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USAID ENERGY POLICY PROGRAM

STEP-I DUE DILIGENCE REPORT

KURRAM TANGI MULTI PURPOSE DAM PROJECT

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KURRAM TANGI MULTI PURPOSE DAM PROJECT

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with active participation and valuable contribution

by all Members of the

Joint WAPDA-USAID Project Due Diligence Task Force

set up for the Kurram-Tangi Dam project

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THE KURRAM-TANGI (Multipurpose) DAM PROJECT
Step 1 Due Diligence, Phase III

1. INTRODUCTION

The goal of the USAID energy program in Pakistan, focusing on the power sector, is to support the Government of Pakistan (GOP) in adding power generating capacity available to the National Grid, decrease losses in delivery of electric power to customers and increase cost recovery from them. This will be achieved through investment in infrastructure, support to institutional reform through technical assistance and promotion of new technology.

The program is being implemented in three phases. Phase I supports power plant repairs and efficiency improvements, replacement of existing tube well pump motors with more efficient power saving models, and technical assistance to help reform the power distribution companies. Phase II funds two multipurpose dam projects to generate electricity, store water and control flooding.

Phase III aims to support GOP in its longer term national development plans by making available funds to provide and promote investments in high-priority, high visibility major energy projects. It will also look at new technology initiatives in a way that encourages IFI, other donors and private sector funding and engages all relevant USG agencies (e.g., OPIC, EXIM). Technical Assistance will also be provided to develop institutional capacity and support energy sector reforms that will encourage public and private investment in the sector.

Energy projects under Phase III will be chosen based upon:

1) **Technical feasibility** –
a) Will the proposed intervention actually contribute significantly to meeting Pakistan's energy and other vital development needs, while improving the country's energy security?
b) Does the project use domestic or imported resources?
c) Does the project result in energy diversification?

2) **Cost** –
a) Is the cost reasonable?
b) Can the project's full financing be arranged in a timely fashion?

3) **Overall effect** –
a) Is the project high visibility?
b) Is it a high priority for Pakistan?
c) Will the power generated and other benefits be worth the time and money?

All projects identified for USG support undergo a two-step Due Diligence process. In Step 1 existing documents and other information is reviewed for adequacy to apply selection criteria and make a recommendation to USG. Step 2 is an in-depth analysis of any additional information required for a USG decision on the project.

As part of the assistance to be provided by USAID under Phase III, WAPDA, the implementing agency for the project, has requested funding support to start construction of a hydropower station which is part of the multipurpose Kurram-Tangi Dam project.

USAID tasked AEAI to conduct the Step 1 Due Diligence and confirm facts from WAPDA, evaluate whether the project will meet USAID requirements described above, highlight any particular risk or concern that needs to be mitigated or addressed and to make a recommendation.

2. SUMMARY

There is need to develop the Tribal Areas in North West Pakistan. The area is rugged, generally arid and the population is mostly illiterate and lives off the land, taking benefit from whatever opportunity presents itself in the remote area. A pre-requisite to development is the availability of water and electricity and opportunity for work and for commercial activities. Initiating a large construction project that will harness and put to use water flowing down natural water courses in the Tribal Areas is an ideal solution to begin development. The creation of a large water reservoir will attract and concentrate population in the area, irrigation will bring labor to land cultivation and supply of power will stimulate commercial activity. The Kurram Tangi Multipurpose Dam Project will create opportunities that are currently not available for locals to improve their lives and it has been selected because it is expected to provide the most benefit compared to the cost of the project. An image of area is at **Annex 1**.

The Kurram Tangi Multipurpose Dam will store and manage water from Kurram and Kaitu rivers to irrigate land through three new canals in North Waziristan and Bannu District and supplement water supply to the existing Civil & Marwat canals besides making available electricity to these remote areas in Khyber Pakhtunkhawa. It will bring canal irrigation to 84,000 acres, improve irrigation in another 178,000 acres, provide 330 million units of electric power each year and create 3,500 jobs during construction over 4 years. The long standing security risk associated with the area has reduced owing to appreciation and acceptance of the project by the local population.

