Goose Pasture Tarn Dam: Emergency Planning for a Not-So-Safe Dam


Goose Pasture Tarn Dam is a high hazard-potential dam located along the Blue River about two miles upstream of the Town of Breckenridge. The 57-foot high zoned embankment dam, constructed in 1965, has a combined overtopping reinforced concrete service spillway and a Roller Compacted Concrete (RCC) emergency spillway located in the center of the dam. In 2004 continuous voids were identified beneath the service spillway and indicated significant uplift pressures beneath the spillway slab. The service spillway was repaired in 2006 by a combination of grouting to fill voids and slab ground anchors extending 15 feet beneath the spillway slab to resist uplift pressures, but reformed voids and hydrostatic uplift pressures were again identified in 2016. At that time the Colorado Dam Safety Branch restricted the normal storage in the reservoir by requiring the lowering the emergency spillway to over 4 feet below the service spillway, thereby directing normal flows down the RCC spillway, and the construction of a temporary 3-foot high cofferdam above the service spillway crest to temporarily restrict flows down that spillway until a final spillway repair could be implemented. Rehabilitation of the dam including the replacement of both spillways with a single ogee-crest concrete spillway is planned for construction in 2020, and temporary measures to mitigate the potential for structural failure of the service spillway and/or internal erosion beneath the spillway slab during a large flooding event have been implemented. The Town of Breckenridge, the Colorado Dam Safety Branch, and Summit County have worked collaboratively to develop an interim emergency action plan for protecting Breckenridge, which has a population of over 5,000 people that can double during holidays including the 4th of July. Emergency planning was put to the test in the summer of 2019 when there was a significant flooding risk due to heavy snowpack. This paper discusses the structural and non-structural emergency management measures that were implemented by the Town of Breckenridge in 2019 to prepare the community for a potential service spillway discharge that could potentially lead to dam failure.