

Document of  
The World Bank

FOR OFFICIAL USE ONLY

Report No: 28781

IMPLEMENTATION COMPLETION REPORT  
(SCL-39650)

ON A

LOAN

IN THE AMOUNT OF US\$350.0 MILLION

TO THE

ISLAMIC REPUBLIC OF PAKISTAN

FOR A

GHAZI BAROTHA HYDROPOWER PROJECT

June 22, 2004

**Energy and Infrastructure Sector Unit**  
**South Asia Region**

This document has a restricted distribution and may be used by recipients only in the performance of their official duties. Its contents may not otherwise be disclosed without World Bank authorization.

## CURRENCY EQUIVALENTS

(Exchange Rate Effective October 31, 2003)

Currency Unit = Pakistan Rupee (Rs)  
Rs 1 = US\$ 0.0175  
US\$ 1 = Rs 57.395  
Rs 1 = 100 Paisas

## FISCAL YEAR

July 1 – June 30

## WEIGHTS AND MEASURES

1 megavolt ampere (MVA) = 1,000 kilovolt-amperes (kVA)  
1 megawatt (MW) = 1,000 kilowatts (kW)

## ABBREVIATIONS AND ACRONYMS

DRB	–	Dispute Review Board
ERRP	–	Environmental and Resettlement Review Panel
GBTI	–	Ghazi Barotha Taraqiati Idara
GOP	–	Government of Pakistan
Hubco	–	Hub Power Project
IAEA	–	International Atomic Energy Agency
ICB	–	International Competitive Bidding
ICSID	–	International Center for Settlement of Investment Disputes
IPP	–	Independent Power Project
IPPs	–	Independent Power Producers
IRDPA	–	Integrated Rural Development Plan
JBIC	–	Japan Bank for International Cooperation
LVCs	–	Land Valuation Committees
M&E	–	Mechanical and Electrical
NAB	–	National Accountability Bureau
NEPRA	–	National Electric Power Regulatory Authority
NTDC	–	National Transmission and Dispatch Company
O&M	–	Operations and Maintenance
OECF	–	Overseas Economic Cooperation Fund
POE	–	Panel of Experts
PRO	–	Project Resettlement Organization
RAP	–	Resettlement Action Plan
SAR	–	Staff Appraisal Report
SES	–	Supplementary Environmental and Social Study
TOC	–	Taking Over Certificate
WAPDA	–	Water and Power Development Authority
WEC	–	WAPDA Environment Cell

Vice President:	Praful C. Patel
Country Director:	John W. Wall
Sector Manager:	Penelope J. Brook
Task Team Leader:	Rashid Aziz

**PAKISTAN**  
**GHAZI BAROTHA HYDROPOWER PROJECT**

**CONTENTS**

	<b>Page No.</b>
1. Project Data	1
2. Principal Performance Ratings	1
3. Assessment of Development Objective and Design, and of Quality at Entry	2
4. Achievement of Objective and Outputs	6
5. Major Factors Affecting Implementation and Outcome	10
6. Sustainability	16
7. Bank and Borrower Performance	18
8. Lessons Learned	23
9. Partner Comments	24
10. Additional Information	26
Annex 1. Key Performance Indicators/Log Frame Matrix	35
Annex 2. Project Costs and Financing	37
Annex 3. Economic Costs and Benefits	39
Annex 4. Bank Inputs	44
Annex 5. Ratings for Achievement of Objectives/Outputs of Components	49
Annex 6. Ratings of Bank and Borrower Performance	50
Annex 7. List of Supporting Documents	51
Annex 8. Maps IBRD 25106, IBRD 25107	54

<i>Project ID:</i> P039281	<i>Project Name:</i> Ghazi Barotha Hydropower Project
<i>Team Leader:</i> Rashid Aziz	<i>TL Unit:</i> SASEI
<i>ICR Type:</i> Core ICR	<i>Report Date:</i> June 22, 2004

## 1. Project Data

*Name:* Ghazi Barotha Hydropower Project *L/C/TF Number:* SCL-39650  
*Country/Department:* PAKISTAN *Region:* South Asia Regional Office

*Sector/subsector:* Power (100%)

*Theme:* Regulation and competition policy (P); Pollution management and environmental health (P); Infrastructure services for private sector development (P); Climate change (S)

### KEY DATES

	<i>Original</i>	<i>Revised/Actual</i>
<i>PCD:</i> 05/18/1993	<i>Effective:</i> 06/08/1996	06/27/1996
<i>Appraisal:</i> 00/00/0000	<i>MTR:</i> 12/16/1998	12/16/1998
<i>Approval:</i> 12/19/1995	<i>Closing:</i> 06/30/2002	10/31/2003

*Borrower/Implementing Agency:* GOP/WAPDA

*Other Partners:* Asian Development Bank (ADB); Japan Bank for International Cooperation (JBIC); Kreditanstalt für Wiederaufbau (KfW); Islamic Development Bank (IDB); and European Investment Bank (EIB)

### STAFF

	<i>Current</i>	<i>At Appraisal</i>
<i>Vice President:</i>	Praful C. Patel	Joseph D. Wood
<i>Country Director:</i>	John W. Wall	Mieko Nishimizu
<i>Sector Manager:</i>	Penelope J. Brook	Per Ljung
<i>Team Leader at ICR:</i>	Rashid Aziz	
<i>ICR Primary Author:</i>	Rashid Aziz	

## 2. Principal Performance Ratings

(HS=Highly Satisfactory, S=Satisfactory, U=Unsatisfactory, HL=Highly Likely, L=Likely, UN=Unlikely, HUN=Highly Unlikely, HU=Highly Unsatisfactory, H=High, SU=Substantial, M=Modest, N=Negligible)

*Outcome:* S  
*Sustainability:* L  
*Institutional Development Impact:* M  
*Bank Performance:* S  
*Borrower Performance:* S

*Quality at Entry:* S *QAG (if available)* ICR  
*Project at Risk at Any Time:* Yes S

### **3. Assessment of Development Objective and Design, and of Quality at Entry**

#### *3.1 Original Objective:*

3.1.1 The Development Objectives of the project were to assist the Government of Pakistan (GOP) in its efforts to:

- 1) Develop domestic energy resources and reduce load-shedding in a cost effective and environmentally sustainable manner, thereby supporting the country's long-term energy development objectives;
- 2) Reinforce and complement the reform program for the power sector;
- 3) Strengthen WAPDA's capability to address environmental and resettlement issues related to hydropower projects; and
- 4) Further rationalize the use of electricity.

3.1.2 The Development Objectives (DOs) of the Project were realistic, both in terms of acknowledging the key constraints to be addressed, and the outcomes to be achieved by the Project. Pakistan experienced a severe shortage of power generating capacity during much of the 1980s and 1990s, and load-shedding of up to 25% of peak demand was required, to offset the shortfall. The physical component of the Project - i.e. construction of the 1450 MW Ghazi Barotha Hydropower Project (GBHP) - was a key element of the Government's long-term plan to address the shortfall in generating capacity, develop domestic energy resources, and provide low cost electricity to the grid. Since the 1960s, the Water and Power Development Authority (WAPDA) had executed a number of large and complex hydropower projects, and its technical capacity to undertake such investments had been well established. This component was therefore appropriately targeted towards addressing the shortage of generation capacity.

3.1.3 The Project was prepared concurrently with Government plans to restructure the power sector. The major implication of the restructuring program for this Project was the need to separate the responsibility for developing Pakistan's water and hydropower resources from WAPDA's power utility functions. While agreement was reached to establish a separate Entity for managing this Project, ultimately (given the need for close coordination in the operations of GBHP and Tarbela) it was decided that the development and operation of all large hydropower projects will remain with WAPDA.

3.1.4 During the 1980s the resettlement impacts of hydropower projects had assumed a high profile in Pakistan, and generated considerable public debate and controversy, particularly in the context of the Kalabagh project, which was being prepared at that time. Strengthening WAPDA's capacity to manage the environmental and social impacts of hydropower projects was therefore critical for the success of such projects. The Project's Environmental and Resettlement Management Plan included specific actions to: (a) provide top-of-the-line expertise to WAPDA, and train WAPDA's staff; (b) develop participatory and transparent procedures for addressing social concerns; (c) evaluate various alternatives, to minimize the environmental and social impacts of the Project; and (d) earmark resources for income generation activities in the Project area. In addition, a comprehensive set of monitoring arrangements was included in the Project. This component was designed to build on WAPDA's existing capacities, and to provide additional expertise in areas where in-house capacity was felt to be inadequate.

3.1.5 Actions to moderate the growth in demand, through tariff and non-tariff measures to rationalize electricity consumption, also needed to be accorded a high priority. However, this DO was not fully defined at the appraisal stage, and no specific components (or activities) were identified as the means for rationalizing electricity use.

### 3.2 Revised Objective:

Same as above.

### 3.3 Original Components:

3.3.1 The original Project components were:

#### **Construction of the Ghazi Barotha Hydropower Project (GBHP), involving:**

- ◆ A barrage and ancillary works, located about 7 kms downstream of the Tarbela Dam, to divert water from the Indus River into a power channel;
- ◆ A 52 km long concrete-lined power channel, with a capacity of 1,600 cumecs, to transmit the water to a power complex;
- ◆ A power complex, located at the confluence of the Indus and Haro Rivers, with an installed generating capacity of 1,450 MW, comprising 5 units each of 290 MW; and
- ◆ Transmission facilities to connect the power house to WAPDA's 500 kV grid, involving two 500 kV transmission lines of 100 kms between Barotha and Rewat, and about 150 kms of loop in-and-out of existing 500 kV lines between Tarbela and Gatti.

#### **An Environmental and Resettlement Management Plan, which included:**

- ◆ An Environmental Mitigation and Monitoring Plan;
- ◆ A Resettlement Action Plan, involving land acquisition, compensation and rehabilitation for project affected people; and
- ◆ An Integrated Rural Development Plan, to address project induced impacts and promote long-term sustainable development in the Project area.

#### **A Power Sector Reform Component, involving:**

- ◆ Setting up GBHP as a separate project entity; and
- ◆ Establishing a separate transmission and despatch entity.

#### **A Technical Assistance Component, to assist WAPDA in:**

- ◆ engineering design, procurement and construction supervision;
- ◆ continued participation of two Panels of Experts (POEs), one for technical aspects, and one for environmental and social (resettlement) issues; and
- ◆ managing and monitoring the implementation of the other components of the Project.

3.3.2 The Project was prepared (in terms of feasibility study, detailed design, and preparation of bidding documents) through a UNDP funded assignment, with the Bank as executing agency. A consultant team (a joint-venture of Binnie and Partners from UK, Harza Engineering from USA, Ewbank Preece from UK, and NESPAK and Associated Consulting Engineers, both from Pakistan) was selected by the Bank, for conducting the feasibility and design studies. The Project Document was signed in 1989, and the feasibility study (including a draft Resettlement Action Plan - RAP) was conducted during FY1990-92. Despite significant disruptions in the work schedule (arising from the first Gulf war) and major changes in the scope of work (e.g. the addition of 2 Headponds, to maximize power generation during low water months), the feasibility study was completed well in time, and was deemed by the Bank to be fully acceptable for its preparation and appraisal of the Project.

3.3.3 The Project included a number of features that were departures from normal project preparation requirements, but were considered to be consistent with best practice approaches (which were evolving at that time) for preparing hydropower projects. Specifically:

- ◆ An independent Environment and Resettlement Review Panel of Experts (ERRP) - in addition to a POE on technical aspects - was appointed during the feasibility and design stage. GBHP was the first example of a Bank financed hydropower project where an environmental and social Panel of Experts was associated, from the feasibility study stage till the completion of the Project.
- ◆ Environmental and social impacts were incorporated in the design of all components. This included, e.g., review of alternate locations for the barrage and power house, and selection of sites that involved the least impacts on existing villages and settlements. In fact, the project was originally called Ghazi Garijala Hydropower Project, as one potential site for the power house was close to Garijala village. When the final site was selected at Barotha village, and at the request of residents of Barotha, the name of the Project was changed to Ghazi Barotha Hydropower Project. Similarly, the power channel alignment was adopted after reviewing options to avoid all towns, villages, graves and other cultural properties - even though it enhanced the length of the channel, relative to the most direct route.
- ◆ An innovative process (consistent with the Land Acquisition Act) was proposed in the RAP, and was adopted, for the valuation of land and other assets to be acquired for the Project. This involved the active participation - through Land Valuation Committees (LVCs) - of affectees, along with officials from WAPDA and the Revenue Department(s), in determining the value of land and other assets which were to be acquired for the Project.
- ◆ Under GBHP, the Government agreed to implement a program to address the outstanding compensation issues related to the Tarbela Dam Project—which was constructed in the 1960s and 1970s. While such retrofit of "past legacy" issues is highly recommended by the World Commission on Dams (see *Dams and Development: A new Framework for Decision-Making*; World Commission on Dams, November 2000), it was an innovative feature of GBHP for which there was little or no prior experience or precedent.
- ◆ For Project implementation, a fairly rigorous regime was adopted for ensuring compliance with agreed safeguards. This involved a three-pronged monitoring and management plan, including reviews by WAPDA's Environment Cell and other Units, inputs by the supervision consultants and specialized consultant support to WAPDA, and periodic reviews by the ERRP, which provided oversight and assessment on all project components.

3.3.4 The Project components were appropriate in terms of the requirements of a large and complex hydropower project. However, in view of the implementation experience on many of these components (see, e.g., Section 5 below), the ICR mission is of the view that the program which was adopted for mitigating the environmental and social impacts of the Project proved particularly challenging for the Government and WAPDA. While some additional and focussed support from the Bank (e.g. to manage the construction of the spoil banks) could have facilitated early resolution of a few issues, for others - e.g. the public consultation/LVC process adopted for land valuation and compensation - there was essentially no precedent or best practice example which the Bank could have brought to the attention of the Government or WAPDA.

### 3.4 Revised Components:

3.4.1 There was no change in the Project components, except for the transmission facilities required for the evacuation of GBHP power. Load flow studies carried out by WAPDA identified the need for the following additional lines/sub-stations:

- ◆ a 500 kV transmission link between Rewat and Lahore, along with extensions of the (existing) Rewat and Lahore sub-stations;
- ◆ a new 500 kV sub-station at Gakhar; and
- ◆ a 220 kV transmission line linking the power house (Barotha) to Nowshehra.

3.4.2 These transmission system extensions are being financed and constructed by WAPDA under a separate Project—Transmission Arrangements for Dispersal of Ghazi Barotha Power.

### 3.5 Quality at Entry:

3.5.1 A Quality of Supervision review of the Project was carried out - jointly with a number of other projects in South Asia - by a Panel constituted by the Bank's Quality Assurance Group (QAG) in FY98. For GBHP, the Panel also reviewed Quality at Entry aspects (on a post-approval basis). The Panel's conclusions and ratings for GBHP were positive: the Panel rated the (overall) Quality at Entry and Quality of Supervision of GBHP as Satisfactory. In fact, for Quality at Entry, the Panel considered GBHP to be better than fully satisfactory. The Panel's detailed comments on this aspect were:

"...The Panel considers the quality at entry, in summary, as **fully satisfactory and partly better**; in fact, project development and preparation exhibit in some respect best practice features. It reflects the full panoply of environmental, social / resettlement and sector restructuring / privatization policies. It was firmly embedded in a sector-wide approach, well coordinated with the accompanying *Power Sector Development Project (PSDP)* and based on good knowledge of the executing agency, WAPDA. The project did not only bring together a number of important multilateral and bilateral donors for cofinancing, but also gained from their accumulated know how, and, through synchronization of their policies towards the power sector, enhanced the combined leverage with the government.

The Panel noticed best **some best practice approaches** in the way the complexity of the project was dealt with, appropriate alternative solutions were considered, and the way relevant experiences from the past entered the project design. Perhaps most outstanding are the identification of, and communication with key stakeholders, in conjunction with resettlement issues, which also were handled in an exemplary way. **Fully satisfactory** were the analysis of the institutional framework, the broad range of experts deployed, the inclusion of a strong project management team with outside support and the readiness of procurement decisions prior to implementation. Risk and sensitivity analyses were extensive, too, but missed out one area which turned critical, soon after inception.

One **major weak spot** was the oversight of political currents adverse to reform, the strength of it seems to have caught everybody by surprise when a new government with more populist power policies gained power. Another development which should not have escaped Bank's attention was the financial impact on WAPDA of the purchases from the Hub River Project, together with the surge in fuel prices. Both developments have led to the current financial crunch of WAPDA which imperils the time table of the project....".

