

Annexure - I

TAPOVAN VISHNUGAD HEP (4 X 130 MW)**PACKAGE WEIGHTS & DIMENSIONS****BUTTERFLY VALVE & ACCESSORIES**

S.NO.	DESCRIPTION	No. of pieces per unit(Valve)	Total no. of pieces	Dimension			UNIT WEIGHT (T)	TOTAL WT. (4 UNITS) for MAT HANDLING (T)	TOTAL WT. (4 UNITS) for ERECTION (T)
				L	W	H			
				(mm)	(mm)	(mm)			
1.00	Valve Body	2.00	4.00	-----In suitable no. of packages-----			15.00	30.00	30.00
2.00	Disc with trunnions	1.00	2.00	-----In suitable no. of packages-----			18.00	36.00	36.00
3.00	Upstream connecting pipe	1.00	2.00	-----In suitable no. of packages-----			4.00	8.00	8.00
4.00	Downstream connecting pipe	1.00	2.00	-----In suitable no. of packages-----			7.00	14.00	14.00
5.00	Servomotor	2.00	4.00	-----In suitable no. of packages-----			5.00	10.00	10.00
6.00	By pass valve	1.00	2.00	-----In suitable no. of packages-----			0.50	1.00	1.00
7.00	Weight for closing	1.00	2.00	-----In suitable no. of packages-----			20.00	40.00	40.00
8.00	Miscellaneous			-----In suitable no. of packages-----				44.00	44.00
	SUB TOTAL WEIGHT							183.00	183.00

TURBINE (Pelton) & ACCESSORIES

S.NO.	DESCRIPTION	No. of pieces per unit	Total no. of pieces	Dimension			UNIT WEIGHT (T)	TOTAL WT. (4 UNITS) for MAT HANDLING (T)	TOTAL WT. (4 UNITS) for ERECTION (T)
				L	W	H			
				(mm)	(mm)	(mm)			
A)	TURBINE (each)								
1.00	Runner (20 nos. of Buckets)	1.00	4.00	3500.00	3500.00	1000.00	20.00	80.00	80.00
2.00	Shaft	1.00	4.00	6000.00	950.00	950.00	33.00	132.00	132.00
3.00	Housing cone & Top cover each in 5 pieces	5.00	20.00	-----In suitable no. of packages-----			56.50	226.00	226.00
4.00	Nozzle servomotor assembly (6 jets)	6.00	24.00	-----In suitable no. of packages-----			66.00	264.00	264.00
5.00	Brake jet (2 jets)	2.00	8.00	-----In suitable no. of packages-----			1.00	4.00	4.00
6.00	Distributor Piping in 7 segments	7.00	28.00	-----In 7 nos. of segments-----			140.00	560.00	560.00
7.00	Testing device for distributor piping	1 set		-----In suitable no. of packages-----				15.00	15.00
8.00	Pit Liner(Lower)	2.0	8.00	-----In suitable no. of packages-----			20.00	80.00	80.00
9.00	Deflector Servomotors	6.0	24.00	-----In suitable no. of packages-----			3.00	12.00	12.00
10.00	Guide Bearing	1.00	4.00	-----In suitable no. of segments-----			10.00	40.00	40.00
11.00	Embedded pipelines for all units comprising penstock drain, distributor drain, brake jet valve piping etc			-----In suitable no. of transportable segment boxes-----				143.00	143.00
12.00	Embedded tubes for field efficiency test			-----In suitable no. of transportable segment boxes-----				1.00	1.00
13.00	Miscellaneous							50.00	50.00
B)	MAIN INLET VALVE (each)								
1.0	Max assembled weight with associated equipments	1.0	4.0	-----In suitable no. of packages-----			115.0	460.00	460.00
2.0	Weight for closing	1.0	4.0	-----In suitable no. of packages-----			60.0	240.00	240.00
3.0	Oil pressure Vessel	1.0	4.0	-----In suitable no. of packages-----			12.0	48.00	48.00
4.0	Other Misc. assemblies & components			-----In suitable no. of packages-----			20.0	80.00	80.00
C)	AUXILIARIES (one set for complete power house)								
1.00	Plate Type Heat Exchanger for Cooling Water	1 set		-----In suitable no. of boxes-----				2.00	2.00
2.00	Cooling Water Pump Motor Set	1 set		-----In suitable no. of boxes-----				5.00	5.00
3.00	Cooling Water Automatic Filter	1 set		-----In suitable no. of boxes-----				3.50	3.50
4.00	LP Compressor motor set	1 set		-----In suitable no. of boxes-----				5.00	5.00
5.00	Dewatering Pump motor set	1 set		-----In suitable no. of boxes-----				5.00	5.00
6.00	Drainage Pump motor set	1 set		-----In suitable no. of boxes-----				15.00	15.00
7.00	LP Air Receiver	1 set		-----In suitable no. of boxes-----				3.00	3.00
8.00	Misc. piping, valves, fittings for C-1 to C-7			-----In suitable no. of boxes-----				200.00	200.00
	SUB TOTAL WEIGHT							2673.50	2673.50

