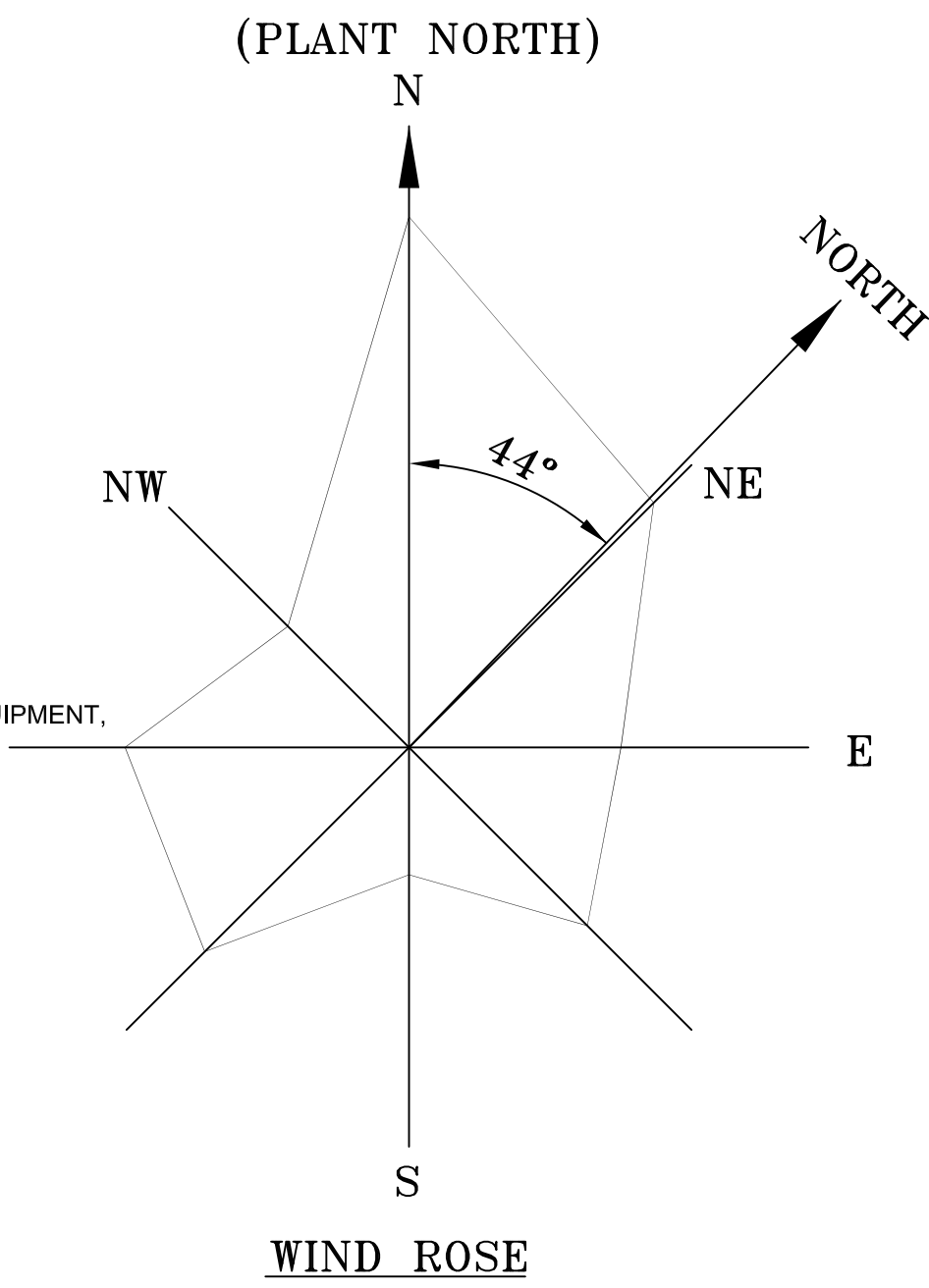


SL.NO.	DESCRIPTION	400kV	
		CONDUCTOR DETAIL	CONNECTION HEIGHT (ABOVE PLINTH LEVEL)
1.	EQUIPMENT INTERCONNECTION	4.0" IPS (EH) AL. TUBE/ MOOSE CONDUCTOR	10mtr.
2.	JACK BUS ON GT/ST - IN ACC AND INTERCONNECTOR AREA	TWIN ACSR MOOSE CONDUCTOR	25 mtr.
3.	JACK BUS TOWARDS ACC - IN SWYD	TWIN ACSR MOOSE CONDUCTOR	23 mtr.
3.	LINE SIDE DEAD-END STRINGING	#QUAD ACSR MOOSE CONDUCTOR	23 mtr.
4.	EARTHWIRE	7/3.66mm SHIELD WIRE	33.5 mtr / 31.5 mtr.
5.	DROPPER ON CVT, LA	TWIN ACSR MOOSE CONDUCTOR	-