3.5.2 The ICR mission agrees with the Panel's ratings. As stated in Section 3.3, the ICR mission found the "design" aspects of GBHP - particularly the processes for handling environmental, social and resettlement issues - to be very comprehensive and participatory. The ICR mission also agrees with the observation regarding the somewhat weak recognition of the political support (or lack of it) for the restructuring and reform program, and of the substantial escalation in WAPDA's operating costs due to power purchases from IPPs and the increase in fuel prices - and their impact on WAPDA's financial situation. These aspects are discussed in more detail in Section 5 below.

3.5.3 The Panel's findings and ratings for Quality of Supervision are discussed in Sections 5 and 7 below, since these ratings relate primarily to factors which affected project implementation, and Bank and Borrower/Implementing Agency performance, in addressing issues and constraints as they emerged during implementation.

## **4. Achievement of Objective and Outputs**

### *4.1 Outcome/achievement of objective:*

4.1.1 The Development Objectives (DOs) of the Project have been largely achieved. Specifically:

- ◆ The Project has assisted in developing an indigenous renewable energy resource and produce electricity at a very competitive price (about US 1.7 cents/kwh over the life of the Project, compared to average generation costs of over US 6 cents/kwh). Load shedding was largely eliminated, due to capacity additions in the late 1990s. Between June 1996 and end-2000, about 4,830 MW of thermal generating capacity was installed by the private sector (through fuel oil or gas fired plants). These additions were adequate for overcoming the prevailing severe shortage of generating capacity, and for meeting the growth in electricity demand in the intervening period. The additional capacity provided by GBHP will cater for the projected growth in electricity demand for the next few years. The ICR mission therefore rates the achievement of this DO as Fully Satisfactory.
- ◆ The project was designed and implemented in the context of the power sector reform program, which involved, inter alia, the unbundling of WAPDA into independent entities responsible for generation, transmission and distribution. While the reform program has been under implementation for a number of years now, the unbundling of WAPDA has still not been completed. The (revised) target date for achieving this milestone is end-June 2004. For GBHP, the main implication of the unbundling was the need to separate WAPDA's hydel generation functions from its power utility operations. GBHP is being implemented (and will be operated) by the Hydel wing of WAPDA, which is responsible for the integrated development of Pakistan's water and hydropower resources. It will sell electricity under a bulk-sale agreement to the transmission entity (the National Transmission and Dispatch Company - NTDC), and the bulk sale price for the sale of power from WAPDA's hydropower units to NTDC has been determined by the regulator - the National Electric Power Regulatory Authority (NEPRA). The ICR mission rates the achievement of this DO as Satisfactory.
- ◆ The Resettlement Action Plan (RAP) provided a comprehensive framework for handling environmental/social issues in hydropower projects. Despite a number of problems, including delays in completing some components, and the difficulties in land acquisition during the initial years, the Bank has been satisfied that the RAP is being fully implemented. Full implementation of the RAP has not only ensured that adverse impacts of the Project on

the environment, loss of income, assets or livelihoods, are adequately mitigated, it has also enhanced WAPDA's capacity to prepare and implement hydropower projects. For example, with the three pronged approach for managing and monitoring environmental and social issues, WAPDA gained a wealth of experience in handling social issues which are encountered in large hydropower projects. This experience is gradually being put to use by the Government and WAPDA, in follow-up projects. For example, for the Mangla Raising Project (which primarily seeks to enhance the storage capacity of the Mangla reservoir, but can also provide 200 MW of new generation capacity), the Government and WAPDA adopted the approach which was pioneered under GBHP - of closely involving affectees while preparing the compensation package which will be part of the Resettlement and Rehabilitation component of that Project. Therefore, the ICR mission rates the achievement of this DO as Satisfactory.

- ◆ Progress in achieving the final DO - rationalizing the use of electricity - was limited. This is partly because no specific components or activities were prepared or identified at appraisal, specifically for achieving this DO. This DO was more of a generalized statement about the needs to address the financial situation of WAPDA, which includes operational inefficiencies (high technical and non-technical losses), governance issues (including high levels of receivables), and the need to raise tariffs (over time) towards cost covering levels. The dialogue between the Government/WAPDA and the Bank on WAPDA's finances was handled primarily through the macro-economic and structural reform program - which was supported through Structural Adjustment Loans and Credits. A number of efforts were made by the Government, WAPDA and the Bank (e.g. a Financial Restructuring Plan was implemented in 1999-2000, a Financial Improvement Plan was adopted in mid-2002), to improve WAPDA's finances. However, for various reasons, these plans were not fully implemented. As discussed in Section 5.2 of the ICR, WAPDA's financial position remained adverse through much of the Project life, and this impacted adversely on Project implementation, at various times. Therefore, this DO was not achieved, and the ICR mission rates this outcome as Unsatisfactory.

4.1.2 The final estimated cost of the Project (about US\$2,068 million, at April 2003 prices, including contingencies and interest during construction) is slightly lower than the appraisal estimate (US\$2,250 million). This estimate does not include claims submitted by the contractors (see para 5.3.1), which are being reviewed in accordance with mechanisms set out in the contracts. Nevertheless, completion of a large hydropower project at a cost that is close to appraisal estimates is a significant achievement.

4.1.3 The distribution of Project costs between various components did, however, vary significantly compared to appraisal estimates. As shown in Table 2 (see Section 5.4 below), the final cost of land acquisition and resettlement was more than three times the appraisal estimate (about US\$117 million compared to US\$37 million), and the requirement for interest during construction was about 17% larger than estimated (US\$451 million, compared to US\$386 million). By comparison, the cost of the civil works and mechanical and electrical equipment was substantially lower. The final cost of these components was about US\$825 million, relative to the appraisal estimate of more than US\$1,285 million. While some leeway in the cost estimates can be expected (since the actual quantum of work depends on geological, hydrological and other conditions, which cannot be anticipated with any level of certainty), the appraisal estimates of the cost of various components were substantially in excess of the final/actual costs. The appraisal estimates were, however, reviewed by a number of parties, including the consultants' joint venture partners, the (technical) POE, WAPDA, and the Bank.

4.1.4 The actual implementation period was considerably longer than estimated at appraisal. The Project was to be completed by mid-2001, and the final generating unit was expected to be commissioned in June 2001. However, due to a number of factors (details are provided in Sections 5.1–5.3 below) the Project was completed, and the final generating unit was commissioned, in May 2004. The major factor accounting for the delay in project completion was the delay in land acquisition (see Section 5.2 below). At the time of appraisal, land acquisition was expected to be completed by end-1995; however, this was not accomplished till almost four years later.

#### *4.2 Outputs by components:*

4.2.1 The physical components of the Project have now been commissioned, and all five generating units are in commercial operation. During the first 11 months of FY04, over 4,100 GWh of electricity has been generated from the Project; this is around 16.5% of total hydropower generation, and about 7.8% of total electricity generation in the WAPDA system, for the same period.

4.2.2 A Taking Over Certificate (TOC) for "Works Essential for Impounding" was issued under Contract C-01 (Barrage) on June 16, 2003, and the TOC (excluding six items) for "Works not Essential for Impounding" was issued in November 2003 - effective from August 22, 2003. Impounding of the Barrage pond commenced in February 2003, and the maximum level was reached on May 20, 2003. For Contract C-02 (Power Channel) the TOC for "Works Essential for Impounding" was issued on August 9, 2003 - effective from July 30, 2003. Impounding of the Power Channel commenced on April 9, 2003. Under Contract C-03 (Power Complex), most of the work - including the powerhouse, installation and testing of turbines, generators, and other mechanical and electrical (M&E) equipment - has been completed. Impounding of the Forebay and South Head-pond was started in April 2003, simultaneously with the impounding of the Channel. The Tailrace Channel was flooded on April 18, 2003, and its downstream cofferdam was removed.

4.2.3 Units 1 and 2 were commissioned during the summer of 2003, and the Project was formally inaugurated on August 19, 2003. Reliability runs for these units were completed, and these units started commercial operation, on August 28, 2003, and September 18, 2003, respectively. For Unit 3, wet testing was initiated in September and completed in October 2003, and the unit was put into commercial operation on November 20, 2003. These units have been in commercial operation since that time, and were generally operated close to full load, till the reduction in water availability in mid-December 2003. For Unit 4, the first mechanical run was conducted on December 3, 2003; reliability runs were initiated in mid-December and completed in January 2004; and this unit started commercial operation on January 18, 2004. Commissioning tests and reliability runs on the final unit (Unit 5) were initiated in April 2004, and the unit was formally commissioned and started commercial operation on May 14, 2004. Progress on other M&E equipment contracts has been commensurate with the pace of work on the turbines/generators.

4.2.4 The 500 kV Tarbela-Gatti lines (In and Out arrangements) were completed by end-February, 2003, and were fully operational during the testing and commissioning of various units. As regards the 500 kV Barotha-Rewat lines, the supply of towers, conductor, insulators and hardware, and accessories has been completed. However, the pace of construction of these lines was slower than planned, and physical progress of the construction work was only 48% as of end-December 2003. Completion of these two lines by end-June 2004 is essential for ensuring the full evacuation of GBHP power, and this contract remains on the critical path.

#### 4.3 Net Present Value/Economic rate of return:

4.3.1 In the feasibility report several options for the project were considered, but the economic and financial analysis was conducted/reported for only one option, involving an installed capacity of 1,425 MW; a 1600 cumecs power channel; head pond of 15 million cubic meters; and average annual generation of 7,583 GWh. By comparison, the Staff Appraisal Report (SAR) defines the Project as: installed capacity of 1,425 MW; a power channel capacity of 1600 cumecs, and head pond of 25 million cubic meters, and average annual generation of 6,607 GWh. The Project (as constructed) involved the same installed capacity, power channel and head pond configuration, and annual generation, as the SAR. The economic and financial analysis for the ICR was therefore based on the parameters defined in the SAR, and the actual cost (based on April 2003 prices) of the Project. The results—including a comparison with the Feasibility Study and SAR estimates—are presented in Table 1.

4.3.2 In addition to these rate of return computations, an ex-post analysis to confirm that GBHP remains part of the least cost expansion plan for the power sector (specifically of the WAPDA system) was carried out for this ICR. This involved using the Wien Automatic System Planning Package (WASP), a simulation tool developed by International Atomic Energy Agency (IAEA) and used by a large number of utilities worldwide to develop and optimize their generation expansion plans on a least-cost basis.

**Table 1: Summary Economic and Financial Analysis**

No:		Feasibility Report	Staff Appraisal Report	Actual Project (as constructed)
1.	Capacity (MW)	1,425	1,425	1,425
2.	Annual Energy (GWh)	7,583	6,607	6,607
3.	Project Cost (US\$ million)			
3.a	Land Cost	39	37	116
3.b	Other Cost (including contingencies)	1,872	1,803	1,412
3.c	Duties and Taxes		24	88
3.d	Interest During Construction		386	451
3.e	Total Financial Cost	1,912	2,250	2,068
3.f	Project Economic Costs	1,751	1,686	1,320
4.	Construction Start Date	1992/93	1994/95	1994/95
5.	Commissioning Date	1997/98	2001/02	2003/04
6.	Construction Period (Years)	6	8	9
	<b>Economic and Financial Indicators</b>			
	Economic Rate of Return	22.25%	19.92%	22.48%
	Benefit/Cost Ratio at 10% Discount Rate	2.78	2.44	2.93
	Financial Rate of Return (w/o Duties and Taxes)	15.67%	13.87%	15.56%
	Financial Rate of Return (with Duties and Taxes)	14.90%	13.76%	15.13%
	Financial Rate of Return (including Duties and Taxes and IDC)		12.66%	13.47%

4.3.3 The following three cases were studied to determine whether GBHP - with its actual costs, construction and completion dates - is part of the least cost expansion plan for the sector:

- ◆ A low-demand forecast scenario, involving only the Hub Power Project (Hubco) to be developed as an Independent Power Project (IPP)
- ◆ A low-demand forecast scenario, with Hubco and 11 new IPPs with a total installed capacity of 3,793 MW to be implemented during the construction period of GBHP
- ◆ A high-demand forecast scenario, with Hubco and 11 new IPPs with a total installed capacity of 3,793 MW, included in the committed system.

Other assumptions e.g. regarding the load duration curve, fixed system, candidate options, costs and generation characteristics, and discount rate were kept the same as the SAR. The cost and construction schedule of GBHP was modified to conform with the actual year wise expenditure on the project. Based on these assumptions, GBHP was selected for completion by 2003/04 in all WASP scenarios, thereby confirming that GBHP - with its revised cost, construction schedule, and with the additional capacity installed through IPPs—remains part of the least cost system expansion plan for WAPDA.

#### *4.4 Financial rate of return:*

See Section 4.3 above.

#### *4.5 Institutional development impact:*

4.5.1 The Project provided WAPDA and the Government an opportunity for dialogue with a number of key stakeholders - e.g. local communities and affectees - who were not extensively consulted during the preparation and execution of hydropower projects in the past. This interaction has provided valuable insights and lessons to both parties. These experiences and lessons are gradually being adopted, in preparing new hydropower projects.

4.5.2 Given the close proximity of the GBHP barrage to the Tarbela reservoir, WAPDA has established a new office, to manage for operations of the External Works of Tarbela, and the barrage (see Section 6.2). This will not only promote more efficient use of WAPDA's human and technical resources, it will also ensure better coordination between the operations of Tarbela and GBHP.

4.5.3 Overall, the Project has contributed positively towards enhancing WAPDA's capacity to implement and manage large hydropower projects - though the concerns relating to the financial situation of WAPDA (of the power sector in general) were not fully addressed.

## **5. Major Factors Affecting Implementation and Outcome**

### *5.1 Factors outside the control of government or implementing agency:*

5.1.1 Project implementation was affected by a number of events, some of which could not be anticipated. These include a delay in the award of one civil works contract (since the original request for bids did not comply with donor requirements); and the events of September 11, 2001—which led to a cessation of work by the contractors, and a full year's delay in Project completion.

5.1.2 The first issue arose even before the Bank's appraisal of the Project. Procurement documents for three civil works contracts were submitted to, and cleared by, the World Bank - on the understanding that compliance with Bank procurement guidelines could be acceptable to other financiers. However, the

contract for the power house (Contract C-03) was financed by Japan Bank for International Cooperation (JBIC—formerly Overseas Economic Cooperation Fund, OECF). JBIC (OECF) guidelines require the procurement documents to be cleared by JBIC before they are issued. Since this was not done, JBIC was not able to provide funding, unless the contract was re-bid. The rebidding, following JBIC/OECF approval of the bidding documents, meant that the award of this contract was almost 12 months after the award of the other two civil works contracts—and there was a serious risk (in the early years) that the power house may not be completed till well after the other project facilities had been completed. This ultimately proved to be a non-issue, given the delays experienced under the other contracts.

5.1.3 Work on the project was also severely impacted by the events of September 11, 2001 in the U.S. Given the enhanced security risks worldwide—as also in Pakistan, particularly after the war in Afghanistan—most of the contractors working on the Project evacuated their personnel from Pakistan in late 2001, and work on the Project essentially stopped for the next 6-8 months. For example, the civil works contractors for the barrage and power channel resumed work only in April-2002—following a Supplementary Agreement between WAPDA and the contractors. While the calendar duration of this stoppage was about 8 months, in fact it led to a full year's delay in project completion, since (even after the work had resumed) the next few months were the high flow season in the Indus, and it was not possible to work at full speed at the barrage, till the high water flows had passed—i.e. till about October 2002. This was clearly an event over which no party had any control.

## *5.2 Factors generally subject to government control:*

5.2.1 Other factors affecting Project Implementation, which the Government has some leverage over, included the Government's inability to move aggressively to resolve the outstanding compensation issues on Tarbela, and to address the deterioration in WAPDA's finances. Finally, the Government did not take adequate up front actions to head-off the controversies that arose following an investigation into the causes and consequences of the substantial escalation in land prices.