MAJOR ITEMS OF GOVERNING GROUP

S.NO.	DESCRIPTION	NO. OF PACKAGES	PACKAGE DIMENSIONS (EACH)			WT.OF EACH PACKAGE (KG)	TOTAL WT. OF PACKAGE (KG)	TOTAL WT. (4 UNITS) for MAT HANDLING (T)	TOTAL WT. (4 UNITS) for ERECTION (T)
			(mm)	(mm)	(mm)				
1.00	HYDRO MECHANICAL CABINET (HMC) for deflector control	4.00	3000(H)	1600(W)	1500(D)	1700.00	6800.00	6.80	6.80
2.00	MICROPROCESSOR BASED ELECTRO HYDRAULIC GOVERNOR CONTROLLER(EHGC)	4.00	2520(H)	1200(W)	1000(D)	900.00	3600.00	3.60	3.60

3.00	OIL SUMP TANK FOR GOV. (1.6 M. Cu)	1.00	2400(L)	2100(W)	2100(H)	2700.00	2700.00	2.70	2.70
4.00	OIL SUMP TANK FOR MIV (6.3 M. Cu)	1.00							
5.00	OIL SUMP TANK FOR BFV (1.6 M. Cu)	1.00	2400(L)	2100(W)	2100(H)	3000.00	3000.00	3.00	3.00
6.00	Oil Pressure Vessel with oil for MIV	4.00	2200(L)	1800(W)	4700(H)	18000.00	72000.00	72.00	72.00
8.00	Piston type accumulator with nitrogen bottle bank (380 ltrsX2)+17 bottles for Gov.	4.00	1250(Dia)	1250(Dia)	3500(H)	3250.00	13000.00	13.00	13.00
9.00	Piston type accumulator with nitrogen bottle bank (650 ltrsX4)+60 bottles for MIV	4.00					5000.00	5.00	5.00
10.00	HYDRAULIC CONTROL PANEL FOR MIV.	4.00	2450(H)	1020(W)	820(D)	350.00	1400.00	1.40	1.40
11.00	Turbine Junction Box for MIV	4.00					500.00	0.50	0.50
12.00	TROLLY MOUNTED OIL STORAGE TANK CAPACITY - 5 KL	1.00	5000(L)	2000(W)	3000(H)	8000.00	8000.00	8.00	8.00
13.00	CENTRIFUGING OIL PURIFIER	1.00	8000(L)	3000(W)	5000(H)	20000.00	20000.00	20.00	20.00
14.00	FIRST FILLING OF OIL	4.00	-----In suitable no. of drums-----			10000.00	40000.00	40.00	0.00
15.00	Instruments						5000.00	5.00	5.00
16.00	SPARES	1 SET	-----In suitable no. of packages-----				10000.00	10.00	10.00
	SUB TOTAL WEIGHT							191.00	151.00