1. ALL DIMENSIONS ARE IN MM.
2. ALL STRUCTURE/CONDUCTOR HEIGHTS ARE ABOVE PLINTH LEVEL. PLINTH LEVEL IS 300 MM ABOVE F.G.L.
3. WAVE TRAP FOUNDATION SHALL BE PROVIDED FOR ALL THREE PHASE OF THE LINE AND SHALL BE SUITABLE FOR BP ALSO. HOWEVER WAVE TRAP SHALL BE INSTALLED ON TWO PHASES ONLY. STRING INSULATOR SHALL BE PROVIDED FOR ONE PHASE WHEREVER WAVE TRAP IS NOT INSTALLED.
4. TYPE OF GANTRY STRUCTURES SHALL BE AS PER APPROVED STRUCTURAL LAYOUT DRAWING.
5. SWITCHYARD LIGHTNING PROTECTION IS ACHIEVED THROUGH SHIELD WIRES AS PER APPROVED DLSLP.
6. SA PRESSURE RELEASE VALVE SHALL NOT BE TOWARDS TRANSFORMER SIDE / ANY EQUIPMENT KEPT NEAR LIGHTNING ARRESTER AND BHEL SHALL ENSURE THE SAME DURING ERECTION AT SITE.
7. DIMENSIONS MARKED OVER ALL TUBE ARE CUT LENGTHS. DETAILED CUT LENGTHS ARE ATTACHED AS ANNEXURE 1. LIGHTNING ARRESTER AND BHEL SHALL ENSURE THE SAME DURING ERECTION AT SITE.
8. FOR SECTION DETAILS, REFER SHEET NO. 02.
9. STRIKING UPTO CT & BT BAYS SHOWN IS TENTATIVE.
10. SIZE OF GIS AND CONTROL ROOM BUILDING IS AS PER RESPECTIVE APPROVED LAYOUTS.
11. DEAD END TOWERS LOCATION TO BE CONFIRMED BY NTPC.
12. SUPPLY AND STRINGING OF 400KV LINE CONDUCTOR, SHIELD WIRE, INSULATOR AND HARDWARE BETWEEN 400KV DEAD END TOWER AND SWITCHYARD TERMINAL GANTRY ARE NOT IN BHEL SCOPE. HOWEVER, JUMPERING FOR THE RESPECTIVE EQUIPMENT, JUMPERS & HARDWARE REQUIRED FOR JUMPERS ARE IN SCOPE OF BHEL.



Sl.No.	DESCRIPTION OF PARAMETER	
1	SYSTEM OPERATING VOLTAGE	400kV
2	MAX. OPERATING VOLTAGE OF THE SYSTEM (rms)	420kV
3	RATED FREQUENCY	50Hz
4	NO. OF PHASES	3
5	RATED INSULATION LEVELS	
	i) FULL WAVE IMPULSE WITHSTAND VOLTAGE (1.250microsec.)	± 1425kVp
	ii) SWITCHING IMPULSE WITHSTAND VOLTAGE (250/2500microsec.)	± 1050kVp
	iii) ONE MINUTE POWER FREQUENCY WITHSTAND VOLTAGE (rms)	630kV (rms)
6	CORONA EXTINCTION VOLTAGE (MIN)	320kV (rms)
7	MAX. RADIO INTERFERENCE VOLTAGE FOR FREQUENCY BETWEEN 0.5MHz & 2MHz AT 266Kv rms	1000 microV
8	MIN. CREEPAGE DISTANCE	25MM/kV (10500 MM)
9	MIN. CLEARANCE	
	i) PHASE TO PHASE	4000MM
	ii) PHASE TO EARTH	3500MM
	iii) SECTIONAL CLEARANCE	6500MM
10	RATED SHORT CIRCUIT CURRENT FOR 1SEC DURATION	63kA
11	SYSTEM NEUTRAL EARTHING	EFFECTIVELY EARTHED
12	SUB CONDUCTOR SPACING	450MM
13	CONDUCTOR STATIC TENSION	
	400kV TWIN	6T PER PHASE
	400kV QUAD	6T PER PHASE

