

Pyramid Dam Emergency Spillway: Comprehensive geologic and geotechnical investigation to quantify rock erodibility for an unlined emergency spillway

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The California Department of Water Resources (DWR) is conducting a geologic and geotechnical investigation to quantify the erodibility of foundation materials of the unlined emergency spillway at Pyramid Dam as well as provide design-level data to support the DWR Pyramid Dam Modernization Program. Pyramid Dam is located 60 miles northwest of Los Angeles County and is part of the Castaic Power Complex, a cooperative venture between DWR and Los Angeles Department of Water and Power. // The emergency spillway is an uncontrolled 375-foot wide, broad crest overpour weir and a zero-freeboard flood capacity of 167,000 cubic feet per second (cfs). The unlined channel beyond the weir is approximately 900 feet long with a 400-foot long, upper low angle (<5% slope) portion and a 500-foot long, higher angle (85% slope) lower portion. The emergency spillway has never spilled. Pyramid Dam is considered a “High Hazard Potential” structure under the Federal Energy Regulatory Commission’s (FERC) guidelines. // Original design and construction documents provide limited data to characterize the erodibility potential of the foundation materials at and below the final grade. A recent spillway assessment (2017) provided surficial geologic data, but did not address key erodibility potential parameters, such as the degree of weathering or variations in discontinuities with depth. To obtain additional data, DWR is implementing a comprehensive foundation characterization investigation consisting of: rock coring, detailed geologic mapping, surficial and downhole geophysical surveys, monitoring well installations, and laboratory testing of rock core samples. The investigation is utilizing a combination of rope access, helicopter support, and scaffolding to overcome the logistical challenges at the project site. Data collected from the investigation will provide a robust characterization of the surface and subsurface conditions along the emergency spillway allowing for a quantitative erodibility assessment and for future design considerations for the Pyramid Dam Modernization Program. This presentation will cover the comprehensive collection of surface and subsurface and application of the data to an erodibility assessment. Additional co-authors /// Mark Pagenkopp, CEG; Senior Engineering Geologist; California Department of Water Resources; 916-376-9884; mark.pagenkopp@water.ca.gov /// Brad von Dessonneck, PG, CEG; Engineering Geologist; California Department of Water Resources; 916-376-9879; bradley.vondessonneck@water.ca.gov /// Dawning Wu, EIT; Water Resources Recovery Facility Process EIT; HDR Engineering; 408-513-7942; dawning.wu@hdrinc.com