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DRAWING No. TB-3-360-316-016

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NOTE :–

1. ALL DIMENSIONS ARE IN mm.
2. SYSTEM FAULT LEVEL FOR 11kV SYSTEM IS 44kA FOR 3 SECOND.
3. LA , BUS POST INSULATOR , ISOLATOR AND TOWER /BEAM STRUCTURE SHALL BE LATTICE TYPE.
4. PROTECTION AGAINST DIRECT LIGHTNING STROKE FOR 11kV SWITCHYARD SHALL BE BY 7/9 SWG SHIELD WIRE(OVERALL DIA. 10.98 MM).
5. TENSION INSULATOR STRING SHALL CONSIST OF 1 NO. ANTI FOG TYPE DISC (ELECTRO MECHANICAL STRENGTH OF DISC IS 120kN AND CREEPAGE DISTANCE OF OF INDIVIDUAL DISC IS 430MM).
6. THE 11kV TOWER AND BEAM STRUCTURE SHALL BE DESIGNED FOR A FACTOR OF SAFETY OF 2 FOR NORMAL/BROKEN WIRE CONDITION & 1.5 FOR SHORT CIRCUIT FORCES CONDITION.
7. THE TRANSVERSE, VERTICAL, LONGITUDINAL LOADS SHALL BE CONSIDERED AS PER IS 802: 1995.
8. 11KV BEAM B5 HAS PROVISION OF SINGLE ANCHORING POINT ON ONE SIDE OF BEAM FOR TERMINATION OF SINGLE TENSION STRING HARDWARE. SUSPENSION STRING HARDAWRE ANCHORING IS NOT APPLICABLE FOR BEAM B5.

TABLE –1 :BILL OF MATERIAL OF SWITCHYARD EQUIPMENTS

ITEM CODE	DESCRIPTION	SYMBOL	QUANTITIES IN NOS.	
			POWER PLANT SIDE	RIVER WATER PUMP SIDE
1	12kV , 1 PHASE LIGHTNING ARRESTER ,10kA, CLASS–3		6	6
2	33kV, 630A, 50kA FOR 3S, 3–PH HCB ISOLATORS(MECHANICALLY GANGED MOTOR OPERATED) WITH 1 E/S (MANUALLY OPERATED),		2	2
3	33kV BUS POST INSULATOR 1 PHASE CUM 11kV CABLE SEALING END 1 PHASE		6(BPI)+6(CSE)*	6(BPI)+6(CSE)*

NOTE *=11kV CABLE AND CABLE SEALING END SHALL BE IN BHEL PEM SCOPE OF SUPPLY

TABLE 2:. MINIMUM CLEARANCE TABLE (IN AIR)

S. NOS.	DESCRIPTION	UNIT	11kV	33kV
1.	PHASE TO PHASE	mm	280	320
2.	PHASE TO EARTH	mm	140	320
3.	MINIMUM DISTANCE OF THE LOWEST EARTH PART OF INSULATOR SUPPORTING LIVE CONDUCTORS FROM GROUND	mm	2550	2550
4.	SECTION CLEARANCE	mm	3000	3000
5.	PLINTH HEIGHT FROM GROUND LEVEL	mm	300	300
6.	MINIMUM LIVE PART TO GROUND CLEARANCE	mm	3800	3800

TABLE–4: LOADING DETAILS ON GANTRY :–

NOTATION	NO. & TYPE OF COND./ SHIELD WIRE PER PHASE	NORMAL TENSION PER PHASE	S/C TENSION PER PHASE	REMARKS
K** →	SINGLE ZEBRA CONDUCTOR SPAN = 100000mm(MAX) WITH 30 DEVIATION (MAX) IN HORIZONTAL & VERTICAL DIRECTION	500 KG	NA	SLACK OUTGOING IIkV LINE
→ d1	SHIELD WIRE WITH 30° DEVIATION (MAX) IN HORIZONTAL & VERTICAL DIRECTION	400 KG	NA	–

** SHORT CIRCUIT FORCE IS NOT APPLICABLE FOR TRANSMISSION LINE CONDUCTOR BECAUSE OUTGOING TRANSMISSION LINE CONDUCTOR ORIENTATION ARE NOT IN SAME PLANE.