The project is technically feasible and will contribute to meeting energy and other vital development needs of a restive region of Pakistan and improve the security situation in the country. It will use mostly domestic resources, promote labor in agriculture and reduce dependence on imported hydrocarbon fuel. The cost is reasonable given the remoteness of the area and with support from USAID the financing can be arranged in a timely fashion. The project has very high priority with the beleaguered provincial government of Khyber Pakhtunkhwa that is beset with terrorism. Its overall effect will be highly visible as it will bring investment to a neglected corner of the region. The social and economic benefit to the deprived 3.4 million residents will be well worth the time and money spent.

WAPDA has spent about $2 Million in investigations, engineering studies and completion of a Feasibility Study in 2004. See **Annex 2**. After unavoidable delays, WAPDA has now established project offices and has local support to start implementation of its plan for the project. USAID funding assistance to reimburse costs already incurred and those planned in immediate future will enable start of activities.

A critical issue needing investigation and resolution is the matter of resettlement of displaced persons. The Feasibility Study of 2004 suggests that 13,000 people will be displaced whereas the PC I of 2010 states that "Study of Resettlement Action Plan shows that no displacement of population will take place". Since then WAPDA has also prepared a "500 Acre Resettlement Action Plan". The issue will be investigated during the Step 2 Due Diligence and the subject will also be studied by M/s Mott McDonalds who have been selected as Project Consultant.

Another issue relates to the Feasibility Study and Design completed in 2004. The project consultants, Mott McDonald, must review and update the study and design and the result should then be examined and approved by a credible Panel of Experts, before proceeding with construction of the project.

3. RECOMMENDATION

USAID disburse funds to reimburse WAPDA for costs already incurred on survey, investigation, engineering design and planning work and also pay for work in process on the project. The amount and schedule of disbursement may be determined in consultation with the implementing agency.

To ensure appropriate use of funds and provide comfort to other potential investors in the project, USAID approve Step 2 Due Diligence:

1) To undertake further investigative Due Diligence of the project and related activities.
2) To monitor and support Environmental, Social and Cost Impact Assessment of the project.
3) To monitor and verify that procurement continues to be transparent and competitive.
4) To confirm that progress is being made at site.

WAPDA has spent $2 million in investigations and studies and paid $200,000 of $1 million planned this year to acquire land for the project. The estimate for total project cost is $700 million, 80% of which is local currency costs.

Immediate commitment of funds from USAID will avoid possible delay since WAPDA has selected an international firm as Owners Engineer for the project and needs to ensure that funds are in place before making further commitments. Among the first tasks for the Consultant will be to update information, especially data on resettlement, review the Engineering Design, revise the cost estimates and update the Feasibility Study for the project. Collection and review of updated data on environmental and social impact of the project will be included and it is recommended that USAID remain involved to monitor and provide assistance that may be required.

This Step 1 Due Diligence Report and recommendation is based on perusal of the Feasibility Study completed in 2004, review of the project 'Proforma PC I' (budget approval document) prepared by WAPDA in 2010 and information provided by members of the WAPDA-USAID Task Force for the project.

4. BACKGROUND

In 1907 the British Indian Government wanted to bring development to an arid and restless region west of Bannu in the North West of the Subcontinent. Here the Kurram river flows along the foothills of the mountains to the West and begins to enter the plains at Kurram Garhi. This was identified and selected as site for construction of a weir, diversion head works and irrigation canals. A small (3MW now derated) hydropower station was also added. Construction of the project started in the 1950s and was completed in 1962. Local landowners pitched in and extended the canal system. Cultivation got a boost but regular and reliable water availability was low. The Baran Dam was constructed (in 1963) close by to store some of the seasonal excess water and improve water availability in the canals but its storage has depleted and has no s utility now.

Over the years, engineers at the Kurram Ghari Head Works saw the benefit that their project yielded in the fertile land. However, they also saw a lot of water flowing unused during summer and measurements showed that average annual flow was over 1 MAF (million acre foot) at Kurram Ghari. Better water management was required. Survey and flow measurement in upstream areas showed that more than 80% of this flow passed through a gorge in the nearby mountain. They suggested to the provincial Government that seasonal water flowing down the Kurram and Kaitu rivers was being wasted and should be stored for irrigation and an appropriate site was available to build a Dam. The Government was prompted to investigate. The Kurram Tangi Multipurpose Dam project is a result of this dedicated and sustained effort and the provincial government of the Khyber Pakhtunkhwa (KPK) selected WAPDA as the implementing agency for the project.

