RECLAMATION STRATEGIES FOR WASTE ROCK AND TAILINGS PILES AT THE GREENS CREEK MINE

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Abstract: Planned reclamation of waste rock and tailings piles at the Greens Creek Mine near Juneau, Alaska will include relocation of historic waste rock piles; co-disposal of waste rock with tailings; potential in situ treatment of tailings pore water; and construction of a multi-layer cover. Consolidation of waste rock sites reduces the area of environmental risk, minimizes impact to receiving waters and reduces cover construction costs. Co-disposal of waste rock with tailings reduces advective transport of oxygen and subsequent sulfide oxidation, improves tailings strength and reduces tailings permeability. In situ treatment of fresh tailings with organic carbon promotes microbial sulfate reduction, improves pore water quality and has the potential to reduce the time required for tailings drainage to meet desired water quality targets. Construction of a multi-layer cover on waste rock and tailings piles will minimize advective and diffusive transport of oxygen and subsequent sulfide oxidation, prevent contact of runoff with waste rock and tailings and allow for establishment of native vegetation. Reductive mobilization of iron, arsenic and other elements or ions is a potential drawback of co-disposal, carbon amendment and cover placement and must be considered when evaluating these closure strategies. The results of studies of carbon amendment and cover design/performance undertaken while the mine is in operation and monitoring of the effects of concurrent reclamation have been instrumental in refining the overall plan for mine closure.

Key Words: reclamation, closure, relocation, co-disposal, in situ treatment, sulfate reduction, multi-layer cover