

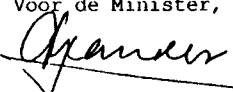
APPENDICES

**Advisory review of the
environmental assessment of the
Ghazi Barotha Hydropower Project,
Pakistan
Comments on the Office Memorandum
of the World Bank**

(appendices 1 to 3)

APPENDIX 1

Letter from DGIS dated 22 December 1994, in which the Commission has been asked to submit an advisory report

Ministerie van Buitenlandse Zaken Bezuidenhousweg 67 Postbus 20061 2500 EB 's-Gravenhage Telefoon 070 - 3 48 64 86 Telex 31326	<table border="1"><tr><td>WEV</td><td>Commissie voor de m.e.r. OS</td></tr><tr><td>ing.</td><td>INGEKOMEN 2 - JAN. 1995</td></tr><tr><td>nummer:</td><td>001 - 25</td></tr><tr><td>dossier:</td><td>016-1</td></tr><tr><td>kopie naar:</td><td>Sc/Rb/Sb/Kh</td></tr></table>	WEV	Commissie voor de m.e.r. OS	ing.	INGEKOMEN 2 - JAN. 1995	nummer:	001 - 25	dossier:	016-1	kopie naar:	Sc/Rb/Sb/Kh
WEV	Commissie voor de m.e.r. OS										
ing.	INGEKOMEN 2 - JAN. 1995										
nummer:	001 - 25										
dossier:	016-1										
kopie naar:	Sc/Rb/Sb/Kh										
Commissie voor de m.e.r./OS t.a.v. de heer drs. J.J. Scholten Postbus 2345 3500 GH Utrecht											
Directoraat-Generaal Internationale Samenwerking	Datum: 22-12-1994										
Onderwerp: Ghazi Barotha hydropower Act. nr. WW92850-vlgnr 14, irc nr. 93/381 (MER/94/014)	Kenmerk: DDI-DST ML-94-629 (WEV)										
Op korte termijn zal bovengenoemd project in de Board of Directors van de Wereldbank worden behandeld. Ten behoeve van de oordeelsvorming van het DGIS wordt een toetsingsadvies van het EIA-summary van dit project op prijs gesteld.											
Moge u verzoeken een werkgroep samen te stellen die het EIA-summary (reeds in uw bezit) op hoofdlijnen toetst. Een aanpak zou kunnen zijn reeds in een vroeg stadium van het advies vragen te formuleren ter zake het EIA van het project die dan door het DGIS aan de WB voorgelegd kunnen worden. Afhankelijk van de antwoorden daarop kan het advies gefinaliseerd worden.											
De samenstelling van de werkgroep en bijbehorende begroting worden dezerzijds ingewacht, onder verwijzing naar de overeenkomst die in maart 1993 tussen DGIS en Cie is gesloten.											
DE MINISTER VOOR ONTWIKKELINGSSAMENWERKING, Voor de Minister, b/a 											
Het Hoofd van het Milieuprogramma											
Dr. K.A. Koekkoek											
Verzoek bij beantwoording datum, kenmerk en nummer van tekenen											

APPENDIX 2

Project information

Proposed Activity: The Pakistan Water and Power Authority (WAPDA) intends to implement in the northern Indus river plain, between the tail waters of the Tarbela dam and the confluence of the Indus and Haro rivers, an activity named 'the Ghazi-Barotha hydropower project'. The main objective of the proposed project is to meet the acute shortage of power in Pakistan. The intended project will utilize the fall of about 76 metres of the river along a distance of about 63 kilometres. The project includes three basic elements: a barrage, a power channel and a power complex. The project will have an installed capacity of 1450 MW. The power will be transmitted to WAPDA's national grid system.

Categories: hydroelectric power projects, power transmission lines

Project numbers: WW92850-vlgnr 14, jrc. nr. 93/381(MER/94/014) Cie m.e.r. 016

Progress: The environmental assessment executive summary will be submitted to the board of directors of the World Bank. A Study Appraisal Report is in preparation at the World Bank. This report will be discussed in the board of Directors by the beginning of April 1995. An advisory review on the Summary has been submitted to the Netherlands Minister for Development Cooperation on 10 April 1995. In its Office Memorandum of 22 August 1995 the World Bank formulates reactions on the Commission's advisory review. The discussion of the Study Appraisal Report is postponed to a date not yet known. On 20 November 1995 the Commission submits to the Netherlands Minister of Development Cooperation its advisory review in which she formulates comments on the Office Memorandum of the World Bank.

