

Updated Synopsis on Diامر Basha Dam

WRDC presented on 10 April 20 its article with the title “Have a heart Chairman Sahib we love Pakistan”. It was placed as IWA-22 in the Indian Water Aggression (IWA) series of articles available on our website www.wrdc.com.pk. Developments compel us to write this synopsis to help readers navigate the sequence of events from June 2004. To gain an insight of the train of manipulations on major WAPDA projects in the last decade we refer our article IWA-21 of 02 March 20. This document highlights the critical role of WAPDA as our Economic HQ. Under a new culture the WAPDA Act is being ignored and the incumbent Chairman prefers to fill most senior positions on a temporary basis. For the first time since its creation the WAPDA Authority has consistently promoted temporary Members of Water & Power, which has further eroded its dismal in-house design capability. Pakistan has no recognized large dam design expert. It is ominous that Mr. Mehr Ali Shah a Jt. Secretary of the Ministry of Water Resources could manoeuvre a Draft Recruitment Resolution by the **CCI on 23.12.19** for the post of Chairman and Members of WAPDA. It entails more; covers Organizational restructuring to “ensure corporate governance in WAPDA.” The most alarming statement “Chairman and Members with no executive powers shall be appointed to oversee policy formulation.” All relevant professional staff shall be appointed by the Federal Government. A final clause: Chairman of the Authority shall be appointed through rotation from all provinces. Mehr Ali Shah is also Acting Commissioner PIWC. Proving more lethal than the 5th Commissioner Jamaat Ali Shah. Openly dictating policy to WAPDA. Pushing the Tarbela 5th Extension HPP inspite of the repeated rejection by WAPDA Hydroelectric Planning Dept. The most recent rejection was around July 2020. Mehr Ali Shah had earlier advised WAPDA to ignore the Akhori Off-channel project (in hibernation since 2006.)

Specifically on DBD we have endeavored to place before the nation the facts of the Diامر Basha Design switch as done in 2004 during Feasibility Studies by the NEAC JV. NESPAK was the lead in the NEAC JV. NESPAK was never an internationally recognized dam expert. The “Indus Forum” master-mind Sen. Nisar Memon had been in active collusion with WAPDA GM Dr. Izhar ul Haq & GM Raghob Abbas Shah. His interventions on behalf of NEAC JV remain obvious. **He froze for 10 years all attempts to debate the Feasibility switch from a Non-Rigid rock fill dam proposed in 1984 by MONENCO Consultants to a Rigid RCC dam in 2004.** The first protest had come from Gen. Dr. Butt a Geotech PhD with over three decades of exposure to the Karakorums; an active participant in the survey and construction of the incredible KKH. The river bed already at +3182 ft ASL and upper stretch of reservoir to be located over a fault-line. MONENCO never conceived DBD as a “flood control” structure and its primary role foreseen was “sediment control”. Some 200 mn tons of sand, silt & sediment enters the Indus Main as it grows into a large river inside GB & KP. The great quantum of sediment would make the large Indus Cascade projects most vulnerable. For example the run-of-river HPPs Dasu, Pattan & Thakot will have nearly 11,200 MW cumulatively. Therefore there is no logic to turn DBD into the world’s tallest RCC dam for the sake of an additional 1,100 MW & storage increase about 1 MAF (live.). The objective should be a safe design that allows rapid construction at low cost. Flood Control should be done at the point of maximum flow. KBD conjunctive use with Mohmand dam on Swat River & the Akhori off-channel storage has been foreseen as an adequate bulwark for future floods which threaten the plains of Pakistan in this cycle of global warming & glacier melt. Expert comments on the planet’s tallest RCC dam:

