

Report of the visit of Shri Amit Roy Singal, Deputy Director (HPPI), CEA to Vishnugad Pipalkoti Hydro Electric Project (4x111 MW=444 MW) in Uttarakhand on 23rd February, 2022 to review the progress of the project

The Vishnugad Pipalkoti Hydro Electric Project (VPHEP) being executed by M/s THDC India Ltd was visited on 23rd February, 2022 to review the physical progress of various works of the project. Discussions were also held with the Officers / Site Engineers and Contractors of VPHEP on various aspects of the on-going works, problem areas and measures taken/necessary to accelerate the pace of works with the aim of timely commissioning of the units as per schedule. The status of works, critical areas / activities and observations during the visit are as under :-

1.0 Introduction:

The Vishnugad Pipalkoti Hydro Electric Project (VPHEP) is a run of river scheme (with diurnal peaking) on river Alaknanda in Chamoli district of Uttarakhand . The project was concurred by CEA for an estimated cost of INR 2091.45 crores (March, 2006 PL). The investment approval to the project was accorded in August, 2008 at an estimated cost of INR 2491.58 crores (March, 2008 PL) with completion by June, 2013.

Subsequent to all statutory clearances and availability of land, the EPC contract for Civil and Hydro-Mechanical works was awarded to M/s Hindustan Construction Company Ltd. for INR 1597.30 crores on 17th Jan, 2014. The Electro-Mechanical works have been awarded to M/s BHEL, Noida on 18.11.2014 for total contract price of INR 422.0 crores.

The estimated cost of the project has been revised upwards to INR 3860.35 crores (February, 2019 PL) and approved by NTPC on 31.07.2021. The project is presently scheduled for commissioning by **December, 2024** against the approved completion date of June, 2013.

2.0 Salient Features:

The 444 MW Vishnugad Pipalkoti Hydroelectric Project is a run-of-the river scheme (diurnal storage), located on river Alaknanda in Chamoli District of Uttarakhand. The project envisages construction of Concrete Gravity Dam (Height 65m above deepest foundation level, length 89.55 m); 3 nos. Power Intake tunnels (6.2 m circular shaped); 3nos. Desilting Chambers (width 16m, height 21.25 m and 390 m long); one HRT (Circular type, dia. 8.8m, length 13.4 km); one Upstream Surge Shaft (dia. 15/22 m, Height 140m); 2/4 nos. Pressure Shaft (steel lined, dia 5.2/3.65 m, length 310/35 m each); Underground Power House (size 146 m x 20.3m x 48 m); Underground Transformer cavern (size 142m x 15 m x 25.5 m); Francis Turbine, Rated Head 212m; TRT (circular shape, dia. 9.1 m, length 3.07 km); GIS switchyard (40m x 84m) and 2800m XLPE cable. The original Design Energy of the Project envisaged in TEC in a 90% dependable year with 95% machine availability was 1674 MU. However, Design Energy was revised to 1657.09 MU by CEA on 09.01.2018. The 1st year tariff and Levelised tariff is Rs. 4.71/kWh and Rs. 4.52/kWh respectively.

3.0 Award of Works:

Brief details of Contract	Executing Agency	Value of Contract (Nu./Rs. million)	Date of Contract Awarded	Expenditure incurred(upto 31.12.2021)
CIVIL/ HYDRO-MECHANICAL WORKS				
EPC Contract for Civil and Hydro-Mechanical Equipment/ Works including penstock steel liner	M/s Hindustan Construction Company Ltd, Mumbai	INR 1597.30 crores	17 th Jan, 2014	INR 1338 crores
ELECTRO-MECHANICAL WORKS				
Electro-Mechanical Works	M/s BHEL , Noida	INR 422.0 crores	18 th November, 2014	INR 143 crores

4.0 Status Of Various Works / Activities:

The project is in advanced stages of construction and excavation of Desilting Chambers, Head Race Tunnel, branching tunnels, intake tunnels and crown of machine & transformer hall is complete. The benching works of machine hall and transformer hall are in progress. The excavation works of HRT is currently on hold because TBM could not be moved further due to poor geology. The detailed status is as under:

4.1 Dam:-

The river diversion works has been completed. Construction of coffer Dam has been completed. The physical progress of excavation works at dam left abutment and dam right bank is approximately 70% and 15% complete respectively. The river bed excavation at Dam/ Plunge Pool location is in progress.