Composition of the working group of the Commission for EIA:

Mr J.F. Agema

Mr A. van Dijk

Mr J.W. Kroon (chairman)

Mr Azher Uddin Khan acted as resource person in Pakistan.

Technical secretary: Mrs I.A. Steinhauer (advisory review) and Mr R.A.M. Post (advisory review on Office Memorandum of the World Bank).

APPENDIX 3

Office memorandum of the World Bank dated 22 August 1995

THE WORLD BANK/IFC/MIGA

OFFICE MEMORANDUM

DATE: August 22, 1995

TO: Ms. Eveline Herfkens, Executive Director, EDS19

THROUGH: Lord's *Ly* ap. Acting, Director, SA1

FROM: Per *Ly* Ljung, Chief, SA1EF *B*

EXTENSION: S1933

SUBJECT: PAKISTAN: Ghazi Barotha Hydropower Project -
Advisory Review of the Environmental Assessment Executive Summary

1. With regard to Mr. van den Boogaard's memorandum of May 4, 1995, my staff has reviewed the Advisory Review of the Environmental Assessment Executive Summary for the above project, prepared by the Commission for Environmental Impact Assessment for the Minister for Development Cooperation and provided through the Ministry of Foreign Affairs. The work of the Commission is well known to the Bank and we appreciate the effort taken in the preparation of their report. The key findings and recommendations have been carefully reviewed by Bank specialists concerned with environment, resettlement and dam safety issues. During the Bank's most recent mission to Pakistan, which was just completed, a number of issues raised were reviewed with local counterparts in the field.

2. The Bank is pleased that the overall impression of the Commission was positive concerning the potential environmental and social impacts associated with the proposed Project and that it found key elements of the environmental assessment procedure to have been correctly executed. The following specific responses to each of the issues raised in the comments, are provided below:

- Cover Letter.

- (a) *Project Monitoring Bodies.* The Commission is correct in its observation that the monitoring bodies for the proposed Project are financially dependent on the Government of Pakistan for funding. Under the provisions of Pakistani law, the development of environmental policies and regulations is the responsibility of the Pakistani Environmental Protection Agency (PEPA), which represents the federal government. The work of PEPA is complemented by provincial level environmental protection agencies which are responsible for monitoring and enforcement. In the case of the Project, responsibility rests with the Punjab Environmental Protection Agency (P-EPA) and the Northwest Frontier Province Environmental Protection Agency (NWFP-EPA). In order to assist federal and provincial authorities in undertaking the required environmental monitoring, the Project includes provisions for a monitoring program supported by an international consultant.

It should be clarified that the federal and provincial environmental agencies are administratively and financially independent of the Water

and Power Development Authority of Pakistan (WAPDA), which is the implementing agency for the proposed Project. In addition, the Project design explicitly involves, in the implementation phase, the participation of an external Environment and Resettlement Panel to provide independent oversight of all aspects of the Project, including the monitoring program.

The Project design also provides for the participation of a Project Nongovernmental Organization (PNGO) which is to assure implementation of the provisions of the Resettlement Action Plan, support the Integrated Regional Development Plan, and serve as an advocate for the interests of potentially affected parties. The PNGO is being provided with an endowment from WAPDA to allow for its operations in an independent manner. The PNGO could serve as a vehicle to raise issues concerning environmental monitoring should problems arise that could not be addressed by either the parties legally responsible for monitoring or the Environment and Resettlement Panel.

- (b) *External Environment and Resettlement Panel.* The external Environment and Resettlement Panel for the implementation of the proposed Project would include three experts: (i) an environmental specialist; (ii) an agricultural specialist; and (iii) a resettlement specialist. This panel would continue the work of the external Environment and Resettlement Panel which was established and successfully used during the preparation phase of the Project.

This panel is complemented by a Technical Panel which is responsible for engineering and dam safety aspects of the proposed Project, consistent with World Bank Operational Directive 5.80, "Dam Safety Guidelines." This panel will include six to seven specialists, including an expert in hydraulic engineering. As in the case of the feasibility study, the Environment and Resettlement Panel and the Technical Panel would conduct their work in an interactive manner, to assure full complementarity of their recommendations.

