

TALKING POINTS FALL BROOK AMD TREATMENT PROJECTS

- Southwestern Energy (SWN)
 - First met with SWN in December 2013
 - They adopted a corporate policy of being “water neutral” in their energy operations by 2016. For every gallon of fresh water they used, they would restore a gallon of polluted water.
 - Fall Brook was a good fit due to the data collected and treatment plans already in existence as well as the volume of water requiring treatment.
 - Their program is called Energy Conserving Water or ECH₂O.
 - After many coordination meetings with various government agencies, SWN decided to fully fund both the construction and the trust for O&M
 - Construction costs totaled \$1,720,841.60
 - Trust Investment for 20 years of O&M \$778,200.00
 - Construction began in June 2015
 - Treatment systems went on line in November of 2015
 - Official Ribbon Cutting for the project was held May 19, 2016

- Fall Brook Treatment Systems
 - South System – one large discharge (099)
 - 5.2 acres for treatment system
 - 1.5 acres for pipeline
 - 1.1 acres for staging area and miscellaneous
 - 7.8 acres total
 - Three limestone beds
 - 10,000 tons high calcite limestone
 - One polishing pond
 - 349,000 gallon capacity
 - One settling pond
 - 680,000 gallon capacity
 - pH before treatment was 3.5
 - pH following treatment was 7.6
 - Average flow is 1,000 Gallons Per Minute (GPM)
 - System is set to handle 2,500 GPM
 - Overflow above 2500 GPM goes back into the channel. This would be a high rainfall event and it is felt that

increased runoff and flow from the overall watershed would help to neutralize untreated water so that it would not negatively impact future aquatic life.

- North System – 3 smaller discharges (001, 003, 004)
 - 1.9 acres for treatment system
 - 1.4 acres for discharge collection & pipeline
 - 1.2 acres for staging areas and miscellaneous disturbance not needed for treatment
 - 4.5 acres total
 - One limestone bed
 - 1,850 tons high calcite limestone
 - One combination polishing and settling pond
 - 310,000 gallon capacity
 - pH before treatment was 3.6
 - pH following treatment was 7.5
 - Average flow is 200 GPM
- Miles of stream recovered
 - Fall Brook – 2 miles
 - Tioga River – 3 miles

➤ How do the treatment systems work?

- AMD polluted water is piped through an underground network of pipes to the limestone beds. The water remains in the beds for a designed period of time before draining into the polishing pond. Iron, aluminum and manganese react with the limestone, some drops out in the limestone beds and some drops out in the polishing pond. The limestone beds will be automatically drained empty every 1 to 2 weeks with a computer-controlled electrically actuated gate valve. The draining will remove 50 to 70 percent of the solids formed in the limestone aggregate. Approximately every three years the aggregate will be cleaned using mechanical equipment and pumps to wash and stir the limestone. Additional limestone will be added as the beds are depleted. All of the solids produced by the systems during draining events and the cleaning process will be collected in the settling ponds. When the settling ponds begin to fill up with solids, they will be drained, the accumulated solids will be removed and dehydrated and disposed of in a landfill.

- Primary contributors to Tioga River Acid Mine Drainage (AMD) pollution are:
 - Iron
 - Aluminum
 - Manganese
- Water Quality information:
 - Restoration of aquatic life – macroinvertebrates (bugs) and brown trout – require pH of 5.5 or greater, iron less than 1.5 mg/L, and aluminum less than 0.5 mg/L
 - Restoration of naturally reproducing trout populations require pH of 6 or greater, iron less than 1.5 mg/L, and aluminum 0.5 or less mg/L. All trout require very low aluminum.
 - Restoration of water quality suitable for use in public water supplies require pH of 6.0 or greater, iron at 0.3 or less mg/L, manganese less than 1 mg/L, sulfate less than 250 mg/L.
- Watershed Size
 - Tioga River – 460 square miles
 - Fall Brook – 8.9 square miles
 - Morris Run – 7.0 square miles
 - Coal Creek – 1.6 square miles
 - Bear Creek – 0.7 square miles
- Approximately 13 miles of the Tioga River as well as Tioga Lake at the Tioga Hammond Dam are affected the AMD pollution in the headwaters. Streams entering the River north of Blossburg do not suffer from AMD pollution and help to neutralize the AMD but it is not enough to offset the pollution.
- Morris Run is the next tributary requiring treatment.
 - Currently collecting water quality and flow data for Morris Run
 - Upon completion, consultant will provide an assessment and proposal for treating this tributary.