_____	FUTURE/ NOT IN BHEL SCOPE.
_____	PRESENT/ BHEL SCOPE
*	TO BE SUPPLIED ALONG WITH MAIN EQUIPMENT
#	TO BE CONFIRMED BY CUSTOMER

SN	NTPC Drg. No.	DESCRIPTION
1	9585-001-999-POC-F-001	PLOT PLAN
2	9585-001-572-PVE-P-0002	400kV SWITCHYARD SINGLE LINE DIAGRAM
3	9585-001-572-PVE-F-0283	GIS Layout (Plan and Section View)
4	9585-001-572-PVE-F-0013	400 kV Layout Plan and Section

ADDITIONAL INFORMATION
W.O.No.

STATUS OF DRAWING
DISTRIBUTION OF PRINTS

REV.	DATE	ALTERED
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		APPROVED
ZONE		

[illegible]


01/PVUNL-CS-9585-001-2/NDA-FC	DATED	08/03/2018
01/PVUNL-CS-9585-001-2/NDA-SC	DATED	08/03/2018
01/PVUNL-CS-9585-001-2/NDA-TC	DATED	08/03/2018

ग्राहक/परियोजना का नाम	PATRATU VIDYUT UTPADAN NIGAM LTD.
NAME OF CUSTOMER/PROJECT	PATRATU SUPER THERMAL POWER PROJECT EXPANSION PHASE-I (3x800 MW)

	भारत हेवी इलेक्ट्रिकल्स लिमिटेड	खाना DRAWN	नाम /NAME	हस्ता.
	दूरभाषिणन परिशोधना विभाग	नेपा	NS	-SC