Initially there was strong resistance from locals against building the Dam and site visits were carried out under heavy security measures. However, slowly the situation improved due to public awareness campaigns by local politicians and WAPDA. A Pre feasibility report was prepared followed by a Feasibility Report and detailed engineering design. The Feasibility Report was based on extensive and comprehensive studies including survey, geotechnical investigations, bed rock geologic mapping, core drilling, surface soil mapping, rock testing, permeability testing, laboratory testing of soil and rock samples and model test studies.

In 2004 the Feasibility Study, detailed design and Tender Documents were ready. The ECNEC (Executive Committee of the National Economic Council) chaired by the Finance Minister, approved Rs 17.2 billion ($289 million @ Rs 59.5 = $1) in February 2005 based on a Proforma PC I and almost Rs 2.85 billion ($47.0 million @ Rs. 60.7 = $1) were earmarked from PSDP (Public Sector Development Program) in 2007[1]. For various reasons, mostly security related, not much progress was made and funds allocated in the PC I were also not released. Meanwhile, the Provincial Government requested review of project design to raise Dam height by 30 feet and increase reservoir capacity. Additional studies were carried out and design, cost and Tender Documents were revised but effort to establish a site office was unsuccessful. A Jirga (meeting of local tribal elders) was called and the project was explained. With local acceptance and approval, land acquisition activity started and has been continuing as and when and where possible given the volatile security situation in the region. New studies were completed and a revised PC-I for $700 million was developed in 2010 which is currently in the approval process.

[1] Historical exchange rates for Pakistani Rupees to the US Dollar

5. THE PROJECT

The Kurram Tangi Dam will be constructed across Kurram River about 9 Miles upstream of existing Kurram Garhi Head Works and 19 Miles North of Bannu City in North Waziristan Agency of the Federally Administered Tribal Areas (FATA) in Khyber Pakhtunkhwa (KPK) Province of Pakistan. An image of the area is at **Annex I**.

A 322 foot high, 1,035 foot long, concrete faced rock fill dam will provide storage of 1.2 MAF, provide 0.9 MAF of water for irrigation and feed hydropower plants with total installed capacity of 83.4 MW, expected to generate over 330 million units a year. It will have a Spillway on the right bank and 2 Diversion Tunnels, one of 20 foot diameter and other of 14 foot diameter, will be constructed between the Dam and the Spillway. These diversion tunnels will later be the power tunnels with capacity to pass 34,800 cusecs (cubic feet per second) of water.

Five powerhouses will be built. The first will be at the toe of the Dam with 3 machines and total capacity of 36.5 MW. The second with 2 machines and 11 MW capacity will be 1.25 miles downstream of the first one. Further downstream a 75 foot roller compacted concrete weir will divert water to power house number 3 with 2 units and 8.5 MW capacity. A fourth (18.5MW) and fifth power house (400kW) are also planned. A 132 kV line will start from the main Dam at Kurram Tangi and following the access road will connect all the power plants to the 220/132 Grid Station at Domail, near Bannu.

The Project will provide irrigation to areas in Thal (68,000 acres), Sheratala (12,300 acres) and Spaira Ragha plains (4,080 acres) of Bannu and North Waziristan Agency and supplement irrigation supplies to the command areas of existing Civil and Murwat Canal systems of the Bannu Plain (over 270,000 acres). The Civil canal and extensions, with collective length of 200 miles, were constructed a long time ago as part of the Kurram Garhi weir and by the local land owners. These canals will be renovated and remodeled. Concrete lining of the main canal, including improvement of structures, is part of the Project scope. A new Thal Canal Head Regulator will also be constructed at Kurram Garhi Headwork on its left abutment.

As a part of the project, a Diversion Weir will also be constructed on the Kaitu River to divert surplus flows in to the reservoir on Kurram Tangi to its north through a 7 mile long canal. This canal to be built will also provide 28 cusecs for irrigation of the Spaira Ragha Plains lying east of the canal. Another canal, 17 miles long, will take off from the right abutment of the weir on Kaitu and have capacity for 47 cusecs to feed the Sheratala Plains.

