

The Neelum-Jhelum HPP rip-off

In spite of the tragic (but logical) decision of 18 Feb 2013 by the Court of Arbitration in favor of India the nation is being kept in the dark by the Pakistan Commissioner of Indus Waters (PCIW) and the WAPDA hierarchy. There is an obvious pressure of the illegally appointed czar of Pakistan's hydrologic affairs one Mr. Kamal Majeedullah who has controlled for some years all water issues including IRSA matters, under protection of the previous regime and dictates of the ANP. This gentleman is reportedly a journalist or a lawyer but surely is not qualified to deliberate on hydrology. This project is clearly the biggest financial & technical scam in sixty six years of the chequered history of Pakistan. Once the magnitude of the scam is understood it will become a commentary on the history of our state. It infact involves gross negligence by a series of governments and members of the engineering & hydrologic community. The Indus Waters Treaty of 19 Sep 1960 (IWT 1960) is a seriously flawed agreement. Against all norms of civilizations, the demands of ecology and human rights the leadership of Pakistan gifted three perennial Punjab rivers (the Eastern Rivers) for the sake of ensuring uninterrupted flow of the so-called three "Western Rivers" that first flow via Indian Held Kashmir (the Upper Riparian). However there is no exit strategy and Pakistan consistently fails to counter the Indian moves.

The central villain is the fifth Pakistan Commissioner of Indus Waters (PCIW), Jamaat Ali Shah. The entire episode falls within his tenure (1991-2011). The PCIW had failed to respond within the stipulated period to his counterpart / ICIW's communication. The first official information on the Kishenganga HPP project was received from India in June 1994 inline with IWT 1960 Annex D, Appendix-II, para 9. Pakistan reacted in 2005 after both sides failed to resolve the matter, since the June 1994 Indian proposal was to construct a storage dam and then divert. Something not allowed under the IWT 1960. However Pakistan did not send a clear memorandum within the mandatory three months on receiving India's letter of June 1994. This letter had to conform to IWT 1960 Annexure D, para 10 which requires that the project should be in compliance with Annexure D, para 8. India changed the design in April 2006 to a Run-of-River project. **Due to the PCIW's incompetence Pakistan has received a decision from the Court of Arbitration on 18 Feb 2013 permitting India to divert Kishenganga / Neelum River for power generation.** Pakistan was asked to provide hydrological data so that a supplementary award can be given on the minimum flow necessary to maintain the ecology of the Neelum valley. Pakistan could lose the bulk of the flow between October to June if the CoA is not sympathetic. The impact on Neelum Jhelum HPP power generation / energy output will be serious. The flow in Neelum will be about 27% less p.a. & especially severe in the low flow season.

The project was of academic and superficial interest to WAPDA as PCIW has to formally request WAPDA intervention. With the arrival of Mr. Shakeel Durrani as its Chairman in Sep 2007 he immediately owned the project. He saw this as an opportunity. Below is the sequence:

- A. **False pretext of a race under the IWT-1960.** Neelum Jhelum HPP 969MW tunnel project with a head of 420m and a maximum discharge of 280m³/s was signed in 2008 at about USD 1.4bn with the CMEC/CGGC JV. The full PC-I value being USD 2bn including Admin & Financial costs. Drill & Blast (D&B) was the agreed methodology of tunneling. Completion 08 years away. WAPDA continued to use the false pretext to scare the nation & escalate costs. Contrary to PCIW & WAPDA announcements there was no race between Indian & Pakistani projects on the Jhelum & its tributaries. WAPDA interpretation that whoever builds first will have perpetual rights over the Neelum waters is perfect blasphemy. The flow of the western rivers under the IWT 1960 are perpetually a PAK endowment; for the "uninterrupted use" of Pakistan. However the Pak side must announce its hydro project with data. Let's understand the spirit of the IWT 1960:

The Indus Waters Treaty 1960 is sacrosanct. Indian agents have to stop playing with Article III. The consortium of traitors disregards the violation of Annexure C Para (9), Annexure D Para 15 (iii) & Annexure E Para (10). Let us simply analyze the Annexure D Para 15(iii) concerning the provision in IWT 1960 for Hydro-Electric power (generation) by India on the Western Rivers. Quote: *“Where a Plant is located on a Tributary of The Jhelum on which Pakistan has any Agricultural Use or hydro-electric use, the water released below the Plant may be delivered, if necessary, into another Tributary but only to the extent that **the then** existing Agricultural Use or hydro-electric use by Pakistan on the former Tributary would not be adversely affected”*. The phrase “the then” cannot possibly mean the Pak infrastructure in September 1960 on these Western Rivers. Mangla & Tarbela Dams were built after September 1960 and were not to be the last reservoirs on these Western Rivers. The intent had to be clearly shown by the PCIW.