	BHARAT HEAVY ELECTRICALS LTD. TRANSMISSION PROJECTS DIVISION	CHECKED स्वीकृत	SKS AG	-SG -SG

विभाग DEPT.		अनुपात / SCALE	कार्ड कोड CARD CODE	APPROVED	
				VENDOR	

कोड CODE				

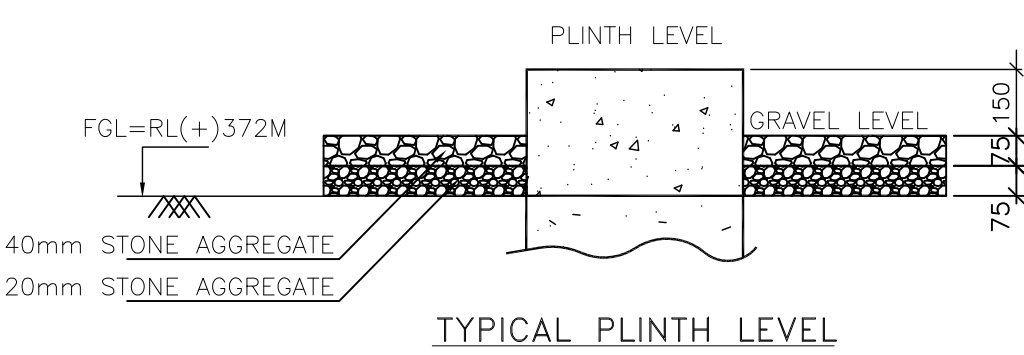