Owing to rugged surface geology and narrow width of the reservoir, sedimentation is expected to be low and most (68%) will deposit in the 'dead storage' space. The life of the reservoir is therefore expected to be 250 years (when capacity is reduced by 80%) and 'live' storage (useable water) capacity will reduce to about 50% in over 100 years. Investigations confirm that rockfill material for the Dam is available at site and that good and suitable bedrock to support the Dam is just 20 feet below the alluvium in the river valley.

The project cost is currently estimated at $700 Million and is expected to take 4 years to complete.

6. COST

The project is primarily to bring social benefits and calm down an otherwise restless population by initiating a large project that will bring employment and economic opportunities and contribute substantially to the local agricultural economy. Most of the cost of the project has been attributed to water related benefits when conducting Feasibility Study analysis and calculating the returns. The cost benefit justification in the PC I is based mainly on improvement in cropping patterns, their intensity and irrigation water charges. Less than 20% cost of project is for power, however it is the promise of immediate and regular financial returns from sale of power that makes the investment attractive.

The budget in Rs Millions is:

Description	Local Cost	Forex Cost	Total
Dams & Canals	23,320	-	23,320
Power Plants	1,455	7,110	8,565
Land	2,790	-	2,790
Engineering Management	1,815	375	2,190
Security & Contingency	4,500	215	4,715
IDC & Escalation	15,350	2,500	17,850
Total	49,230	10,200	59,430

Equivalent $699 Million (@ Rs85 = $1)

The schedule and purpose of funds estimated to be required up to year 2015, assuming project starts in 2011, is given below in $ Millions, and figures are rounded off – some may not add up.

	* Description	Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	Total
		$ Million					
1	Site preparation works (office, camp, etc)	0.0	2.0	0.0	0.0	0.0	2.0
2	Land acquisition and resettlement cost estimate	1.0	23.0	3.0	0.0	0.0	27.0
3	Security Arrangements**	0.0	5.0	13.0	13.0	13.0	44.0
4	Dam, Spillway, Power Houses & other Structures	0.0	12.0	47.0	35.0	24.0	118
5	Kaitu Weir and Affiliated Structures	0.0	13.0	19.0	0.0	0.0	32.0
6	Thal Canal & Affiliated Structures	0.0	10.0	34.0	24.0	0.0	68.0
7	E & M(Power Plant & Transmission Line)	0.0	6.0	29.0	29.0	25.0	89.0
8	Remodeling of Existing Canals & Weirs	0.0	4.0	6.0	6.0	6.0	22.0
9	Command Area Irrigation System Development	0.0	0.0	5.0	16.0	32.0	53.0
10	Contingency @ 3%	0.0	2.2	4.5	3.5	3.0	13.0
11	Engineering Supervision & Design (@ 3%)	1.0	2.2	4.5	3.5	3.0	14.0
12	Escalation (local 6.5%, foreign 2.5%)	0.0	0.0	10.0	15.0	25.0	50.0
13	IDC (@ 13.65%)	0.0	0.0	32.0	48.0	81.0	161
14	Office equipment, transport, expenses, etc.	0.0	1.8	0.0	0.0	0.0	1.8
15	Management & Administration (@ 2.25%)	0.0	1.7	3.0	2.5	2.0	9.0
	Total	2	83	209	195	212	700

***** - Yr 1 is 2010 to 2011
****** - includes payment to security officers & staff; arms & ammunition; detection equipment; construction of fencing/pickets; helicopter rental service; etc.

Almost 80% cost will be incurred in local currency. Foreign exchange cost is for expertise, machinery and equipment. Detail of costs incurred to date is given at **Annex 2**.

7. ENVIRONMENT & RESETTLEMENT

WAPDA has prepared a "500 acre Resettlement Plan" which is being reviewed and may be revised. Population of 3.4 million will benefit from the project of which about 13,000 people will also need to be compensated, relocated and resettled. Reservoir will cover about 11,000 acres and less than 4,000 acres will be acquired for the rest of the project.