5.2.2 One effectiveness condition was that "(the Government would carry out) a survey .. to determine the status of outstanding claims of persons affected by the Tarbela Dam, .. and an action plan would be agreed with the Bank, to settle those claims and to redress the legitimate grievances arising from those claims..". The Government, through WAPDA, engaged a consultant to ascertain the number of claimants and the status of their claims. The consultant's report was submitted in time; however, the Government and WAPDA did not endorse the consultant's proposed methodology (i.e. to provide cash in lieu of land—which was the Government's original offer) for paying this compensation. While the Bank accepted the consultant's report as meeting the effectiveness condition, the risk that there would be further discussion and debate over the means of compensation had been enhanced. By end-1997, the Government (and WAPDA) raised this issue again, and proposed a fresh survey—to confirm the number of legitimate claimants, and verify their entitlements and claims. A special commission was established by the Government for this purpose. The commission's report, submitted in June 1999, recommended that (as per the original announcement) land be provided to these claimants—a second group of people were to receive residential plots, for residential properties which were acquired for Tarbela. Since the issue originally arose (in part) because one province did not provide sufficient land for compensating all affectees, the commission's recommendation opened up another avenue for delay. The Government requested the provinces to allocate land, which the provinces had been unable to do in the first place. Finally, the Government decided to compensate these affectees in cash, and announced the amounts which the Federal/Provincial Governments and WAPDA had to provide for this purpose. All parties deposited their shares in mid-2003, and the compensation payments were largely completed by end-2003. For the second

group of 225 affectees (who were to receive residential plots) the compensation has still not been provided. While the land has been acquired, a dispute has arisen recently over the number of persons who are entitled to receive such plots, and over the status of the acquired land. This group of affectees had therefore not received their full compensation by the time the Project was completed.

5.2.3 The delays in completion the compensation of the Tarbela affectees was highlighted by the QAG panel. The Panel also termed the Bank's acceptance of the Government's decision to question the methodology proposed in the consultant's report (to provide cash, in lieu of land) as a waiver of the effectiveness condition. Specifically, the Panel noted:

"..Though there may not be sufficient justification for the decision to require the residual resettlement issues of Tarbela to be addressed as part of Ghazi Barotha, once this was indeed decided, the Bank could have used its leverage for an early resolution of this issue. Allowing a waiver to the condition of effectiveness was a major step in itself; not taking any remedial steps after the Borrower reneged on its assurance regarding prompt submission of a resettlement plan may have actually contributed to the lack of subsequent prompt attention by the borrower to this issue..."

5.2.4 The ICR mission agrees with this observation; a stronger signal by the Bank - that, in order to meet the effectiveness condition, the Government must adopt a compensation mechanism - could have focussed Government attention on the need to finalize the implementation mechanism at an earlier date.

5.2.5 Another key issue which delayed project implementation was the delay in land acquisition, particularly during FY96-97. In this period, the outcome of the LVC deliberations was a substantial escalation in land prices. This was partly a reflection of the affectees' expectations regarding the price they would like to receive for their assets. There are also reports - documented in Bank aide memoires - of some political intervention in the LVC deliberations. Nevertheless, due to these high land prices, the process of land acquisition was essentially stalled for a couple of years. Both WAPDA and the affectees initiated court proceedings against most of the announced awards. By end 1997, almost 500 such cases had been registered in the courts. Concurrently, the civil works contractors (rightly) raised claims for idle time, since WAPDA did not acquire (and provide to the contractor) adequate stretches of land, in a timely manner. By end-June 1997, for example, only about 20 % of the land required for the power channel had been acquired. As the contract was signed in December 1995, and the contractor had been on the job for more than 18 months, the lack of adequate land to work with was severely constraining the contractor's ability to work at full pace. The issue was ultimately resolved through a consultative mechanism. WAPDA requested the Project NGO (the Ghazi Barotha Taraqati Idara - GBTI, whose main mandate was to mobilize the affectees and advocate their interests at various stages of the Project) to prepare estimates of "fair market value" for various categories of land, and to evolve a consensus among the affectees towards accepting these estimates. GBTI submitted its report to WAPDA in early 1998. Even though the revised estimate of land acquisition costs was significantly higher than the appraisal estimate (about Rs 4.5 billion, compared to Rs 1.8 billion), WAPDA accepted these recommendations, since it was in WAPDA's own interest to expedite project implementation. Land acquisition proceeded relatively smoothly after that, and there were no major interruptions or delays in the work on this account, in subsequent years.

5.2.6 The QAG Panel also noted the delays in project implementation due to the delays in land acquisition. However, since WAPDA's financial situation from FY97 precluded the entity from implementing a large investment program, the Panel did not feel that the delay in land acquisition was the only factor responsible for construction delays.

5.2.7 The deterioration in WAPDA's finances - particularly from FY97 onwards - also impacted adversely on the Project. Up to FY96, WAPDA's financial performance was largely satisfactory, and it complied with financial covenants under Bank projects - specifically, it financed 40% of its average investment program from its own resources. However, by mid-1997, it faced a large increase in operating costs (due to power purchases from IPPs, which were contracted by the Government under the 1994 Private Power Policy) while its revenues, particularly power tariffs, did not increase in tandem. At appraisal, implementation of the Government's IPP policy was fairly advanced - the Government had announced the Policy in early 1994; a large number of proposals for new capacity had been received and were being evaluated; and the quantum of WAPDA's power purchases in future years could be projected fairly accurately. These developments were incorporated in the financial analysis carried out at appraisal. These projections showed that, in order to cover the increased costs, power tariffs needed to rise steeply - by more than 30% in FY98 (the first year of large power purchases from IPPs). Implementing such a sharp increase in tariffs was, understandably, a difficult proposition for the Government. Therefore, while the impact of the IPP program on WAPDA's finances was assessed, the (political) risks entailed in implementing the required tariff increases was not fully recognised by the Bank and the Government.

5.2.8 Due to the large increase in costs, WAPDA was unable to contribute its agreed share of funding for the Project - particularly to pay for land acquisition, and to fund the local currency portions of the civil works contracts. WAPDA therefore formally requested the Bank (through the Economic Affairs Division) in September 1997 to enhance the percentage of expenditures to be financed from the Loan. This would provide temporary relief to WAPDA - by reducing its shares of payments for those contracts - while the Government and WAPDA prepared a comprehensive financial restructuring plan. The Bank agreed with this request, and through an Amendment to the Loan Agreement dated August 13, 1998, the disbursement percentage for Contract C-02 was enhanced (retroactively) from 70% to 90%, for expenditures incurred between June 1996 and September 1999. Simultaneously, work was initiated on the Financial Restructuring Plan. In evaluating the steps taken by the Government, WAPDA and the Bank to address the financial constraints, the ICR mission is of the view that all parties acted pro-actively and positively to develop contingency plans. However, the implementation record is quite unsatisfactory.

5.2.9 A direct result of WAPDA's financing constraints was that WAPDA did not comply with the financial covenants that were agreed under the Loan; in fact, WAPDA's compliance with the agreed financial covenants was rated "Unsatisfactory" during most of the implementation period.

5.2.10 The Government and WAPDA (with Bank support) prepared and implemented a Financial Restructuring Plan in mid-1999 - this included conversion of about Rs 35 billion of WAPDA's outstanding debt service liabilities to the Government into Government equity in WAPDA. However, other factors which contributed to the deterioration in WAPDA's finances - including tariff adjustments to compensate for increases in fuel and power purchase costs, reducing technical and non-technical losses, and improving WAPDA's collection performance - were not fully implemented. Since the Government was responsible for notifying adjustments in electricity tariffs, and as owner of WAPDA it could have ensured better governance of the utility (including compliance with the agreed technical and commercial performance targets), the onus for this deterioration in WAPDA's financial performance rests first with the Government. However, this conclusion should not detract from WAPDA's responsibility to ensure compliance with financial and other performance targets, to which it had agreed.

5.2.11 Another factor, and for the Bank perhaps the most serious issue on this Project, was the investigations by the National Accountability Bureau (NAB) on the land acquisition process. At the request of WAPDA, NAB initiated in mid-2001 an investigation into the causes and consequences of the

substantial escalation in land prices, to determine whether this was due to any illegal acts committed by officials of WAPDA and/or the land acquisition authorities, or by the beneficiaries/affectees. While the Bank was provided assurances that NAB was only investigating allegations of corruption in the land acquisition process, it became apparent that the basis which NAB was using for determining "corruption" amounted to a negation of the RAP. Specifically, NAB took historical land prices (as per land revenue records) as an indicator of "fair market value" of the land. The consultative process (involving affectees through LVCs, or the recommendations of the GBTI committee of 1998) for establishing values for land and other assets which were to be acquired for the Project was, therefore, not being recognized as legally valid. The Bank concluded that this amounted to a significant violation of the Legal Agreements. Since this non-compliance coincided with major delays in implementing other important components of the Environmental Management Plan, the Bank informed the Government in December 2002 that unless corrective actions were taken immediately, these violations of the RAP would be adequate grounds for the Bank to suspend disbursements under the Loan, and ultimately to cancel the Loan.

5.2.12 The Bank's determination of non-compliance with the RAP had two important implications:

- ◆ first, if the Bank cancelled its Loan, the Government would have to cover the financing gap from its own resources (given the advanced stage of implementation, it was not likely that the Government would terminate the Project); and
- ◆ second, in the absence of Bank financing, the other donors/financiers could also suspend, or cancel, their respective Loans.

5.2.13 This could have created a financing gap which the Government may not have been able to cover. Notwithstanding these considerations, the Government took strong note of the Bank's views, and actions were initiated immediately (the Bank was kept fully informed) to address the non-compliance. The Bank also engaged all its resources to facilitate the Government's efforts - by advising on options which could be considered for addressing specific concerns, highlighting key decisions that needed to be taken urgently, and facilitating dialogue between all parties, including the affectees. The Bank agreed with the thrust and direction of the remedial actions taken by the Government and WAPDA, and informed the Government in May 2003 that, since the RAP was now being fully complied with, it was no longer proceeding with the suspension of disbursements or cancellation of the Loan.

### *5.3 Factors generally subject to implementing agency control:*

5.3.1 Physical implementation of the Project was satisfactory, and the works and equipment supply contracts have been completed to international standards. WAPDA's relations with the civil works contractors has, however, not been smooth. The main problems were encountered on Contracts C-01 and C-02 which were awarded to a joint venture of five firms (Ghazi Barotha Contractors—GBC), with Impregilo S.p.A. from Italy as the lead firm. The major impact of the delays in land acquisition was on these two contracts. This not only slowed down the pace of work, it also affected GBC's finances, since the contractors had mobilized their equipment and personnel, but could not proceed at a pace that would generate adequate cash flow to cover their fixed costs. In an effort to improve the contractors' cash flow, the parties signed a Supplementary Agreement in March 1998, where WAPDA agreed, inter alia, to provide additional Advances to the contractors. Over time, GBC also expressed displeasure over the process for reviewing and approving the contractors' claims, and with the functioning of the Dispute Review Board (DRB). In fact, GBC indicated its desire to reconstitute the DRB. The evacuation of the contractors from Pakistan in late 2001 added further urgency to the need to resolve these disputes. The parties signed another Supplementary Agreement in April 2002, which provided for the resumption of work, and further advances to GBC; the DRB was also reconstituted under this Agreement. The

reconstituted DRB held hearings in November 2002 and January 2003 on GBC's claims, and issued its determinations; however, WAPDA objected to the conduct of the DRB Chairman, and filed a request for Arbitration with the International Chamber of Commerce (the Arbitration forum defined in the contracts) against these DRB determinations. It also requested that the DRB, Chairman be replaced. Concurrently, Impregilo has filed a request for Arbitration with the International Center for Settlement of Investment Disputes (ICSID). While acknowledging that, for projects and contracts of this magnitude, resort to Arbitration is not unusual (and recognizing that the issues are being processed in accordance with the contracts) the Bank has highlighted to both sides the benefit of avoiding lengthy legal proceedings, and the need to reach a mutually acceptable solution as early as possible.

#### 5.4 Costs and financing:

5.4.1 Table 2 provides the original (appraisal) and revised estimate of Project costs of the Project.

**Table 2: Project Costs--Appraisal Estimate and Revised (Actual \*)**

Item	US\$ Million					
	Original			Revised		
	Local	Foreign	Total	Local	Foreign	Total
Land Acquisition	36.95	0.00	36.95	116.50	0.00	116.50
Relocation and Resettlement	51.61	0.23	51.84	28.82	0.00	28.82
Preparatory Works	17.95	11.97	29.92	27.08	0.00	27.08
Civil Works						
C-01 Barrage and Ancillary Works	51.00	119.00	170.00	54.84	78.21	133.05
C-02 Power Channel and Ancillary Works	87.00	203.00	290.00	100.32	137.65	237.97
C-03 Power Complex and Ancillary Works	113.97	265.94	379.91	42.07	147.76	189.83
C-03A Penstocks				2.31	12.45	14.76
<b>Subtotal Civil Works</b>	<b>358.48</b>	<b>600.14</b>	<b>958.62</b>	<b>371.94</b>	<b>376.07</b>	<b>748.01</b>
Mechanical and Electrical Works						
ME-01 Turbines and Auxiliaries	13.69	78.51	92.20	3.60	47.96	51.56
ME-02 Generators and Auxiliaries	16.75	96.05	112.80	1.81	47.16	48.97
ME-03 Transformers and Misc. Equipmnt	11.98	38.91	50.89	1.74	26.70	28.43
ME-04 Cranes	1.24	7.96	9.20	0.48	11.37	11.85
ME-05 HV Switchgear, Control & Protection	7.40	49.86	57.26	0.78	22.60	23.38
ME-08 SCADA and Telecom Equipment	0.96	14.27	15.23	0.46	8.14	8.60
ME-09 Gate Equipment	21.12	17.59	38.71	0.00	16.69	16.69
ME-10 Transmission Lines	14.45	55.05	69.50	18.20	46.69	64.90
<b>Subtotal Mechanical &amp; Electrical Works</b>	<b>87.59</b>	<b>358.20</b>	<b>445.79</b>	<b>27.06</b>	<b>227.31</b>	<b>254.38</b>
Engineering and Administration						
Project Consultancy	33.99	24.00	57.99	39.16	37.41	76.56
Monitoring and Other Consultancy	1.90	3.91	5.81	1.90	4.59	6.50
Studies and Field Investigations	1.10	0.00	1.10	1.70	0.00	1.70
WAPDA's Engineering and Administration	21.81	0.00	21.81	66.47	0.00	66.47
<b>Subtotal Engineering &amp; Administration</b>	<b>58.80</b>	<b>27.91</b>	<b>86.71</b>	<b>109.23</b>	<b>42.00</b>	<b>151.23</b>
Duties and Taxes	24.00	0.00	24.00	88.34	0.00	88.34
<b>Total Base Cost</b>	<b>528.87</b>	<b>986.25</b>	<b>1,515.12</b>	<b>596.56</b>	<b>645.38</b>	<b>1,241.96</b>
Physical Contingencies	55.03	114.81	169.84	73.16	189.74	262.91
Price Contingencies	87.44	91.13	178.57	54.90	56.66	111.56
<b>Total Project Cost</b>	<b>671.34</b>	<b>1,192.19</b>	<b>1,863.53</b>	<b>724.64</b>	<b>891.78</b>	<b>1,616.43</b>
Interest During Construction	175.66	210.81	386.47	343.71	107.52	451.23
<b>Total Financing Required</b>	<b>847.00</b>	<b>1,403.00</b>	<b>2,250.00</b>	<b>1,068.35</b>	<b>999.30</b>	<b>2,067.66</b>

\* Estimate based on April 2003 prices.

## 6. Sustainability

### 6.1 Rationale for sustainability rating:

6.1.1 The ICR mission rates the Sustainability of the Project as "Likely". This rating reflects the following considerations:

- ◆ The cost of electricity generation from GBHP is very competitive, in fact well below the average cost of generation for WAPDA. Among the new plants in the WAPDA system, it is therefore at the top of the merit order. The generation units are thus expected to be dispatched at their full (available) capacity throughout the year. This will ensure an adequate revenue stream for WAPDA, to cater for operations and maintenance expenses.
- ◆ WAPDA (in coordination with the contractors and equipment suppliers) had initiated preparations for the transition from the construction phase to the operations phase, well in advance of the actual completion and commissioning of the Project. The organization structure, staffing levels, annual budget requirements, etc. have already been authorized, and staff have been posted in all key positions. These steps will ensure that the project facilities will be efficiently operated and maintained.

6.1.2 The commissioning of GBHP will also help to partly address the imbalance between thermal and hydel generation capacity in the WAPDA system. Since the mid-1990s, all additions to the system were thermal projects (largely IPPs, though some WAPDA thermal plants - e.g. Muzaffargarh - were also commissioned during 1995-97), and the share of hydropower in total generation capacity fell from about 50% in 1994 to about 33% by 2003. This not only increased the annual cost of generation, it also made the system (and the country's balance of payments) more vulnerable to fluctuations in international oil prices - since the bulk of domestic oil fuel requirements are imported. The Government and WAPDA therefore accorded (and continue to accord) a high priority to GBHP, both in allocating the resources required for construction and operations, and in taking prompt actions to address implementation issues. These considerations provide further justification for the rating on Sustainability of the Project.

