## Average Raw Water

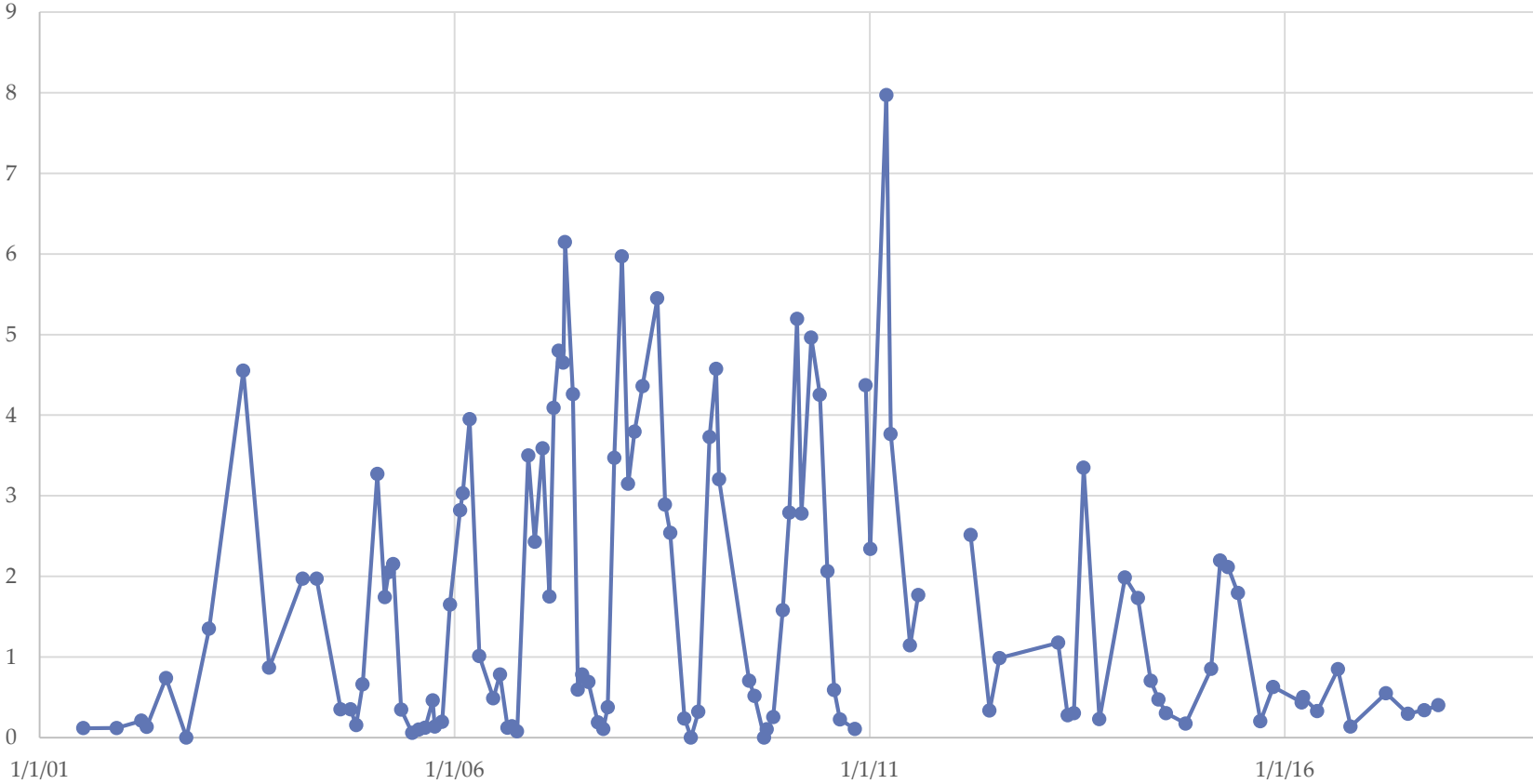
- pH 5.5
- Acidity 100 mg/L
- Alkalinity 20 mg/L
- Iron 40 mg/L
- Manganese 30 mg/L
- Aluminum 3 mg/L
- Sulfate 1500 mg/L

## 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)





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# Hydrogen Peroxide Treatment System

## Mathies Mine

Union Township, Washington County

Tom Wolf, Governor

Patrick McDonnell, Secretary

# Mathies Mine Treatment System Overview



# Mathies Mine Water Quality

	1992 - 2010	2011 - 2018
Flow	1344.2 est. gpm	1196.1 est. gpm
pH	6.9	7.0
Alkalinity	294.1 mg/L	376.7 mg/L
Acidity	-294.6 mg/L	-310.4 mg/L
Iron	27.5 mg/L	46.1 mg/L
Manganese	1.8 mg/L	1.6 mg/L
Aluminum	2.2 mg/L	4.7 mg/L
Sulfates	1120.3 mg/L	862.3 mg/L
Total Suspended Solids	49.1 mg/L	89.5 mg/L

## Mathies Mine Treatment System

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

### Pros

Cheap to purchase

Alkaline

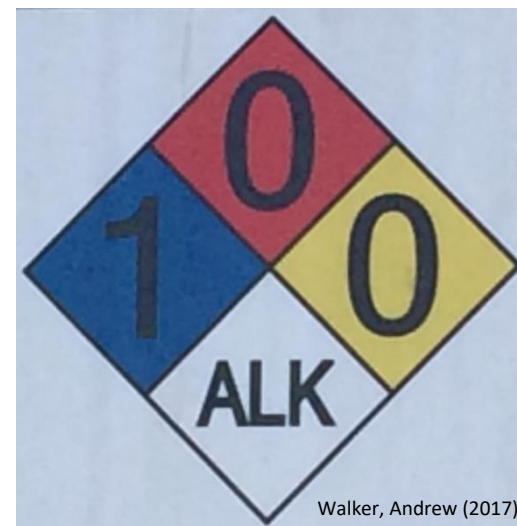
Quicker settling times

### Cons

Produces a heavy sludge

Not 100% calcium bicarbonate

Higher maintenance



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# ▶ The Use of Hydrogen Peroxide