The Feasibility Study Report of June 2004, estimated that 13,000 acres of land would be required for construction of the project (dam, reservoir, power houses, canals) of which 82% was privately owned and about 2,400 or less than 20% was state owned. Most of this land (almost 75%) was for the proposed storage reservoir. 1,700 acres of agricultural land would be lost in the reservoir. Since then the design has been optimized and height of dam has been raised by 27 feet, increasing length at crest by 104 feet, reservoir area from 9,200 acres to 11,000 acres and storage capacity by 0.3 million acre feet or more than 30%. A summary showing the land that will be required for the project is at **Annex 3**.

The construction of three new canals for the Project would require 2,300 acres, 25% of which is in the tribal territory of North Waziristan Agency and remaining 75% lies in settled district of Bannu. About 1,000 acres will be covered by construction of Project structures like main dam including its appurtenant structures, powerhouses and the weir on Kaitu River.

The 11,000 acres required for the water reservoir has a population of about 12,000 living in 32 villages with an average size of 7 per family. Their economic grouping includes landowners, tenants, herdsmen, service groups like artisans and other groups involved in business, and labor serving elsewhere within the country and abroad.

Some crops, fruit and other trees will also be lost. Where permitted by the construction schedule, farmers will be allowed to harvest standing crops or otherwise compensated.

Resettlement areas will be developed for families losing houses and farms to the water storage reservoir. Hundreds of acres of land in the Spaira Ragha Plain has been designated for resettlement housing and infrastructure to be developed as part of the project.

A major disruption will be caused by the submergence of about 6 miles of the Mirali - Thal Road. This will need to be replaced and the 'Mazar' (shrine) of Shewa Faqir will need to be relocated.

In addition, 4 miles of metalled road off-taking from Mirali-Thal road to Zarwam near Dam site, 23 miles of un-metalled road and 4 miles of tracks will be submerged and alternate routes provided.

Environmental Impact Assessment (EIA) and Resettlement Action Plan (RAP) for the project were prepared in 2004 and submitted to Environmental Protection Agency (EPA) of Khyber Pakhtunkhawa (KPK). These were evaluated and discussed and have since been approved.

WAPDA has also submitted the EIA and RAP to the World Wild Fund (WWF) for review.

8. BENEFITS

Employment

Employment during construction is expected to be in excess of 1,800 (including security staff) and 400 permanent jobs will be created on completion of the project.

Agriculture

New canals will bring irrigation water to more than 84,000 acres of land and supplement supply in existing canals that are to be renovated as a part of the project. The cropping intensity in these areas, covering a total of more than 350,000 acres, is expected to increase by 100% to 500%. Assuming $75 return from agriculture for each acre foot of water made available for irrigation (based on estimate of $100 benefit per acre foot of water from Diamer Basha in the fertile Punjab) the 0.9 MAF of water from Kurram Tangi will contribute $67 million to the economy each year.

Electricity

The power generated from the project should be sufficient to connect 275,000 village houses as customers (assuming 100 units a month each) and with around 7 persons per household, almost 2 million people will benefit from having electricity at home.

Environmental Benefits

The hydropower produced at Kurram Tangi will be equivalent to that produced by burning $30 million of imported fuel every year in a thermal power plant.

Other benefits include flood control, improved livestock, fisheries and forestation.

9. PROJECT FINANCING

The Project PC I says that GOP will fund the project. It is not clear whether financing for the project is expected from a donor, supplier's credit, international lenders or allocation from the Public Sector Development Program (PSDP). Eventually, it would probably be some from all the above.

USAID can contribute to work with WAPDA as an 'equity partner' in the project, analyzing and supporting their effort to raise financing for the project. The partnership will play a major role in the overall determination of financing sources and uses, analyzing financial credentials and generating least cost financing plans.

The project financing for Kurram Tangi would probably have to be guaranteed by the provincial government of Khyber Pukhtunkhwa backed by a sovereign guarantee of the GOP. In targeting the

total financing sources and uses for the project, it will be very important to tie down how much the Public Sector Development Program (PSDP) can provide in a phased construction plan.

The matter of gaining Carbon credits is also being considered as the size of the global market is around $60 billion.