### 6.2 Transition arrangement to regular operations:

6.2.1 In parallel with the commissioning of the facilities under GBHP, comprehensive Operations and Maintenance (O&M) procedures have been prepared by WAPDA—in accordance with the O&M manuals which have been prepared/provided by the contractors and equipment suppliers. The organizational set up of various units responsible for O&M of the barrage, the power channel and the power complex have been prepared; the required posts have been sanctioned by WAPDA, and staff are being appointed as per the requirements; and funding for all O&M expenditures—including staff and other costs—will be provided annually from WAPDA's budget.

### **Barrage**

6.2.2 In view of the need for close coordination between the Tarbela Dam and the barrage, the external works of Tarbela (comprising the tunnels, spillways and ancillaries) and the GBHP barrage have been combined into one Residency - which will be responsible for the "External Works and the Barrage". This Residency includes three sections:

- ◆ an Operations section, responsible for operating the Head Regulator, Standard Bays Gates, Undersluice gates, and regulation of the barrage pond;
- ◆ an Electrical section, which handles preventive maintenance of the electrical equipment (including Control Panels, Switchgear, transformers, etc) installed at the barrage; and
- ◆ a Mechanical section, responsible for the maintenance of Standard Bays and Head Regulator gates, Undersluice gates, gantry cranes, etc.

Daily log sheets for operations of the barrage, and daily, weekly, and monthly log sheets for inspection of equipment and structures have been prepared.

### **Power Channel**

6.2.3 O&M responsibilities for the power channel involve two offices, one for the barrage structures and upper reach of the channel, and one for the lower reaches of the channel and the power complex structures. The monitoring regime involves Daily and Routine inspections, as well Special Inspections after heavy rains, high winds, or an earthquake in the area. Routine maintenance requirements (e.g. de-silting of basins, culverts, inlet and outfall structures, and escapes after each monsoon season; procedure for inspection and repair of concrete and structures, cut slopes, embankments and spoil banks) have been specified, and daily and routine inspection sheets have been prepared.

### **Power Complex**

6.2.4 O&M of the power complex is headed by a Chief Engineer, and includes three sections handling Electrical equipment, Mechanical equipment, and the Control and Protection systems.

- ◆ The Electrical Maintenance Section is further sub-divided into units responsible for the main plant and auxiliaries (including the generators, generator transformers, and station batteries), and for the switchyard equipment.
- ◆ The Mechanical Maintenance Section includes separate units for the main plant - the turbines pit and turbines, governor, generator thrust and guide bearings, etc.; and auxiliary plant and equipment, which covers the intake gates, tail regulator gates, cranes, etc.
- ◆ The Control and Protection Section is responsible for the instrumentation and control equipment at the power complex.

Daily, weekly and monthly check sheets covering the inspection of all equipment have been prepared.

6.2.5 Up-front preparation and adoption of these O&M procedures should ensure that the transition from the construction phase to the operations phase of GBHP will be smooth, and the equipment and structures will be operated as per design specifications. No problems were encountered during the commissioning of various project facilities (e.g. the civil works/structures, electrical and mechanical equipment), which provides further comfort that the transition is being managed effectively.

## **7. Bank and Borrower Performance**

### **Bank**

#### *7.1 Lending:*

7.1.1 The Bank's contributions towards the preparation and appraisal of the Project comprised two distinct roles. At the preparation stage, it was the executing agency for the UNDP-financed feasibility and design study. In addition to selecting/appointing consultants and supervising the work, the Bank's role therefore included analytical inputs to enhance the quality of work; providing international best practice examples - e.g. to further develop the participatory and consultative process for handling environmental and social issues; and ensuring that the consultants and WAPDA had timely access to the best available expertise (through the POE, etc.) for review and advice on key design features of the Project. The Bank's role during this phase was thus one of facilitation, advice, and support to the consultant team, the Government and WAPDA.

7.1.2 During appraisal, the Bank's role shifted from preparing the technical designs of the Project, to verifying that the Project was consistent with Government priorities (including the macro-economic and fiscal framework); assisting the Government and WAPDA in mobilizing the required finances; and evaluating WAPDA's (managerial, technical and financial) capacity to undertake this Project.

7.1.3 However, the Bank maintained its emphasis on ensuring that Project design was up to the required technical, economic and financial standards, and met the Bank's environmental and social safeguard requirements. The Project required a large financial commitment by WAPDA for a 5-6 year period, and mobilizing the external financing was a major challenge. Therefore, the Bank initially approached the appraisal of this Project in two phases. In the first phase, finances were to be provided to WAPDA for key preparatory works - construction camps, approach roads, etc. This phase included a donor conference/briefing session, to mobilize the required external financing; actions to improve WAPDA's financial situation were to be implemented; and supplementary studies on selected environmental and social issues were to be carried out. The second phase would involve a larger Bank Loan - along with other donor financing - for the construction of the main Project facilities. The Bank was expected to finance one (or more) of the civil works contracts, with other donors financing the remaining civil works and equipment contracts. The Government and WAPDA did not agree with the two phased approach since, in their view, project preparation activities had been completed, and the Project was ready for appraisal. The Project was ultimately appraised by the Bank in one go, and the Bank's formal appraisal was carried out in December 1994. However, the discussion over one or two phases meant a delay of 12-18 months in the Bank's appraisal of the Project. The Project was approved by the Bank's Board in December 1995. While the interval between appraisal and Board approval (one year) was considerably longer than the norm for Bank projects, the ICR mission does not classify this as a delay, since this time was required for arranging the financing from the other lenders. As a result, the SAR was finalized in November 1995, and only after the indicated financing from the other lenders/donors had been firmed up.

7.1.4 The ICR mission rates overall Bank performance during identification, preparation and appraisal of the Project as "Satisfactory".

## 7.2 Supervision:

7.2.1 The Project entailed extensive supervision by the Bank—a total of 16 supervision missions were fielded between January 1996 and October 2003—which was also the closing date of the Loan. As there were no missions between May 2001 and November 2002 (and a mission planned for November 2001 was deferred/cancelled) due to restrictions on missions to Pakistan post 9/11, the average number of supervision missions was three per year—somewhat higher than the Bank's average. In addition, these missions had an extensive agenda—physical implementation, environmental and social components, WAPDA's financial situation, etc.

7.2.2 Bank missions generally followed a prudent approach—by documenting the implementation status and issues on all components of the Project, facilitating pro-active discussion of key issues and constraints, and providing advice on measures which could be taken, to address the major constraints. The overall quality of Bank supervision of the Project was good, and the Government and WAPDA followed up on mission recommendations and advice fairly promptly. Mission aide memoires also provided a useful reference for other donors, on the status of various components of the Project.

7.2.3 The QAG Panel had the following observations regarding Bank supervision of the Project:

- ◆ “..The *efficacy of Bank supervision* seems to have been *impaired* by the change of the TM at a critical juncture, when the local currency shortfall threatened WAPDA’s ability to contribute to the project. Then, continuity and tight monitoring would have counted most. In addition, no management involvement has been recorded, and the missions to the field did not include reform or other network specialists. The formerly close-knit donor collaboration seems to have loosened, and—as importantly—the supervision of sector developments in conjunction with PSDP appears to have become detached from the project.
- ◆ Monitoring of WAPDA’s financial performance by the Bank was quite effective but in March 1997 when the GOP suspended critically needed tariff increases, the Bank management did not act decisively. An important question is whether the Bank should have anticipated the financial crisis that enveloped WAPDA in 1997. The surge in fuel costs, the 17% devaluation of the currency and the impact of power purchases from the Hub River project should have been anticipated. The Bank might have lessened the crisis if it had moved to a rate of return covenant at the outset rather than retaining the self-financing approach which proved ineffective when WAPDA’s investment program was reduced by the IPP program. As WAPDA is now facing financial illiquidity, as of to-date, the handling of this crisis by the Bank and proposed financial support operation is necessary and timely...
- ◆ The project was set up and supervised to complement reforms in the PSDP project, which established the key elements for reform of WAPDA. *Ghazi-Barotha* did include two important reform conditions for WAPDA reform; completion of full corporatization of WAPDA and establishment of a separate transmission company by December 31, 1998. Evidence of progress on these changes and attention to them by supervision missions was not apparent, although the May 1997 aide-memoire urged WAPDA to take faster implementation action. The Panel feels that supervision missions should have included staff with specialized skills in corporate restructuring. GOP might then have paid more attention to them...

- ◆ A factor contributing to the current disarray in WAPDA's finances may have been the delay in revising private power policies. Under this loan, GOP had agreed to do this by December 31, 1996. It would seem that the Bank did not pursue this target actively enough. It did propose a freeze on GOP issue of letters of support for IPPs and discussed the new policies in December 1997. However, the target date for meeting the covenant was not revised.
- ◆ Management should possibly have ensured closer links between project teams supervising the Private Sector Development Fund and WAPDA projects. It turned out that these links have become weaker over time..."

7.2.4 The ICR mission offers the following comments on the findings of the QAG Panel:

- ◆ The mission agrees that the Bank should have had a better appreciation of the impact of power purchases and fuel cost increases on WAPDA's finances, and their consequential impact on the Project. The Bank could, for example, have taken a more aggressive stance to support the Project, when it became apparent that WAPDA was able to finance only a minimal level of investments—by insisting on a rigorous prioritization of investments, more aggressively pursuing the loss reduction program, etc.
- ◆ Bank supervision of the reform program and unbundling of WAPDA was not really separated from the supervision of GBHP. In fact, for most of the tenure of GBHP, the same staff were supervising both the Power Sector Development Project (PSDP) and GBHP. While the implementation of the reform components was discussed in supervision reports and aide memoires on the PSDP, critical issues that could constrain progress under this Project were highlighted in GBHP aide memoires and supervision reports also.
- ◆ The ICR mission agrees that closer coordination between the Private Sector Energy Development Projects (PSEDPs) and GBHP should have been ensured by the Bank—particularly given the significant impact of the PSEDP investments on the financial situation of WAPDA.

7.2.5 The ICR mission rates the Bank overall performance during supervision as "Satisfactory". While, as also noted by the QAG panel, the Bank could have highlighted selected issues (e.g. the impact of delays in land acquisition on construction activities) at an earlier stage - and pushed harder for their resolution - in general Bank feedback to the Government and WAPDA was timely and focussed. The Bank also monitored implementation closely to ensure compliance with the safeguard requirements.

### *7.3 Overall Bank performance:*

7.3.1 Overall Bank performance is rated as "Satisfactory".

### *Borrower*

#### *7.4 Preparation:*

7.4.1 GBHP was a high priority project for the Government and WAPDA—given the shortage of generating capacity, and the cost this was imposing on the economy. Also, the very competitive price of electricity generation from this Project made it a very attractive investment. Therefore, the Government and WAPDA made every effort to expedite Project preparation. Towards this end, WAPDA proposed that instead of selecting consultants for the feasibility and design study through International Competitive Bidding (ICB), a joint venture of international and local firms that had the required experience and capacity be selected on a sole source basis. The Government supported this proposal, and provided the Bank a strong justification for single-source selection; the Bank accepted this justification.

7.4.2 The feasibility/design study was of a high quality and up to international standards for hydropower projects, and was completed within the estimated time, despite a substantially enhanced scope of work, and disruptions due to the first Gulf war in 1991. A important highlight of the study was the conscious effort to minimize adverse environmental and social impacts of the Project, even when these involved higher costs relative to some alternative designs (see Section 3.3 above). Finally, the consultative and participatory process adopted for the final selection of Project sites, valuation of land and other assets, etc. was another positive feature and recommendation of the study.

7.4.3 The Government's processing and approval of the feasibility study was also very prompt. The Project was thus prepared and ready for donor appraisal within about 36 months—which was very expeditious for a large hydropower project.

7.4.4 In view of the above, the ICR team rates Borrower performance during the preparation phase of this project as "Highly Satisfactory".

#### *7.5 Government implementation performance:*

7.5.1 The Government did not expect to have a major role in implementation apart from mobilizing the required foreign currency funding, since the local currency requirement was to be met by WAPDA through internal cash generation. However, during implementation, a number of constraints and issues arose (see Section 5 above) for which the onus rested largely with the Government. The first was the deterioration in WAPDA's finances, following the induction of Independent Power Producers (IPPs) under the 1994 Policy. Those projects were solicited by the Government, and it provided guarantees to the sponsors for the performance of the public sector counterpart agencies and entities - including WAPDA. The Government could have taken actions to insulate WAPDA from the increase in generation costs; however, it did not raise WAPDA's tariffs to fully pass those costs to consumers (up to December 1997, when the NEPRA Act was passed by Parliament - and the task of determining power tariffs was transferred to NEPRA - the Government had the full mandate to approve any adjustments in power tariffs), nor did it provide other resources to WAPDA to cover the increased costs.

7.5.2 From 1999 - when a new management team was appointed in WAPDA—the Government's control over WAPDA's affairs was substantially reduced. Partly reflecting the strong mandate and authority accorded to the new management team (although this mandate was mainly for addressing governance issues and alleged corruption in the utility), WAPDA became very unresponsive to Government directives and oversight. During this period, WAPDA continued to face a cash shortfall; at the same time, it continued to essentially disregard Government directives to further reduce line losses, improve collections, etc.; all of these measures would have helped in overcoming the cash crunch. The pace of implementation therefore continued to be slower than warranted. However, by this time the Project had already been delayed by about two years, and target dates for commissioning of the generation units had been revised to July 2002 - June 2003 (as compared to 2000/2001 in the SAR). WAPDA's lack of compliance with agreed financial and technical performance targets during this period, therefore, does not appear to have contributed to further delays in completion.

7.5.3 The Government could have taken actions to maintain the focus of the NAB investigations. The Government had approved this Project on the basis of, inter alia, the consultative and participatory process for land valuation; it had also confirmed to the Bank (in the Legal Opinion furnished at effectiveness) that all agreements reached under the Project were consistent with Pakistani law. Therefore, when NAB

questioned the acquisition of land at prices that were not (solely) based on past revenue records—and implicitly questioned the validity of the agreement reached with the Bank—the Government should have alerted NAB about this agreement. This could have allowed NAB to focus its investigations solely on instances of corruption and violation of the law. It would also have prevented a number of officials and affectees from being arrested and prosecuted solely because they performed their duties in accordance with the agreed procedures for land acquisition.

7.5.4 WAPDA could also have facilitated the NAB investigations. Specifically, the investigations were initiated at the request of WAPDA. It is not clear whether complete details regarding the agreements reached with the Bank (e.g. on the participatory process for land valuation and acquisition) were provided to NAB, when NAB was requested to investigate the reasons for the increase in land costs. Some of the resentment and uncertainty about the Project which arose during the investigations could have been avoided, if NAB had been provided the full background on the Project, at the outset. However, WAPDA has informed the Bank (see Section 9 (a) on Borrower/Implementing Agency Comments) that all records and relevant documents relating to land acquisition under this Project were provided promptly to NAB.

7.5.5 The ICR mission rates Government performance during implementation as "Unsatisfactory", since its follow up/remedial actions on two key issues has been inadequate:

- ◆ the Tarbela compensation issues have lingered since the start of the Project, and were not fully addressed even at the completion date; and
- ◆ the continued deterioration in WAPDA's finances reflects, in part, the Government's failure to maintain fiscal discipline, or to effectively manage its ownership role as a means to improving the governance of the power sector entities.

#### *7.6 Implementing Agency:*

7.6.1 It was in WAPDA's interest that the Project be completed successfully, and as early as possible; conversely, it was the entity which stood to lose the most from a delay in project implementation. Therefore, WAPDA made all the efforts it could, to expedite the Project. This included, inter alia, allocating funds for GBHP even if this meant deferring other high priority activities; and assigning all the required staff and resources for the Project. Despite according such a high priority to this Project, there were a few instances where WAPDA was unable to comply (or comply on time) with the requirements of the Project. These included delays in a number of studies on environmental issues; and delays in constructing a number of waste water and sewerage treatment facilities which were included in this Project.

7.6.2 However, on a number of issues WAPDA could have adopted a more pro-active and positive stance. Specifically, it could have expedited the NAB investigations if it had provided NAB the details on the process for land acquisition which was agreed for this Project. Similarly, WAPDA did not make aggressive efforts to comply with agreed financial performance targets, particularly during FYs99-2003; there was significant room for improvement in WAPDA's performance in these areas.

