Bench Scale Assessment of Acid Mine Drainage Addition to Secondary Municipal Wastewater Treatment Processes for Co-treatment¹

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Abstract: Acid mine drainage (AMD) and municipal wastewater (MWW) are two pollutants that pose serious risks to the water environment if left untreated. MWW can cause eutrophication and introduce pathogenic microorganisms into downstream freshwaters while AMD discharges to surface waters can lead to acidification and increased metal loadings that are harmful to aquatic organisms. One of the more novel ideas for AMD treatment is the co-treatment with MWW. This co-treatment can remove metals from low pH AMD while also decreasing BOD and phosphorus in higher pH MWW. The minimal quantity of data on co-treatment leaves many unanswered questions about the feasibility in an existing wastewater treatment facility. The goal of this research was to access the potential of adding AMD to MWW at a conventional wastewater treatment plant in Johnstown, Pennsylvania. Johnstown has a large discharge of AMD located in the city's more urbanized area with a wastewater treatment facility 6 km further upriver from the discharge.³ This bench-scale batch study examined the impact of adding AMD at various ratios to aeration tank mixed liquor effluent, prior to secondary settling. After mixing & settling, common wastewater treatment laboratory tests were performed on reactor supernatant (secondary effluent) including sludge settleability, BOD5, COD, turbidity, solids, coliforms, and other important water chemistry parameters. All results were then compared to MWW absent of AMD to determine the impact of AMD on the MWW final effluent and the feasibility of incorporating co-treatment at full scale.³

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- AMD discharge located near 40° 19' 41" N, 78° 55' 34" W; Wastewater was obtained from the Dornick Point Wastewater Treatment Facility at 241 Asphalt Rd, Johnstown, PA 15906 (near 40° 21' 51" N, 78° 57' 8" W).