TABLE–3: SYSTEM PARAMETERS

S. NOS.	DESCRIPTION	UNIT	11kV	33kV
1.	NOMINAL SYSTEM VOLTAGE	kV	11	33
2.	HIGHEST SYSTEM VOLTAGE	kV	12	36
3.	BASIC IMPULSE LEVEL	kVP	75	170
4.	POWER FREQUENCY WITHSTAND	kVrms	28	70
5.	CREEPAGE DISTANCE (MINIMUM)	mm/kV	31	31

LEGEND

	PRESENT BHEL SCOPE
– – – – –	SHIELD WIRE
	FENCE
	TENSION STRING INSULATOR
	COLUMN WITH PEAK
	GATE

TABLE .5: TOWER DETAIL

TOWERS DESIGNATION	STR. HEIGHT DETAIL FROM PLINTH TOP (m)	QUANTITY (NOS.)		REMARKAS
		POWER PLANT SIDE	RIVER WATER PUMP SIDE	
T9	6+1.8	2	2	1. BEAM TAKE OFF ONE SIDE AT A HEIGHT OF 6.0m. 2. PEAK OF HEIGHT 1.8m
T10	6+1.8	1	1	1. BEAM TAKE OFF TWO SIDE AT A HEIGHT OF 6.0m. 2. PEAK OF HEIGHT 1.8m

TABLE–6: BEAM DETAIL

BEAM TYPE	HEIGHT FROM PLINTH TOP/SPAN (m)	QUANTITY (NOS.)		REMARKS
		POWER PLANT SIDE	RIVER WATER PUMP SIDE	
B5	6/6	2	2	SUITABLE FOR STRINGING OF CONDUCTOR WITH 30 DEVIATION (MAX) IN HORIZONTAL & VERTICAL DIRECTION

REFERENCE

1. SINGLE LINE DIAGRAM FOR 400 kV SURATGARH SUBSTATION – DRG. TB–1–360–510–001
2. PLOT PLAN DRAWING NO. PE–DG–392–100–M001
3. LAYOUT OF TRANSFORMER YARD DRAWING NO. PE–DG–392–100–E001
4. LAYOUT OF 400kV SWITCHYARD DRAWING NO. TB–0–360–316–002
5. STRUCTURE LOADING DIAGRAM DRAWING NO. TB–0–360–316–010

REV.	DATE	REASONS FOR REVISION	DRN.	PREPARED BY	CHECKED BY	APPROVED BY

OWNER
RAJASTHAN RAJYA VIDYUT UTPADAN NIGAM LIMITED

PROJECT
2X660MW THERMAL POWER PLANT,SURAT GARH STAGE -V, UNIT 7 & 8 AT SURATGARH , RAJASTHAN

OWNER'S ENGINEER
TATA CONSULTING ENGINEERS LIMITED

EPC CONTRACTOR
BHARAT HEAVY ELECTRICALS LTD TRANSMISSION BUSINESS GROUP

DEPT CODE		NAME	SIGN.	DATE
422	DRN	MS		17.07.14
	DESN	SK		
	CHD	SKS		
	APPD	RS		

TITLE
LAYOUT PLAN AND ELEVATION OF 11kV S/S AT SURATGARH

CV	ME	EL	I&C			DEPT.	SCALE 1:600
						SIGN	
						DATE	

BHEL/SUB VENDOR DRG NO.
TB-3-360-316-016

SHT. No 01 OF 03 REV. 00

COMPUTER DRG. PATH NAME :
REF. DRG. No.
SIGN. & DATE
INVENTORY No.

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