AA) Lt. Gen. (R) Dr. Ghulam Safdar Butt: On learning that NESPAK & Senator Nisar Memon (Minister of Information) have announced that DBD will have a bigger reservoir (& power house) as a result of the Feasibility Studies he immediately enquired and learnt that NEAC JV Feasibility Report (2004) switched to a Roller Compacted Concrete (RCC) dam 272m above bed rock; the tallest RCC Rigid dam on the planet. It ignored the reality of an active seismic area & the reservoir location on a major fault-line. It meant rejection of the concept of a Non-Rigid Rock Fill dam (as per Pre-Feasibility of 1984.) He wrote to Gen. Musharraf. As outlined in our paper IWA-22 he was invited to visit WAPDA house on 30 June 2004. NESPAK & its associates made a presentation to Dr. Butt & his three assistants present. He expressed his disgust with NESPAK actions & callous acts of the Panel of Experts (POEs) who approved the Feasibility. He was

so disappointed by the presentation that he interrupted it and wrote a hard hitting five pager to Chairman Tariq Hameed on the same day (30 June 2004.) Dr. Butt was 100% accurate with both concerns. On 08 Oct 2005 the major earthquake in AJK/GB/NA happened. Gen. Dr. Butt passed away on 01 May 2006. The seismic disaster of 13 May 2008 in Sichuan, China caused by the reservoir location on a fault line should have convinced all concerned to revert to a safe CFRD design. Reservoir induced earthquakes are a reality. A sentence from the covering note in Gen. Dr. Butt's first letter to Gen Pervez Musharraf.

"I shudder at the thought of earthquake effects on Basha. Dam-burst would wipe out Tarbela and all barrages on Indus; which would put us back to stone-age".

Between June & Nov 2004 he wrote three memos to President Musharraf & one to the WAPDA Chairman protesting the design change. Safety of a high RCC structure his greatest concern. A Geotech expert he had a command of Geophysics, Geology & Glaciology and was convinced this is a conspiracy to entangle Pakistan in a huge financial quagmire. It had hidden costs. Logistics of construction material for +16 mn cub. m of RCC plus conventional concrete would involve massive quantities of cement, steel, sand & other inputs over the existing KKH. It would have disastrous consequences & costs. He called it a conspiracy to deny the nation the benefits of the KBD project by making DBD project a financial black-hole. DBD as RCC would make our economy & our defense vulnerable. These priceless four letters form Chapter-15 of Pakistan Business Council (PBC) Water Panel Report (Nov 2015 at PEF III) by the Panel Chair. PBC Water Panel had included Dr. (Hon) Shams ul Mulk, Engr. Sardar Mohammad Tariq and several others.

BB) Comments of Dr. (Hon) Shams ul Mulk in 2005 Report of Technical Committee on Water Resources:

Sen. Nisar Memon constituted this Technical Committee on Water Resources in 2003 with the purpose to discredit Kalabagh Dam (KBD) project. The seven members of the committee rebelled against their Chairman Mr. A.N.G. Abbasi and issued their report in May 2005 without comments of Chairman Abbasi. They declared KBD an essential project for flood control and low cost electrical energy in close proximity of the load centers. The Chairman Mr. Abbasi was compelled to agree with his committee members in August 2005. The engineering world knew that World Bank studies had declared KBD project ISO-14000 compliant in 1987. No adverse environmental effects were found. By 2004 Gen. Dr. Butt also wanted WAPDA to build both KBD & DBD in tandem. The summary is available at pages 70 & 71 of the PBC Water Panel Report placed in our website. Following are the May 2005 comments by Dr.(Hon) Shams ul Mulk:

"Basha RCC option is with a height of 908 ft in active seismic region. A dam of 600 to 650 ft on the other hand would create substantial multi benefits without creating discomforts about its sustained safety. Pakistan needs a facility and Not a Monster. No RCC dam of even lesser or comparable height has so far been built in the world under such unfavorable conditions." In para g) of the report the Technical Committee 2005 demands "intensive & extensive investigations over a substantial period to make it safe & bankable project to acceptable & recognized international standards. The need is for a greater degree of caution before launching the project."

CC) Dr. Barry Cooke: NESPAK states Dr. Barry Cooke (a CFRD pioneer) supported the switch to RCC design. We quote para 4) from our memo to NESPAK:

"Barry Cooke (1915-2005) was a great believer in CFRD. His life sketch tells us that he was too frail to work in the last year of his life. He passed away on 21 April 2005. His motto was "CFRD dams are inherently safe". Therefore it is not believable that an 89 years old man on his death bed advised NESPAK to switch from CFRD to RCC. He is being unfairly quoted. There can be no record of his visiting Pakistan to assist NESPAK for DBD Feasibility Studies. This reference to late Barry Cooke does not seem logical. Someone managing his consultancy misused his name".