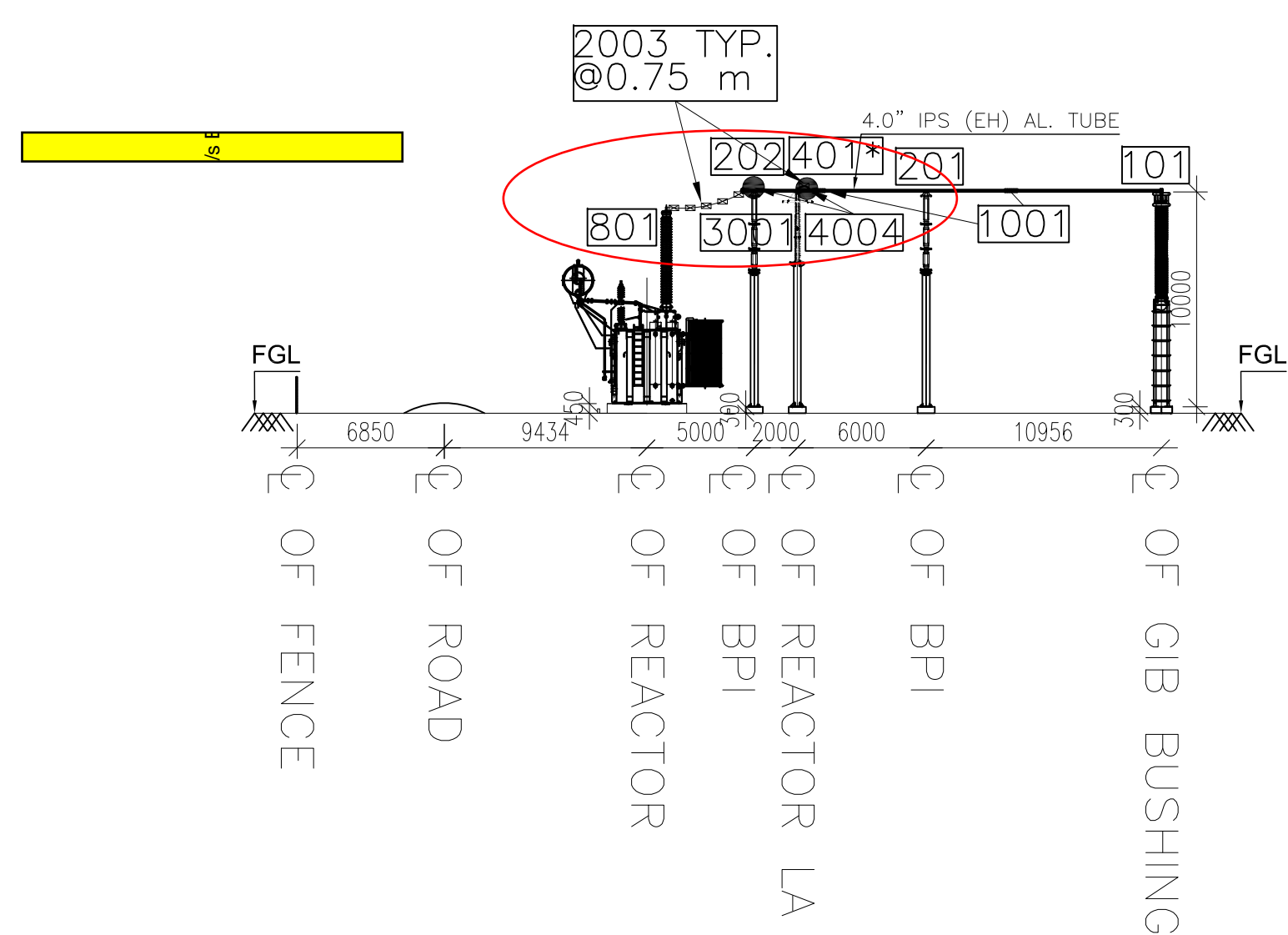
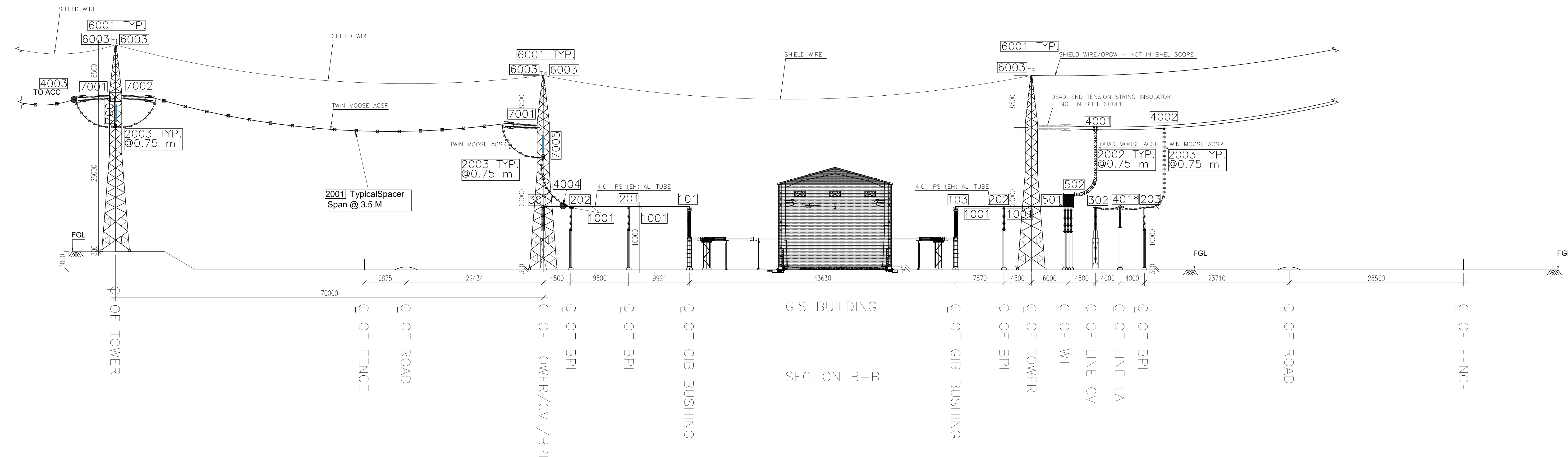
शीर्षक/TITLE	ड्रिंगा.क्र./DRAWING NO.
400 KV EKD - PLAN SECTION & BOM	NTFC DRG NO. 9585-001-572-PVE-F