7.6.3 Nevertheless, and considering that WAPDA was operating under some constraints over which it had little or no direct control, the ICR mission rates WAPDA's performance during implementation as, by and large, Satisfactory.

### *7.7 Overall Borrower performance:*

7.7.1 While recognizing that Project implementation could have been more expeditious, and a number of issues could have been avoided or resolved much earlier than they actually were, the ICR mission rates overall Borrower performance under this Project as "Satisfactory".

## **8. Lessons Learned**

8.1 One of the key lessons from the implementation experience under GBHP is that the funding requirements of such large projects need to be more formally committed than was the case for GBHP. The financing plan for the Project (including donor commitments to provide the foreign currency resources for the various contracts) was a key element of the overall funding requirement. However, it was also important to document the circumstances which would enable WAPDA to contribute its share of the costs (i.e., tariff increases to offset increases in operating costs, measures to strengthen governance and improve efficiency, etc), and the Government's commitment to undertake the policy and institutional actions that were essential for reversing the deterioration in WAPDA's performance. The Project included an agreement by WAPDA to finance about 40% of the cost of GBHP from its own resources—a commitment of US\$1 billion equivalent, over 6-7 years. While the financial analysis carried out at appraisal highlighted the conditions under which WAPDA could generate this large surplus, the political and social implications of the substantial increase in tariffs (which were implicit in those projections) were not fully analyzed. Consequently, when the actual tariff increases were lower, WAPDA was not able to generate its share of the finances, and implementation of the Project suffered.

8.2 Another key lesson of GBHP relates to the environmental and social impacts of large hydropower projects. The environmental aspects of GBHP are mainly positive, in that it obviates the need for a comparable sized (thermal) generation plant, and thereby reduces the damaging atmospheric impacts of such plants. However, as demonstrated under GBHP, it is also possible to reduce the potential social impacts to manageable levels, through rigorous evaluation of alternatives, public consultation and awareness building, etc. In this context, the selection of the final power channel alignment (and the conscious decision to avoid existing villages and settlements, even at somewhat higher costs) and locations of the barrage and power house deserve to be highlighted. These decisions substantially reduced the scale of the resettlement and relocation under GBHP, without adversely affecting the economic and financial viability of the Project.

8.3 Another important lesson from this Project is the need for caution while introducing radically new design or implementation features. The key areas where innovative approaches were pioneered under GBHP were: (a) the involvement of affectees in the valuation of land and other assets, and (b) the retrofit of past legacy issues onto a new Project—by attempting to address the outstanding compensation and claims of the Tarbela Dam Project as a component of GBHP. In both cases, there was limited or no precedent in Pakistan which could have served as a guide for the Government or WAPDA, when issues arose. This could have been overcome, to some extent, by exposing the concerned officials to similar conditions in other countries or other projects/sectors, which the Bank and the Government could have facilitated through orientation visits, study tours, etc. Similarly, when disagreements over the valuation of land (resulting from the LVC deliberations) started to emerge, focussed support could have been provided to WAPDA, for launching public awareness and consensus building campaigns - to promote agreement with the affectees on the "fair market value" of the land and other assets. The track record of GBHP highlights the need for flexibility during implementation, and learning from experience while designing measures to execute such innovative designs and policies.

8.4 Some of these problems may have been handled more expeditiously if the concerned officials were exposed to similar conditions in other countries or projects, and the Bank could have taken a more active role in providing such exposure or first hand examples.

## **9. Partner Comments**

*(a) Borrower/implementing agency:*

The draft ICR was distributed to the Government and WAPDA, and to the co-financiers of the Project, and all parties were requested to provide to the Bank their inputs – including their own assessment of Project design and implementation experience, and any comments they would like to make on the Bank’s draft. No formal comments were provided by the co-financiers. However, WAPDA provided a detailed set of reports to the Bank which covered, inter alia:

- ◆ the arrangements made for the operations phase (including the organizational set-up for the operation of project facilities, monitoring and maintenance arrangements, allocation of budgets, etc.); and
- ◆ the results of the surveys carried out for the ICR, which document the pre- and post-project status of the affectees (in terms of their income levels, asset profiles, etc.), and therefore provide an evaluation of the success achieved in meeting the key objective of the RAP – i.e. “.. to improve or restore the standards of living and earning capacity of all project affected people..”.

These reports have been summarized in the ICR, and the full reports are available in Bank files. Section 6.2 provides a summary of the O&M arrangements which have been adopted by WAPDA, and Section 10 (paras 10.8 – 10.12, and Tables 4 – 8) provides the key results of the income restoration and compensation activities which were carried out under the Project.

WAPDA also provided the following comments on two sections/paragraphs of the Bank's draft:

**GHAZI BAROTHA HYDROPOWER PROJECT (LOAN 3965-PAK)  
IMPLEMENTATION COMPLETION REPORT (ICR)**

Sub Section	World Bank's Draft	Comments
5.3.1	..... WAPDA objected to the conduct of the DRB Chairman, and has filed a request for Arbitration with the International Chamber of Commerce, Paris (the Arbitration forum defined in the Contracts) against these DRB determinations..... GBC filed a request for Arbitration..... With ICSID.	Sub Clause 67.3 (Arbitration) of Conditions of Particular Application states, interalia that "Any dispute in respect of which the Recommendation, if any, of the Board has not become final and binding shall be finally settled by arbitration under the Rules of Pakistan Arbitration Act 1940,..... The place of arbitration shall be Lahore, Pakistan..... WAPDA was not satisfied with the conduct of the Chairman DRB, however WAPDA has filed a request for arbitration against the DRB hearings/determinations. The Contractor's request for arbitration with ICSID was filed by Impregilo the leading partner of GBC and not by the Ghazi Barotha Contractors.
7.6.2	WAPDA performance regarding settlement of case with NAB.	The record/relevant documents regarding cases under the NAB/Accountability Courts for investigation were provided and are being provided promptly by this office and no slackness falls on the part of project authority. WAPDA performance regarding settlement of cases with NAB for investigation of the land acquisition scam has been very prompt. Legally project authority is not in a position to interfere in NAB's affairs.

*(b) Cofinanciers:*

*(c) Other partners (NGOs/private sector):*

## 10. Additional Information

10.1 This section discusses the implementation experience in a few key areas. The procurement and construction schedule - planned as well as actual—for the physical components of the Project is presented in para. 10.2. The objectives and key components of the Environmental Mitigation and Monitoring Plan are presented in paras. 10.3-10.6; and their achievement (or otherwise) is discussed in para. 10.7. Since a critical objective of the Environmental Mitigation and Monitoring Plan was to restore or improve the livelihoods of all project affectees, the remaining paragraphs (10.8 to 10.12) focus exclusively on the extent to which this has been achieved. Tables 4-7 below provide details (from surveys which were carried out by WAPDA specifically for the ICR) of the assets, income and expenditure patterns of a subset of affectees - before and after the Project. These results are used for deriving some preliminary conclusions about the success of the income restoration activities which carried out as part of the Project.

10.2 Table 3 provides dates of the key implementation milestones. It is clear from this Table that in the preparation phase (i.e. for procuring the works and equipment contracts) Project implementation was fairly smooth, and the original target dates were generally met. However, during implementation, and for almost all of the contracts, the time required for completion was longer than initially estimated.

**Table 3: Procurement and Construction Timetable**

Contract Package		Bidding Documents Completed	Bidding Document to funding agency	Bidding Documents approved by funding agency	Bidding Documents released	Bid Opening Date	Bid Evaluation to funding agency	Approval of contract by funding agency	Contract Award	Completion of Works	Funding Agency
<b>Civil Works Contracts:</b>											
Barrage & Ancillary works: C-01	SAR date Actual	May 94 May 94	Jun 94 Jun 94	Jun 94 Jun 94	Aug 94 Aug 94	May 95 May 95	Jul 95 Jul 95	Aug 95 Aug 95	Nov 95 Dec 95	Jan 2000 Jul 2003	ADB
Power Channel & Ancillary works: C-02	SAR Actual	May 94 May 94	Jun 94 Jun 94	Jun 94 Jun 94	Aug 94 Aug 94	May 95 May 95	Jul 95 Jul 95	Aug 95 Aug 95	Nov 95 Dec 95	Jan 2000 Jul 2003	IBRD
Power Complex & Ancillary works: C-03	SAR Actual	May 94 May 94?	Jun 94 Jun 94?	Jun 94 Jun 94?	Aug 94 Aug 94?	Dec 95 Jan 96	Feb 95 Jun 96	Mar 96 Aug 96	Apr 96 Feb 97	Jun 2001 Jul 2003	IBRD/ JBIC
Penstocks: C-03A	SAR Actual	Dec 95 Sep 96	Nov 96	Dec 96	Jan 96 Jun 98	Apr 96 Jul 98	Oct 98	Aug 96 Nov 98	Sep 96 Jan 99	Jan 2000 Mar 2003	KfW
<b>Main Mechanical:</b>											
Turbines & Auxilliaries: ME-01	SAR Actual	Jan 95 Feb 96	Apr 95 Feb 96	Sep 94? Mar 96	Jan 96 Mar 96	Apr 96 Jun 96	Nov 96	Aug 96 Apr 97	Sep 96 Nov 97	Jun 2001 Feb 2004	KfW/ JBIC
Generators & Auxilliaries: ME-02	SAR Actual	Jan 95 Feb 96	Apr 95 Feb 96	Sep 94? Mar 96	Jan 96 Mar 96	Apr 96 Jun 96	Feb 97	Aug 96 Apr 97	Sep 96 Dec 97	Jun 2001 Feb 2004	JBIC
Transformers: ME-03	SAR Actual	May 96 Jun 97	Sep 97	Oct 97	Sep 96 Oct 97	Jan 97 Mar 98	Nov 98	Jun 97 May 99	Jul 97 Oct 99	Sep 2000 Apr 2004	KfW
Switchgear, Control & Protection Equipment: ME-05	SAR Actual	Mar 96 Dec 97	May 96 Feb 96	Jul 96 Mar 98	Jul 96 Apr 98	Dec 96 Jun 98	Mar 97 Feb 99	Apr 97 Feb 99	May 97 Apr 99	Mar 2000 Feb 2004	EIB
SCADA/Telecom Equipment, etc: ME-08	SAR Actual	Jan 96 Jan 97	Feb 96 Jan 97	Mar 96 Feb 97	Apr 96 Mar 97	Aug 96 Jun 97	Dec 96 Jan 98	Feb 97 Apr 98	Mar 97 Aug 98	Dec 2000 Mar 2004	KfW
<b>Transmission Lines:</b>											
In-Out Tarbela-Gatti	SAR Actual	Sep 96 Apr 98	May 98	Jun 98	Jan 97 Oct 98	Jun 97 Feb 99	Jun 99	Aug 97 Sep 99	Sep 97 Oct 99	Jan 2000 Jan 2003/ Feb 2003	ADB/ IDB
Barotha-Rewat	SAR Actual								Nov 2001		IDB

## Environmental Mitigation and Monitoring Plan

10.3 The following were the main potential impacts of the Project, as identified in the SAR:

- ◆ Reduction in water flows in the Indus river—in the stretch between the barrage and the confluence of the Indus with the Kabul river—during the low-flow months;
- ◆ Impacts on flora and fauna, as well as riverain ecosystems in the barrage pond and downstream of the barrage;
- ◆ Acquisition of land for the barrage, power channel, and power complex;
- ◆ Relocation/resettlement of 179 families (involving 899 persons) living at the power channel and power complex sites, and demolition of 110 private housing units;
- ◆ Disposal of about 70 million cubic meters of excess spoil from excavation of the power channel;
- ◆ Variations in groundwater levels in the vicinity of the channel, due to seepage below the channel lining;
- ◆ Passage of a fast flowing channel through an agricultural area, which could pose safety hazards for inhabitants/livestock, or disrupt pedestrian, livestock and vehicular traffic; and
- ◆ Changes in health conditions of the local population due to construction activities, reduction in water flows during the low-flow season, etc.

10.4 Comprehensive mitigation measures were incorporated in the project, to address these potentially adverse impacts. Specifically:

- ◆ A minimum of 28 cumecs would be released from the barrage at all times. During high-flow months, the Indus would receive the major portion of releases from Tarbela, and the diversion of water into the power channel was not expected to impact on ecosystems and riverain conditions downstream of the barrage during these months. A program of regular water quality monitoring, as well as monitoring of local flora and fauna, was to be implemented downstream of the barrage, and when data from this monitoring program indicated a need for larger flows, releases from the barrage would be enhanced.
- ◆ The Government and WAPDA were committed to improve or restore the current standard of living and earning capacity of all affectees. This was reflected in entitlement packages which clearly identified the type of land (or asset) loss, definition of entitled person, rights and entitlements to compensate for various categories of loss, etc. Compensation for land and other assets was to be provided at current market prices, include compensation for improvements made by the owners, and the procedures for valuation of land and other assets were to be transparent and participatory. The relocation of houses was to be coordinated with allocation of agricultural lands, to minimize "out-of-area resettlement".
- ◆ Efforts were to be made to compensate affectees through re-developed land in the same area, to the extent possible. This involved about 30 million cubic meters of spoil from the channel excavation being placed in spoil banks located along the channel, graded, covered with top-soil, provided with tubewell irrigation, and offered for re-sale to the affectees, at prices consistent with the rates at which the land was originally acquired.
- ◆ An underdrainage system was provided under the channel, to minimize seepage losses and adverse impacts on local groundwater levels.

- ◆ Safety measures for the power channel include chain-link fences near populated areas; cattle grids to prevent livestock from wandering on the service roads and/or accidentally falling into the channel; hand rails, floating booms and grab rails along points of public access; and public education programs to alert residents about the potential safety risks; etc. In addition, the Project included the construction of 46 bridges and crossings over the channel—most of which were located along traditionally used routes.

10.5 In addition, a comprehensive monitoring plan was adopted for the construction and operational stages. This involved, inter alia:

- ◆ Oversight and implementation of the Environmental and Resettlement Plan by the WAPDA Environment Cell (WEC), and supervision of resettlement activities by WAPDA's Social Sciences Unit, through the Project Resettlement Organization (PRO).
- ◆ A specialized (external) Monitoring Consultant would support WEC and PRO in monitoring the environmental and resettlement aspects of the Project; in particular, the Monitoring Consultants would prepare a set of environmental and social monitoring protocols, to serve as the basis for monitoring by WEC.
- ◆ The Environmental and Resettlement Review Panel (ERRP) would continue to be associated with the Project during construction; ERRP would periodically visit the site, provide independent assessments and views to WAPDA, and where necessary suggest ways for further strengthening the implementation, monitoring and evaluation process.

10.6 Finally, the Project included provision for an Integrated Rural Development Plan (IRDP) to be implemented by GBTI. WAPDA was to provide funding for IRDP—which aimed at facilitating the economic development of the project area by, e.g., providing finances for establishing businesses, small industries, and small-scale infrastructure schemes; assisting area residents in developing farmers' marketing organizations; and providing training and other advisory services in the Project area.

10.7 The record of implementation of these mitigation measures is mixed—while some items were implemented promptly, others were significantly delayed, and in some cases it is unlikely that the original components will be fully implemented. Specifically:

- ◆ The monitoring/oversight components were implemented. WEC and Social Sciences Branch were fully associated with the Project, and prepare monthly and quarterly reports which are reviewed by the Project Office, and remedial actions are taken. WEC's capacity to undertake these tasks was substantially enhanced in recent years. Specialized consultants were provided to WAPDA, to prepare Environmental and Social Monitoring Protocols, and WEC's monitoring activities are based on these Protocols. The ERRP was retained for the construction phase, and visited the site twice a year, on average. WAPDA accorded high priority to the findings and recommendations of the ERRP, and took prompt actions to implement the Panel's recommendations. While ERRP did not visit the site after 9/11, this was entirely due to travel warnings and advisories issued by the host countries of some panel members.
- ◆ Implementation of agreed land acquisition procedures (including participation and consultation, replacement at current market value, no "out-of-area" resettlement, etc.) was only partly successful. As discussed above (Section 5.1), a major impediment in the Project was the delay in land acquisition, largely due to the high cost of land that emerged from LVC deliberations. While this impasse was addressed in a participatory manner by requesting

GBTI to evolve a consensus on land values, the entire process was called into question by the NAB investigation (see Section 5.2). Since the Government and WAPDA had agreed to (and confirmed to the Bank the legal validity of) the participatory process for determining the values of land and other asset, it was surprising that NAB did not recognize this as such.

