0 Executive Summary

0.1 Introduction

This Chapter of the Report summarizes the findings of the Feasibility Study carried out for the Project. According to the study, Gahrait-Swir Lasht Hydropower Project is marked to have an installed power generation capacity of 377 MW against 340 MW as originally estimated in the identification studies conducted earlier by GTZ. Accordingly, the Annual Energy is now estimated as 1579 GWh against 1,553 Gwh indicated in GTZ Report. Salient Features of the Project and Project Layout Plan are placed at the end of this Chapter.

All relevant desk and field studies including Field Investigations have been conducted as a part of Feasibility Study. Geological, Environmental and Seismic Studies have not indicated any major adversity that may challenge/threaten further development and construction of the Project.

The Feasibility Report has been prepared by a Joint Venture of three local Consultants including ACE, EGC and TEAM Consultants, ACE being the lead Consultant.

0.2 Project Location

Gahrait-Swir Lasht HPP is located on Chitral River which is the main river that passes through Chitral Valley. It flows from north to south and enters Afghanistan near Arandu Town. The dam site is proposed about 35 km downstream of Chitral Town. Powerhouse site is located about 8 km downstream of Drosh Town near Swir Lasht Village on the right bank of Chitral River.The national grid at Chakdara is at a distance of about 170 km from the powerhouse site. Water from the dam will be conveyed through a 10 km long tunnel to an underground power house, about 8 km downstream of Drosh town near Swir Lasht village.

0.3 Geological and Geotechnical Studies

Significant information about the geology of the project components / parts has become available, based on which the feasibility of the project has been studied.
Results of Geological and Geotechnical Investigations carried out are presented in this report and evaluation of the foundation conditions and the parameters established for use in the design of various surface and underground structures, including the design of rock excavations, have been defined. Generally the strength of the rocks are not likely to pose any serious problem for the structures.
Certain Geotechnical Investigations remained outstanding due to various unavoidable circumstances.Further geological and geotechnical investigations should be carried out at the detailed design stage of the project.

0.4 Seismic Hazard Analysis

The project is located in a region which is seismically active due to the proximity of the collisional boundary of the Indian and the Eurasian plates. The seismicity of the area is depicted by small to major earthquake activity. The main active tectonic features within 100 km of the site, which govern the ground motion at the project site, are the Main Karakoram Thrust (MKT), Reshun Thrust, Tirich Mir Thrust and the Hindukush Deep Seismic Zone.

The recommended PGA value for Safety Evaluation Earthquake (SEE) associated with horizontal ground motions is 0.42g which has a return period of 3,000 years. The dam safety critical features like dam body, bottom outlet and spillway gates are recommended to be designed to maintain their integrity during shaking from SEE ground motions.

The PGA of 0.18g having a return period of 145 year is recommended for the project structures to remain operative for horizontal ground motion associated with Operating Basis Earthquake (OBE). All the appurtenant structures of the dam, tunnel and power house are recommended to be designed for PGA of 0.26g which is associated with horizontal ground motion of Design Basis Earthquake (DBE).

0.5 Optimization and Project Sizing

The Project is optimized with a maximum reservoir level of 1337m asl and design discharge of 430 m^3/s, which has availability approximately 26% time of year. Installed capacity of 377MW and Annual Energy equivalent to 1,579Gwh has been attributed to the Project with a Plant Factor of 49%.

0.6 Environmental and Social Impact Assessment

Surveys and studies are indicative of Low-Adverse Impact resulting from implementation of Gahrait-Swir Lasht Hydropower Project. All the impacts can be mitigated without difficulty.

0.7 Construction Planning

It is presumed that the construction of this Project shall be carried out as Engineering, Procurement & Construction (EPC) Package. At this stage, Consultants have carried out an exercise to establish broad outlines which identify the extent, viability and interdependence of various activities involved in construction as shown in the Project Construction Schedule given in Chapter-15 of this Report. The Project can be completed in a Period of 96 months, out of which 12 months are for pre-construction activities and 84 months for construction.

0.8 Cost Estimate

Cost estimates of the Project are prepared on the basis of Feasibility Level Designs and Drawings. Unit Rates of various items used for cost estimation are derived from rate analyses.
Rates have also been obtained from suppliers / manufacturers wherever applicable. All rates pertain to the year 2013 price level. While working out the cost of each Project component, appropriate contingencies for Civil Works and E&M items have been included.
Total Project cost has been worked out as US$ 1,773 million or Rs.174, 802 million which also includes US$ 425.80 million as Interest during construction (IDC).

0.9 Economic and Financial Analyses

Economic viability of the Project has been determined using the “Alternative Cost” approach, wherein the investment of Gahrait-Swir Lasht Hydropower Project is compared with the investment of alternative thermal power plants.

EIRR in comparison with thermal plant of equivalent capacity is 23.71% in case of furnace oil plant and 13.81 % in case of gas operated plant. Benefit-Cost Ratio in each of the two cases is 2.05 and 1.15 respectively.

To test the robustness of the Economic appraisal of the Project, a sensitivity analysis has been carried out. This test has been performed only for the combined cycle plant (in case of furnace oil) as this alternative has been compared with the proposed Project.

The above mentioned analysis has also been tested for its robustness for Cost increase of 10 % and Benefit decrease of 10%. The cumulative effect of the above two conditions gives an EIRR of 19.75 % and B.C Ratio as 1.68 .Study of Certified Emission Rate (CER) indicates a saving of emission of 757,920 tons of CO_2 per annum compared to furnace oil plants and 663,180 tons/annum if gas is considered as the alternative source of energy

Financial Analysis has indicated B.C Ratio greater than one (1). It is also seen from the Financial Analysis that repayment of the loan installments will be easily manageable.