MAJOR ITEMS OF HYDRO GENERATOR

S.NO.	NAME OF COMPONENT	QTY. PER GEN	TOTAL NO. OF QUANTIT Y	DIMENSION			WT. PER QTY.	TOTAL WT. (4 UNITS) for MAT HANDLING	TOTAL WT. (4 UNITS) for ERECTION
				L	W	H			
				(m)	(m)	(m)			
1.00	Generator Stator	1.00	4.00	-----In suitable no. of packages-----			198.00	792.00	792.00
2.00	Generator Rotor	1.00	4.00	-----In suitable no. of packages-----			270.00	1080.00	1080.00
3.00	Lower shaft	1.00	4.00	-----In suitable no. of packages-----			22.00	88.00	88.00
4.00	Upper shaft	1.00	4.00	-----In suitable no. of packages-----			9.00	36.00	36.00
5.00	Rest Items of Generator	1.00	4.00	-----In suitable no. of packages-----			41.00	164.00	164.00
6.00	Bottom barcket assembly	1.00	4.00	-----In suitable no. of packages-----			40.00	160.00	160.00
7.00	Upper bracket assembly	1.00	4.00	-----In suitable no. of packages-----			30.00	120.00	120.00
8.00	Tools, Tackles & Lifting device	1 set		-----In suitable no. of packages-----				25.00	25.00
	SUB TOTAL WEIGHT							2465.00	2465.00

SCHEDULE OF PANELS FOR STATIC EXCITATION SYSTEM

S.NO.	SCOPE OF SUPPLY	NO. OF PANELS PER SET	NO. OF SETS	DIMENSION			WIGHT OF EACH SET	TOTAL WT. (4 UNITS) for MAT HANDLING	TOTAL WT. (4 UNITS) for ERECTION
				W	D	H			
				(m)	(m)	(m)			
1.00	Regulation Panel with AVR	1.00	6.00	1.15	1.25	2.32	1000.00	6.00	6.00
2.00	Thyristor converter Panel	3.00	6.00	0.68	1.25	2.32	700.00	12.60	12.60
3.00	Field Suppression Panel	1.00	6.00	1.50	1.25	2.32	1200.00	7.20	7.20
5.00	Excitation Transformer with enclosure	1.00	6.00	1.80	1.25	2.50	4000.00	24.00	24.00
	SUB TOTAL WEIGHT							49.80	49.80

GENERATOR CIRCUIT BREAKER

S.NO.	NAME OF COMPONENT	QTY. PER GEN	TOTAL NO. OF QUANTIT Y	DIMENSION			WT. PER QTY.	TOTAL WT. (4 UNITS) for MAT HANDLING	TOTAL WT. (4 UNITS) for ERECTION
				L	W	H			
				(m)	(m)	(m)			
1.00	Generator Circuit Breaker complete with SF6			6700.00	3000.00	3500.00	13.50	54.00	54.00
	SUB TOTAL WEIGHT							54.00	54.00

BUS DUCT

TENTATIVE LENGTH IN M										
S NO.	DESCRIPTION	LENGTH PER UNIT	DIMENSIONS (EACH)				Unit Weight	Weight	TOTAL WT. (4 UNITS) for MAT HANDLING	TOTAL WT. (4 UNITS) for ERECTION
			(m)	(m)	(m)	(m)				
A	Isolated Phase Bus duct (Main)	279.00	-----In suitable no. of packages-----				200.00	55800.00	223.20	223.20
B	Isolated Phase Bus duct (Tap - off)	30.60	-----In suitable no. of packages-----				130.00	3978.00	15.91	15.91
C	SPVT CUBICLES	-	-----In suitable no. of packages-----				-	1800.00	7.20	7.20
D	NG CUBICLES	-	-----In suitable no. of packages-----				-	1500.00	6.00	6.00
E	Miscellaneous Items Packages	-	-----In suitable no. of packages-----				-	1000.00	4.00	4.00
	SUB TOTAL WEIGHT =							256.31	256.31	

HSE PACKAGES (Electrical)