- ◆ Work on developing spoil banks—which would provide land that is in close proximity to the affectees' original locations, and enhance the prospects for land-for-land compensation—was not handled carefully. During construction, the contractors and WAPDA focussed mainly on completing the power channel (the spoil banks were to be prepared as part of the civil works under this contract), and not enough attention was paid to ensuring that the requirements of the spoil banks were met. These included, e.g., steps to ensure that excavated materials were properly graded, top soil was stored separately, and during construction of the spoil banks the required quantum of top soil was indeed placed on top of the banks. As a result, the quantum of spoil bank land is much less than projected, the quality of top-soil is not uniform across all the banks, and evidence that affectees really are interested in this "land-for-land" option is incomplete. Consequently, the program is not likely to achieve its intended objectives.
- ◆ Consequently, the main reason for classifying the land acquisition/compensation process as partly "successful" is the preliminary evidence that affectees appear to have received fair market for their assets, and their asset holdings etc., appear to be better now than prior to the Project. WAPDA is conducting surveys, covering sample sub-sets of the residents of resettlement villages, affectees whose land was acquired for the project, affectees who suffered a loss of incomes, and women in the Project area. The surveys are aimed at documenting the pre- and post-project situation of the affectees. The results from some of these surveys are discussed below.
- ◆ Measures to avoid adverse impacts due to the diversion of water into the channel were partly implemented. WAPDA agreed to carry out (in addition to the studies carried out at appraisal) a Supplementary Environmental and Social study (SES), and prepare a management plan for the floodplain area. Also, the Project included a number of wastewater and sewerage treatment facilities for the WAPDA colonies whose discharges would flow into the Barrage pond or into the river, below the barrage. Work on both these components was significantly delayed. The draft final report for the SES was provided to the Bank only in December 2003. The draft report is, however, not complete. A key element of the work (the hydraulic model) was not completed, since the expatriate specialists have not visited Pakistan, for security reasons. Similarly, the wastewater and sewerage treatment plants were completed by mid-2003; however, the facility at Ghazi-Khalo (the largest, and most important one) has still not been constructed.

10.8 Table 4 provides some statistics on the affectees' current and previous residences. These show an improvement, in some cases significant, in the quality of the residences. For example, the number and percentage of kacha houses (i.e. mud houses) declined, while those with "brick and mortar" construction increased. The average size of houses is larger, and the number and percentage with three rooms (or less) fell, while those with 6 or more rooms increased. Also, more houses have latrine and sewerage facilities. An interesting finding of the survey was how the affectees had financed the construction of their houses. About a third of the affectees had inherited (or received parental support for) their previous house. Now, almost 90% have financed their houses from their own sources, or taken a loan. While any conclusions about improvements in incomes should not be drawn from one statistic alone, one of the indicators that can be used for making such judgements is the respondents' ability to pay for assets such as houses.

**Table 4: Housing Characteristics**

Housing Characteristics	Present House		Previous House	
	Frequency	Percent	Frequency	Percent
<b>Construction Type</b>				
Katcha	6	7.6	16	20.3
Brick and cement	49	62.0	49	62.0
Cement plaster	19	24.1	10	12.7
Mosaic	3	3.8	2	2.5
Others	2	2.5	2	2.5
<b>Financing</b>				
Inherited/Parental support	9	11.4	36	45.6
Self finance	44	55.7	36	45.6
Loan	5	6.3	1	1.3
Self and loan	21	26.6	6	7.6
<b>Area of House: (a) Covered (Marlas)</b>				
≤ 5	21	26.6	20	25.3
6 – 10	36	45.6	36	45.6
11 – 15	12	15.2	12	15.2
16 +	10	12.7	11	13.9
<b>Area of House: (b) Covered (Marlas)</b>				
≤ 5	13	16.5	18	22.8
6 – 10	26	32.9	32	40.5
11 – 15	19	24.1	14	17.7
16 +	21	26.6	15	19.0
<b>Boundary Wall</b>				
Hedge	2	2.5		
Katcha	7	8.9	24	30.4
Pacca	70	88.6	55	69.6
<b>Rooms (No.)</b>				
≤ 3	31	39.2	39	49.4
4 – 5	28	35.4	28	35.4
6 +	20	25.3	12	15.2
<b>Bathrooms</b>				
0	6	7.6	12	15.2
1	44	55.7	50	63.3
2	23	29.1	15	19.0
3	6	7.6	2	2.5
<b>Latrine Type</b>				
Open field	12	15.2	32	40.5
Flush	53	67.1	24	30.4
Ordinary	14	17.7	23	29.1
<b>Drainage</b>				
Yes	61	77.2	21	26.6
No	18	22.8	58	73.5
<b>Water Supply</b>				
Hand pump	14	17.7	6	7.6
Well	10	12.7	54	68.4
Tap	49	62.0	14	17.7
Others	6	7.6	5	6.3
<b>Electricity</b>				
Yes	76	96.2	70	88.6
No	3	3.8	9	11.4

10.9 Preliminary results of the survey of women in the Project area do not depict any noticeable trends. This survey covered 250 women (about 40% of the number who were interviewed as part of the feasibility study/baseline survey). Some of the responses are positive, for example:

- ◆ the number of women who possess skills which can be used for income generation was higher than in the baseline survey;
- ◆ a larger proportion of the women are in favor of girls/females acquiring skills for income generation; and
- ◆ a significantly larger proportion (compared to the baseline survey) are in favor of women taking up some form of income-generating employment.

However, these qualitative responses were not reinforced by other evidence regarding e.g. the proportion of females who—in addition to performing household chores—are employed on a full- or part-time basis. These survey results should therefore be complemented by further details on the income and employment status of women, and WAPDA needs to accord a high priority to completing these aspects of the survey work as soon as possible.

10.10 Some preliminary results of the survey relating to the income status of affectees are presented below. Table 5 provides the distribution of a sub-set of the affectees, according to income levels. This indicates a significant decline in the number and percentage of respondents who were in the lower and middle levels of the scale; specifically, in the 1994 (baseline) survey, about 30% of respondents were in the low and middle-income brackets. In the current survey, this proportion has dropped to about 15%, and nearly 85% of the respondents now report their annual household incomes to be at the top end of the scale (Rs 25-50,000 per annum, or more than Rs 50,000 per annum).

10.11 Tables 7 and 8 provide details of the affectees' weekly expenditures on food, and annual expenditures on clothing, education and health expenses, and electricity and water supply services. One striking result from these tables is that 40-50% of the households are now reporting "high" expenditures (Rs 5000 or more per annum) for education, health, and electricity, whereas in 1994 the corresponding percentages (for education and health only, since expenditures on electricity—under that survey—have not been tabulated) were 25-30%.

10.12 These survey results need to be complemented with further work on the income-expenditure profiles and household budgets, particularly on the savings potential of the affectees. Such analysis would be essential for drawing conclusions as to whether incomes and standards of living of affectees have been maintained, increased, or reduced, over the life of the Project.

**Table 5: Percentage distribution of respondents—by annual household income from all sources**

<b>Annual Income (Rupees)</b>	<b>1994 Survey</b>	<b>2004 Survey</b>
≤ 5,000	7.4	0.4
5,001 – 10,000	4.4	1.9
10,001 – 15,000	4.8	2.6
15,001 – 20,000	5.8	5.3
20,001 – 25,000	6.8	3.2
25,001 – 50,000	23.9	28.3
50,001 +	46.9	58.4
<b>Mean (Annual Income Per Head)</b>	<b>15,579</b>	<b>16,645</b>
<b>Total</b>	<b>100.0</b>	<b>100.0</b>
<b>N</b>	<b>1,312</b>	<b>2,638</b>

**Table 6: Percent distribution of the families of respondents by the types of material goods possessed (multiples answers)**

<b>Type of Material Possession</b>	<b>1994 Survey</b>	<b>2004 Survey (Self Reports)</b>	
		<b>6 Years Ago</b>	<b>Presently</b>
Electric iron	79.3	78.1	85.5
Sewing machine	64.9	58.5	63.7
Radio/Tape Recorder	49.2	32.5	37.1
Bicycle	45.6	34.1	40.2
Television	43.6	36.0	46.1
Refrigerator	43.1	32.9	42.8
Washing Machine	35.7	43.7	52.8
Electric Water pump	24.7	19.6	23.2
Telephone	12.5	10.9	17.1
Geyser	9.5	2.2	3.2
Car	8.7	3.8	4.8
Motorcycle/Scooter	8.3	8.2	10.7
VCR	7.3	2.3	3.7
Deep Freezer	7.2	4.8	6.3
Air conditioner	5.7	1.2	1.6
Van/Pick Up	3.4	0.7	1.3
Power Generator	2.1	0.3	0.3
Dish Antena	1.0	1.0	1.2
Rickshaw	0.7	0.6	1.1
Cable Connection	--	0.2	0.2
Natural Gas Connection	--	3.1	5.2
<b>Total</b>	<b>100</b>	<b>100</b>	<b>100</b>
<b>N</b>	<b>1312</b>	<b>2638</b>	<b>2638</b>

**Table 7: Percent distribution of respondents -- weekly expenditure on food items**

2004 Survey (Presently)	Expenses in Rupees						Total	N
	≤100	101-200	201-300	301-400	401-500	501+		
<b>Food expenses on</b>								
Meat/Beef/Chicken	77.2	15.9	4.4	1.0	0.7	0.8	100	2638
Vegetable	46.2	38.2	10.9	2.5	1.4	0.7	100	2638
Fruit	86.7	10.1	2.1	0.5	0.3	0.2	100	2638
Milk	24.9	39.7	23.5	6.1	3.6	2.1	100	2638
Eggs	97.7	1.7	0.5	-	0.1	-	100	2638
Ghee/Butter	38.5	46.4	11.6	2.3	0.9	0.2	100	2638
Sugar	80.1	16.4	3.0	0.2	0.2	0.1	100	2638
Flour	14.6	34.0	36.5	8.2	5.0	1.7	100	2638
Rice	90.0	8.2	1.6	0.1	-	-	100	2638
<b>Non-food Expenses</b>								
Wash Soap/Powder	95.0	4.1	0.5	-	0.1	0.2	100	2638
Bath soap/Shampoo	97.9	1.7	0.3	-	-	0.1	100	2638
Kerosene oil	93.6	4.9	1.0	0.2	0.1	0.2	100	2638
Other (specify)	76.0	18.2	4.5	0.6	0.3	0.4	100	2638
<b>2004 Survey (Six Years Ago)</b>								
Meat/Beef/Chicken	88.2	9.0	1.5	0.3	0.3	0.7	100	2638
Vegetable	68.1	25.3	5.0	0.9	0.3	0.3	100	2638
Fruit	93.7	4.5	1.1	0.4	0.1	0.1	100	2638
Milk	44.6	38.9	11.9	2.6	1.3	0.7	100	2638
Eggs	99.1	0.8	0.1	0.1	-	-	100	2638
Ghee/Butter	65.0	29.3	4.5	0.7	0.3	0.1	100	2638
Sugar	91.8	7.3	0.7	0.1	-	-	100	2638
Flour	30.1	47.2	17.1	2.9	2.2	0.5	100	2638
Rice	94.5	4.7	0.8	-	-	-	100	2638
<b>Non-food Expenses</b>								
Wash Soap/ Powder	97.8	1.8	0.2	-	-	0.2	100	2638
Bath Soap/Shampoo	99.0	0.7	0.2	-	0.1	0.1	100	2638
Kerosene oil	95.7	3.6	0.4	0.2	-	0.1	100	2638
Other (specify)	88.8	9.6	1.3	0.2	0.1	0.1	100	2638
<b>1994 Survey</b>								
Meat/Beef/Chicken	63.4	25.7	5.5	2.1	1.7	1.7	100	1262
Vegetable	72.1	22.8	2.9	0.8	0.5	0.9	100	1299
Fruit	71.9	17.6	5.3	1.5	1.5	2.3	100	1159
Milk	36.6	35.5	17.9	4.6	2.4	2.9	100	1256
Eggs	95.4	3.5	0.3	0.2	-	0.1	100	869
Ghee/Butter	60.3	30.1	6.2	1.5	0.6	1.3	100	1300
Sugar	87.7	9.7	1.7	0.5	0.2	0.3	100	1305
Flour	42.3	42.2	10.5	2.1	1.2	1.6	100	1287
Rice	96.8	2.5	0.2	0.2	0.2	0.1	100	1103
<b>Non-food Expenses</b>								
Wash Soap/ Powder	95.6	2.9	0.9	0.2	0.2	0.1	100	1303
Bath Soap/Shampoo	47.5	2.1	0.3	-	-	0.1	100	1290
Kerosene oil	92.6	6.5	0.7	-	0.1	0.1	100	1019
Other (specify)	69.0	19.5	5.0	1.7	2.9	1.9	100	477

**Table 8: Percent distribution of respondents -- annual expenditures on clothing, education, health and utilities**

	Expenses in Rupees							
2004 Survey (Presently)	≤ 1000	1001-2000	2001-3000	3001-4000	4001-5000	5001+	Total	N
<b>Clothing/Shoe Expenses</b>								
Winter	20.8	28.7	18.3	11.3	8.2	12.7	100	2638
Summer	28.7	28.3	16.9	11.2	5.2	9.7	100	2638
<b>Other</b>								
Education expenses	44.1	4.2	5.9	4.3	3.7	37.8	100	2638
Health expenses	2.5	7.2	10.7	11.3	8.9	59.4	100	2638
Electricity Charges	3.0	7.7	14.5	12.5	12.0	50.3	100	2638
Water supply	93.6	5.4	0.3	0.2	0.1	0.3	100	2638
<b>2004 Survey (Six Years Ago)</b>								
<b>Clothing/Shoe Expenses</b>								
Winter	34.1	28.4	17.6	10.2	4.1	5.6	100	2638
Summer	43.1	27.7	16.2	6.7	2.2	4.0	100	2638
<b>Other</b>								
Education expenses	50.3	6.9	8.1	4.0	4.9	25.8	100	2638
Health expenses	6.7	15.7	18.5	11.4	9.5	38.1	100	2638
Electricity Charges	10.3	19.5	23.0	11.3	10.0	25.9	100	2638
Water supply	98.5	1.3	0.1	-	-	0.1	100	2638
<b>1994 Survey</b>								
<b>Clothing/Shoe Expenses</b>								
Winter	17.6	28.4	18.4	9.0	11.2	15.3	100	1291
Summer	24.7	30.5	19.4	8.8	6.5	9.9	100	1289
<b>Other</b>								
Education expenses	28.2	19.4	9.9	5.5	7.0	30.0	100	917
Health expenses	24.5	18.1	11.1	6.0	9.2	31.1	100	1258
Electricity Charges								
Water supply								
Utilities	94.5	3.0	1.0	1.2	1.2	0.2	100	1200

## Annex 1. Key Performance Indicators/Log Frame Matrix

### Outcome / Impact Indicators:

Indicator/Matrix	Projected in last PSR <sup>1</sup>	Actual/Latest Estimate
Increased hydro generation.	No specific targets as hydropower generation percentage is expected to vary from year to year.	Hydro generation increased substantially; during FY04 (July-May) hydro was about 46% of total generation, compared to about 35% in FY03. GBHP accounted for about 16% of hydro generation during FY04.
GWH load shed per annum.	Less than 0.5% total generation.	No formal load-shedding in WAPDA system.
Unbundle and separate WAPDA hydro wing from other power operations.	Separated hydro entity established.	Completed
Project completion date.	July 2003 (appraisal target was June 2001).	Generating units 1-5 were commissioned between June 2003 and May 2004.
Completed cost.	US\$2.25 billion.	Final Cost estimate is US\$ 2.067 billion.
Establish monitoring panel and improve institutional capacity:		
i) Establish independent monitoring panels;	Establish ERRP and MFG;	ERRP conducted periodic reviews of GBHP up to mid-2001;
ii) Develop environmental and social unit in WAPDA.	Develop WEC.	WEC improving performance.
Community acceptance of project and adequate compensation for loss:		
i) Establish project NGO;	Establish GBTI;	GBTI is fully functional;
ii) Community Acceptance;	Community acceptance indices to be determined;	Surveys being conducted by WAPDA, to determine affectee views on compensation, restoration of income etc.;
iii) PIC established and effective.	PIC established and effective.	PIC has been operational.
Satisfaction of affectees:		
i) Satisfaction of affectees;	Indices to be determined;	Indices to be determined;
ii) Number of court cases.	Targets not appropriate now.	Court Cases withdrawn by affectees and WAPDA, and compensation payments were made according to 1998 Compensation Agreement.

