Advancements in Iron Terrace Design for Metal Mine Sites[1]

James Gusek[2], Lee Josselyn, and Eric Wolaver

Abstract: Volunteer iron terrace formations associated with coal mine sites are well-documented in the literature but relatively little has been published regarding iron terraces in metal mining terrain. Iron terraces might be considered a subset of aerobic wetlands that appear to remove iron without macrophytes/plants and open water surfaces. Microbial mechanisms appear to be important. The influence of organic carbon such as leaf litter and other natural cellulolytic material on first-order iron removal kinetics is somewhat uncertain. Early work at understanding the mechanisms in iron terraces (aka terraced iron formations -TIFs) in Eastern US coal mine ARD originated at Penn State but iron terraces have been studied by the USGS at metal mining sites in the western US in the Rocky Mountains and by others in the Iberian pyrite belt in Spain. This paper examines iron terraces/TIFs from a process engineering perspective as applied to passively treating iron-bearing metal mine drainage as a first step in a multi-unit treatment system that may include biochemical reactors, aerobic polishing wetlands, and manganese removal beds.

Additional Key Words: Ferricrete; Ferrous Iron; Organic Dehydration; TIFs

Optional Data: Project Locations: Lat. Multiple°N, Long. Multiple°W

---

[1] Oral paper to be presented in the "AMD Passive Treatment" Session at the 2017 National Meeting of the American Society of Mining and Reclamation, Morgantown, WV ***What's Next for Reclamation?***, April 9-13, 2017. Published by ASMR; 1305 Weathervane Dr., Champaign, IL 61821.

[2] Senior Engineer, Sovereign Consulting Inc. 12687 W. Cedar Dr., #305 Lakewood, CO 80228 (720) 524-4908; jgusek@sovcon.com.