

# THE BEGINNING: PASSIVE TREATMENT OF A HIGHLY ACIDIC MINE DRAINAGE DISCHARGE<sup>1</sup>

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**Abstract:** The McIntire bond forfeiture site (Butler County, PA) possesses a post mining discharge that has been identified through the Blacks Creek Watershed Implementation Plan as the single largest impact to Blacks Creek, and is often referred to as the worst discharge in the Slippery Rock Creek Watershed due to its high level of dissolved iron. For over 17 years this discharge has flowed unabated to Blacks Creek, causing pronounced degradation to the stream. With design water quantity and quality data of: 50 gallons per minute (flow rate), pH 2.5 SU, acidity 1,150 mg/L, total iron 330 mg/L, total aluminum 62 mg/L, total manganese 96 mg/L, and sulfates of 2,520 mg/L the severity of the water in question represents a challenge for current passive treatment techniques. This presentation will cover the process of implementing a passive treatment system to address the highly acidic McIntire discharge and improve the water quality of Blacks Creek.

Key partnership efforts by Quality Aggregates Inc. and HARSCO Minerals plus the dynamic landowner relations that transpired during this project illustrate important aspects associated with successfully constructing a large passive treatment system through US EPA and PA DEP 319 program funding. Innovative technology has been incorporated into the design of this system by pairing an Agri Drain solar powered “Smart Drainage System” with the siphon operated limestone only Auto-Flush Vertical Flow Pond to ensure regular flushing regardless of flow rate. Additionally, the phenomenon of low pH iron oxidation and precipitation is being promoted at the head of the treatment system to aid in iron removal prior to conventional passive treatment components. Innovation, natural processes, and basic passive treatment principles have been employed to construct a passive treatment system capable of treating this metal laden, highly acidic mine drainage discharge.

**Additional Key Words:** Low pH Iron Removal, Dashed

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