Emergency Replacement of Collapsed Spillway Underdrain Pipe

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FERC requested that the City of Portland, Oregon conduct a focused assessment of the concrete lined spillway at one of their water supply dams. The assessment included a CCTV inspection of the spillway underdrains. This effort revealed a collapse in the first 30-ft of a 6-inch diameter, 447-foot-long, concrete transverse underdrain. This prevented the camera from proceeding past the collapse. The City then conducted a Potential Failure Mode Analysis (PFMA) which concluded that the extent of the collapse be determined and the pipe be repaired, and FERC required the repair be completed by October 31, 2019. The City hired HDR to develop demolition and underdrain replacement plans. Northbank Civil and Marine (contractor) was involved early to assist in the design phase. A construction PFMA was conducted in July 2019. Construction challenges included the potential of flow on the spillway during construction and the possibility of a wildfire shutting down work. Conference participants will hear about the development of a decision tree which pre-emptively outlined decision making guidelines so that the team could immediately move forward with final design after the investigation. Spillway demolition began in August 2019 with Northbank using hydro-demolition to remove a 3-ft by 5-ft section of the spillway to expose the known collapsed pipe section. This allowed the City to do another CCTV inspection past the collapse and no other critical pipe defects were found. The audience will learn how the team developed repair plans including replacement of the broken pipe, restoration of the reinforcing steel, and new anchor bars to provide additional resistance against uplift forces. The underdrain replacement and slab reconstruction were completed ahead of schedule on September 30, 2019.