Community incomes and social satisfaction:		
i) Average income	Indices to be determined.	Surveys being carried out.
ii) Social acceptance	Indices to be determined.	Indices to be determined.
1. Extent of land in Spoil Banks transferred for agricultural use by affectees.	Target extent to be determined.	Soils banks under preparation.
2. Acceptable treatment of effluents.	Acceptability of effluents; target to be determined.	Regularly monitored by WEC.
3. Worker safety: a) number of deaths; b) number of serious accidents.	Targets to be determined.	Information to be compiled.

**Output Indicators:**

<b>Indicator/Matrix</b>	<b>Projected in last PSR<sup>1</sup></b>	<b>Actual/Latest Estimate</b>
Power output.	1,450 MW	Capacity fully installed, and generating units commissioned.
Annual energy output.	6,000 GWH	Planned energy output will be achieved. First 11 months generation from the Project is about 4100 GWh, about 16% of total hydel generation.

<sup>1</sup> End of project

## Annex 2. Project Costs and Financing

### Project Cost by Component (in US\$ million equivalent)

Component	Appraisal Estimate US\$ million	Actual/Latest Estimate US\$ million	Percentage of Appraisal
1. Land Acquisition, Relocation and Resettlement, and Preparatory Works	118.71	172.40	145.2
2. Civil Works	839.91	575.61	68.5
3. Mechanical and Electrical Equipment	445.79	254.36	57.1
4. Engineering and Administration	86.71	151.23	174.4
5. Taxes and Duties	24.00	88.34	368
<b>Total Baseline Cost</b>	1515.12	1241.94	
<b>Physical Contingencies</b>	169.84	262.91	154.8
<b>Price Contingencies</b>	178.57	111.56	62.5
<b>Total Project Costs</b>	1863.53	1616.41	
Interest during construction	386.47	451.23	116.80
<b>Total Financing Required</b>	2250.00	2067.64	

### Project Costs by Procurement Arrangements (Appraisal Estimate) (US\$ million equivalent)

Expenditure Category	Procurement Method <sup>1</sup>			N.B.F.	Total Cost
	ICB	NCB	Other <sup>2</sup>		
<b>1. Works</b>	882.80 (303.00)	4.00 (0.00)	0.00 (0.00)	316.70 (0.00)	1203.50 (303.00)
<b>2. Goods</b>	0.00 (0.00)	0.00 (0.00)	4.00 (4.00)	522.50 (0.00)	526.50 (4.00)
<b>3. Services</b>	0.00 (0.00)	0.00 (0.00)	9.00 (3.00)	93.40 (0.00)	102.40 (3.00)
<b>4. Miscellaneous - Taxes and Duties</b>	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	31.10 (0.00)	31.10 (0.00)
<b>5. Miscellaneous - Interest During Constr.</b>	0.00 (0.00)	0.00 (0.00)	386.50 (40.00)	0.00 (0.00)	386.50 (40.00)
<b>6. Miscellaneous</b>	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
<b>Total</b>	882.80 (303.00)	4.00 (0.00)	399.50 (47.00)	963.70 (0.00)	2250.00 (350.00)

**Project Costs by Procurement Arrangements (Actual/Latest Estimate) (US\$ million equivalent)**

Expenditure Category	Procurement Method <sup>1</sup>			N.B.F.	Total Cost
	ICB	NCB	Other <sup>2</sup>		
<b>1. Works</b>	742.11 (298.78)	0.00 (0.00)	0.00 (0.00)	344.30 (0.00)	1086.41 (298.78)
<b>2. Goods</b>	0.00 (0.12)	0.00 (0.00)	0.00 (0.00)	290.40 (0.00)	290.40 (0.12)
<b>3. Services</b>	0.00 (0.99)	0.00 (0.00)	0.00 (0.00)	151.20 (0.00)	151.20 (0.99)
<b>4. Miscellaneous - Taxes and Duties</b>	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	88.30 (0.00)	88.30 (0.00)
<b>5. Miscellaneous - Interest During Constr.</b>	0.00 (0.00)	0.00 (0.00)	451.20 (40.00)	0.00 ( )	451.20 (40.00)
<b>6. Miscellaneous</b>	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
<b>Total</b>	742.11 (299.89)	0.00 (0.00)	451.20 (40.00)	874.20 (0.00)	2067.51 (339.89)

<sup>1/</sup> Figures in parenthesis are the amounts to be financed by the Bank Loan. All costs include contingencies.

<sup>2/</sup> Includes civil works and goods to be procured through national shopping, consulting services, services of contracted staff of the project management office, training, technical assistance services, and incremental operating costs related to (i) managing the project, and (ii) re-lending project funds to local government units.

### **Annex 3. Economic Costs and Benefits**

The least cost analysis which was carried out for the feasibility study was based on the WASP generation expansion planning model. WAPDA's standard practice for its generation planning exercises includes a number of assumptions/requirements, which were retained for the feasibility studies:

- ◆ a minimum margin requirement of 10% above peak summer demand; and a maximum margin of 25%;
- ◆ the Loss of Load Probability (LOLP) was unconstrained; and
- ◆ the value of Energy Not Served (ENS) was taken as Rs 6.50/kWh.

Committed plant additions (both thermal and hydro) were taken from WAPDA's investment program. For some of the hydro plants, feasibility studies and detailed designs had been completed, while others were only at a pre-feasibility stage. For Candidate Plants, the following were included in the feasibility study for GBHP:

- ◆ 210 MW Oil Fired Steam
- ◆ 300 MW Oil Fired Steam
- ◆ 500 MW Coal Fired Steam
- ◆ 300 MW Combined Cycle
- ◆ 50 and 100 MW Gas Turbine(s)
- ◆ 100 MW Diesel plant; and
- ◆ 300 MW Nuclear plant

Number of private projects were in the planning and initial preparation phase in the early 1990s. These were also included as candidate plants (or as committed additions, depending on the stage or preparation or implementation) for the generation expansion program. Private (IPP) projects which were considered by WAPDA included:

**IPPs Considered under the Three Development Scenarios  
for GBHP Least Cost Expansion Study**

	Description	No. of Units	Unit Size (MW)	Installed Capacity (MW)
1	Hubco	4	323	1,292
2	Davis Energin	1	8	8
3	Fauji Kabir Wala	1	144	144
4	Multan Power Generation	1	114	114
5	Southern Electric	1	113	113
6	Saba Power	1	102	102
7	Kohinoor Energy	1	120	120
8	Northern Electric	1	6	6
9	AES	1	337	337
10	Security Electric	1	285	285
11	Walk Power	1	736	736
12	Uch Power	1	536	536
	<b>Total</b>			<b>3,793</b>

The Bank's appraisal of the Project was conducted when the Government's policy for private investments in generation had already been launched - in early 1994. Therefore, the least cost analysis which was conducted for the Bank's Staff Appraisal Report (SAR) was based on a specific list of IPP projects - specifically, for the SAR it was assumed that 2502 MW of capacity (in addition to the 1292 MW Hub Power Project) would be added to the system through IPPs by 1998. The SAR also assumed a cost of Energy Not Served (ENS) of USc 0.27/kWh, which is fairly close to the value used in the feasibility studies (Rs 6.50/kWh). For the post 1998 period, the list of candidate (thermal/IPP) projects used in the SAR was:

- ◆ 50-100 MW Gas Turbine
- ◆ 150-600 MW Steam plant, and
- ◆ 150-600 MW Combined Cycle plant

The analysis carried out for the feasibility report as well as for the SAR confirmed the ranking of GBHP in the least cost expansion program for the power sector - and GBHP was selected at its earliest feasible commissioning date (1998 in the feasibility studies, and 2002 in the SAR studies). GBHP was selected for commissioning after 2002 only in those cases where the additional capacity to be installed through IPPs was 600-1800 MW larger than the amounts contracted under the 1994 Policy.

For the ICR, three scenarios based on the growth in power demand during the 1990s, and the capacity installed through IPPs were recomputed using the actual construction schedule and cost of GBHP. These scenarios were refined to include:

- ◆ with low demand growth: (a) only the Hub Power Project as a committed addition, with other IPPs taken as candidate plants; and (b) all IPPs, including Hub as committed additions; and
- ◆ with a high demand growth, all IPPs (including Hub) as committed additions.

In all three cases, GBHP was selected at its earliest feasible date - i.e. 2004. This analysis reaffirms the feasibility study conclusions that GBHP, with its revised construction schedule and completion date, remains part of the least cost generation expansion program for the WAPDA system. The results of these three scenarios are presented in the following tables.

**Ghazi Barotha Hydropower Project  
Least Cost Generation Expansion Schedule**

**CASE-1: Low Demand Forecast with Hubco only**

Year	Peak Load (MW)	Capacity Addition (committed Additions shown in parenthesis)	Total System Capacity (MW)	LOLP (%)	ENS (GWh)	Reserve Margin (%)
1995	10534		11869	13.841	868.40	12.70
1996	10972	(Muzaffargarh 210MW, Bin Qasim 210MW)	12357	11.576	698.50	12.60
1997	11462	Muzaffargarh 530MW, Kot Addu 397MW, Hub 646MW	13930	2.235	71.80	21.50
1998	12002	2 GTS, 1 IPPS, (Hub 646MW)	15276	0.867	21.50	27.30
1999	12592	1 IPPS, (Chashma Barrage 184MW)	15935	0.808	19.40	26.60
2000	13098	1 IPPS, (Chashma Nuclear 300MW)	16860	0.697	14.70	28.70
2001	14054	2 IPPS	17915	0.638	13.40	27.50
2002	14569	1 IPPS	18430	0.658	13.70	26.50
2003	15019	1 GT, 2 HYDRO	18664	0.976	24.10	24.30
<b>2004</b>	<b>15382</b>	<b>GBHP</b>	<b>19970</b>	<b>0.148</b>	<b>1.30</b>	<b>29.80</b>
2005	15998		19876	0.873	20.50	24.20
2006	16534	1 GT, 1 IPPS	20421	0.887	20.80	23.50
2007	17380	Kalabagh	21810	0.536	10.20	25.50
2008	18191	Kalagagh	22728	0.437	8.10	24.90
2009	19056	2 GTS, Kohala HPP	23428	0.886	37.40	22.90
2010	19984	1 GTS, 2 IPPS	24728	0.882	40.60	23.70
2011	21067	2 IPPS	25928	0.517	11.40	23.10
2012	22227	3 GST, 1 IPPS	26828	0.806	23.90	20.70
2013	23467	3 GTS, 1 IPPS, Tarbela HPP	28688	0.622	27.20	22.20
2014	24793	1 IPPS, 2 IPPS	29678	0.949	48.40	19.70
2015	26224	1 GT, 2 IPPC, 2 IPPS	31148	0.94	40.3	18.8
2016	27720	1 GT, 1 IPPC, 2 IPPS	32424	0.954	35.20	17.00
2017	29335	1 GT, 1 IPPC, 2 IPPS	34114	1.000	39.30	16.30
2018	31058	2 GTS, 3 IPPS	36114	0.940	36.60	16.30
2019	32490	10 GTS, 1 IPPS	37714	0.949	38.00	16.10
2020	33955	1 GT, 3 IPPS	39614	0.944	39.10	16.70

**Ghazi Barotha Hydropower Project  
Least Cost Generation Expansion Schedule**

**CASE-2: Low Demand Forecast with all IPPS**

Year	Peak Load (MW)	Capacity Addition (committed Additions shown in parenthesis)	Total System Capacity (MW)	LOLP (%)	ENS (GWh)	Reserve Margin (%)
1995	10534		11869	13.841	868.40	12.70
1996	10972	(Muzaffargarh 210MW, Bin Qasim 210MW)	12357	11.576	698.50	12.60
1997	11462	Muzaffargarh 530MW, Kot Addu 397MW, Hub 646MW	13930	2.235	71.80	21.50
1998	12002	Private Thermal Power Plants for 2502MW, (Hub 646MW)	16977	0.025	-	41.40
1999	12592	(Chashma Barrage 184MW)	17036	0.101	1.00	35.30
2000	13098	1 IPPS, (Chashma Nuclear 300MW)	17361	0.28	4.00	32.60
2001	14054	2 IPPS	17816	0.715	15.10	26.80
2002	14569	1 IPPS	18331	0.74	16.40	25.80
2003	15019	4 GTS	18601	0.972	23.80	23.90
<b>2004</b>	<b>15382</b>	<b>GBHP</b>	<b>19970</b>	<b>0.148</b>	<b>1.30</b>	<b>29.40</b>
2005	15998		19813	0.870	19.80	23.80
2006	16534	1 GT, 1 IPPS	20358	0.884	20.50	23.10
2007	17383	Kalabagh HPP	21747	0.532	9.90	25.10
2008	18191	Kalagagh HPP	22665	0.431	7.80	24.60
2009	19056	2 GTS, Kohala HPP	23365	0.790	27.40	22.60
2010	19984	1 GTS, 2 IPPS	24665	0.764	28.90	23.40
2011	21067	2 IPPS	25865	0.513	10.80	22.80
2012	22227	2 GTS, 1 IPPS	26665	0.843	25.50	20.00
2013	23467	4 GTS, 1 IPPS, Tarbela HPP	28625	0.655	29.60	22.00
2014	24793	1 GTS, 3 IPPS	29715	0.788	36.50	19.90
2015	26224	1 GT, 2 IPPC, 2 IPPS	31148	0.94	40.3	18.8
2016	27720	1 GT, 1 IPPC, 2 IPPS	32361	0.958	34.90	16.70
2017	29335	2 GTS, 1 IPPS, 2 IPPS	34151	0.935	34.60	16.40
2018	31058	1 GT, 3 IPPS	36051	0.943	36.70	16.10
2019	32490	8 GTS, 1 IPPS, 2 Hydro	37715	0.943	37.70	16.10
2020	33955	1 IPPC, 2 IPPS	39515	0.997	43.10	16.40

Total Capacity Additions

27,646

**Ghazi Barotha Hydropower Project  
Least Cost Generation Expansion Schedule**

**CASE-3: High Demand Forecast with all IPPS**

Year	Peak Load (MW)	Capacity Addition (committed Additions shown in parenthesis)	Total System Capacity (MW)	LOLP (%)	ENS (GWh)	Reserve Margin (%)
1995	10,534		11,869	13.841	868.40	12.70
1996	11,349	(Muzaffargarh 210MW, Bin Qasim 210MW)	12,357	18.974	1,336.20	8.90
1997	12,301	Muzaffargarh 530MW, Kot Addu 397MW, Hub 646MW	13,930	8.069	451.50	13.20
1998	13,452	Private Thermal Power Plants for 2502MW, (Hub 646MW)	16,977	0.604	12.70	26.20
1999	14,761	2 IPPS (Chashma Barrage 184MW)	18,236	0.734	17.40	23.50
2000	16,120	1 GT, 2 IPPS (Chashma Nuclear 300MW)	19,861	0.919	22.50	23.20
2001	18,066	4 GTS, 3 IPPS	21,916	0.911	22.80	21.30
2002	19,318	3 IPPS	23,631	0.566	11.40	22.30
2003	20,586	2 IPPS	24,701	0.778	18.50	20.00
<b>2004</b>	<b>21,895</b>	<b>GBHP</b>	<b>26,007</b>	<b>0.650</b>	<b>13.40</b>	<b>18.80</b>
2005	234,540	2 GTS, 3 IPPS	27,913	0.979	27.20	18.60
2006	25,256	2 GTS, 3 IPPS	29,758	0.979	28.30	17.80
2007	27,413	Kalabagh 1&2	32,347	0.759	18.20	18.00
2008	29,672	6 GTS, 1 IPPC, 1 IPS, Kohala	34,365	0.958	28.20	15.80
2009	32,144	4 GTS, 2 IPPS, Tarbela Ext.	36,925	0.938	27.20	14.90
2010	34,854	1 IPPC, 5 IPPS	40,525	0.807	30.70	16.30
2011	37,982	1 GT, 1 IPPC, 4 IPPS	43,625	0.995	47.10	14.90
2012	41,416	2 GTS, 2 IPPC, 4 IPPS	47,425	0.984	50.80	14.50
2013	45,182	4 GTS, 1 IPPC, 4 IPPS, Basha 1	51,682	0.989	55.50	14.40
2014	49,312	5 GTS, 3 IPPC, 5 IPPS	56,172	0.979	58.80	13.90
2015	53,853	3 GTS, 2 IPPC, 6 IPPS, Basha 2	61,682	0.962	61.80	14.5
2016	58,800	5 GTS, 3 IPPC, 6 IPPS	66,958	0.999	69.90	13.90
2017	64,241	6 GTS, 3 IPPC, 4 IPPS, Basha 3&3	73,228	0.977	72.90	14.00
2018	70,204	4 IPPC, 7 IPPS	79,828	0.975	76.70	13.70
2019	76,333	8 GTS, 2 IPPC, 8 IPPS	86,628	0.977	79.80	13.50
2020	82,996	8 GTS, 3 IPPC, 9 IPPS	94,628	0.99	85.20	14.00

