

SUSTAINED TOXICITY REDUCTION IN BIOSOLIDS TREATED FLUVIAL MINING TAILINGS DEPOSITS ALONG THE UPPER ARKANSAS RIVER¹

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Abstract. The USEPA has been evaluating emerging cost-effective green engineering solutions, such as application of biosolids to large area metals mining sites developed by the U.S. Department of Agriculture (USDA). A portion of the California Gulch Site in Leadville, Colorado was characterized by discrete 0.5-1.0 hectare parcels of fluvial mine tailings deposits which occurred along the embankment of the Upper Arkansas River. The contaminants of concern in the tailings were zinc, lead, cadmium, copper and manganese, with zinc concentrations ranging from 50,000 - 100,000 ppm. During a 4.5-hectare pilot demonstration project, biosolids and agricultural lime were applied to the tailings at a rate of 224 MT/hectare each, and incorporated the mix using heavy equipment. At one, two and six years post treatment, the demonstration plots were evaluated for changes in soil physical, chemical, biological and toxicological characteristics. The particular parameters measured were phased over time; however toxicity and soil functioning were evaluated as critical assessments for the demonstration of the treatment success. Results indicate that sustained toxicity reduction was achieved through the biosolids treatment through six years. To date, the other parameters measured also support the conclusion that the treatment technology was successful in reducing ecological risks to an acceptable level.

Additional Key Words: mine tailings, soil treatment, ecorisk

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