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# USAID ENERGY POLICY PROGRAM



## SITE VISIT REPORT STATUS OF 4 RUN OF RIVER HYDROPOWER PROJECTS

**October 2013**

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## SITE VISIT REPORT

### STATUS OF 4 RUN OF RIVER HYDROPOWER PROJECTS

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## Status of 4 Run of River Hydropower Projects – October 2013

In keeping with directions from USAID, EPP visited 4 ‘run of river’ hydropower projects to verify their status. This is a brief report on the visit undertaken from 8 to 12 October 2013.

All the 4 Run of River power projects were under construction in 2010 and all of them suffered substantial damage during the floods that year. Human life was lost at Duber where about 40 locals and 2 Chinese nationals were taken by the flash flood that swept the power house site.

The 3 in the Northern Areas were also hit by an Earthquake and suffered from Sectarian Riots. Each event caused physical damage to structures and the project suffered long ‘shutdown’ owing to disruption of work as either the access route was blocked or labor had to leave and tend to their home and families or the expatriate staff had to be evacuated and then remobilized. Each disruption delayed construction schedule, cost money and was a major setback for the project.

The substantially experienced European consultant for the 3 Northern Projects remarked that: “I have never seen anything like this before on any project. These projects have survived unusual natural and political disasters - everything that could possibly go wrong went wrong – there was an unprecedented devastating earthquake in 2005, unprecedented bloody riots in 2007 and a flood in 2010 that probably has come down the mountains only once before in the past 1,000 years! It is a tribute to WAPDA and the Contractor that we have finally completed them.”

3 plants are now operational and 1 is yet to be commissioned. A list of works to be done at each site is attached.

### 130MW Duber Khwar

**Weir:** The weir is located about 12 km upstream in the Duber Valley. The road to the site is in deplorable condition. Basic structures are complete but works remain. Control room is still to be constructed. Work on Spillway Gates is not complete. Site clearing and some finishing works are to be done. Several micro hydropower generation machines, most reconstructed and improved by various NGOs after the 2010 flood, are located downstream of the weir and 1 cumsec water has to be released to keep them operational besides local use of water from the stream.

**Power House:** The power house is located near the township of Pattan. Pressure test has been done and ‘dry’ tests on equipment have been conducted but actual operational tests on all equipment and both machines are pending connection of Transmission Line. Clearing and finishing works at station sites are still to be completed. A large Contractors Camp is located on the KKH between the sites of the Weir and the Power House and it is proposed to be paid for and taken over by WAPDA after completion of the project.

### 72MW Khan Khwar

- Weir:** The project was commissioned in 2010 and has generated over 550 Gwh. An issue is that with construction of the weir the otherwise 'invisible' debris and garbage flowing down the stream accumulates at the weir and is released downstream as before the weir was built. The garbage scatters over the roughly 6 km of stream bed or flows to the Indus.
- During our visit we were told that the spillway gates were stuck shut and unable to open. There was also a visible oil leak in the operating hydraulic distribution node of the servomotors. WAPDA was awaiting rectification by Contractor as all equipment was still under warranty of the 3 year Defect Liability Period.
- As a social service to local population, a water supply pipeline is under construction to take water from an upstream tributary to the township of Besham where the power station is sited.
- Power House:** The station has 2 Francis Turbines connected to 34MW generators and a 4MW Pelton Wheel auxiliary generator. It is operational since 2010 and the operators seemed satisfied with the plant.

### 121MW Alai Khwar

- Weir:** The weir is located downstream the scenic Alai valley which has considerable population and therefore substantial garbage accumulating in the lake. There is still considerable activity at site although the project has started commercial operations. An 'access tunnel' to the weir has to be completed and major demobilization works are pending, especially of the batching plant just upstream of the weir. Downstream the embankments are being strengthened involving major concrete works and dumping of 'rip rap'.
- Power House:** The power station along the left bank of the Indus is operational and seemed to be better constructed and maintained probably because it is the largest of the 3 and has the central Grid Station serving all 3 power stations. The Grid has 2 x 220kV lines going South and 2 x 132kV lines leading to the Khan and Duber hydropower plants up North.

### 96MW Jinnah

The hydropower facility is located on right bank of Indus at Jinnah Barrage and houses 8 Kaplan Turbines, each connected through a gear assembly to 8 generators of 12MW each. 5 of the machines were inundated during floods of 2010 and have since been replaced by the Contractor. All 8 units are now operational. The power transformers at the Switchyard convert power generated at 11kV to 137.5kV, as against rated voltage of 132kV, and are connected to the National Grid. WAPDA has evaluated and determined that feeding this relatively small amount of power at the higher than normal voltage stabilizes their system.

A problem faced by operators is the debris flowing down the Indus that partially clogs the intakes and reduced energy output of the turbines.

*Attached: List of 'work to be completed'*

## Works to be completed in 4 RoR Hydropower Projects

- Duber hydro power project
  - Road repair
  - Intake Structure Civil work
  - Stilling Basin
  - Back Filling of Weir area
  - Transmission interconnection with Grid Station at Allai Khwar
  - Wet Test of Units
  - Trial Commercial Operation of Units
  - Defect Liability Repairs of Civil Work
  - Defect Liabilities Repair of E & M equipment
  
- Khan Khwar Hydro Power Project
  - Flaps Gate Seal replacement
  - Bottom Outlet Gates
  - Servomotors oil leakage
  - Back Filling and Leveled Weir Site
  - Defect liabilities repairs of Civil Work.
  
- Allai Khwar Hydro Power Project
  - Access Tunnel Not complete
  - Stilling Basin
  - Repair of Bottom outlet gates
  - Back filling
  - Defect Liability Period Repairs of Civil Work
  - Defect Liabilities Repairs of E & M works
  
- Jinnah Hydro Power Project
  - Various minor finishing works at plant and others not covered under the EPC Contract, like providing accommodation for plant operating staff and enhancing site security measures.

**Note:** WAPDA reports on these projects say that all environmental issues have been adequately addressed, however, USAID may consider helping WAPDA find a solution to removal of accumulated debris – an unexpected benefit afforded by the 4 projects as all such debris was earlier flowing down the streams/river but is now ‘collectable and removable’.