- B. Now the most expensive “Run of the River” hydropower project in the world.** Tunnel Boring Machines (TBMs) suddenly became the obsession of the WAPDA Chairman and his Member Water. Starting from Norconsult who were the first to study this project, 25 years ago, to the present project implementation Consultants no recommendation has been made in favor of using TBMs. In 1988 it was a project of Rs 15bn with the power tunnels terminating at the upper Jhelum limb. The revised Feasibility by Norconsult / Norplan in 1996 (project Option-2) had the design option to go below the Jhelum upper limb & reach the Jhelum lower limb. This increased the tunnel lengths more than two times & the financial cost fourfold. Unacceptable for just a 400MW enhancement. Every opportunity has been taken to escalate the contract value. WAPDA management in 2010 decided to induct TBMs. They used these TBMs as bait for the PRC contractor. A quid pro deal in Aug 2010 where he would supply the two TBMs on the plea of an earlier completion. Approval was taken from an in-house WAPDA Consultant almost two years after signing of the main contract. The 8.5m diameter TBMs were according to the in-house WAPDA Consultant going to increase the costs by only Rs16bn. This was a calculated bluff. WAPDA claimed two years will be saved but concealed the fact that TBM delivery period was also about two years. **The 2011 revised PC-I now Rs 333 bn (USD 3.3 bn)**. To reduce the impact on a nation paying a NJ HPP surcharge WAPDA announces small periodic escalations.

The contractor will now not only be forgiven the accumulated delays; but also could justify future delays. How efficiently will these TBMs work in Neelum Jhelum soft rock, siltstone, mild-stone & sandstone? Every Consultant had apprehensions about the squeezing factor of the soil conditions. The convergence factor becomes higher when minor seismic events are a regular event. TBMs will be clearly facing the prospect of being trapped upto 2.5km below the surface. Some more questions arise. What is the real contract escalation after these two TBMs are inducted and the contract basis changed? These expensive moles will only be deployed for +11km (8.5m dia) of the C-2 section (Headrace twin Tunnel). Project tunneling +48km. There can be minimum coordination with ongoing “D&B” work for the balance works of Neelum Jhelum tunnel project. If the TBM has ideal conditions it can deliver even 20m/day in good rock conditions but Neelum Jhelum soil will permit about 10m/day. How can a TBM be shifted to future projects when each TBM has a fixed width of its electro hydraulic boring wheel? Every TBM is designed for specific soil conditions & cannot be “a strategic asset”.

- C. This +USD 5bn project is not going to be completed before 2025.** Total cost will exceed USD 5bn without calculating interest during & after construction. If the original Option-1 design had been followed the project could have been completed in less than USD 1.1bn by terminating the Neelum Jhelum tunnel at the Jhelum upper stem (before it meets the Neelum). The Option-1 design head being 220m with power house capable of 550MW (reliable due to minimum hydraulic losses). **The main project technical issues are therefore as below:**

1. The revised design (Option-2) by Norconsult/Norplan involved a virtual tripling of the tunnel route length & the unprecedented feature of tunneling below the main Jhelum River. This effort to get an additional 400MW is clearly a very clever intrigue by the friends of India to make the project extra-ordinary expensive and technically difficult. It also ensured that Pakistan can never win the “imaginary race” with their Kishenganga Project. Why did Pakistan allow Consultants working on IHK projects to work in sensitive AJK & NA? The nation does not understand the reach of the Indian ICID network? **The clear strategic fault line in the GoP / PCIW / WAPDA’s hydrologic administration.**
2. The Neelum Jhelum tunnels will be the deepest hydraulic tunnels in the world. The tunnel will be very expensively steel lined in the section below the upper Jhelum stem. Due to hydraulic losses the 969MW rating will not be achieved (closer to 750MW) even after spending +USD 5bn, the minimum estimated cost of the Neelum Jhelum HPP. Today the cost of tunneling (8m to 9m dia) is already over USD 100mn/km. Clearly observed from the Gotthard Base Railway Tunnel expected to complete in 2016.
3. Geology of sedimentary rock formation (layers of sandstone/mildstone/siltstone) is not suitable for TBM operations. High convergency due to shale & clay formations is described in WAPDA files as the “squeezing strata”. It is a basic & major factor for not using TBMs on specific projects. Infact not a single Neelum Jhelum recognized Consultant has proposed use of TBMs in 25 years. The soil squeezing factor will be a constant danger of their getting stuck. With Drill & Blast method (D&B) as originally contracted one does not encounter rock bursting. Therefore it is superior to shotcreting of the tunnels after TBM has drilled. With D&B we loosen the rock & have an allowance for the squeezing factor. The overburden of over 2km above the proposed tunnel is unprecedented. The tunnels are either in an overburden stress zone or in a high pressure hydrofracturing situation. There will be several holdups. This is already clear from the very slow progress by the two TBMs used on the twin tunnel part of the C-2 tunnel section. The standard Drill & Blast (basis of the original contract) is faster upto May 2013. The TBMs cannot operate safely in inclined shafts due to de-watering / mucking issues. The conventional D&B method is to be used for the twin tunnels of the C-2 section when the attempt will be made to go below the main Jhelum River (upper stem). Who has benefited from the USD 250 mn investment on these two TBMs?
4. It is a dangerous, unprecedented & expensive exercise to tunnel below a main river and can result in “hydrofracturing”. Therefore expensive steel lining will be used. WAPDA has decided it already for a 800m section but evaluation tests have not been extensive.
5. There has been no detailed design study of the project (with or without TBM deployment) after the 08 October 2005 massive geological changes. No Pakistani technicians & engineers are being trained at site. Where is the PEC?

