

A TALE OF TWO METAL REMOVAL MECHANISMS; SEASONAL TRENDS IN BIOTIC AND ABIOTIC METAL REMOVAL IN A SULFATE REDUCING BIOREACTOR¹

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Abstract: Sulfate reducing bioreactors (SRBRs) are a passive treatment technology used to treat low pH, metal-laden, acid rock drainage waters. SRBRs are an attractive alternative to traditional active water treatment because they are low-cost and low-maintenance. SRBRs rely on two mechanisms to remove metals and increase alkalinity; a biotic, or bacteria-mediated, process that precipitates metals as sulfides and an abiotic mechanism which removes metals via precipitation or sorption. The bacteria-mediated mechanism is affected by seasonal temperature fluctuations especially in mountainous environments with large annual temperature fluctuations. Treatment data from a two-year old pilot scale SRBR allows characterization of the seasonal variation of both metal removal mechanisms.

Additional Key Words: passive treatment, sulfate-reducing bacteria, metal removal, bioreactors

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