

Booker Discharge Abandoned Mine Drainage Passive Treatment System Project

This report is submitted as required for the close out of an Office of Surface Mining grant for the construction of a Passive Treatment System for an Abandoned Mine Drainage to Carnahan Run in Parks Township Armstrong County PA. The project is on the land of Phillip Booker.

The discharge is from an old drift mine. The mine is in the Upper Freeport Coal and apparently operated in the early 1900's. The iron concentration prior to the project was 36.84 mg/L and the discharge was gauged as 62.25 GPM. The discharge is alkaline. The actual mine opening was not evident prior to the project. The discharge emanated to the surface through either sediments or colluvial materials that covered the actual mine opening / source. Watershed Specialist Thomas Clark collected the preliminary data.

Mr. Clark obtained a Growing Greener Grant to design a treatment system for this discharge. The Armstrong Conservation District (ACD) and Watershed Specialist David Beale and Thomas Clark conducted a topographic survey of the site and designed a three cell wetland system to treat the discharge.

An OSM grant was obtained by the Kiski River Watershed Association (KRWA) to construct the system. Bid documents were prepared by ACD on behalf of the KRWA to obtain a contractor to do the Construction.

The successful bidder was Paul Atkinson and Son of Kittanning, PA. Construction was carried out during the winter of 2008. The process was very slow due to wet weather limiting the ability to move equipment and materials on the site.

The delivery channel and three wetland cells were constructed very close to the initial design configuration.

The first cell was constructed in such a way as to allow easy access and potential commercial recovery of the iron sludge once it fills. The third cell was constructed in such a manner as to support a bass / bluegill fishery should the landowner choose to introduce these fish.

The effluent was gauged at the 24" culvert pipe at the discharge from cell three to Carnahan Run. The flow on April 18, 2008 was 75 GPM. Thomas Clark sampled and field checked the iron loading on April 29, 2008. The mine discharge concentration was 18 mg/L and the treated effluent concentration was 4 mg/L. The efficiency of the system is presently 78% and is expected to improve as aquatic vegetation develops and iron-fixing bacteria become established.



Picture 1: Opening the pit.



Picture 2: Construction of delivery channel



Picture 3: Construction of treatment cell 1



Picture 4: Construction of treatment cells showing transition channels



Picture 5: Transition channel from second cell to third



Picture 6: View of third cell showing excavated area and outflow with 24-inch CPP



Picture 7: Completed impoundment of mine discharge and beginning of delivery channel, also showing surface water diversion channel



Picture 8: Surface water diversion channel



Picture 9: Delivery channel from impoundment to first cell



Picture 10: Delivery channel inflow to first cell



Picture 11: Finished second cell



Picture 12: Finished third cell



Picture 13: Detail of transition channel from second to third cell



Picture 14: Detail of discharge channel to Carnahan Run



Picture 15: Picture of first and second cells



Picture 16: Picture of second and third cells