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SITE VISIT REPORT

SATPARA DAM AND MULTIPURPOSE HYDROPOWER PROJECT

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REPORT ON VISIT OF SATPARA DAM-SKARDU (NORTERN AREAS)

Satpara Dam site was visited on 17th Sept. and 18th. Sept. 2010, by me along with WAPDA's Adviser on Mega Dam projects Engr. Abdul Khaliq, Adviser on Basha Dam project Dr. Izhar, G. M. Tech. Services Water, Dr. Siddique. G. M. Projects (North) Brig. Zarin and representatives of project consultants Pakistan Engg. Services and project contractors DESCON. The Issues of water seepage and dam safety were studied at site.

Satpara dam is an earth filled dam of 128 feet height with a lake of 93,600 cusecs ultimate capacity out of which more than sixty percent impounding has already been achieved up to level of 8715 feet against the conservation level of 8740 feet while the height of dam crest is 8750 feet altitude from sea level.

The location of seepage and the flumes where it was being measured were checked, along with the relief wells in the Drain Channel constructed on the toe of the dam. It was found that about 10 relief wells were drilled in the drain channel but not much water appeared to be coming from these wells. On the other hand, seepage water was apparent coming from the D/S side of left abetment near the spillway. The experts probed into the installation of the piezometers (both pipe type and electric type) which were about 90 in number scattered on the dam mainly towards upstream side while 1bout 10 on the downstream side mainly near spillway. Their readings were arranged for gauging the hydraulic pressure (potential) on these points of dam to determine the hydraulic gradient which, if not proper, could be cause of substantial or excessive seepage. Measurements were arranged with help of research officer of instrumentation brought from Lahore and the local expert of consultants, which could be accomplished on the second day.

A presentation was also made by the consultants PES on the relevant design features of the dam and the measures required to be taken for seepage control as per design of dam structure. This will be attached with this report to show the details. The matter of seepage was probed into with required concern and interest by the experts on site on both days of visit. It was thus found at site that the seepage is slightly more than 53 cusecs as reported earlier by the consultants because there was some additional water seeping on one side under the gravels placed (and not being measured) as it was by-passing the pipe type flume made to measure the total seepage passing through. So the real seepage may be slightly higher by about another 10-15 %.

The matter of design factors of seepage control are quite complicated and calls for a full fledge study by the qualified civil engineers with specialized experience of dam safety of such earth filled dams. The abovementioned experts are supposed to do that further study by evaluation of the data collected, go through a further desk study and then prepare a report and submit to Chairman WAPDA, with their comments on the design as well as actual workmanship as they conclude at the end of study, after thorough consideration of various parameters and measurements collected by them about hydraulic potentials at various points of the dam, both upstream as well as downstream. I, being an electrical engineer cannot give a final conclusion on my own, however, on the basis of what I gathered from the colloquial knowledge of the potentials and hydraulic gradient as being discussed between the experts as understood by me, their onsite opinion is that the found seepage is not a matter of serious concern for them with regard to dam safety and that dam would not

collapse because of this and that this amount of seepage was within the usual maximum allowable limits, in case of such earth filled dams, particularly if its value has been stable despite significant increase of level and impounding of water this year. However, in my opinion, the situation warrants for continuous monitoring of the seepage measurements of water potentials for a decision by the experts after a thorough detailed study, as to conclude, if at all some additional measures were required to fix the problem.

It was also considered that better and standardized flumes are required to be installed (in my opinion, immediately) against the existing ones to measure the actual seepage to give more exact values of the same for the said purpose. The flume can also be made alternatively along with the existing ones to have a comparison with the old data of the seepage, to arrive at exact reference values of the same (duly corrected, on the basis of the new flume data), in order to study the behavior of seepage over the past time with the increasing level of impounding.

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