

Puritan Original Treatment (2012-2020) System History Summary

The Puritan Mine discharge (TR4) emanates from an abandoned underground coal mine, which was in operation from the late 1800s to the early 1900s. This up-dip mine and other mines to the east also drain to the Puritan Mine are partially flooded and generate an acidic discharge with elevated concentrations of metals and variable flow rates. The discharge is located about 2 miles east of the town of Portage, near the town of Puritan, north of SR-0164 and along Trout Run in Portage Township, Cambria County, PA. The Puritan discharge flowed into and impacted Trout Run, a Cold Water Fishery and major tributary of the Little Conemaugh River. Trout Run is reportedly a vibrant native trout fishery upstream of the Puritan AMD discharge, but at least prior to 2020 does not support trout downstream.

In 2012, a passive treatment system was installed to treat the T4 discharge by the Trout Run Watershed Association through a \$179,000 grant from the PA DEP Growing Greener program. The treatment system was designed by Todd Stager of PennTerra Engineering Inc of State College, PA. The system was designed as a FeAlMn bed consisting of a single bed of limestone aggregate with a series of nine, over-and-under flow, wooden baffles that discharges to a channel lined with limestone aggregate which then flowed into Trout Run. The mine discharge was collected at an inlet control box which was designed to only allow a maximum of 100 gpm of the discharge to enter the system. The portion that was captured was then conveyed by pipe to the system, while any remaining flow would bypass down a channel and into Trout Run. As the discharge at times exceeded 500 gpm, often a larger portion remained untreated than treated.

In addition to the lack of a full-sized treatment system, the system experienced both construction and maintenance issues. Because the limestone bed utilized horizontal flow with no method of flushing, the first two “cells” of the baffled limestone bed have repeatedly become clogged with iron and aluminum precipitates, beginning just a few months after construction. The limestone aggregate was replaced in April of 2013 and March of 2014 and, semiannually, volunteer time and effort have stirred and cleaned the two cells. Often limestone would be rotated between being placed in the system and placed in piles that were then set out to be washed by the rain. A final issue with the original system is that there were multiple leaks along the northern berm of the treatment pond. A water balance study by SFU indicated that between 20% and 50% of the influent water does not flow through the entire system and instead leaks through coal refuse into Trout Run. The treatment system was redesigned and rebuilt in 2020.

Water Quality of the discharge, passive system effluent and upstream and downstream through 2016 is provided in the table below.

Table: Average water quality parameters 1997-2016							Average Min/Median/Max
Sample Point	Flow (gpm)	Lab pH	Acidity (mg/L)	T. Fe (mg/L)	T. Mn (mg/L)	T. Al (mg/L)	SO₄ (mg/L)
TR4 (Raw)	160 19/100/569	3.1 2.8/3.1/3.4	241 92/211/465	20.9 5.2/15.7/47.6	3.0 1.2/3.1/5.1	17.8 7.9/15.4/31.9	742 378/721/1123
TR4.1 (Effluent)	70 40/63/136	6.6 3.3/6.7/7.3	-61 -138/-76/101	0.9 0.3/0.6/2.4	0.9 0.6/0.7/1.5	2.3 0.5/2.3/8.7	694 527/675/930
TR2 (upstream)	1615.3 0.06/101/7620	7.1 4.9/6.4/7.1	17.03 -7.8/1.0/28	1.09 0.4/0.8/2.9	1.42 0.2/1.3/3.4	1.14 0.5/0.8/3.2	110 44/88/280
TR5* (downstream)	2066 0.0/1310/8906	5.4 3.9/5.2/7.0	37 -9.0/42/103	1.2 0.3/0.5/6.8	1.1 0.3/1.0/2.5	2.7 0.8/1.8/8.8	169 65/145/327