DD) Lecture by Dr. Weiland of Poyry Consultants, Switzerland: Dr. Martin Weiland, PoE for NJHPP in his lecture delivered at WAPDA Auditorium on “Construction of Dams in Active Seismic Zone” declared that Embankment Dam (Earth and Rockfill) is the best choice in seismic Active Zone which is valid for all promising dam sites in Pakistan. His detailed comments on DBD safety at Annex VIII (DBD Compilation.)

EE) The Letter of 10 Sep 2018 by AECOM Consultants USA addressed to CJP: is placed at Serial # V of our Compilation. It cautions our nation that the only option is a Concrete Faced Rock Fill dam (CFRD). They have designed the tallest & biggest dams on the planet. From their analysis we quote a short para:

“If WAPDA decides to proceed with this concept, the cost would be exorbitant and construction time would exceed ten (10) years. The project risk associated with an RCC dam is extremely high due to the transportation issue and seismic profile found at the location of the project. In summation, for practical and economic reasons the RCC dam should not be recommended for the DBD project.”

FF) The letter of 08 Dec 2018 written by ex-CEO DBD project to the PM: At serial # VII his letter & two Annexures compare an Earth Core Rock-fill dam (ECRD) with RCC design. His comparison is accurate with respect to the serious technical & safety issues of building a tall RCC dam at that hazardous location. However the ECRD has been superseded by the CFRD concept because Earth fill is not abundant at site. Neither is a CCFRD the best option, as described in the AECOM JV letter at Serial # V and in EE) above.

GG) CFRD the safest and economical choice for DBD conditions: There is dearth of seismic historical data but major landslides caused by earthquakes in the region are known since +150 years. Dams are designed for max 0.5g PGA (Peak Ground Acceleration.) According to Brume’s (1970) model, an earthquake of magnitude 7.0 on Richter scale in the type of rocks prevalent at NPM (Nanga Parbat Massif) would easily produce PGA as great as 2g at the epicenter. The CFRD design has become the most popular & economical Non- Rigid design for tall dams in remote areas which may also be seismically active. The Non-Rigid profile in CFRD design at DBD site will be a wide structure involving about 38mn cub.m of Rock-fill available in situ at great financial savings compared to 16mn cub.m of concrete for the main RCC Dam structure which involves over burden excavation 50m down to bed rock (approximately 30mn cub.m.) AECOM estimates the foundation preparation could take upto 3 years due to time needed to remove the over burden. The approximate cost of this activity alone would exceed USD 6Bn i.e. foundation evacuation, spillway diversion works and cofferdam. **A quote on CFRD design development from Research-gate website:**

“Western China has abundant hydropower resources and great potential for hydropower development. However, these resources are difficult to exploit due to the high altitude, harsh natural environment, complex topographical and geological conditions, inconvenient transportation routes, and high seismic intensity of potential dam sites. Under these circumstances, dams constructed with local materials have better adaptability. In particular, the concrete-faced rockfill dam (CFRD) is one of the most promising dam types for this region, since it can make full use of local materials to reduce the transportation of construction materials out to the dam site, and has high adaptability, distinct economic advantages, and an excellent capability for earthquake resistance. A number of ultra-high dams that are 250–300 m in height, including the Gushui (dam height 240 m), Rumei (dam height 315 m), Maji (dam height 277.5 m), and Cihaxia (dam height 257.5 m) dams, are planned for construction in Western China. If the situation permits, the CFRD will be the preferred dam type. At present, there are more than 600 CFRDs around the world, including constructed, under-construction, and proposed dams. China possesses the largest number of CFRDs. According to the Technical Committee on CFRDs of the China Society for Hydro-power Engineering [1], [2], [3], at the end of 2013, there were 325 CFRDs with heights greater than 30 m in China and 16 CFRDs with heights greater than 200 m around the world—10 of which were in China. The Shuibuya Dam in China, which is 233 m high and was completed in 2008, is currently the world’s highest CFRD”.