## Hydrogen Peroxide – used after 2011

Pros	Cons
Low maintenance	Expensive to purchase
Produces a very fine particle	Longer settling times
Diluted with distilled water	Highly reactive



Somogyi, Matthew (2018)

FOR INDUSTRIAL USE ONLY

BEFORE USING, READ AND UNDERSTAND CURRENT MATERIAL SAFETY DATA SHEET FOR THIS PRODUCT

### HYDROGEN PEROXIDE 50%

**DANGER: STRONG OXIDIZER, CORROSIVE**

COMPONENTS INCLUDE:  
Hydrogen Peroxide CAS # 7722-84-1  
Water CAS # 7732-18-5

HEALTH 3  
FLAMMABILITY 0  
REACTIVITY 1

**FIRST AID**  
INGESTION: Rinse mouth with water. Dilute by 1 or 2 glasses of water. Do not induce vomiting.  
SKIN: Wash with plenty of soap and water. Get medical attention if irritation occurs and persists.  
INHALATION: Remove to fresh air. If breathing difficulty or discomfort occurs and persists, contact a medical doctor.  
EYES: Immediately flush with water for at least 15 minutes, lifting the upper and lower eyelids frequently. Use a medical device or eyewash/shower immediately.

**NOTES TO MEDICAL DOCTOR:** Hydrogen peroxide at these concentrations is a strong oxidizer. Direct contact with the eyes is likely to cause central damage especially if not washed immediately. Careful ophthalmologic evaluation is recommended and, if possible, without contact lens should be considered. Because of the likelihood of corrosive effects on the gastrointestinal tract after ingestion, and the risk/likelihood of peroxis effects, attempts at evacuation, the stomach, the entire GI tract, and/or gastric lavage should be avoided. There is a remote possibility, however, that a nasogastric or orogastric tube may be required for the reduction of gastric distension due to gas formation.

**FIRE FIGHTING MEASURES**  
EXTINGUISHING MEDIA: Flood with water.  
EXPLOSION HAZARDS: Product is non-combustible. On decomposition, releases oxygen which may intensify fire.

**PRECAUTIONARY MEASURES**  
KEEP AWAY FROM HEAT, SPARKS AND FLAME  
AVOID BREATHING VAPORS  
AVOID CONTACT WITH EYES  
DO NOT SWALLOW  
KEEP CONTAINERS CLOSED  
USE WITH ADEQUATE VENTILATION  
WASH THOROUGHLY AFTER HANDLING

**ACCIDENTAL RELEASE MEASURES**  
RELEASE NOTES: Dilute with a large volume of water and hold in a pond or ditch and let hydrogen peroxide decompose. Hydrogen peroxide may be decomposed by hydrogen sulfide or sulfur until the solution is about 7% hydrogen peroxide according to methods outlined for waste disposal.

**HANDLING AND STORAGE**  
HANDLING: Use cap type chemical safety goggles and full-face shield, impervious clothing, such as rubber, PVC, etc., and rubber or neoprene gloves and shoes. Avoid contact with metal. Avoid excessive heat and concentration. Contamination may cause decomposition and generation of oxygen gas which could result in high pressure and possible container rupture. Hydrogen peroxide should be stored only in metal containers and transferred only in a prescribed manner (see IAC Technical Bulletin). Never return unused hydrogen peroxide to original container. Empty drums should be triple rinsed with water before discarding. Universal used for handling hydrogen peroxide should only be made of glass, plastic and, aluminum or plastic.  
STORAGE: Store drums in cool areas out of direct sunlight and away from combustibles.

**5.1**

**Somogyi, Matthew (2011)**

**HEALTH HAZARD**  
4 Deadly  
3 Extreme danger  
2 Hazardous  
1 Slightly hazardous  
0 Neutral material

**FIRE HAZARD**  
Flash Points  
4 Below 73°F  
3 Below 72°F (Boiling pt. at/below 100°F) and/or at/below 72°F - not exceeding 100°F  
2 Above 100°F, Not exceeding 200°F  
1 Above 200°F  
0 Not flammable

**3 0 1**

**OXY**

**SPECIFIC HAZARD**  
OX Oxidizer  
Use NO WATER  
Simple Asphyxiant BA

**INSTABILITY**  
4 May detonate  
3 Shock and heat may detonate  
2 Violent chemical change  
1 Unstable if heated  
0 Stable

**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)

Somogyi, Matthew (2018)

# Pond 2



370' x 50'

# ▶ Pond 3



Somogyi, Matthew (2018)

Somogyi, Matthew (2018)

# Wetland



# Treated Water

	Lime (1992 – 2010)	Peroxide (2011 – 2018)
Flow	1344.2 est. gpm	1196.1 est. gpm
pH	8.0	7.4
Alkalinity	262.9 mg/L	366.4 mg/L
Acidity	Negative	-323.5 mg/L
Iron	2.8 mg/L	2.8 mg/L
Manganese	.6 mg/L	1.4 mg/L
Aluminum	.5 mg/L	.5 mg/L
Sulfates	1093.9 mg/L	887.7 mg/L
Total Suspended Solids	69.2 mg/L	23.3 mg/L

# Cost Analysis

Since the implementation 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.



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# 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](#)