100-RV-ENR ENR, SUBMITTAL & DATA	BHEL DRG NO.	TB-0-397-316-017
	पृष्ठ क्र./SHEET No. 01	अगला पृष्ठ

[illegible]

REV.	DATE	ALTERED CHECKED APPROVED	विभाग DEPT. कोड		अनुपात / SCALE	कार्ड कोड CARD CODE	APPROVED VENDOR		
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ZONE	CURVE						
	शीटिंग/TITLE					ड्रॉइंग नं./DRAWING NO.	पुनः/REV.
	400 kV EKD - PLAN, SECTION & BOM					NTPC DRG NO. 9595-001-572-PVE-F-0023 IREL DRG NO. TB-0-397-316-017	00
						पृष्ठ नं./SHEET No. 01	अगला पृष्ठ/NEXT SHEET 02



*NOTE: THE SECTIONS OF ACC SHALL BE FINALIZED AFTER FINALIZATION OF ACC YARD.

REF. DRG.	SECTION C-C												01/PVUNL-CS-9585-001-2/NOA-FC DATED 08/03/2018 01/PVUNL-CS-9585-001-2/NOA-SC DATED 08/03/2018 01/PVUNL-CS-9585-001-2/NOA-TC DATED 08/03/2018																																																																																																						
	SIGN. & DATE												ADDITIONAL INFORMATION W.O.No. STATUS OF DRAWING DISTRIBUTION OF PRINTS																																																																																																						
INVENTORY No.	A												BHARAT HEAVY ELECTRICALS LTD. PATRATU VIDYUT UTPADAN NIGAM LTD. PATRATU SUPER THERMAL POWER PROJECT EXPANSION PHASE-I (3x800 Mw)																																																																																																						
	DISTRIBUTION OF PRINTS												BHARAT HEAVY ELECTRICALS LTD. TRANSMISSION PROJECTS DIVISION																																																																																																						
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Equipments Clamps, Sleeves, Spacers, Corona Bells, String Insulator Hardware etc																Shall												
Clamp No.	Equipment	kV Rating	Current Nominal(A)	Short Circuit (kA)	Terminal				Quantities															5% Mandatory spares			Remarks	
					Terminal Type	H/V	Material	Connector Type	Bay 401 (GT1 Bay)	Bay 403 (Line1 Bay)	Bay 404 (ST1 Bay)	Bay 406 (Line2 Bay)	Bay 407 (GT2 Bay)	Bay 409 (Line3 Bay)	Bay 410 (ST2 Bay)	Bay 412 (Line4 Bay)	Bay 413 (BR1 Bay)	Bay 415 (BR2 Bay)	Bay 416 (ST3 Bay)	Bay 418 (Line5 Bay)	Bay 419 (GT3 Bay)	Bay 421 (Line6 Bay)	Total		Total			
101	GIS Bushings	400	3150	63	Pad	H	Aluminium	TRH	3	--	3	--	3	--	--	2	3	3	--	2	--	2	21	2	23	Suitable for 4" IPS (EH) Al. Tube		
102	GIS Bushings	400	3150	63	Pad	H	Aluminium	4SH	--	--	--	--	--	--	--	1	--	--	--	1	--	1	3	1	4	Suitable for Quad ACSR Moose		
103	GIS Bushings	400	3150	63	Pad	H	Aluminium	TEH	--	3	--	3	--	3	3	--	--	--	3	--	3	--	18	1	19	Suitable for 4" IPS (EH) Al. Tube		
201	Bus Post Insulator	400	3150	63	Pad	H	MCI/SGI	TEH	3	--	3	--	3	--	--	--	3	3	--	--	--	--	15	1	16	Suitable for 4" IPS (EH) Al. Tube		
202	Bus Post Insulator	400	3150	63	Pad	H	MCI/SGI	TRH/SLIDING	3	3	3	3	3	3	3	--	3	3	3	--	3	--	33	2	35	Suitable for 4" IPS (EH) Al. Tube		
203	Bus Post Insulator	400	2000	63	Pad	H	MCI/SGI	2SH	3	3	3	3	3	3	3	3	--	--	3	3	3	3	36	2	38	Suitable for Twin ACSR Moose		
301	GT CVT	400	3150	63	Pad	H	Mild Steel(Electro Tinned)	TEH	3	--	--	--	3	--	--	--	--	--	--	--	3	--	9	1	10	Suitable for 4" IPS (EH) Al. Tube		
302	Line CVT	400	2000	63	Pad	H	Mild Steel(Electro Tinned)	2SH	--	3	--	3	--	3	--	3	--	--	--	3	--	3	18	1	19	Suitable for Twin ACSR Moose		
401*	Lightning Arrester	400	2000	63	Pad	H	Aluminium	2SH	3	3	3	3	3	3	3	3	3	3	3	3	3	3	42	3	45	Suitable for Twin ACSR Moose		
501	Wave Trap	400	3150	63	Pad	H	Aluminium	TEH	--	2	--	2	--	2	--	2	--	--	--	2	--	2	12	1	13	Suitable for 4" IPS (EH) Al. Tube		
502	Wave Trap	400	3150	63	Pad	H	Aluminium	4SH	--	2	--	2	--	2	--	2	--	--	--	2	--	2	12	1	13	Suitable for Quad ACSR Moose		
601	GT Bushing	400	2000	63	Pad	H	Cu	2SH	3	--	--	--	3	--	--	--	--	--	--	3	--	9	1	10	Suitable for Twin ACSR Moose			
701	ST Bushing	400	2000	63	Pad	H	Cu	2SH	--	--	3	--	--	--	3	--	--	--	3	--	--	--	9	1	10	Suitable for Twin ACSR Moose		
801	Bus Reactor Bushing	400	2000	63	Pad	H	Cu	2SH	--	--	--	--	--	--	--	--	3	3	--	--	--	--	6	1	7	Suitable for Twin ACSR Moose		
1001	Aluminium Tube - Welding Sleeves	400	3150	63	--	--	Aluminium	--	9	5	6	4	6	2	--	2	6	6	3	2	3	2	56	3	59	Suitable for 4" IPS (EH) Al. Tube		
2001	Spacers (Flexible)	420	2000	63	--	--	Aluminium	S2	227	--	227	--	227	--	227	--	--	--	227	--	227	--	1362	69	1431	Suitable for Twin ACSR Moose		
2002	Spacers (Rigid)	420	3150	63	--	--	Aluminium	S4	--	58	--	58	--	58	--	58	--	--	--	58	--	58	348	18	366	Suitable for Quad ACSR Moose		
2003	Spacers (Rigid)	420	2000	63	--	--	Aluminium	S2	379	90	379	90	379	90	379	90	32	32	379	90	379	90	2878	144	3022	Suitable for Twin ACSR Moose		

