Considerations for dam safety risk in capital planning

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Municipal dam owners are increasingly recognizing the risk to water supply from aging dam infrastructure and increased frequency of extreme loading events. Within an asset management context, reservoirs and their associated dams are often considered “static” features of municipal water treatment and distribution systems while system components like pipelines and plant equipment are integrated into asset management systems and subsequent capital improvement planning. Asset management practices typically emphasize potential service impacts, replacement costs, and service life for individual assets wherein industry or owner-specific data on reliability is readily available. This approach works well for the traditional components for which anticipated consequences of failure may include loss of service, reputational impacts, and/or environmental damages. Consequences of failure for dams are significantly different and may include long-term supply loss, regional economic impacts, and life loss consequences. Because of these inherent differences in risk type and scale, additional considerations are required to incorporate dams into utility-wide asset management and capital improvement planning. Risk-Informed Decision Making (RIDM) is the standard of practice for managing dam safety. RIDM leverages dam failure risk to prioritize projects and funding within an individual dam or a portfolio of dams. Likelihood of potential hazards, dam performance, and consequences of potential failure are considered within the RIDM framework to estimate the risk. Municipal dam owners also have a need to incorporate unique water supply and operational consequences, which are specific to each owner, system, and facility. Integrating dams into existing asset management and planning practices requires collaborative development between dam owners and dam safety practitioners to understand existing systems and support the organization’s long-term needs. Springfield Water and Sewer Commission (SWSC) and Stantec performed a Portfolio Screening Risk Assessment (PSRA) for nine of SWSC's dams. The PSRA leveraged established RIDM practices, SWSC’s existing capital planning framework, and information on SWSC’s operations and distribution system to develop a relative estimate of the overall portfolio and dam-specific risk profiles. The results from the PSRA were used to define and prioritize future capital expenditures for SWSC’s dams. This presentation will cover the approach that was developed and implemented with the goal of outlining a simplified framework that could be referenced by other dam owners.