10. STATUS

Despite completion of project studies and design, progress has been slow. This is due to security related issues that created an uncertainty and resulted in lack of funding. A PC I for acquiring land was approved but no funds were made available to the project. So far only 385 acres of land has been acquired out of 1,716 acres required for the Thal Canal. 175 acres was state land whereas 210 acres was bought from owners for Rs 17 million. Cost of land has varied from Rs 50,000 to Rs 350,000 and acres and at these rates additional Rs 120 million ($1.4 million) may be required to secure land for just the Thal Canal. Total land requirement is around 15,000 acres, 11,000 for the reservoir and 4,000 for the canals and structures. The land for the Thal canal is mostly privately owned and expensive, hence the effort to secure it early.

An achievement has been acceptance of the project by locals. Whereas earlier, project staff had to travel under elaborate security arrangements, recent survey crews demarcating the revised higher limits for the reservoir were assisted by locals in setting up markers on mountain slopes.

The Feasibility Report prepared by the joint venture of Pakistan Engineering Services (PES) and Coyne ET Bellier of France was completed in 2004. Detailed Engineering Design and Tender Documents were completed in March 2005. Project was reviewed to increase water storage by raising height of Dam and PC I was ready in 2010. In anticipation of receiving funds from the Federal Government, WAPDA has selected a joint venture of firms, led by Mott McDonalds, as Project Consultant. They will review the previous design, provide the final project design, assist WAPDA in procurement of an EPC Contractor and will supervise construction of the project.

WAPDA is also considering appointing 'General Consultants' to review all their projects-in-process and may even appoint a Panel of Experts (POE) to review and advise specifically on the Kurram Tangi Dam project.

Recognizing the long lead time required to follow International Competitive Bidding procedures and to reduce delays after receipt of funds, WAPDA had asked for EOIs to prequalify construction contractors. 5 EOIs were received on 28 February 2011 and after due process, following 3 have been short listed to receive the Tender Documents:
M/s. DESCON (Pakistan)
M/s. SAMBU – SARCO JV (Korea)
M/s. FWO – LIMAK JV (Turkey)

These 3 selected firms will be asked to bid on the construction contract. The Bid Documents will be issued after the Project Consultants, to be hired, have cleared them.

WAPDA has also established and staffed a Project Office in Bannu and the land acquisition process has progressed. 385 acres have been acquired and Rs. 17 million has been paid as

compensation. Rs. 70 million is required to purchase additional land planned for this year. Construction of the Project is expected to start during next Financial Year 2011-12 (beginning July 2011) and will take 4 years to complete.

11. IMMEDIATE PLAN

On availability of funds, work on the following activities will be initiated in the order they are listed:

Activity	Schedule	Time Lapsed
1) Appointment of Project Consultants	ASAP	-
2) Finalization of Tender Documents	6 weeks after 1 above	6 weeks
3) Invitation to Bid for Construction	On completion of 2 above	6 weeks
4) Receipt of Bids	3 months after 3 above	19 weeks
5) Negotiate/Award Construction Contract	within 2 months of 4 above	27 weeks
6) Construction of Project	4 Years	

12. RISKS & ISSUES

Security:

WAPDA is planning project and personnel security along the lines tried and tested at Gomal Zam. Air transport will need to be available and dependable. The Provincial Government is very keen and local population is also happy about the project, however, it takes a few to disrupt project activities.

Per established local tradition, tribal elders will have to be paid to provide and ensure security in support of normal project site security arrangements. WAPDA has a security plan proposing over 1,500 trained personnel, armed and moving in more than 130 4xwheel drive vehicles. The budget estimate is in excess of $40 million.

Political:

The area has a history of resistance to change and large settlements exist in the reservoir area. Indications at the moment are that local population is eagerly looking forward to start of activity at Kurram Tangi and opportunity to get ‘a piece of the action’. However those that do not succeed in participating in local small contracting and or supply contracts could create problems. Experts in community mobilization and public awareness will need to support the project. This activity will work to sustain support among the local population and an appropriate budget item should be set aside for it.

