Case study – The gladden acid mine drainage (AMD) treatment facility and fishing run stream sealing project

Katie Wood

Tetra Tech, Inc., 661 Andersen Drive, Suite 200, Pittsburgh, Pennsylvania, 15220

Extended Abstract

Tetra Tech, Inc., in partnership with the South Fayette Conservation Group (SFCG), designed and oversaw the construction of the Gladden Acid Mine Drainage (AMD) Treatment Facility through a design-build project with funding provided by the US Department of the Interior-Office of Surface Mining (OSM) through Pennsylvania Department of Environmental Protection. The treatment plant, which is located on Millers Run, 16 mi (26 km) south of Pittsburgh in South Fayette Township, Allegheny County, PA, was designed to treat 2.2 million gpd (8,328 m^3/d) and remove 690 lb/d (313 kg/d) of iron pollution from the Chartiers Creek watershed, eliminating one of the largest discharges in the watershed. The facility, which became operational in January 2021, is restoring water quality to four miles of Millers Run and three-and-one-half miles of Chartiers Creek. The discharge, which ranges from 750 to 1,500 gpm (3 to 6 m^3/min), originates from the abandoned Pittsburgh Coal Company's Montour No. 2 underground mining complex. The plant includes two pumping stations to extract the AMD from the mine pool and bring it to the surface for treatment. Treatment consists of aeration, oxidation with hydrogen peroxide and alkaline addition as needed. The iron is precipitated and settles in a clarifier. The clarified water is then routed through a polishing pond before final discharge to Millers Run. The iron sludge is collected and pumped from the clarifier via a pipeline where it is injected into a distant section of the mine for disposal. With the operation of the plant approximately annually 387,000 lb (175,540 kg) of iron, which previously was entering Millers Run, is treated.

In the two years since the plant has been operational, additional work has been completed to address surface infiltration into the mine. Monitoring of the Gladden discharge flow revealed a high rainfall response indicative of stream infiltration. An investigation determined that flow losses of the upper parts of Fishing Run and an unnamed tributary to Millers Run are entering the Montour No. 2 Mine. Four stream channel sections were identified as having substantial loss of flow through infiltration into the abandoned mine. Most of these stream channels are often dry due to the losses and as a result, they are barren of aquatic life. Reducing these stream losses would not only restore flow to the streams but also reduce the pollution to Millers Run and Chartiers Creek. The Fishing Run stream sealing project eliminated infiltration of surface water into the mine by installing geosynthetic clay liner and by grouting the strata beneath the stream bottom using a two-part component polyurethane grout injection on over 6,000 linear ft (1,829 m) of stream. Work was completed in the fall of 2023 and increased flow has been measured in some sections of the restored stream channel, but additional areas have been identified within Fishing Run where flow loss is still occurring. The stream sealing has resulted in an approximately 60 % decrease in mine water being treated. During the first year of plant operation the average pumping rate to treat the discharge was 1400 gpm (5.3 m^3/min) after stream sealing the pumping rates are 600 gpm (2.3 m^3/min). Reducing the inflow into the mine has maximized the effectiveness of the plant and help reduce operating costs.