SEEPAGE ANALYSIS OF POWER INTAKE EMBANKMENT AND POWER HOUSE DRAINAGE NETWORK FOR DAM RAISED CONDITIONS

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ABSTRACT

Dams are very important for the development of our country. Mangla Dam and Tarbela Dam are the back bone of Pakistan's Economy. To raise the technical skills, Engineers have lot to learn from these two dams. Seepage study is an important aspect of Dam Engineering which ensures the conservation of the reservoir storage. This thesis is the research work on the seepage flow through the Power Intake Embankment of Mangla Dam and to evaluate the adequa of the drainage network below existing Power House.

The computed seepages at various reservoir levels as an outcome of the SEEP/W model are comparable to those which have been actually measured at the seepage chamber during the past years. Plots for the computed seepages and observed seepages show the same trend against the rising and falling reservoir levels. The analysis of the historic seepage flows and the computed flows provides that the model results are quite realistic and projected flows for the reservoir elevation of 1242.0 ft. a.m.s.l can be considered as correct seepage quantities for raised power intake embankment.

The impact of raising the embankment has been analyzed and it is concluded that the additional seepage can be collected by the existing open jointed RCC pipe and disposed off through the under ground drainage system of the powerhouse. The seepage will increase as a result of 40 ft. rising of the Mangla reservoir. However the present thickness of the drainage mattress under the existing downstream shoulder can

safely intercept the seepage flows without creating any additional head under the shoulder. However, filters of the drainage mattress will require extension under the raised downstream shoulder for safe disposal of intercepted flows outside the toe.

The seepage quantities as shown by the curves representing the SEEP/W model output provide that these quantities, in general, are higher as compared to the actually observed data. This can be concluded that higher model seepage quantities are due to conservative permeability values considered for power intake embankment zones. Permeability values used for the SEEP/W model are the same which were taken at the time of original design of Mangla dam.

Increase in the number of sections to be analyzed will further refine the results of seepage study as such the minimum foundation levels vary along the entire length of the dam resulting in the variance in the net head acting on the corresponding sections. There are number of depressions or low points along the reservoir rim which have been filled to retain water up to maximum flood level. These low points are called reservoir rim works. A full fledge study can be made for these rim works.