Resettlement

A critical issue needing investigation and resolution is the matter of resettlement of displaced persons. The Feasibility Study of 2004 suggests that 13,000 people will be displaced whereas the PC I states that “Study of Resettlement Action Plan shows that no displacement of

population will take place". A 'Google Earth' view of the reservoir area shows cultivated land and continuous and considerable village houses all along and on both sides of the Kurram River, upstream of the Dam site, for about 20 km leading to the townships of Thal (picture attached). There is obvious conflict in information regarding an issue that can "make or break" a project.

Technical:

The Feasibility Study and detailed design was completed in June 2004 and a review was conducted to raise the Dam by 30 feet. New consultants are to be appointed. They will review and approve the design before going for construction. The start of construction is at least a year away and so there is sufficient time for the consultants to complete this review and not delay the proposed schedule.

Given WAPDA's vast experience with construction and completion of similar projects and more recently, in similar terrain and environment at Gomal Zam Dam, WAPDA is well qualified as client and owner's representative to manage and ensure credible technical due diligence and compliance. However, an in-depth review of existing design is essential to minimize possible technical risk of the project.

This review is the more essential since there could have been some change in hydrology and geology after the large earthquake of 2008 and extra ordinary flood in 2010. Investigations may result in requirement to revise existing design and change the project cost. In such an eventuality, the change in design and cost could possibly delay the project by a year.

Cost:

The PC I of 2004 estimated cost of the project at $300 million, excluding IDC (Interest During Construction). Owing to raising the height of Dam, inflation and addition of security related costs, the estimate in the revised Proforma PC I of June 2010 is $700 million. WAPDA claims that this revised cost estimate is based on realities and lessons learnt during construction of a similar project at Gomal Zam. The cost estimates should be examined for accuracy.

For example, the cost of acquiring land and building resettlement facilities is expected to be higher than estimated in the PC I and will increase. Some other costs may be overestimated?

USAID review of this Report will determine Step 2 Due Diligence for the Project


Annex 1
Step 1 Due Diligence
Kurram Tangi (KT) Dam
Thal
Kaitu weir
Spira plain
Federally Administered Tribal Areas
KT Dam
Sheratala plain
KG Headworks
© 2011 Europa Technologies
US Dept of State Geographer
© 2011 Google
Image © 2011 GeoEye
©2010 Google
Imagery Date: 3/13/2011
33°11'27.83" N 70°31'13.26" E elev 1910 ft
Eye alt 28.14 mi

Annex 2
Step 1 Due Diligence

KURRAM TANGI DAM PROJECT

Cost of Studies & Design (2002-2007)

Activity	Work Done	PC-II	Cost ($ million)	
Feasibility Study (2002-2007) JV of firm led by PES (Pakistan Engineering Services) with: - IN Consult - Progressive Consultants - MM Pakistan - Khyber Consulting Engineers **In Association with:** Coyne et Bellier (France)	- Topographic survey - Drilling of 26 boreholes to total depth of 3760 ft - 150 ft exploratory adit - 3 km Seismic Refraction Survey - Model studies - Sedimentation Studies - Geological survey and mapping - hydro geological and metrological data	The Study was carried out under approved PC-IIs: - Feasibility Study in 2005 - Detailed Design in 2006, and - Study for raised dam height in 2007	Administration Consultancy Investigations Machinery & equipment Total:	0.29 0.98 0.65 0.02 1.94

Cost of Land Procured

Activity	Status	PC-I	Cost ($ million)
Acquisition of Land & Resettlement	14,630 acres of land to be acquired (12,124 private & 2,506 state owned) 385 acres acquired to date for Thal Canal in Bannu District	ECNEC approved PC-I for Rs. 17.205 Billion in 2005 ($289 million @ Rs 59.5 = $1)	**0.20**

Annex 3
Step 1 Due Diligence

Kurram Tangi Multipurpose Dam Project

LAND REQUIRED FOR PROJECT

Project Component	Area (Acres)		
	Private Owned	**State Owned**	**Total**
Storage Reservoir	9,424	1,576	11,000
New Canals			
• Thal Canal 1,716 acres	2,300	-	2,300
• Sheratalla 397 acres			
• Spaira Ragha Canal 147 acres			
Main Dam Including Appurtenant Structures & Powerhouse	-	600	600
Weir on Kaitu River	-	400	400
Resettlement Area	500	-	500
Total	**12,224**	**2,576**	**14,800**

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