HH) Appointment of DBD Consultant & Award of Main Civil Works Construction MW-1: It has been obvious to all observers of WAPDA that by ignoring the tenets of WAPDA Act, PEC Regulations & FIDIC (international Regulations for Consultants) every conceivable SoP has been violated by WAPDA to award the Consultancy to NESPAK and its associates. Much lower proposals were ignored in the first round while

in the second round of bidding in 2019 the new criteria clearly ensured a local Consultant in the lead. The objective was achieved and NESPAK emerged as the sole bidder. **It was a repeat of the Mohmand Dam story of 2017.** The unilateral and subjective decisions were taken for Mohmand Dam Consultancy after receiving three proposals in 2017. The lowest bid of PKR 4.7bn by the Australian (SMEC) JV was ignored and the single bidder NESPAK Consortium awarded (after rebid) at around PKR 10bn. The elevation of NESPAK from a Road, Bridge & Building Consultant to be responsible for the World's tallest RCC dam was obvious to the entire Consultant community of the world. What started in 2002 as a Feasibility Study by NESPAK led NEAC JV has culminated in 2020 with NESPAK being the lead Consultant for the Design Review and Construction Phase. NESPAK's performance at the Neelum-Jhelum HPP tunnel project where the cost escalated around 600% to USD 5.4bn proved that NESPAK did not have the institutional strength to resist 'milking' of the NJHPP by Mr. Raghbir Abbas Shah reportedly for President Asif Ali Zardari. Perhaps this was the perk expected by Mr. Raghbir Abbas Shah to follow the dictates of the fifth-column.

Is NESPAK being prepared for a bigger milking operation at the massive DBD? While Mohmand dam has some multilateral control there is a great symmetry between NJHPP tunnel project commissioned in 2018 and the colossal DBD project. Both are linked to 'Greater Kashmir' which unfairly also includes GB where the fifth-column several decades ago did not allow the rejection of Indian misinformation on GB. Therefore DBD became **not eligible** for multilateral financing. It seems NESPAK is being supported because they are amenable to a milking operation similar to NJHPP. Mr. Mehr Ali Shah and WAPDA's Managers could not have chosen a more hazardous project. The entire engineering industry of the world understands the real role of NESPAK and its main associate Mr. Waseem Nazir CEO of MMP. WRDC wrote to WAPDA Chairman in its second memo on 25 Jan 2020 (Annex IX) the following concluding paragraph: *I focus on the ongoing consultancy imbroglio. NESPAK is not a large dam consultant. They associate with recognized international lead consultants of dams. This adhoc policy will have a major impact on WAPDA's international reputation & solvency. WAPDA's new SOPs on major consultancy jobs are disturbing. NESPAK is also being used as the "Trojan horse" for MMP's Waseem Nazir. MMP was blacklisted for financial irregularities. Award of consultancy & construction contracts on the basis of single bids is illegal.*

Conclusion: Mr. Nisar Memon and Mr. Raghbir Abbas Shah are apparently not on the scene but the strategy they imposed from their so-called 'Indus Forum' has been fully taken over by Mr. Mehr Ali Shah and the WAPDA management. This is bigger than the IPP scourge based on imported energy which started in 1994 with the blessings of Mr. Asif Ali Zardari (the first husband) and several others. Infact this is even much bigger than the Agartala conspiracy that resulted in the breakup of Pakistan. We must change course and ensure that large water projects of WAPDA are not enhanced for personal profit. **The scale of DBD project makes it an existential issue for Pakistan.** The design review of DBD is imperative. It is too late to discuss the lack of competitive bidding for consultancy & construction. Was WAPDA Chairman misled? The fifth-column has laid a financial trap. WAPDA can still change course on DBD and opt for CFRD to build speedily a safe dam within a budget. Building such an unsafe & wasteful project will God forbid cripple our nation. Building a high wall dam to holdback 10bn tons of water at an elevation of 4,000ft makes our entire defense vulnerable. Those who understand Military concepts & strategy can figure that out. Surely our nuclear deterrent will be futile if the enemy is given a non-nuclear option to devastate our economy. With this foolhardy and reckless project the great Kalabagh Dam project first proposed in 1948 by one of our founding fathers Sardar Abdur Rab Nishtar will stand relegated. The 'red-shirts' could finally win.

WRDC appeals to all patriots to glance at the eighteen annexures which form the DBD Compilation 2020. This compilation is an integral part of our article of 04 Sep 2020. The first step is to reverse the tide and defeat the fifth-column in the nation. We must call an international conference of neutral world experts on large dams (and seismologists) within the next few months. Pakistan's future is at stake.

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www.wrdc.com.pk (Sep 28, 2020)