BIOSOLIDS REMEDIATION OF A BASE METALS MINING SITE[1]

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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. One and two years after the amendments had been applied, the Environmental Response Team evaluated changes in soil physical, chemical, biological and toxicological characteristics, through metals analyses, agronomic assessment, evaluation of soil microbial community structure and function, and rye grass and earthworm toxicity testing. At two years post treatment field bioaccumulation investigations were also conducted to support the evaluation of residual ecological risks. The short term results demonstrated that biosolids amendments were effective for treating large area, highly impacted, base metals mining sites, and reducing metals toxicity and availability and promoted the establishment of microbial and plant communities. Results of the field bioaccumulation assessments are promising in terms of the degree of accumulation observed.

Key Words: mine tailings, soil treatment, and ecorisk

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