

STEWARTS BRIDGE PMP/PMF STUDY

Reliant Energy Liverpool, NY

This study was undertaken by Reliant Energy Corporation (Reliant) of Liverpool, NY, as an attempt to reduce the Probable Maximum Flood (PMF) below the project's spillway capacity. A reconnaissance-level site-specific Probable Maximum Precipitation (PMP) study concluded that a full site-specific analysis of the PMP for the watershed would likely result in a reduction on the order of 20-25% from the HMR 51 values.

HMR51 provides generalized estimates of PMP values for a large, climatologically diverse area, but it recognizes that studies addressing PMP over specific regions can incorporate more site-specific considerations and provide improved PMP estimates. Certain areas of HMR51 are designated as stippled on the PMP maps therein and are considered as "areas within which the generalized PMP estimates might be deficient because detailed terrain effects have not been evaluated." This is especially true for basins that are located within the stippled regions. The Stewarts Bridge watershed, located in eastern upstate New York, is within one of these stippled regions. Additionally, by periodically reviewing storm data and advances in meteorological concepts, PMP analysts can identify relevant new data and approaches for use in making improved PMP estimates. A decision was made to proceed with the PMP study, in preference to constructing physical remedial measures at Stewarts Bridge to increase the project's discharge capacity. A three-member BOC was selected and approved by the FERC, including members with expertise in meteorology/climatology, hydrology, and civil engineering. The BOC oversaw and reviewed both the PMP and the PMF studies for the Stewarts Bridge Project.

PMP data were provided by Applied Weather Associates (AWA), who completed a site-specific analysis to determine the maximum precipitation amounts that could occur on the 1,044-square mile watershed. AWA's procedure consisted of analysis of historic storms to determine the precipitation that could have occurred if the storm passed directly over the watershed and all the storm's precipitation-producing parameters were increased to the maximum level that could be expected in this region - this is known as storm maximization and transposition. The AWA study reviewed many storms and developed an envelope curve representing the greatest depth of precipitation for a given duration and aerial coverage that is considered physically possible over the Stewarts



Bridge watershed. This site-specific analysis resulted in reductions of 10 to 50% (varying with duration and area size, equal to 25% at 1,000 square miles and 72 hours) in the PMP compared with HMR 51.

Using the new PMP values, the HMR 52 computer program was then used to maximize the precipitation depth-area-duration values on the watershed, and the HEC-1 model was used to convert precipitation to runoff and combine hydrographs from subbasins through the basin. Sensitivity analyses were performed to determine the relative influence of several input parameters (location of storm center, unit hydrograph parameters, infiltration rates, stage-discharge rating curve and starting level for a large upstream reservoir, base flow recession values). The peak outflow for the Stewarts Bridge Dam was calculated to be 39,100 cfs, which resulted in 2.7 ft of freeboard below the top of the embankment.

The PMP and PMF analysis reports have both been submitted to and are currently (January 2004) under review by the FERC.

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