

Geologic and Geotechnical Considerations for Condition Assessments of Unlined Spillways in the Sierra Nevada, California

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Abstract- Unlined spillways in hard rock are generally assumed to be problem free. We reviewed an inventory of unlined or partially-lined spillways in hard rock of California's Sierra Nevada and identified adverse geologic and geotechnical aspects common to many of the facilities. These aspects include increased susceptibility to erosion, slope instability, and seepage related to the original ground surface weathering profile and rock mass dilation. Often the structural components of the spillway (e.g., ogee weirs, gated control structures, training walls) are in this zone of potentially less competent rock. Linear, weak, erodible seams were observed that sometimes lead to preferential erosion of otherwise hard rock, and stress redistribution following excavation of large quantities of rock for spillway and dam construction can result in destabilization of the rock mass. These aspects should be considered during condition assessments and potential failure modes analyses of similar spillways in hard rock.