- (c) *Project Information Center.* The Project Information Center (PIC) is fully operational at this time and funding is provided under the proposed Project to keep it functioning through the life of the proposed Project. The Government of Pakistan has found the work of the PIC to be useful in providing information to parties in the Project area. The Government may choose, on the basis of performance of the PIC and its needs, to continue the operation of the Center into the long-term operational phase of the proposed Project. It should be noted that the Center is the first of its type in Pakistan and will serve as a model facility which can provide training for personnel for other future centers.

• Section 2.2 - Supplementary Information.

- (a) *Analysis of Alternatives.* In order to meet the future energy requirements in the country, continued investments with energy conservation and efficiency are very important. Thus, considerable energy savings expected from these investments were included in the estimated energy demand on the basis of which alternative power generation projects, including thermal, nuclear and hydropower were considered. Under all scenarios studied, Ghazi-Barotha has been shown to be the most attractive option for meeting future demand. In particular two groups of alternative hydropower project options have been reviewed by the Government and the Bank. The first group consists of medium-size hydropower projects (whose size varies from 80 to 800 MW) identified at desk-top inventory level by the Sindh Hydroelectric Development Organization (SHYDO) with the assistance of GTZ (the German Agency for Technical Cooperation). Although their data related to costs, land acquisition, resettlement and mitigation costs are preliminary or not available, the analysis indicates that these projects are not comparable with the Ghazi-Barotha project.

The alternative of small-scale hydropower options had been previously reviewed by WAPDA as an element of its national energy program and determined to provide 70 MW so that it was viewed as a complementary rather than alternative action. With regard to the alternative of "dividing the Project into smaller units and dams," it was not viewed as technically feasible, due to the large size of the Indus River, to construct a smaller unit on the main channel, while it was recognized that small dams could be built at selected sites in northern Pakistan. In general, it has been concluded that small-scale hydropower could not cost-effectively replace, on a national scale, the 1,450 MW which would be generated by the proposed Project due to its unique design and relatively low environmental and social impacts. However, it is fully recognized that small-scale hydropower, particularly at the provincial level, could play a complementary role to the proposed Project and should be given consideration as an element of energy investment programs. Also, the analysis of alternatives for the proposed Project included the examination of both alternative investments and alternative configurations for the proposed investment, including the siting of the barrage, alignment of the power channel and location of the power complex.

- (b) *Disaster Management Plan.* Preparation of the proposed Project has taken into consideration all aspects of dam safety and risk management, consistent with the provisions of the World Bank's Operational Directive 3.80, "Dam Safety Guidelines." The adjacent Tarebia Dam, which is immediately upstream of the barrage that would be constructed for the proposed Project, has its own emergency action plan which is currently being updated by WAPDA with the

assistance of international experts, under the Tarbela Assistance and Surveillance Project.

- (c) *Indus River Bed.* The Environmental Assessment in its "Report on Supplementary Environmental Studies," includes an evaluation of the potential hydrological and ecological impacts of reduced flows in the Indus River bed. This volume also includes an analysis of potential changes in river water quality. Downstream of the barrage, the Indus water is used to provide an estimated 10% of the consumptive water demands of 15 riverside villages, principally for watering livestock, washing and as receiving waters for sewage from settlements. Little water is taken for irrigation or drinking due to the use of wells and tubewells. Flood reductions would adversely affect about 80 hectares of recession agriculture in Malla and Noor Malla; however, this could be addressed by the Project providing tubewells for these areas. In the hotter months, dry season pools are used for bathing by a small percentage of the population. Adequate compensation water for these purposes would be provided downstream of the barrage through releases from the barrage supplemented by the provision of tubewells to replace traditional wells in selected areas. The proposed Project would support rehabilitation and upgrading of wastewater treatment facilities for the Tarbela colony and Ghazi-Khalo. In addition, releases of sewage compensation and sewage would be coordinated during the low flow season to maximize dilution.

It was concluded that the reduction of the flow in the Indus River during the low-flow season may affect the present ecosystem only in the braided alluvial channel zone and that these impacts would slow down the plant succession process and potentially make some alluvial areas subject to cropping by local residents due to increased accessibility. Wildlife impacts in the braided section, especially to waterbirds, are anticipated to be minor. Pools will remain throughout much of the year, especially during the autumn, when most migratory birds pass through the Project area.

