

CANADIAN INTERNATIONAL DEVELOPMENT AGENCY  
PAKISTAN WATER AND POWER DEVELOPMENT AUTHORITY

HYDROELECTRIC INVENTORY RANKING  
AND FEASIBILITY STUDIES FOR PAKISTAN  
PHASE B

BASHA STORAGE AND POWER PROJECT  
FEASIBILITY STUDY

OCTOBER 1984

*To my friend, Shahid,  
who made it all  
possible!*

VOLUME ONE OF ELEVEN

*Prof. Sarban  
November 1984*

CIDA PROJECT NUMBER 714/00603

MONTREAL ENGINEERING COMPANY, LIMITED

The report and its recommendations were formally endorsed by WAPDA on January 3, 1983. CIDA's concurrence was communicated in writing to WAPDA by the Canadian Embassy in Islamabad on January 9, 1983. The "Final Draft Inventory and Ranking Report Phase A(1)", incorporating comments and suggestions made by WAPDA and CIDA, was submitted in May 1983.

Work on the feasibility study of the Basha scheme commenced in January 1983, although the site drilling which had started during Phase A(1) continued from November 1982.

The study was conducted by an integrated interdisciplinary team consisting of specialists provided by the Consultant and staff of WAPDA's Hydro Electric Project (see Annex XVII). The contribution of the WAPDA counterpart engineers, geologists and other technical and support personnel was crucial to the successful completion of the study. In addition to its role as a member of the study team, the Hydro Electric Project was responsible for the execution of the field investigation program. The project team received consistent support from WAPDA senior management. Particularly welcome was help and encouragement from Lt.-General Dr. Ghulam Safdar Butt, Chairman of WAPDA; Mr. Mohammad Akram Khan, former Member (Power); the late Dr. S.M.H. Bokhari, former Member (Water); Mr. Mohammad Ayub Sadozai, Member (Power); Mr. Abdul Rehman, Managing Director, Project Monitoring; Ch. Ghulzar Ahmad, former General Manager Dams; and Mr. Mohammad Arshad, Chief Engineer Planning (Power). The active and sustained participation of Mr. M. Badruddin, General Manager Planning (Water); Mr. Riaz Nazir Tarar, Chief Engineer, Dams Review Cell; and Mr. Saeed Akhtar Niazi, Chief Engineer, Hydro Electric Project, is gratefully acknowledged.

Special expert advice was also obtained during the course of the study. Decisive contributions were made by Mr. J. Barry Cooke, Consulting Engineer of San Rafael, California, U.S.A. and by Prof. N.R. Morgenstern of the University of Alberta, Edmonton, Canada, both of whom visited Basha in August 1983.

Mr. Sadiq Sirhindi of WAPDA and Dr. John D. Cadman, of Brasilia, Brazil pioneered the exploration of the Basha site. Perhaps the most difficult assignment of the entire field investigation program, the riverbed drilling, was

managed with great determination by Maj. (Ret'd) Shahid Ata-Ullah of the Indus Valley Construction Company, Limited of Lahore.

The CIDA officers responsible for the Project were Mr. L. Breiner and Dr. C.A. Tsou. Assistance from the Canadian Embassy in Islamabad was coordinated by Mr. D.C. Smart until August 1982 and thereafter by Dr. Lorne E. Heuckroth.

Throughout the course of the studies, matters relating to the Consultant and counterpart staff, WAPDA facilities, WAPDA and CIDA equipment, and in particular the progress of the work, were described in comprehensive monthly reports addressed to CIDA with copies to WAPDA and the World Bank.

This report presents an evaluation of the technical and economic feasibility of the Basha storage and power project. It is made up of eleven volumes. This volume (Volume One) contains the Main Report, the Terms of Reference and the Study Organization Chart. Volumes Two, Three, Four and Five include an Appendix describing the regional and site geology and the geotechnical site investigation, together with Annexes giving borehole and test pitting logs, laboratory test reports and seismic data. Volumes Six, Seven, Eight, Nine, Ten and Eleven comprise Appendices giving details of the hydrology and project benefits, project layout studies, transmission studies, construction planning, cost estimates, environmental considerations, and economic and financial analyses. They also contain supporting material in the form of Annexes.