

## SALIENT FEATURES

<b>1.</b>	<b>Location</b>		
(i)	State	:	Uttarakhand
(ii)	District	:	Pithoragarh
(iii)	Block	:	Gangolihat
(iv)	Village	:	Seraghat
(v)	Access-road	:	About 50 kms from Almora on Almora - Berinag road
(vi)	Topo sheet No.	:	53 O/14
(vii)	Geographical Coordinates	:	Diversion weir      Power House
	Longitude	:	N 29 <sup>0</sup> 42' 38"      N 29 <sup>0</sup> 42' 10"
	Latitude	:	E 79 <sup>0</sup> 52'59"      E 79 <sup>0</sup> 52'52"
(viii)	Altitude	:	715 m (level at the diversion site) 703.0 m at power house site
<b>2</b>	<b>River Catchment</b>		
(i)	Catchment intercepted at the diversion site	:	1461 sq. km.
(ii)	Name of River	:	Sarju River
(iii)	Maximum flood (Dicken's)	:	2603 cumec
<b>3.</b>	<b>Low Head Project:</b>		
<b>3.1</b>	<b>Diversion Structure (Head works)</b>		
(i)	Type of structure	:	Barrage (with 15.3 m high gates)
(ii)	Water way of barrage	:	3 bays of 10.0 m each, total= 30+2x3.0=36.0 m
(iii)	Bed level of river at barrage site	:	EL 715.00 m
(iv)	Pond level	:	EL 733.00 m
(v)	(MWL) RL of top of Wing wall	:	EL 736.00 m
(vi)	Crest level of sill beam of gate	:	EL 718.00 m
(vii)	Size of gates	:	3 Gates, each 10 m (wide) x 15.3 m (high)
(viii)	Type of Gates	:	Radial Gates
(ix)	Discharging capacity of barrage for a water depth of 7.0 m above crest	:	5324 cumec
(x)	Slope of barrage floor	:	1.0 V : 20.0 H
(xi)	Total length of barrage floor	:	60.0 m

<b>3.2</b>	<b>Intake</b>	
(i)	Type	: Side channel type intake
(ii)	Design discharge	: 73.75 cumec
(iii)	Size and shape of each bay	: Rectangular – 6.0 m width x 7.00 m (height) of one bay
(iv)	Crest level	: EL 725.7 m
(v)	Top RL of intake d/s wing walls	: EL 733.3 m
(vi)	Number of bays	: 3 bays
<b>3.3</b>	<b>Intake Gates</b>	
(i)	Type	: Vertical lift, fixed wheel type gates
(ii)	Size of each gate -	
	Width	: 6.6 m
	Height	: 7.3 m
(iii)	Number of gates	: 3 nos.
<b>3.4</b>	<b>Desilting Tank</b>	
(i)	Type	: Hopper Type
(ii)	No. of rows of hoppers and no. of hoppers is one row	: 2 parallel rows, and two hoppers in each row
(iii)	Width of D-tank (total)	: 23.5 m
(iv)	Length of D-tank	: 26.7 m
(v)	Incoming discharge to D-tank	: 73.75 cumec
(vi)	Outgoing discharge from D-tank	: 59.0 cumec
(vii)	Flushing Discharge from D-tank	: 14.75 cumec
(viii)	Depth of Flow (above hoppers)	: 7.0 m
(ix)	Depth of hoppers	: 6.0 m
<b>3.5</b>	<b>Tunnel Intake Pool</b>	
(i)	Shape (in plan)	: Curved; open tank
(ii)	Average Width along flow	: $\frac{5.7 + 19.3}{2} = 12.5$ m
(iii)	Length (width normal to flow)	: 23.5 m
(iv)	Full tunnel intake pool level	: 732.50 m
(v)	MDDL	: 731.50 m
(vi)	Level of centre line of tunnel	: 721.00 m
(vii)	Level of invert tunnel	: 718.25 m
<b>3.6</b>	<b>Head Race Tunnel</b>	
(i)	Type of Section	: Modified Horse Shoe section
(ii)	Dia of tunnel	: 5.5 m (area = 24.052 sq.m)
(iii)	Length of tunnel	: 2620 m
(iv)	Velocity through tunnel	: 2.4 m/sec for 53 cumec discharge
(v)	Bed slope of tunnel	: 1.0V : 500 H
<b>3.7</b>	<b>Surge Tank</b>	
(i)	Type	: Restricted orifice type

