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Design and Installation of Passive AMD Treatment Systems in Tributaries of the Lower Cheat River Watershed

Project No. WV-206 A&B

Recipient: West Virginia University

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Project Description: These projects were designed to remediate acid mine drainage (AMD) in 3 tributaries of the Cheat River. Sovern Run, has been impaired by numerous surface and underground mines. Pre-construction chemistry at the site had a pH of 3 and an acidity of 288 mg/L. In addition, the AMD had high levels of iron, aluminum and manganese, 21.4 mg/L, 31.3 mg/l and 3.0 mg/L respectively. A passive treatment system consisting of open limestone channels, limestone leachbeds, and two steel slag leach beds were installed.

Pringle Run has been impaired by numerous surface and underground mines. The site consists of an unreclaimed highwall/faceup with two collapsed/buried portals. The site had a pre-construction pH of 2.8, acidity of 160 mg/L, with metal concentrations of 19 mg/L for iron, 29 mg/L for aluminum, and 2.6 mg/L for manganese. This project constructed a vertical flow system built in two stages with the first portion of the reactor built on the terrace adjacent to the portals. The second component of the vertical flow system, an Anoxic Limestone Drain (ALD), was constructed on the lower portion of the project area and was designed to treat mine drainage in an anoxic environment. A settling pond is located at the outfall of the ALD with open limestone channels connecting the ALD to the pond and then to the discharge point.

Muddy Creek is a major contributor of acidity to the Cheat River. The area adjacent to the Creek has been impacted by numerous surface and underground mines. The project consists of four seeps on a strip bench above the creek. The site had a pre-construction pH of 3.1, acidity of 162 mg/L, with metal concentrations of 7.3 mg/L for iron, 15.5 mg/L for aluminum, and 5.37 mg/L for manganese. Pre-construction acid loads from the site totaled 55 tons/year. This project consists of four limestone leach beds, as well as open limestone channels.

Project Significance: Water quality sampled on Sovern Run at the discharge end of the system shows the pH is now over 9 with net alkalinity of 171 mg/L and Fe, Al, and Mn concentrations of 0.03 mg/L, 0.5 mg/L, and 0.02 mg/L, respectively. The Pringle Run site has removed approximately 66 tons per year of acidity. Of the four leachbeds installed at Muddy Creek, two are performing while the other two have failed. Leachbeds 1 and 2 have not treated any acidity while leachbeds 3 and 4 have treated approximately 19.7 and 22.8 tons per year.