S.NO.	DESCRIPTION	NO. OF Packages	PACKAGE DIMENSIONS (EACH)			WT.OF EACH PACKAGE (T)	TOTAL WT. OF PACKAGE (T)	TOTAL WT. (4 UNITS) for MAT HANDLING (T)	TOTAL WT. (4 UNITS) for ERECTION (T)
			W (m)	D (m)	H (m)				
1.00	A. C Distribution Panel	24.00	3.50	1.50	3.00	2.00	48.00	48.00	48.00
	Other panel	6.00	3.00	1.50	3.00	2.00	12.00	12.00	12.00
	LT Busduct	30.00	1.50	3.50	1.00	0.50	15.00	15.00	15.00
2.00	220V DC SYSTEM								
	220V DC SYSTEM for PH								
	Battery	28.00	1.50	2.00	1.25	2.00	56.00	56.00	56.00
		14.00	1.50	1.50	1.00	0.50	7.00	7.00	7.00
	Charger	4.00	2.00	1.00	3.00	1.00	4.00	4.00	4.00
		2.00	2.00	1.00	3.00	1.00	2.00	2.00	2.00
	DCDB	5.00	3.00	1.50	3.00	1.50	7.50	7.50	7.50
		1.00	3.00	1.50	3.00	1.50	1.50	1.50	1.50
	Other Panel	2.00	2.00	1.50	1.50	0.50	1.00	1.00	1.00
	STARTER PANEL	25.00	1.50	1.00	1.50	0.50	12.50	12.50	12.50
		6.00	2.00	1.00	3.00	1.00	6.00	6.00	6.00
		8.00	3.00	1.50	3.00	1.50	12.00	12.00	12.00
3.00	11 kV Air Insulated Switchgear		-----In suitable no. of boxes-----					4.00	4.00
	Panels								
	vaccuum circuit breaker								
	relays								
	measuring and indicating instrument								
4.00	CCTV System	1.00	3.00	1.50	2.00	0.80	0.80	0.80	0.00
5.00	PUBLIC ADDRESS SYSTEM	1.00	3.00	1.50	2.00	0.80	0.80	0.80	0.00
6.00	ILLUMUNATION SYSTEM		-----In suitable no. of boxes-----				15.00	15.00	0.00
7.00	33 kV GIS System						10.00	10.00	10.00
8.00	LT Switchgear in PH, PS, Barrage Area, Tailrace Outfall, B/F Valve Cavern & Surge Shaft Top						4.00	4.00	4.00
	SUB TOTAL WEIGHT							219.10	202.50

DG SETS

S.NO.	DESCRIPTION	QTY. PER Generator	TOTAL QTY.	DIMENSION			UNIT WEIGHT (T)	TOTAL WT. (4 UNITS) for MAT HANDLING (T)	TOTAL WT. (4 UNITS) for ERECTION (T)
				L (m)	W (m)	H (m)			
1.00	1250 kVA/11 kV for PH		2.00	11.00	3.50	5.00	19.50	39.00	0.00
2.00	300 KVA/415V for Spillway		1.00	7.00	4.00	3.00	8.00	8.00	0.00
3.00	300 KVA/415V for Barrage area		1.00	12.00	4.00	5.00	12.00	12.00	0.00
	SUB TOTAL WEIGHT =							59.00	0.00

HSE(MECHANICAL) & EMRP PACKAGES									
S.NO.	DESCRIPTION	NO. OF BOXES	PACKAGE DIMENSIONS (EACH)			WT.OF EACH PACKAGE (KG)	TOTAL WT. PACKAGE (T)	TOTAL WT. (4 UNITS) for MAT HANDLING (T)	TOTAL WT. (4 UNITS) for ERECTION (T)
			(m)	(m)	(m)				
A	Mechanical Workshop Equipments (All covered store)		-----In suitable no. of boxes-----				30.00	30.00	0.00
B	Electical Workshop		-----In suitable no. of boxes-----				5.00	5.00	0.00
C	Ventilation & Air conditioning System (All covered store)		-----In suitable no. of boxes-----				20.00	20.00	0.00
D	Earthing Circuit & Lightening Protection		-----In suitable no. of boxes-----				500.00	500.00	500.00
E	Water level monitoting system		-----In suitable no. of boxes-----				0.50	0.50	0.00
F	Flood detection system		-----In suitable no. of boxes-----				2.00	2.00	0.00
G	False door		-----In suitable no. of boxes-----				10.00	10.00	0.00
H	Passenger Lift (All covered store)		-----In suitable no. of boxes-----				40.00	40.00	0.00
I	EOT Cranes								
1.00	2 nos. of 150/30T Crane for PH	2.00	-----In suitable no. of boxes-----				110.00	220.00	0.00
2.00	1 no. of 75/20T BFV Crane	1.00	-----In suitable no. of boxes-----				47.00	47.00	0.00
3.00	1 no. of 10T GIS Crane	1.00	-----In suitable no. of boxes-----				28.20	28.20	0.00

J	Fire Detection & Fire Protection System	-----In suitable no. of boxes-----					10.00	10.00	0.00
K	Fire detection system						5.00	5.00	0.00
L	Telecommunication system						5.00	5.00	0.00
	SUB TOTAL WEIGHT							922.70	500.00

