

Full Title of Project: Diversion of 2.4957 Ha. of forest land for Construction of PAKHNOJ-II SHEP 5.00 MW, Tehsil Manali Forest Division Kullu Distt. Kullu (H.P.)

File No:

Proposal No. : FP/HP/HYD/145089/2021

Date of Proposal :

CHECK LIST NO.4

Detail Note on the project

INTRODUCTION OF THE PROMOTERS

M/s BHOLENATH POWER CONSTRUCTION COMPANY PVT. LTD. has been incorporated by technocrats with the vision of harnessing renewable energy available in India. Small hydro power is one of the renewable energy and PAKHNOJ-II SHEP falls in this category of renewable energy of power sector.

LOCATION OF THE PROJECT

PAKHNOJ-II Small Hydro Power Project is a run of the river scheme for power generation of 5.00 MW on Haripur nallah. The project site is near about 30 Km from Kullu. The diversion / Intake site is located at latitude $32^{\circ} - 8' - 39.39''$ and longitude $77^{\circ} - 13' - 5.31''$ and power house at latitude $32^{\circ} - 08' - 36.14''$ North and longitude $77^{\circ} - 11' - 48.08''$ East. Topo Sheet No is 52H/4 & 52 H/8.

CHOICE OF SCHEME

For optimum utilization of power potential available in the lower reaches of Haripur Nallah three alternatives were considered and the best possible alternate was selected on the merit basis.

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ALTERNATIVE - I

This is mainly a right bank alternative. The alternative involves construction of diversion structure at EI + 2250.00 m on Pakhnoj Stream just near village Soyol. The project component shall consist of diversion weir, Feeder Pipe 5 m long I, Desilting tank Cum Forebay tank, However, penstock alignment runs through rocky slope. The gross head available for power generation shall be around 400m. The left bank of the khad does have stable slopes but in some areas due to saturation to be caused by water conductor system sliding tendencies may occur in few areas. Surface power house is located on Left bank of the Haripur Nallah.

ALTERNATIVE - II

This alternative involves construction of diversion structure at Haripur nallah at EI +2250 meter. The left bank has exposed rocky strata & cutting more trees at this bank if this bank is proposed.

ALTERNATIVE - III

This alternative involves construction of diversion structure at Haripur nallah at EI +2250 meter. This alternate involves large no. of trees and also found loose portion and topography of the same is not suitable for laying of penstock and slopes are not stable for construction of the project.

In view of the advantages offered by the alternative I, it has been taken up for preparation of Detailed Project Report.

Examining above three alternatives, alternate no -I was finally adopted, which is environmentally sustainable, socially equitable, ecologically compatible and economically viable. Trees and area coming in this alignment is less than other alignment.

GEOLOGY OF THE PROJECT AREA

The catchment of Pakhnoj-II Hydro Electric Project lies longitude $77^{\circ}-15'-22''$ and latitude $32^{\circ}-07'-44''$ and power house at longitude $32^{\circ}-08'-36.14''$ North and latitude $77^{\circ}-11'-48.08''$ East. Pakhnoj stream originates from high snow clad mountains having elevation m above MSL. Rocks are better with regard to strength, erosion resistance, weathering resistance and water observation capacity. Rocks are exposed intermittently at most of the places. Some of the area is covered with overburden of varying depth.

Manikaran Quartzite, chloriticphylliticandmetabasic of Banjarformation occur in this area. These are covered by over burden deposits consist of colluvial, fluvioglacialand

fluvial materials. These deposits are of Quaternary to recentage. White quartzite known as the Manikaran Quartzite is the main rock type and found from intake site to Desilting Tank cum Forebayalong the Feeder Pipealignment. Fine to medium grained Phylliteinterbedded with quartzite, chloriticphyllite with basic schist are occurring in penstock and powerhouse area. Following discontinue ties are found in the project area.

Table-1.1

Set No	Dip	Dip Direction	Strike
I	Bedding-36 ⁰ -42 ⁰	N30 ⁰ -50 ⁰ E	N40 ⁰ to 60 ⁰ W - S40 ⁰ to 60 ⁰ E
II	Foliation -42 ⁰ -50 ⁰	N10 ⁰ -60 ⁰ E	N30 ⁰ to 80 ⁰ W - S30 ⁰ to 80 ⁰ E
III	Joint-68 ⁰ -82 ⁰	S20 ⁰ -50 ⁰ W	N40 ⁰ to 70 ⁰ W - S40 ⁰ to 70 ⁰ E
IV	Joint-90 ⁰	-	N30 ⁰ to 50 ⁰ E - S30 ⁰ to 50 ⁰ W
V	Joint-90 ⁰	-	N30 ⁰ to 60 ⁰ W - S30 ⁰ to 60 ⁰ E
VI	Joint-70 ⁰	N40 ⁰ W	N50 ⁰ E - S50 ⁰ W

WEIR SITE & INTAKE SITE

The proposed Intake structure is located on the right bank of the Pakhnoj stream near Soyai village. The axis is aligned N30⁰W - S30⁰E just downstream of existing wooden bridge. Out crop is available up to river bed belonging to Manikaran Quartzite of Banjar Formation on right bank. Bedding strike direction is N60⁰W-S60⁰E with 36⁰ dip toward N30⁰E. At right bank thick fluvio-glacial material is seen covering most of the area. In river bed boulders of gneisses & quartzite with sandy- gravelly axis are present. Slope on left bank is loose portion and steeper than right bank.

