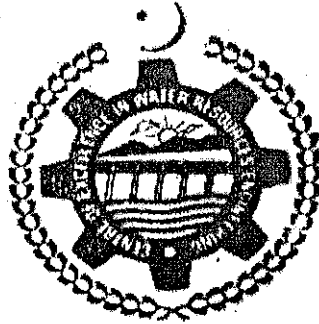


THESIS

**OPTIMIZATION OF OPERATING RULES OF TARBELA
RESERVOIR USING HEC-5 & DRW SOFTWARE**



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By

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ABSTRACT

Optimization of operating rules of Tarbela reservoir is performed. Tarbela reservoir is the largest multipurpose reservoir of Indus Basin System built on River Indus. The methodology processes through data screening, optimization, simulation verifying the optimization, regression and simulation verifying the regression. A hydrologic software DRW (DESIGN RESERVOIRS for Windows) is used for optimization and simulation. HEC-5 (Simulation of Flood Control and Conservation Systems) computer program is employed to countercheck the optimization by DRW model. Optimization is performed through DRW model. These optimal releases are verified by simulation through DRW model. Rule curves envelope is modified in light of optimization and simulation results. The optimal releases in conjunction with modified rule curves envelope are simulated through HEC-5 model. These optimal releases are compared with that of WAPDA's releases. Monthly operating rules are then derived by regressing the optimal set of releases on important independent variables which include reservoir storage in the beginning of current period, lagged storages and lagged inflows. Linear and non-linear release policies are developed in month-specific and generalized form. Maximum R^2 and F-test, minimum residual sum and sum of squared residuals are the criteria for selecting the best release policies. Derived operating rules are verified by simulation through DRW. Large gains in irrigation and hydropower energy sector are expected if these rules are implemented by the Government as minimum deficit and proper resources utilization are the essence of optimization.

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