Total Capacity Additions

82,759

## Annex 4. Bank Inputs

(a) Missions:

Stage of Project Cycle	No. of Persons and Specialty (e.g. 2 Economists, 1 FMS, etc.)		Performance Rating	
	Month/Year	Count	Specialty	Implementation Progress
<b>Identification/Preparation</b>				
Fact-finding September 1987	1	Pr. Dam Specialist (1)		
Follow-up December 1987	1	Pr. Dam Specialist (1)		
Follow-up April 1988	1	Pr. Dam Specialist (1)		
Preparation September 1988	1	Pr. Dam Specialist (1)		
Preparation March 1989	1	Pr. Dam Specialist (1)		
Preparation July 1989	4	Pr. Dam Specialist (1) Sr. Trust Fund Officer (1) Economist (1) Pr. Environmtl Spclst (1)		
Preparation October 1989	1	Pr. Dam Specialist (1)		
Preparation February 1990	1	Sr. Trust Fund Officer (1)		
Preparation March 1990	4	Pr. Dam Specialist (1) Pr. Environmental Spclst (1) Economist (1) Sr. Trust Fund Officer (1)		
Preparation May 1990	5	Pr. Dam Specialist (1) Pr. Environmental Spclst (1) Economist (1) Sr. Trust Fund Officer (1) Power Engineer (1)		
Preparation October 1990	4	Pr. Dam Specialist (1) Sr. Trust Fund Officer (1) Pr. Environmental Spclst (1) Economist (1)		
Preparation December 1990	1	Sr. Trust Fund Officer (1)		

Preparation March 1991	2	Pr. Dam Specialist (1) Economist (1)		
Preparation May 1991	4	Pr. Dam Specialist (1) Pr. Environmental Spclst (1) Pr. Power Engineer (1) Economist (1)		
<b>Appraisal/Negotiation</b>				
Appraisal November 1994	9	Pr. Power Engr/Task Mgr (1) Sr. Power Engineer (1) Pr. Dam Specialist (1) Financial Analyst (1) Energy Economist (1) Project Adviser (1) Pr. Environmental Spclst (1) Financial Analyst (1) Consultant (1)		
Post-Appraisal Review March 1995	7	Pr. Power Engr/Task Mgr (1) Financial Analyst (1) Energy Economist (1) Legal Counsel (1) Disbursement (1) Consultant (2)		
Post-Appraisal Review July 1995	7	Pr. Power Engr/Task Mgr (1) Project Adviser (1) Financial Analyst (1) Energy Economist (1) Environmental Speclst (1) Consultant (2)		
Negotiations November 1995	7	Pr. Power Engr/Task Mgr (1) Financial Analyst (1) Energy Economist (1) Legal Counsel (1) Disbursement (1) Consultant (2)		
<b>Supervision</b>				
January 1996	10	Pr. Power Engineer (1) Financial Analyst (1) Energy Economist (1) Pr. Environmental Spclst (1) Pr. Dam Specialist (1) Resettlement Consultant (1) Project Specialist (1) Environmental Spclst (1) Energy Specialist (1) Consultant (1)	S	S

April 1996	5	Resettlement Consultant (1) Project Specialist (1) Financial Analyst (1) Environmental Specialist (1) Pr. Power Engineer (1)	S	S
July 1996	4	Resettlement Consultant (1) Project Specialist (1) Financial Analyst (1) Pr. Power Engineer (1)	S	S
December 1996	4	Pr Power Engineer (1) Pr. Env Specialist (1) Env and Resettl Specialist (1) Resettlement Specialist (1)	S	S
May 1997	5	Pr. Power Engr/TTL (1) Dam Specialist (1) Env and Resettl Speclst (1) Resettlement Specialist (1) Environmental Speclst (1)	U	S
October 1997	3	Power Engineer (1) Env and Resettl Specialist (1) Economist (1)	U	S
April 1998	7	Power Engineer (1) Financial Analyst (2) Env and Social Dev Speclst (1) Dams Specialist (1) Energy Specialist (1) Resettlement Specialist (1)	S	S
December 1998	4	Sr. Power Engineer (1) Pr. Environmental Speclst (1) Social Dev Specialist (1) Consult--Resettl Speclst (1)	S	S
April 1999	5	Sr. Power Engineer (1) Social Dev Specialist (1) Environmental Specialist (1) Resettlement Specialist (1) Energy Specialist (1)	U	S
September 1999	4	Sr. Power Engineer (1) Social Dev Specialist (1) Resettlement Specialist (1) Sr. Energy Specialist (1)	U	S

	June 2000	10	Sr. Power Engineer (1) Pr. Financial Analyst (1) Social Scientist (1) Resettlement Specialist (1) Sr. Energy Specialist (1) Environmental Specialist (1) Disbursement (1) Procurement (1) Environmental Advisor (1) Consultant (1)	S	S
	November 2000	5	Sr. Power Engineer (1) Sr. Energy Specialist (1) Social Scientist (1) Social Dev Specialist (1) Sr. Environmental Speclst (1)	S	S
	May 2001	8	Social Dev Specialist (2) Environmental Specialist (1) Private Sec Dev Speclst (1) Financial Spclst (con) (1) Energy Specialist (1) Financial Analyst (1) Power Engineer (1)	S	S
	November 2002	5	Task Team Leader (1) Energy Specialist (1) Environmental Speclst (1) Social Dev Speclst (2)		
	June 2003	5	Task Team Leader (1) Sr. Social Scientist (1) Social Dev Specialist (1) Sr. Power Engineer (1) Sr. Engineer (1)	S	U
<b>ICR</b>				S	S
	October 2003	5	Task Team Leader (1) Sr. Social Scientist (1) Social Dev Specialist (1) Sr. Power Engineer (1) Sr. Engineer (1)	S	S

(b) Staff:

Stage of Project Cycle	Actual/Latest Estimate	
	No. Staff weeks	US\$ ('000)
Identification/Preparation	70.30	79.70
Appraisal/Negotiation	193.10	520.60
Supervision	581.89	1,663.34
ICR	14.93	52.69
Total	860.22	2,316.33

## Annex 5. Ratings for Achievement of Objectives/Outputs of Components

(H=High, SU=Substantial, M=Modest, N=Negligible, NA=Not Applicable)

	<u>Rating</u>				
<input type="checkbox"/> <i>Macro policies</i>	<input type="radio"/> H	<input type="radio"/> SU	<input checked="" type="radio"/> M	<input type="radio"/> N	<input type="radio"/> NA
<input type="checkbox"/> <i>Sector Policies</i>	<input type="radio"/> H	<input type="radio"/> SU	<input checked="" type="radio"/> M	<input type="radio"/> N	<input type="radio"/> NA
<input type="checkbox"/> <i>Physical</i>	<input checked="" type="radio"/> H	<input type="radio"/> SU	<input type="radio"/> M	<input type="radio"/> N	<input type="radio"/> NA
<input type="checkbox"/> <i>Financial</i>	<input type="radio"/> H	<input type="radio"/> SU	<input type="radio"/> M	<input checked="" type="radio"/> N	<input type="radio"/> NA
<input type="checkbox"/> <i>Institutional Development</i>	<input type="radio"/> H	<input checked="" type="radio"/> SU	<input type="radio"/> M	<input type="radio"/> N	<input type="radio"/> NA
<input type="checkbox"/> <i>Environmental</i>	<input type="radio"/> H	<input type="radio"/> SU	<input checked="" type="radio"/> M	<input type="radio"/> N	<input type="radio"/> NA

### Social

<input type="checkbox"/> <i>Poverty Reduction</i>	<input type="radio"/> H	<input type="radio"/> SU	<input type="radio"/> M	<input type="radio"/> N	<input type="radio"/> NA
<input type="checkbox"/> <i>Gender</i>	<input type="radio"/> H	<input type="radio"/> SU	<input type="radio"/> M	<input type="radio"/> N	<input type="radio"/> NA
<input type="checkbox"/> <i>Other (Please specify)</i>	<input type="radio"/> H	<input type="radio"/> SU	<input type="radio"/> M	<input type="radio"/> N	<input type="radio"/> NA
<input type="checkbox"/> <i>Private sector development</i>	<input type="radio"/> H	<input type="radio"/> SU	<input type="radio"/> M	<input type="radio"/> N	<input checked="" type="radio"/> NA
<input type="checkbox"/> <i>Public sector management</i>	<input type="radio"/> H	<input type="radio"/> SU	<input checked="" type="radio"/> M	<input type="radio"/> N	<input type="radio"/> NA
<input type="checkbox"/> <i>Other (Please specify)</i>	<input type="radio"/> H	<input type="radio"/> SU	<input type="radio"/> M	<input type="radio"/> N	<input type="radio"/> NA

## Annex 6. Ratings of Bank and Borrower Performance

(HS=Highly Satisfactory, S=Satisfactory, U=Unsatisfactory, HU=Highly Unsatisfactory)

### 6.1 Bank performance

#### Rating

- |                                      |                          |                                    |                         |                          |
|--------------------------------------|--------------------------|------------------------------------|-------------------------|--------------------------|
| <input type="checkbox"/> Lending     | <input type="radio"/> HS | <input checked="" type="radio"/> S | <input type="radio"/> U | <input type="radio"/> HU |
| <input type="checkbox"/> Supervision | <input type="radio"/> HS | <input checked="" type="radio"/> S | <input type="radio"/> U | <input type="radio"/> HU |
| <input type="checkbox"/> Overall     | <input type="radio"/> HS | <input checked="" type="radio"/> S | <input type="radio"/> U | <input type="radio"/> HU |

### 6.2 Borrower performance

#### Rating

- |  |                                     |                                    |                                    |                          |
|--|-------------------------------------|------------------------------------|------------------------------------|--------------------------|
| <input type="checkbox"/> Preparation                           | <input checked="" type="radio"/> HS | <input type="radio"/> S            | <input type="radio"/> U            | <input type="radio"/> HU |
| <input type="checkbox"/> Government implementation performance | <input type="radio"/> HS            | <input type="radio"/> S            | <input checked="" type="radio"/> U | <input type="radio"/> HU |
| <input type="checkbox"/> Implementation agency performance     | <input type="radio"/> HS            | <input checked="" type="radio"/> S | <input type="radio"/> U            | <input type="radio"/> HU |
| <input type="checkbox"/> Overall                               | <input type="radio"/> HS            | <input checked="" type="radio"/> S | <input type="radio"/> U            | <input type="radio"/> HU |

## Annex 7. List of Supporting Documents

1. Staff Appraisal Report (Report No. 14587-PAK; November 27, 1995)
2. Memorandum of the President (MOP) (November 27, 1995)
3. Loan Agreement, Project Agreement Loan 3965-PK (March 7, 1996)
4. Initial Executive Project Summary (IEPS) (February 5, 1991)
5. Minutes of IEPS Review Meeting (June 4, 1993)
6. Project Information Document (PID) (updated on February 23, 1995)
7. Environmental Data Sheet (August 21, 1995)
8. Minutes of pre-appraisal meeting, with comments from peer reviewers (March 30, 1994)
9. Minutes of yellow cover review meeting, with comments from peer reviewers (September 15, 1995)
10. Final Executive Project Summary (FEPS) (November 7, 1994)
11. Environmental Assessment Summary (SecM94-1147; November 17, 1994)
12. Project Information Document (PID) (updated on February 23, 1995)
13. Environmental Data Sheet (August 21, 1995)
14. **Fact-finding mission: September 1987**  
(back-to-office report 11/6/1987)
15. **Follow-up mission: December 1987**  
(back-to-office report 1/20/1988)
16. **Follow-up mission: April 1988**  
(back-to-office report 5/23/1988)
17. **Preparation mission: September 1988**  
(back-to-office report 9/28/1988; aide-memoire 9/21/1988)
18. **Preparation mission: March 1989**  
(back-to-office report 5/11/1989; aide-memoire 3/26/1989; TOR 2/23/1989)
19. **Preparation mission: July 1989**  
(back-to-office report 8/1/1989; aide-memoire 7/24/1989; TOR 6/8/1989)
20. **Preparation mission: October 1989**  
(back-to-office report 10/17/1989; aide-memoire 10/13/1989; TOR 9/15/1989)
21. **Preparation mission: February 1990**  
(back-to-office report 2/22/1990; TOR 1/8/1990)
22. **Preparation mission: March 1990**  
(back-to-office report 4/16/1990; TOR 3/15/1990)
23. **Preparation mission: May 1990**  
(back-to-office report 6/15/1990; aide-memoire 5/17/1990; TOR 4/26/1990)

24. **Preparation mission: October 1990**  
(back-to-office report 10/23/1990; aide-memoire 10/13/1990; TOR 10/5/1990)
25. **Preparation mission: December 1990**  
(back-to-office report 12/18/1990)
26. **Preparation mission: March 1991**  
(back-to-office report 6/7/1991; aide-memoire 5/23/1991; TORs 3/5/1991 and 4/17/1991)
27. **Preparation mission: May 1991**  
(back-to-office report June 7, 1991, aide-memoire May 23, 1991)
28. **Appraisal mission: November 1994**  
(management letter 2/9/1995; back-to-office report 2/22/1995; aide-memoire)
29. **Post-appraisal review mission: March 1995**  
(management letter 5/1/1995; back-to-office report 5/20/1995; aide-memoire)
30. **Post-appraisal review mission: July 1995**  
(TORs 6/30/1995 and 3/13/1995)
31. **Negotiations: November 1995**  
(agreed minutes of negotiations 11/7/1995; summary of negotiations 11/13/1995)
32. **Supervision mission: January 1996**  
(back-to-office report 2/13/1996; aide-memoire; TOR 12/21/1995)
33. **Supervision mission: April 1996**  
(back-to-office report 5/29/1996; management letter 5/17/1996; aide-memoire; TOR 4/1/1996)
34. **Supervision mission: July 1996**  
(back-to-office report 8/8/1996; management letter 8/8/1996; aide-memoire; TOR 7/2/1996)
35. **Supervision mission: December 1996**  
(back-to-office report 1/27/1997; management letter 1/14/1997; aide-memoire; TOR 12/3/1996)
36. **Supervision mission: May 1997**  
(back-to-office report 7/25/1997; management letter 7/22/1997; aide-memoire; TOR 5/8/1997)
37. **Supervision mission: October 1997**  
(back-to-office report 12/5/1997; management letter 12/3/1997; aide-memoire; SMO 9/25/1997)
38. **Supervision mission: April 1998**  
(back-to-office report 6/23/1998; management letter 5/25/1998; aide-memoire; SMO 4/13/1998)
39. **Mid-term review: December 1998**  
(back-to-office report 1/29/1999; management letter 1/28/1999; aide-memoire; mission announcement letter 11/17/1998)
40. **Supervision mission: April 1999**  
(back-to-office report 5/18/1999; management letter 5/12/1999; aide-memoire 5/4/1999; mission announcement 3/12/1999)

41. **Supervision mission: September 1999**  
(back-to-office report 10/13/1999; aide-memoire; SMO 9/1/1999)
42. **Supervision mission: June 2000**  
(back-to-office report 6/26/2000; management letter 6/19/2000; aide-memoire 6/15/2000)
43. **Supervision mission: November 2000**  
(management letter 12/12/2000; aide-memoire; SMO 10/25/2000)
44. **Supervision mission: May 2001**  
(management letter 6/18/2001; aide-memoire; SMO 4/16/2001)
45. **Supervision mission: November 2002**  
(management letter 12/4/2002; aide-memoire)
46. **Supervision mission: June 2003**  
(back-to-office report 7/15/2003; management letter 6/19/2003; aide-memoire; SMO 5/28/2003)
47. **ICR mission: October 2003**  
(management letter 11/4/2003; aide-memoire; SMO 9/23/2003)

## Additional Annex 8. Maps

Map IBRD 25106



pak25106.pdf

Map IBRD 25107



PAK25107.pdf