(ii)	Dia	:	21.0 m
(iii)	Height	:	12.0 m
(iv)	Dia of riser	:	9.0 m
(v)	Dia of orifice	:	2.1 m
(vi)	Upsurge level	:	734.00 m
(vii)	Down surge level	:	727.00 m
(viii)	Level of tunnel bottom (under surge tank)	:	713.00 m
(viii)	R.L. of top of surge tank	:	737.00 m
<b>3.8</b>	<b>Penstock</b>		
(i)	(a) Type of main penstock	:	4.0 m dia pressure shaft (underground) of steel covered with concrete
	(b) Type of unit penstock	:	Surface penstock covered with concrete
(ii)	Number of unit penstock pipes	:	3 nos.
(iii)	Diameter of each unit penstock pipe	:	2.3 m
(iv)	Length of penstock (approx.)	:	50 m (and about 80 m for head loss calculations)
(v)	Design discharge of each penstock	:	17.7 cumec
(vi)	Velocity in each unit penstock	:	4.25 m/sec
(vi)	Type and thickness of steel liner	:	Boiler quality steel corresponding to ASTM-285 Grade "C" or equivalent, 12 mm to 8 mm thick
<b>3.9</b>	<b>Power House</b>		
(i)	Type	:	Surface power house
(ii)	Minimum Gross head (tunnel intake pool - TRC water level)	:	28.7 m
(iii)	Design (rated) head for machines	:	25.2 m
(iv)	Minimum Net head (for design discharge 53.0 cumec)	:	25.2 m
(iv)	Installed capacity	:	3 x 3.7 MW = 11.1 MW
(v)	Turbine	:	Vertical axis Kaplan
(vi)	Number and rating	:	3 turbine - generating unit, each of 3.7 MW
(vii)	Dimensions of the power house (machine hall + erection bay)	:	31.7 m (L) x 8.5 m (W) x 22.9 m (H) upto truss bottom from foundation
(viii)	High flood level in Nala near power house site (about 80.0 m d/s)	:	EL 704.80 m
(ix)	Minimum tail water level (8 cumec in TRC)	:	EL 703.40 m

(x)	Tail water level for a discharge of 59.0 cumec in TRC, corresponding to average water level in Nala during monsoon	:	EL 703.80 m
(xi)	Central line of the runner	:	EL 703.00 m
(xii)	Central line of the unit penstock entering power house	:	EL 704.55 m
<b>3.10</b>	<b>Tail Race Channel</b>		
(i)	Type	:	Trapezoidal section with 10 V: 1.5 H side slopes
(ii)	Bed width	:	22.2 m
(iii)	Water depth corresponding to discharge 59.0 cumec through TRC	:	0.6 m
(iv)	Elevation of the tail pool bed at the end	:	703.20 m
(v)	Longitudinal bed slope	:	1.0 V : 80.0 H
<b>4.0</b>	<b>Power Generation</b>		
(i)	Installed capacity and no. of units	:	3 units of 3.7 MW each
(ii)	Net annual generation (in 50% dependable year with 95% plant availability factor)	:	46.97 million KWh
(iii)	Units available for sale (1 – 15 years)	:	46.26 million KWh
(iv)	Units available for sale (16 – 35 years)	:	37.93 million KWh

#### 5.0 Estimates of Cost and Financial Performance:

(i)	Total cost (Rs. Lakh)	Rs.	9713.09 lacs
(ii)	Total cost including escalation & interest during construction	Rs.	11686 lacs
(iii)	Cost of civil works	Rs.	6854.27 lacs
(iv)	Cost of electro-mechanical works including cost of 33 KV transmission line	Rs.	2658.82 lacs
(v)	Cost of generation in the first year per kWh	Rs.	3.83
(vi)	Cost of Generation per KWh (on levellised cost basis)	Rs.	3.61
(vii)	Annual revenue by sale of energy @ Rs. 3.83 per kwh	Rs.	1771.7 lacs

\*\*\*\*\*