CABLES

S NO.	DESCRIPTION				LENGTH	Unit Weight	Weight	TOTAL WT. (4 UNITS) for MAT HANDLING	TOTAL WT. (4 UNITS) for ERECTION
					(m)	((KG)/Km)	(T)	(T)	(T)
A	33 KV HT CABLE					6.00	6.00	6.00
1.00	3Cx120 AL(VH)						35.00	35.00	35.00
B	11 kV LT POWER CABLE								
1.00	1Cx120AL(H)								
2.00	1Cx150AL(H)								
3.00	1Cx300AL(H)								
C	LT POWER CABLE						140.00	140.00	140.00
1.00	1Cx120AL(L)								
2.00	1Cx240AL(L)								
3.00	1Cx300AL(L)								
4.00	1Cx400AL(L)								
5.00	1Cx630AL(L)								
6.00	1Cx1000AL(L)								
7.00	4Cx6AL(L)								
8.00	4Cx10AL(L)								
9.00	4Cx16AL(L)								
10.00	3Cx95AL(L)								
11.00	3Cx150AL(L)								

12.00	3Cx185AL(L)								
13.00	3Cx240AL(L)								
D	LT POWER CABLE						26.00	26.00	26.00
1.00	1Cx300CU(L)								
2.00	4Cx4CU(L)								
3.00	2Cx6CU(L)								
4.00	4Cx6CU(L)								
E	CONTROL CABLE						31.00	31.00	31.00
1.00	2Cx2.5CU(L)								
2.00	4Cx2.5CU(L)								
3.00	7Cx2.5CU(L)								
4.00	12Cx2.5CU(L)								
5.00	12Cx1.5CU(L)								
F	0.5 MM SQ Twisted Pair Instrumentation Cable						22.00	22.00	22.00
1.00	2 Pair								
2.00	4 Pair								
3.00	8 Pair								
4.00	12 Pair								
5.00	16 Pair								
G	OPGW Cable						21.00	21.00	21.00
H	ADSS Cable						1.00	1.00	1.00
I	Trays for Power House						70.00	70.00	70.00
	SUB TOTAL WEIGHT =							352.00	352.00

SCHEDULE OF PANEL/DESK FOR CONTROL & MONITORING SYSTEM

S.NO.	DESCRIPTION	NO. OF SETS	NO. OF PANELS/ SUITES/D ESKS PER SET	Size of each panel/suite/desk			WEIGHT OF EACH PANEL (KG)	TOTAL WT. (4 UNITS) for MAT HANDLING (T)	TOTAL WT. (4 UNITS) for ERECTION (T)
				W (mm)	D (mm)	H (mm)			
1.00	CONTROL BOARDS/PANELS								
1.10	Unit Control Board (UCB)								
1.1.1	Control & Monitoring Panel	4.00	1 suit	(750+750+750+750+750)	800.00	2320.00	2000.00	8.00	8.00
1.1.2	Temp. & Gauge Panel	4.00	2.00	1000.00	800.00	2320.00	500.00	4.00	4.00
1.20	Common Auxiliaries Control Board								
1.2.1	Common Auxiliaries Control Board	1.00	1suite	(750+750+750+750+750)	800.00	2320.00	1500.00	1.50	1.50
								0.00	0.00
1.30	Remote I/O panel at BFV House							0.00	0.00
1.3.1	Remote I/O panel at BFV House	1.00	1.00	750.00	800.00	2320.00	500.00	0.50	0.50
1.40	Remote Terminal Unit at Barrage								
1.4.1	Panel	1.00	1.00	750.00	800.00	2320.00	500.00	0.50	0.50
1.50	Interface For Remote Control								
1.5.1	Panel	1.00	1.00	750.00	800.00	2320.00	500.00	0.50	0.50
2.00	Power House Control Panel								
2.0.1	Control Desk	1.00	1.00						
2.0.2	Shift In - Charge Desk	1.00	1.00						
2.0.3	Large Video Screen	1 set	1.00						
2.0.4	Printer Stations	1 set	1.00					4.00	4.00
2.0.5	Rack for OWS	1 set	1.00						
2.0.6	Rack for EWS etc	1 set	1.00						
2.0.7	Mobile Operator Station								
	Laptop Computer & Printer	1.00	1.00						
3.00	HMI at NTPCs OS Control Room							2.00	2.00
	Table for OWS	1.00	1.00						
4.00	HMI at Barrage Control Room								
	Table for OWS	1.00	1.00						
5.00	GPS based Time Synchronization Panel							5.00	5.00
	Panel & clocks	1 set	1.00						
6.00	230 V, 1-Phase, UPS (for SCADA HMI)								
7.00	230 V, 1-Phase, UPS (individual UPS for computers)							3.00	3.00
8.00	230 V, 1-Phase, UPS (in Barrage)	1 set	1 set						
9.00	24 VDC Battery & Charger (for SCADA panels in PH)								
4.00			1.00						
10.00	24 VDC Battery & Charger (for BFV control panel)							2.00	2.00
1.00			1.00						
11.00	24 VDC Battery & Charger (for RTU Panel in Barrage)								
1.00			1.00						
12.00	Network Panel								

