

CLASS PROJECT

Acid Mine Drainage in Lower Salem, OH

1. Project Introduction:

This project involves reading the papers related to acid mine drainage (AMD), visiting the site (map attached), testing water samples and presenting your work.

Acid mine drainage problem is very common in coal mining areas. Mine waste usually has pyrite mineral. Chemical reaction of pyrite with water and oxygen forms sulfuric acid and dissolved iron. Sulfuric acid can further dissolve heavy metals such as copper, lead and mercury and pollute any nearby surface water and groundwater system. Iron can precipitate forming red, orange, or yellow sediments.

There are abandoned surface coal mines in Lower Salem, OH. Pittsburgh coal bed, the lowermost unit of the Monongahela Group, is mined in this area. Monogahela Group also consists Meigs Creek and Uniontown coal beds. However, general lithology of this group consists of sandstones, mudstones, shales, limestone, coals and clays. The field locations are indicated in the map.

2. Goals

- Understanding the acid mine drainage problems in the real world and evaluating best approaches for mitigation
- Understanding surface/groundwater flow and possible AMD contamination mechanisms
- Learning the research methods by collecting, analyzing, and interpreting the data

3. Read the background material:

Acid mine drainage

<http://www.sosbluewaters.org/epa-what-is-acid-mine-drainage.pdf>

<http://www.epa.gov/osw/nonhaz/industrial/special/mining/techdocs/amd.pdf>

Geologic information in general

http://geosurvey.ohiodnr.gov/portals/geosurvey/PDFs/BedrockGeology/BG-1_8.5x11.pdf

http://geosurvey.ohiodnr.gov/Portals/geosurvey/PDFs/Misc_State_Maps&Pubs/stratcol.pdf

4. Analyze water chemistry for following constituents to determine the quality of the collected water samples using laboratory methods.
 - Amount of acidity (pH)
 - Amount of total dissolved solids (TDS)
 - Iron (Fe)
 - Sulfate (SO_4^{2-})
 - Calcium Hardness (Ca^{+2})
5. Compare your results with EPA standards for drinking water for public water supplies.
Reading material: <http://water.epa.gov/drink/contaminants/>
6. Prepare a report and present in your class.