FEEDER PIPE

400.00m long power pipe having 1.00m dia is provided upto D-Tank whose slope & velocity is 1:200m and 3.49m/s respectively.

A feeder pipe is 400.0m long is proposed through the right bank of Pakhnoj stream from intake to D-Tank cum Forebay Tank. The rock unit comprises of Quartzite with subordinate bands of schist belonging to Manikaran quartzite of Banjar formation. Manikaran quartzite is a white, massive quartzite but light greenish grey and banded type is also

seen at places. The quartzite is highly metamorphosed and is generally very hard. It breaks with sub coincided fracture yielding sharp edges.

D Tank cum Forebay Tank

The D tank Cum Forebay Tank of size 20.00m x 10.00m and height 5.00m has been proposed at an elevation of $\pm 2392.35\text{m}$. It is located on the rocky area and consists of phyllite with quartzite bands and amphibolites/basic rocks. It is grey to greenish grey, moderately to highly weathered. General trend of strike of foliation is $N30^{\circ}$ to 60° W- $S30^{\circ}$ to 60° E dipping 42° - 50° towards NE to ENE direction. The D Tank Cum Forebay Tank is partially underground and portions below NSL are covered with rock. While excavating the D Tank Cum Forebay Tank side slope needs to be protected. The location of D Tank Cum Forebay Tank is safe & no construction problem is anticipated at this location.

PENSTOCK

A 1016.04m long penstock alignment passes along the right bank of the Haripur Nallah. The average slope of penstock will be 50 degree with minimum 40 degree to maximum of 60 degree. Here medium to coarse grained, moderately to highly

weathered amphibolites sand mica schist bands are present along weathered phyllitic. Some openings are noticed along joints at this location.

SURFACE POWER HOUSE

Power House of the proposed Pakhnoj-II small hydro power project is located on right bank of Haripur Nallah. The powerhouse is proposed on a gentle slope consisting fluvial/fluvioglacial deposit. Thickness of this overburden material extended upto riverbed so there are least chances to meet the rock at power house pit. Above this deposit towards hill side weathered phyllite with quartz bands exposures occur on back slope of power house. Foliation dips towards hillside and upstream. Back slope of the power house seems stable. After careful investigation of the geological and geomorphological conditions of power house area which was selected around EL

±2000.00m. It is located about 5m above the riverbed where massive cutting in steps is required for the placement of powerhouse.

TAIL RACE

The proposed 30 m long rectangular shaped tailrace is located on fluvial deposit at right bank of stream. This overburden slope is very steep hence suitable protection is required at this location to avoid slope instability due to cutting of the slope.

HYDROLOGICAL AND METEOROLOGICAL INVESTIGATIONS

Discharge measurements of Haripur nallah is begin by the developer however long-term details not available. The long-term discharge data has been calculated via regression analysis method.

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The study of the different hydrological parameters like catchment area, rainfall and Runoff etc. are very important parameters to know for the proper designing of the scheme. Following studies were done.

CATCHMENT AREA

The stream is a perennial stream. It originates from the high peaks having an elevation of EL meters. Above Mean Sea (MSL) Level (measured from topo sheet no. 52H/3 of the Survey of India). The total catchment area above the proposed Diversion Weir of Pakhnoj-II Small Power Project is 26 Sq. km. including snow fed catchment area. The catchment is covered with thick forests and barren land. There is negligible seepage in catchment terrain and most part of the rain fall results in run-off in the stream.

POPULATION AFFECTED

PAKHNOJ-II SHEP has no shortage reservoir and so on submergence case is involved. In the layout of project components, no habitat is to be affected. As much no population is adversely affected by the execution of this project. The project will generate employment to the local youth and shall industry in the vicinity of the project area.

Date: 24/03/2022

Place: Kullu



Authorized Signatory
Bholenath Power Const. Co. Pvt. Ltd.
Main Bazar Bhuntar, Distt. Kullu (H.P.)

Authorized Signatory

M/S A BHOLENATH POWER
CONSTRUCTION COMPANY PVT. LTD.
PAKHNOJ-II SHEP (5.00 MW)

Countersigned By: -



Divisional Forest Officer
Kullu Forest Division, Kullu
Distt. Kullu (H.P.)