SUB TOTAL WEIGHT =								31.00	31.00
--------------------	--	--	--	--	--	--	--	-------	-------

AUXILIARY AND STATION SERVICE TRANSFORMER

S.NO.	DESCRIPTION	QTY. PER TRNASFORMER	TOTAL QTY.	DIMENSION, MM			WIGHT PER PACKAG E	TOTAL WT. (4 UNITS) for MAT HANDLING	TOTAL WT. (4 UNITS) for ERECTION
				L	B	H			
				(mm)	(mm)	(mm)			
1.00	13.8kv/11.5 kv,6.300MVA cast resin Dry Type station aux.		2.00	3000.00	800.00	2300.00	2000.00	4.00	4.00
2.00	13.8kv/0.433kv,630KVA, cast resin Dry Type unit aux. Transformers		4.00	4000.00	800.00	2300.00	2500.00	10.00	10.00
3.00	11kv/0.433 kv,2MVA cast resin Dry Type Transformers		2.00	2100.00	1800.00	2600.00	3500.00	7.00	7.00
4.00	11kv/34.5kv,4MVA oil filled Transformers for Colony/Barrage area supply		2.00	3500.00	2700.00	3500.00	10000.00	20.00	20.00
5.00	11kv/0.433 kv,250 KVA cast resin Dry Type Service Transformers for supply to B/F Valve, tailrace area & surge shaft area		6.00	2300.00	2500.00	2300.00	2600.00	15.60	15.60
6.00	33kv/0.433kv,1MVA oil filled Transformers for Barrage area supply		2.00	3200.00	2700.00	3200.00	6800.00	13.60	13.60
7.00	11kv/0.433 kv,500 KVA cast resin Dry Type Service Transformers for Pot –Head yard		2.00	2700.00	2400.00	3000.00	7500.00	15.00	15.00
8.00	Lighting Transformer as per requirement							2.00	2.00
9.00	Dry Type cast Resin Excitation Transformers		4.00					10.00	10.00
10.00	Cubicle of Excitation Transformer		4.00					8.00	8.00
	SUB TOTAL WEIGHT =							105.20	105.20

MISCELLANEOUS

S.NO.	DESCRIPTION	NO. OF QTY.	PACKAGE DIMENSIONS (EACH)			UNIT WEIGHT	TOTAL WT.	TOTAL WT. (4 UNITS) for MAT HANDLING	TOTAL WT. (4 UNITS) for ERECTION
			(mm)	(mm)	(mm)				
1.00	SPARES (one set for complete power house)		-----In suitable no. of boxes-----					50.00	0.00
2.00	Tools tackles, handling & testing devices		-----In suitable no. of boxes-----					40.00	0.00
3.00	Other miscellaneous Mechanical/Electrical assemblies							50.00	50.00
	SUB TOTAL WEIGHT =							140.00	50.00
	SUM TOTAL FOR MAT HANDLING							7701.61	
	SUM TOTAL FOR ERECTION								7073.31

Note :

1. Weights and package size mentioned for the above items are tentative and may change during detail design.
2. Number of Panels for complete Control & Monitoring system, excitation system,starter panels etc.shown are tentative and likely to change during detail design.
3. Erection of cables required to interconnect all systems of the power house shall be in the scope of contractor
4. Complete system erection shall be in the scope of Erection Contractor.