KOTESHWAR HYDRO ELECTRIC PROJECT

INTRODUCTION

Koteshwar Hydro Electric Project is an integral part of Tehri Power Complex comprising of Tehri Dam & HPP (100MW), Tehri PSP (1000MW) and Koteshwar HEP (4000MW) to develop hydro-electric potential of river Bhagirathi. A concrete gravity dame across river Bhagirathi and a Surface Power House with installed capacity of 4x100MW on the right-bank is proposed near village Pindaras, Distt. Tehri, about 20 km downstream of Tehri dame site at Koteshwar. The reservoir created by Koteshwar dam shall also act as a lower reservoir for pumped storage scheme as well as balancing reservoir for Koteshwar Hydel Scheme. This will facilitate the functioning of Tehri Power Complex as a major peaking station in Northern grid, having installed capacity of 2400MW.

The concrete gravity dam, 97.5m high is provide with 4 spillway bays with radial gates to pass the peak design flood. The dam is provided with 3nos. galleries at various levels for instrumentation, grouting and drainage etc. The spillway is provided with energy dissipation arrangement comprising a stilling basin about 96m wide and 107m long. On left bank the stilling basin is bounded by the abutment and on the right bank by the Powerhouse wall. The water from the reservoir shall be drawn through 4 Nos. power intakes and 4 Nos. underground penstocks of dia 6.2 m each, for power generation. The dam toe surface Powerhouse located on right-bank of river has four units of 100 MW each (4x100 MW).

Spillway of Koteshwar dam has been designed for the maximum discharge capacity of 13240 cumecs. It shall cater to the need of dissipating energy associated with about 68m head of water. Dissipation of energy takes place by means of hydraulic jump forming in the stilling basin.

The Salient Features of Koteshwar Hydro Electric Project are numerated below:-

HYDROLOGICAL CHARACTERISTICS

- Catchment area — 7691 km^2
- Long-term average annual flow — 258m^3/s
- Annual run off — 8.14 km^3

1. STORAGE RESERVOIR

- Reservoir area
  - At Full Supply Level — 2.9 km^2
  - At Minimum Draw Down Level — 2.1 km^2
- Full storage capacity
  - At full supply level — 88.9 MCM
  - At minimum Draw Down Level — 53.9 MCM
  - Live storage — 35.0 MCM

3. HEAD WATER LEVEL

- Full Supply Level — 612.5 m
- Minimum Draw Down Level — 598.5 m
- Maximum Flood Level — 615.0 m

4. TAIL WATER LEVEL

- With hydropower station operating at
  - Maximum flow — 539.9 m
  - Same with one unit in operation — 537.4 m
  - At flood flow of 13240 m3/s (0.01% probability) — 569.3 m

5. TYPICAL FLOWS

- Maximum flood flow at Tehri Dam site of
  - 0.01% probability — 15600 m^3/s
  - 0.1% probability — 12850 m^3/s

- Maximum regulated flow at Koteshwar Dam of
  - 0.01% probability — 13240 m^3/s
  - 0.1% probability — 9140 m^3/s

6. SEDIMENT LOAD

- Mean annual sediment load at Tehri dam site — 11.46 MCM
- Mean annual sediment load at Koteshwar Dam site (After retention of part of sediments in Tehri reservoir) — 0.83 MCM

7. POWER HOUSE

- Location — Right bank
- Type of Dam — Surface, at toe
- Number of units — 4
- Rated Unit capacity — 100 MW
- Installed capacity — 400 MW
- Type of Turbine — Francis
- Heads (Net):
  - Maximum head with respect to power — 75m
  - Rated head with respect to power — 69m
  - Minimum head with respect to power — 58m
- Maximum flow at rate head — 161 m^3/s

8. DAM

- Type — Gravity VCC Dam
- Crest length — 300.50 m
- Length of left bank Non-Overflow Dam — 69 m

• Length of Spillway dam	104 m
• Length of Non –Overflow section between Power Intake and spillway	19.5 m
• Length o Power Intake section	77 m
• Maximum structural height	97.5 m
• Dam crest level	618.5 m
• Dam profile:	
- Slope of upstream face from crest to El. 579.5m	Vertical
- Below El. 579.5m	0.1:1
- Slope of downstream face	1.1

9. OVERFLOW SPILLWAY

• Location	Riverbed
• Type	Spillway dam
• Discharge capacity	
- At FSL (612.0)	9140 m^3/s
- At MFL (615.0)	13240 m^3/s
• Number of bays	4
• Bay width	18 m
• Crest level	594.50
• Type of Service Gates	Radial
- Number of gates	4
- Size of gates	18 m X 16.0 m

10. POWER INTAKE

• Location	Right bank, integrated into water retaining structure
• Number of openings	4
• Sill level of Intake	582.5 m

- Number and size of Penstocks — 4, steel lined 6.2 m dia.
- Type / Size of Service Gates — Fixed wheel, 6.5m X 7.5 m

11. DIVERSION TUNNEL

- Tunnel length — 593 m
- Tunnel diameter — 8 m
- Design flow through tunnel — 1180 m^3/s

12. COFFERDAMS

- Height of Upstream Cofferdam — 30.0m
- Height of Downstream Cofferdam — 11.0 m

AREA TO BE AFFECTED BY RESERVOIR — 279 ha.

DESIGN ENERGY : 1234 MU (90% dependable year)