Equipments Clamps, Sleeves, Spacers, Corona Bells, String Insulator Hardware etc.																										
Clamp No.	Equipment	kV Rating	Current Nominal(A)	Short Circuit (kA)	Terminal				Quantities															Remarks		
					Terminal Type	H/V	Material	Connector Type	Bay 401 (GT1 Bay)	Bay 403 (Line1 Bay)	Bay 404 (ST1 Bay)	Bay 406 (Line2 Bay)	Bay 407 (GT2 Bay)	Bay 409 (Line3 Bay)	Bay 410 (ST2 Bay)	Bay 412 (Line4 Bay)	Bay 413 (BR1 Bay)	Bay 415 (BR2 Bay)	Bay 416 (ST3 Bay)	Bay 418 (Line5 Bay)	Bay 419 (GT3 Bay)	Bay 421 (Line6 Bay)	Total		5% Mandatory spares	Total
3001	Corona Bell	420	3150	63	--	H	Aluminium	--	--	1	3	1	--	1	3	--	3	3	3		--	--	18	1	19	Suitable for 4" IPS Al. Tube
4001	TEE Connector	400	3150	63	--	--	Aluminium	QuadACSRMoose - Through QuadACSRMoose - TEE	--	3	--	3	--	3	--	3	--	--	--	3	--	3	18	1	19	QuadACSRMoose - Through QuadACSRMoose - TEE
4002	TEE Connector	400	3150	63	--	--	Aluminium	QuadACSRMoose - Through TwinACSRMoose - TEE	--	3	--	3	--	3	--	3	--	--	--	3	--	3	18	1	19	QuadACSRMoose - Through TwinACSRMoose - TEE
4003	TEE Connector	400	2000	63	--	--	Aluminium	TwinACSRMoose - Through TwinACSRMoose - TEE	12	--	12	--	12	--	12	--	--	--	12	--	12	--	72	4	76	TwinACSRMoose - Through TwinACSRMoose - TEE
4004	TEE Connector	400	2000	63	--	--	Aluminium	4" IPS Al. Tube - Through TwinACSRMoose - TEE	3	--	3	--	3	--	3	--	6	6	3	--	3	--	30	2	32	4" IPS Al. Tube - Through TwinACSRMoose - TEE
4005	TEE Connector	400	3150	63	--	--	Aluminium	4" IPS Al. Tube - Through QuadACSRMoose - TEE	--	1	--	1	--	1	--	--	--	--	--	--	--	--	3	1	4	4" IPS Al. Tube - Through QuadACSRMoose - TEE
5001	PG Clamp	400	1000	63	--	--	Aluminium	1SH	--	--	--	--	--	--	--	--	--	--	--	--	--	--	9	1	10	Suitable for Single ACSR Moose to Single ACSR Moose
6001	PG Clamp For Shield Wire	--	--	--	--	--	MSHDG	1SH	--	--	--	--	--	--	--	--	--	--	--	--	--	--	112	6	118	Suitable for 10.98 mm , 7/9 SWG GS Wire
6002	Clamp for Shield Wire on Structure	--	--	--	--	--	MSHDG	1SH	--	--	--	--	--	--	--	--	--	--	--	--	--	--	628	32	660	Suitable for 10.98 mm , 7/9 SWG GS Wire
6003	Strain Clamp For Shield Wire	--	--	--	--	--	MSHDG	1SH	--	--	--	--	--	--	--	--	--	--	--	--	--	--	70	4	74	Suitable for 10.98 mm , 7/9 SWG GS Wire
6004	Pad Connector To Suit 10.98mm DIA GS Wire and 75X12 mm GS Flat	--	--	--	--	--	MSHDG	1SH	--	--	--	--	--	--	--	--	--	--	--	--	--	--	38	2	40	Suitable for 10.98 mm , 7/9 SWG GS Wire & 75X12 GI Flat
6005	Clamp for Earth Strip on Structure	--	--	--	--	--	MSHDG	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2500	125	2625	Suitable for GI Flat 75X12 and 50X6
7001	400 kV Double Tension Hardware with Turnbuckle suitable for Twin ACSR Moose Conductor	400	2000	63	--	--	--	--	12	--	12	--	12	--	12	--	--	--	12	--	12	--	72	4	76	Suitable for Twin ACSR Moose
7002	400 kV Double Tension Hardware without Turnbuckle suitable for Twin ACSR Moose Conductor	400	2000	63	--	--	--	--	12	--	12	--	12	--	12	--	--	--	12	--	12	--	72	4	76	Suitable for Twin ACSR Moose
7003	400 kV Single Suspension Hardware with Drop Clamp suitable for Quad ACSR Moose Conductor	400	3150	63	--	--	--	--	--	1	--	1	--	1	--	1	--	--	--	1	--	1	6	1	7	Suitable for Quad ACSR Moose
7004	400 kV Single Suspension Hardware with Straight Clamp suitable for Twin ACSR Moose Conductor	400	2000	63	--	--	--	--	9	--	9	--	9	--	9	--	--	--	9	--	9	--	54	3	57	Suitable for Twin ACSR Moose
7005	400 kV Single Suspension Hardware with Drop Clamp suitable for Twin ACSR Moose Conductor	400	2000	63	--	--	--	--	3	--	3	--	3	--	3	--	--	--	3	--	3	--	18	1	19	Suitable for Twin ACSR Moose