Conclusion:

- I. The financial rip-off is analyzed in The News of 11 March 2012. (Dr. Farrukh Saleem).
- II. **Final contract value will be + USD 5 bn. The original USD 1.4 bn was a bluff. Can anyone afford to spend USD 4 bn for an additional 400MW? Perhaps 200MW will be achieved due to the enormous hydraulic losses. A financial & technical scam.**
- III. A genuine race should have convinced the bureaucracy to terminate the tunnel at the upper Jhelum limb & not use the revised Option-2 design with the longer tunnels located below the Jhelum upper stem. Pakistan has lost the case as expected and India will now divert Neelum waters. The project under Option-2 must be suspended before several billion USD are lost. The alternate is to execute in two stages as per Option-1 concept of Dec 1987. The tunnels must be surfaced (day lighted) at the Upper Jhelum River. A power house of 550MW be established as per original feasibility within three years in about USD 1.1bn without any dangerous & costly adventures. The Neelum waters will

- be adequately utilized for 550MW Power & transferred to the Jhelum. Later a second stage power house from Jhelum to Jhelum could be built for power. The second stage is infact a realigned Kohala HPP which would use Jhelum waters from a higher limb to a lower limb. The infrastructure available from the present work of NJ HPP can be utilized for the second stage. The first stage 550MW can also attempt to circumvent the Muzaffarabad fault line. The Dec 1987 feasibility determined the first & second stages Run-of-River HPPs can together generate +1500MW without dangerous experiments.
- IV. Faith of the Chinese people in our nation will be restored. They have already suspected foul play & suspended financing. At the JEWG meeting in Islamabad on 08 May 12 they mentioned that an appraisal has been ordered by their Exim Bank's Board. The smaller Kishenganga HPP in IHK will be clearly built before the NJ-HPP. The nation must "take to task" those elements of Pak bureaucracy who created this false impression of a race for priority rights on these Western Rivers. This consortium of traitors has actually encouraged the Indians, personally profited from the mis-interpretation of the IWT 1960. Pakistan will have to protect its sovereign rights or prepare for the worst.
- V. The scenario emerging is that it will be the most expensive HPP in history. The cost would be +USD 5bn for less than 969MW rating. The "imaginary race" with India had already been lost before the 18 Feb 2013 decision of the Court of Arbitration. The Neelum Jhelum HPP could be commissioned in a total of three (3) years, if the attempt to go below the Jhelum upper limb is abandoned and the power house built at the upper Jhelum limb as per original feasibility. The power generation would reduce to 550MW at 220m head. The total cost would however **reduce to about 20%**. The shorter tunnel system terminating at the upper limb of the Jhelum may be contracted out to CMEC/CGGC JV on EPC (fixed price basis) with GoP accepting the geological risk.
- VI. Several potential millionaires in the bureaucracy will be disappointed. Many political war chests depended on this project. On 08 May 2012 WAPDA declared at the PAK China Energy Forum at Islamabad (while pleading for additional financing) that the project status is 22% complete. This was a monumental bluff. Today they claim +50% completion which is another shameful bluff. WAPDA is using every channel to project that they will complete the project by 2016. Present WAPDA Chairman is desperate to award a USD 250mn Transmission Line Contract (from NJ HPP to Gujranwala) on this plea. An offer lower by USD 75mn is being ignored because it involves an Iranian contractor. Infact Transmission Lines can be built in Pakistan by local manufacturers & contractors. Why accept a Supplier Credit when this can be built in PAK Rs at half cost around the time the HPP will be ready. Let us stop the dacoity and let the nation win.
- VII. WAPDA could be made solvent. Its balance sheet severely weakened by poor leadership. It is now unable to finance even small Run-of-River hydel projects. Its dam building capability is now at the mercy of multilateral institutions. It is trapped in the regional "politics of water". The IHK waters are being diverted. Some regional politicians in KPK & Sindh oppose large dams. The nation has to bring WAPDA out of this impasse. Neelum Jhelum HPP based on a longer tunnel option involves extreme corruption which will jack final costs to +USD 5bn. It should have been abandoned even before the Partial Award of 18 Feb 2013 by the Arbitrator/CoA in India's favor. Alternately the attempt to create the world's deepest hydraulic tunnels in the world by going below the Jhelum upper stem be forthwith stopped. The tunnels be day lighted at the Jhelum upper stem & a 550MW powerhouse built. **Let WAPDA save USD 4bn.**

WRDC /12 July 2013