Riverain fisheries may be affected by the reduction in dry season flows which would have an effect on part-time seasonal fishermen. With effective management, the barrage pool fisheries should replace this loss and provision would be made to assign fishing rights to those who have traditionally engaged in fishing in the area. At present the Indus river is eroding its banks and destroying agricultural lands of the villages on the left bank downstream of the barrage site. The barrage would significantly reduce this process by providing greater regulation of the flood flows and reducing peak flood events.

It is important to recognize that the section of the river bed that would be affected by the proposed Project has been subject to full regulation for over 20 years as a result of construction of the Tarbela Dam. The

implementation of the proposed Project would continue this process of regulation which reduces extreme flows and allows for controlled discharges. In the summer, the channel would continue to flow in a braided pattern, as it was prior to regulation by Tarbela, with considerable amounts of water in the gravel-dominated river bed.

• Section 2.3 - Observations.

- (a) *Environmental Impacts.* Concerning the relationship with the long-term operation of the Tarbela Dam, the design of the proposed Project recognizes the potential influence of the Tarbela Dam on the operation of the Ghazi barrage. The barrage incorporates design features to address sediment management, including the installation of under-slucices and sediment-skimming platforms. In addition, the gradient of the power channel and its operating velocities have been designed to avoid sedimentation problems in the power channel.
- (b) *Social Implications and Socio-economic Impacts.* The potential social implications and impacts of the proposed Project have been subject to extensive studies, consistent with the provisions of the Bank's Operations Directive 4.30, "Involuntary Resettlement." The main volume of the Environmental Assessment includes a general overview of these issues which has been supplemented through preparation of a comprehensive Resettlement Action Plan and an Integrated Regional Development Plan. These documents have been prepared on the basis of extensive public consultations with potentially affected parties in the Project area. The Executive Summary of the Environmental Assessment provides only a brief overview of the findings and recommendations of these complementary plans and focuses on information concerning the Resettlement Packages, given their importance to affected parties.
- (c) *Institutional Considerations.* The proposed Project would include support for the strengthening of the WAPDA Environment Cell to assure that it has the capacity to undertake all necessary activities required of it during the implementation and operational phases of the Project. The Environment Cell is an internal WAPDA technical unit that was created to facilitate the integration of environmental concerns into the planning, implementation and monitoring of WAPDA's activities, including issues related to major investments such as the Tarbela Dam.

The Environment Cell works with the Pakistan Environmental Protection Agency which is a federal-level policy-setting and coordination body. It interfaces at the routine operational level with the Environmental Protection Agencies of the Punjab Province and the North West Frontier Province. Under the federal system of government in effect in Pakistan, it is the provincial level.

environmental protection agencies which have responsibility for day-to-day environmental management. In addition, the Environment Cell would interact with other Pakistani agencies responsible for archaeological and historical sites, health, forestry and resettlement. The Environment Cell would work with WAPDA management and the PIC in interacting with the public and nongovernmental organizations.

- * **Summary.** The findings and recommendations of the Environmental Assessment, including the Executive Summary, Resettlement Action Plan and Integrated Regional Development Plan have been used by the Government of Pakistan and the World Bank to support preparation of the Staff Appraisal Report and its associated annexes. In these documents, effort has been made to ensure that a comprehensive and integrated presentation is provided to decisionmakers concerning both environmental and social aspects of the proposed Project.

3. Please advise me if any additional information is required.

cl/cc: Mr. P. Ljung (SAIEF); Mme. M. Koch-Weser (ASTEN)

cc: Messrs./Mmes.: Lodhi (EDS06); P. Isenman, J. Wali, F. Ahmed (SAIDR); M. Nishimizu (FRSDR); Z. Ladhbi-Belk, C. Gavino, L. Monari, Z. Khawaja (SAIEF); S. Ahmed, R. Aziz (SA3PK); A. Hamid (LEGSA); A. Ghani (ASTHR); H. Mishra, J. Shah (ASTEN); P. Gupta (EMTAW); S. Linnar (ENVLW); K. Kawata (Chairman, Environment and Resettlement Panel)

Black Book;
Asia Information Center.

m/zib.ghazi@duchev.com WPS1