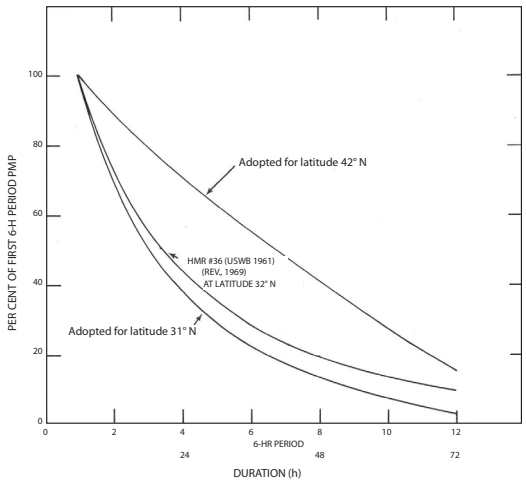

Figure 5.41. Adopted durational variation in orographic PMP for Colorado Rive and Great Basin drainages (Hansen and others, 1977)

5.3.6 PMP estimate for drainage above Dewey Dam, Johns Creek, Kentucky

In a generalized study for the eastern United States (Schreiner and Riedel, 1978), only convergence or non-orographic precipitation was determined. An orographic region, the Appalachian Mountains, was stippled on the maps presenting the results and the study recommended that individual estimates be prepared for individual basins in this region to consider orographic effects. Two such studies have been completed (Fenn 1985; Miller and others, 1984*a*). In each study, the procedures developed for the region between the Continental Divide and the 103rd meridian (Miller and others, 1984*a*) were adapted. In that study (section 5.3.4) convergence PMP was developed and then adjusted for orographic effects. In the eastern United States, convergence PMP is obtained by applying procedures of the *Applications Manual* (Hansen and others, 1982) discussed in section 5.2.7 to the generalized PMP estimates for the region (Schreiner and Riedel, 1978). The procedures used to develop the orographic intensification factors were similar in each instance. In the estimate for the Deerfield River basin (Miller and others, 1984*a*), precipitation stations were located in the basin and data from these stations were used to develop the required orographic factor. In the Johns Creek basin (Fenn, 1985), there were no precipitation stations in the basin and indirect procedures were required.

5.3.6.1 Orographic factor *T*/*C*

Values of *C* (section 5.3.4.2) throughout the region were calculated first. Figure 5.42 shows the isolines of convergence of 100-year 24-hour rainfall for a portion of the central United States. The region where elevations are greater than 1 000 ft (305 m) is hatched and the portion of this region where orographic effects are considered significant is indicated by the stippling. The project basin is on the western edge of the orographic region and is outlined in Figure 5.42. The 100-year 24-hour precipitation-frequency values were calculated for all regularly reporting stations within the region shown in Figure 5.42. The values outside the orographic region can be considered to be due entirely to convergence. The values within the orographic region result from a combination of convergence and orographic influence. Examination of all data indicated maxima of convergence 100-year 24-hour values at the western and eastern edges of the analysis region. Joining these eastern and western regions with smoothly varying isolines produced a trough of lower values in the centre of the region. Along 37° N, the value of *C* was approximately 10 per cent lower than at the western edge and approximately 20 per cent lower than at the eastern edge. A 1 000-hPa value of *C* of 160 mm for the centroid of the basin can be determined from the analysis.

Since there were no precipitation stations located in the basin, it was necessary to determine the total 100-year 24-hour precipitation-frequency value for the basin by use of proxy stations. The topography was examined and separated into three topographic classifications: lowlands, representing the valley floor below about 220 m; uplands, representing the more rugged terrain above about 300 m; and a transition area in between. The lowlands comprised 32 per cent of the basin and the upland area comprised 43 per cent of the basin. The remaining 25 per cent was a transition zone between the two. Next, the 100-year 24-hour precipitation-frequency values

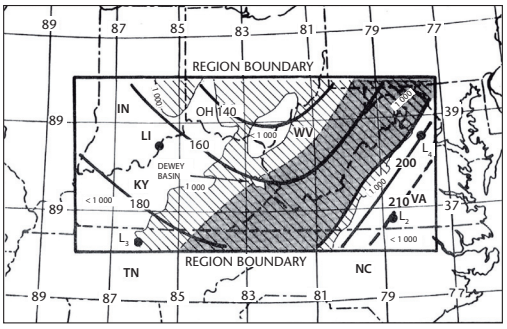

Figure 5.42. Isolines on convergence 100-year 24-hours rainfall (cm) for central United States (Fenn, 1985)