Full title of the Project: Diversion of Forest Land for construction of Bhavali Pumped Storage Project (1500 MW) in Thane & Nasik Districts of Maharashtra State
File No.: FP/ MH/HYD/153240/2022
Date of Proposal: 06/03/2022

(Sr. No. 2 of Checklist)

JUSTIFICATION

Of Site Specificity

The Pumped Storage Project is essentially a "site-specific" project as it requires a particular type of topographical and geo- technical conditions with availability of water source at a close proximity to the identified project site. The sites of elevation variance are required to create upper & lower reservoirs of desired capacity. The reservoirs are critical for storing water for long duration. Their location should compulsorily be fulfilling the geo-technical criteria needed for establishing the Pumped Storage Project. Since this project requires water as a means to store energy, a techno-commercially viable water source, with sufficient capacity, to fill up the reservoir one time at the beginning of its operation and to supply for losses during its operation (mainly evaporation loss, quarterly or semi-annually or annually) has to be available in close proximity of project.

The proposed site has initially been identified by the Government of Maharashtra. Attempts were also made to explore the possibilities for alternate sites based on topographical, geological, geo-technical and techno-economic feasibility parameters. However, the JSW Energy PSP Two Limited has found proposed 275.00 Ha. of land in Jamunde village of Igatpuri Tehsil of Nasik District and Kalbhonde, Kothale villages in Shahapur Tehsil of Thane District as most suitable site for the proposed project. The Government of Maharashtra has entered into an agreement by signing the Memorandum of Understanding for setting up of the said project.

A detailed alternative study to find out the best optimized alignment of water conductor system on left bank of the upper reservoir along with other appurtenant structures was carried out. The location of powerhouse has also been selected based on the due consideration being given to topographical and Geological features. An attempt to optimize the orientation of PH on account of Geo- logical requirements viz-a-viz angle of deviation w.r.t. to the flow direction along the WCS has been done. The location of powerhouse is positioned in such way as to avoid the requirement of upstream surge shaft on the Headrace tunnel.

Underground power house is more suitable as compare to surface powerhouse. Therefore, the **following three "alternative layouts" of the project have been developed for techno economic comparison** and the pros and cons of all the alternatives are discussed below: -

Alternative I:

This alternative envisages the construction of following Major Components:

- Construction of Upper and lower dam of Height 47.0 m and 70.0 m respectively from the lowest natural surface level.
- Construction of Upper and Lower intake.
- one number of 11m dia water conductor system comprising of about 475.0 m long Head Race Tunnel (HRT) bifurcated into two penstocks of 7.7m dia of 647.107m length and each penstock is trifurcated into 3 branch penstocks of 4.0m dia and

135.32m long, 6 No's of each 5.0m TRT of length 90m is connected to the surge chamber in the downstream end in-turn connected to one number of tail race tunnel (TRT) of 11m dia and 808.75 m long.

- Downstream underground surge chamber on Tail Race Tunnel
- An underground power house and Transformer cavern, the arrangement of powerhouse is positioned under high cover zone of about 365m or more.

Alternative II:

This alternative envisages the construction of following Major Components:
Upper and Lower dam is similar to Alternative-1.
Construction of Upper intake, the location of lower intake is same as Alternative-1.
one number of 11m dia water conductor system would comprise of about 1605.302 m long Head race tunnel bifurcated into two numbers of 7.7m dia penstocks of length 169.90m in which each penstock intern trifurcated into small branch penstock of 4.0m dia and tail race tunnel (TRT) 358.52m long
Underground Powerhouse location is similar to Alternative-1 but positioned under optimized top cover to avoid problems related to high cover zone on the underground caverns.

Alternative III:

This alternative envisages the construction of following Major Components:

- Upper and Lower dam is similar to Alternative-1.
- Construction of Upper intake, the location of lower intake is same as Alternative-1.
- One number of HRT of 11m dia 653m long bifurcated into two numbers of 7.7m dia with a length of 1704.11m at the upstream surge chamber of 25m dia and each penstock is divided into branch penstock of 4.0 m dia and 76m long and tail race tunnel (TRT) 213.5m long.
- Surface Powerhouse location shifted downstream towards lower reservoir but involves deep surface cut

Conclusion

- Both the alternative for underground scheme has similar arrangement except minor changesin the length of various tunnels. In Alternative 2 the Power House location is located such that D/S Surge Chamber get eliminated. The overall impact is reduction in the overall cost. Hence Alternative-2 has been selected for the further studies as compare to Alternative-1.
- Also, based on Techno-Economic comparison of all the alternatives, Alternative-2 has less Levellised Tariff as compared to Alternative-1 & 3.

Hence, considering Techno-Economic Parameter underground power house with Alternative-2 is chosen for the development of the proposed PSP.

The above layout was received by the CEA/ CWC and further modification in Water Conductor System was suggested; like, instead as one HRT and Pressure Shaft, three HRT(s) & PS(s) were suggested. Accordingly, further layout was optimized and details of the same are given in the Salient Features mentioned in this note.

The proposed site involves 243.74 Ha. of Forest Land and 31.08 Ha. of Non- Forest Land. Attempts have been made to minimize the use of Forest Land for the project. However, the Forest Land cannot be avoided or no alternative can be substituted. The Forest Land proposed for diversion is, thus, unavoidable. The barest minimum Forest Land, to the extent of 243.74 Ha., is proposed to be diverted in the extant proposal.

Date: 07 / 02 /2025
Place: Shahapur.

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