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The spillway at Fort Peck Dam in northeast Montana is a 5,030-foot-long, trapezoidal concrete channel built ca 1934-1938. The spillway was constructed with a cellular concrete terminal (end) structure, but without a formal stilling basin. The terminal structure varies in total height from 70 to 129 feet, and was constructed by mining vertically into the native Bearpaw shale bedrock. Bearpaw shale is a mid-continent compaction shale, formed originally by deposition in a marine environment, then compressed heavily by continuing sediment deposition, and much later by advance and retreat of glacial ice.

Periodic use of the spillway, combined with a strong tendency for air slaking of the shale, has eroded the tailrace channel downstream of the terminal structure. Interim repairs were constructed from 2013-2016, and included addition of inclined anchors to augment connection of the front to back walls of the terminal structure, and vertical anchors to resist unbalanced uplift and hydrodynamic load on a new concrete apron mat constructed immediately downstream of the terminal structure. This paper discusses the lessons learned in the design, construction and testing of the inclined and vertical anchors.