

In recent years, several serious incidents occurred at embankment dams which highlight the importance of evaluating and understanding spillway exit flow conditions at dams. In all cases, the peak spillway flows during these incidents were significantly less than the design flood flows, and, although the spillways performed satisfactorily, the outflows from the spillways led to significant erosion and near breaching of the dam embankments. Had the spillway design flows occurred, they would have likely resulted in complete breaching and catastrophic failure of the dams.

This paper presents the lessons learned from two separate case studies that occurred in 2007 in Oklahoma (Sugar Creek Dam) and Yorkshire, England (Ulley Dam) and discusses potential failure modes related to exit flows from spillways. Inspection techniques and modeling tools that are available to engineers to evaluate downstream spillway flow conditions and their potential to adversely impact embankment dams will also be discussed.