400kV GIS at Patratu 3X800 PSTPP 4" IPS Al Tube - Cutting Schedule 17-May-2019													
S.No.	Description	Unit	C/C - R Phase	C/C - Y Phase	C/C - B Phase	Exact Length - R Phase	Exact Length - Y Phase	Exact Length - B Phase	Standard Cut Lengths (meters)				Total
									4	6	5	7	
1		GT1											
1.1	GIB(TRH) To BPI (TEH)	m	10	10	10	10	10	10		3	3		33
1.2	BPI(TEH) To BPI(TRH - No Tube Break)	m	9.5	9.5	9.5	9.5	9.5	9.5	3	3			30
1.3	BPI(TRH - No Tube Break) To CVT (TEH)	m	4.5	4.5	4.5	4	4	4	3				12
2		ST1											
2.1	GIB(TRH) To BPI (TEH)	m	7.9	7.9	7.9	7.9	7.9	7.9	3		3		27
2.2	BPI(TEH) To BPI(TRH - No Tube Break)	m	9.5	9.5	9.5	10	10	10	3	3			30
3		GT2											
3.1	GIB(TRH) To BPI (TEH)	m	5.9	5.9	5.9	5.9	5.9	5.9		3			18
3.2	BPI(TEH) To BPI(TRH - No Tube Break)	m	9.5	9.5	9.5	9.5	9.5	9.5	3	3			30
3.3	BPI(TRH - No Tube Break) To CVT (TEH)	m	4.5	4.5	4.5	4	4	4	3	3			12
4		ST2											
4.1	GIB(TEH) To BPI (TRH)	m	4.5	4.5	4.5	5	5	5			3		15
5		BR1											
5.1	GIB(TRH) To BPI (TEH)	m	10.95	10.95	10.95	10.95	10.95	10.95	3			3	33
5.2	BPI(TEH) To BPI(TRH - No Tube Break)	m	8	8	8	8.5	8.5	8.5	3		3		27
6		ST3											
6.1	GIB(TEH) To BPI (TRH)	m	8.5	8.5	8.5	9	9	9	3		3		27
7		GT3											
7.1	GIB(TEH) To BPI (TRH)	m	9.8	9.8	9.8	9.8	9.8	9.8	3	3			30
7.2	BPI(TRH) To CVT(TEH)	m	4.5	4.5	4.5	4.5	4.5	4.5			3		15
8		Line 1											
8.1	GIB(TEH) To BPI (TRH)	m	7.9	0	0	8.4	0	0	1		1		9
8.2	GIB(TEH) To BPI(TRH - No Tube Break)	m	0	7.9	7.9	0	7.9	7.9	2			2	22
8.3	BPI(TRH - No Tube Break) To WT (TEH)	m	0	10.5	10.5	0	9.7	9.7				2	14
9		Line 2											
9.1	GIB(TEH) To BPI (TRH)	m	5.9	0	0	6.4	0	0				1	7
9.2	GIB(TEH) To BPI(TRH - No Tube Break)	m	0	5.9	5.9	0	5.9	5.9	2			2	22
9.3	BPI(TRH - No Tube Break) To WT (TEH)	m	0	10.5	10.5	0	9.7	9.7			2		10
10		Line 3											
10.1	GIB(TEH) To BPI (TRH)	m	3.9	0	0	4.4	0	0			1		5
10.2	GIB(TEH) To BPI(TRH - No Tube Break)	m	0	5.9	5.9	0	5.9	5.9				2	14
10.3	BPI(TRH - No Tube Break) To WT (TEH)	m	0	10.5	10.5	0	9.7	9.7				2	14
11		Line 4											
11.1	GIB(TRH) To WT (TEH)	m	0	12.4	12.4	0	11.6	11.6			2	2	24
12		BR2											
12.1	GIB(TRH) To BPI (TEH)	m	8.8	8.8	8.8	8.8	8.8	8.8	3		3		27
12.2	BPI(TEH) To BPI(TRH - No Tube Break)	m	8	8	8	8.5	8.5	8.5	3		3		27
13		Line 5											
13.1	GIB(TRH) To WT (TEH)	m	0	10.8	10.8	0	10	10	2			2	22
14		Line 6											
14.1	GIB(TRH) To WT (TEH)	m	0	12.4	12.4	0	11.6	11.6			2	2	24

Note:

1. Wherever tube is terminated on the last equipment 0.5m extra is considered in the cut length for fixing corona bell (for last BPI)
2. the above cutlength are based on equipment to equipment distance as per layout drawing. Site should cut the tube as per actual measurements between termination points.