4.2 Dam Right Bank Underground works :-

Heading excavation of HRT by Drill and Blast method has been completed for the total length of 1000 m. Excavation works of HRT Gate Operating chamber (GOC) completed and shaft excavation of GOC- 1,2 & 3 is in progress. Silt flushing Tunnel with a total length of 57m has been excavated upto 17m.

Concreting of 3 nos. Intake Tunnels is in progress. Heading Excavation works of Desilting chambers viz DC-1, DC-2 & DC-3 completed. The physical progress of Desilting chambers is given below:

Desilting chamber	Benching	Concrete Lining
DC - 1	38%	0.65%
DC - 2	57%	13%
DC - 3	57%	11%

4.3 Power House Area:-

In Machine Hall, crown excavation has been completed. Rib erection work to strengthen geologically weak section is 97% completed. Further, consolidation grouting and cable anchor work is in progress.

In Transformer Hall, crown excavation, side slashing and rib erection works completed for the total length of 140.3m. Benching work is in progress.

In Surge Tank (D/s), Heading and Benching works completed for the total length of 80m. Central gullet heading excavation started and completed in the length of 3m.

In TRT U/S, heading excavation completed in the length of 322 m out of 562 m. Further, TRT D/S heading excavation completed 268 m out of 2480 m. At TRT outlet area, slope stabilization work and cladding wall concreting works are under progress.

4.4 TBM Works: Total length of TBM entry adit is 614m. Initial reach of 55m of the TBM entry adit constructed by conventional method. Remaining length was planned to be executed using TBM. During the excavation using TBM, the pipe roofing, pre-installed in TBM adit, collapsed and boulders (detached from the roof) got accumulated in front of the cutter head, causing restriction in the movement of TBM. Due to this, excavation using TBM could not be advanced further. Now, bypass tunnel has been excavated from the surge shaft bottom adit to reach TBM adit alignment i.e. 84m ahead of TBM. From this junction, excavation shall be done towards TBM to expedite TBM works.

4.5 Electro-Mechanical Works: Model testing of Turbine has been successfully completed in BHEL, Bhopal. Design and Engineering is in progress. Supply works of Rs.169.37 crore has been completed.

5.0 Financial Progress:

The revised cost of the project is INR 3860.35 crores (February, 2019 PL) and approved by NTPC on 31.07.2021. At present INR 2387 crores has been spent till January, 2022.

The contractor was facing cash crunch which delayed the progress of construction of the project. THDC's board approved Working Capital Advance (WCA) of INR 229 crores in October, 2021. WCA is being routed in phased manner through escrow account. With this infusion of capital, M/s HCC has gained trust of the supplies, PRWs etc. and construction work has gained pace since then. Project plans to achieve INR 25 crores (+) work value in the month of February,2021 from actual work value of INR 8.56 crores in the month November,2021 and improve further in the coming months.

6.0 Earning Warning System:

VPHEP has already identified vulnerable areas where there can be sudden rise in water level and potential water streams posing danger to identified vulnerable areas. The basic philosophy of EWS is to remain in contact with upstream project through satellite phones and sound warning in vulnerable areas if any

adverse event is reported in upstream project. For that, procurement of satellite phones is under process. Also, THDC is installing warning sign boards & emergency sirens to warn in vulnerable areas.

7.0 Major Progress hurdles/ challenges:

- **Geological challenges**

- Poor Geology at powerhouse area, Transformer Hall which led to change in scope and design.
- TBM commissioned, however tunneling by TBM could not progress as planned.

- **Flash Flood**

Flash Flood of year 2013 caused Change in scope of works

- **Law and Order**

- Frequent Stoppage of work by locals and PAFs on pretext of undue demands.
- Presently Law and Order situation is under control.
- Law and Order challenges may arise when full-fledged TBM operation starts.

- **Non-vacation of HAAT Village and Harsari issue**

- Haat village vacated in Sep'21 with the help of District Administration
- Harsari village issue is presently under control.
- All help is being extended by State Government and District Administration.

- **Delay in Statutory clearances like Gadi quarry from administration.**

- Clearance has been obtained with active support of State Government/ District Administration.

Site Photographs

Dam Right Bank



Desilting Chamber



Transformer Hall



Machine Hall

