

BILL OF QUANTITIES FOR ERECTION, TESTING AND COMMISSIONING

PROJECT : 400/230 KV SUBSTATION AT ARASUR & 400KV SUBSTATION AT UDUMALPET

CUSTOMER : POWERGRID CORPORATION OF INDIA LTD.

ETC BOQ (MAIN QTY.)

Sl. No.	DESCRIPTION	UNIT	QTY	RATE	AMOUNT	REMARKS
I.	400/230kV ARASUR SUB-STATION					
A	POWER TRANSFORMERS					
AI	AUTO TRANSFORMERS					
1	315 MVA, 400/230/33 kV three phase auto transformers complete with terminal connectors, all auxiliaries and internal cabling and termination complete including oil filtration (optional), if necessary	No.	2			
All	LT Transformer					
1.1	800 kVA, 33/0.433 kV complete with terminal connectors, all auxiliaries and internal cabling and termination complete including oil filtration (optional), if necessary	No.	1			
1.2	630 kVA, 11/0.433 kV complete with terminal connectors, all auxiliaries and internal cabling and termination complete including oil filtration (optional), if necessary	No.	1			
BI	400 kV EQUIPMENT					
1.0	420kV Circuit Breakers (3 Ph.) with support structure					
(a)	420 kV Circuit Breakers, 3 Ph., 2000A, 40 KA, without closing resistor alongwith Support Structure, Rigid / Expansion type terminal connectors for AI tube / ACSR Moose, Breaker Control Cabinets and interpole cabling	No.	6			
2.0	Current Transformer (1 Ph.)					
2.1	420kV (5 core) CT					
(a)	Current Transformer 420 kV, (5 core) CT, 2000A, 40 KA with 120% extended current rating 1 Phase, complete with Rigid / Expansion type terminal connectors for AI tube / ACSR conductor	Nos.	18			
3.0	Capacitive Voltage Transformer (1 Ph.)					
3.1	420kV CVT					
(a)	Capacitive Voltage Transformer, 1 Ph., 420 kV, 4400 PF, complete with Line terminal connector	Nos.	12			
4.0	Isolators					
	Isolators 420 kV, 3 phase double break, motor operated (Tandem / Standard - mechanically ganged) complete with 9 Nos. support insulators per Isolator, Rigid / Expansion type terminal connectors for AI tube / ACSR Moose conductor.					
(a)	2000A, 40 KA, isolator with one E/S	Nos.	14			
(b)	2000A, 40KA, isolator with two E/S	Nos.	2			
5.0	390kV Surge Arrester (Gapless)	Nos.	12			
	Surge Arrester 390 kV, Gapless, Metal Oxide, 1 Phase, complete with surge counter, leakage current meter, insulating base, connecting cable, Line terminal connector.					

Sl. No.	DESCRIPTION	UNIT	QTY	RATE	AMOUNT	REMARKS
CI	245 kV EQUIPMENT					
1.0	245 kV Circuit Breakers , 3 Ph., 40 KA, without closing resistor alongwith Support Structure, Rigid / Expansion type terminal connectors for Al tube / ACSR Moose, Breaker Control Cabinets and interpole cabling					
a)	1600A, 40 kA	Nos.	7			
b)	2500A, 40 kA	No.	1			
2.0	Current Transformer 245 kV , (5 core) CT, 1 Phase, complete with Rigid / Expansion type terminal connectors for Al tube / ACSR conductor	No.				
(a)	1600 A, 40KA with 120% extended current	No.	21			
(b)	2500 A, 40KA with 120% extended current	No.	3			
3.0	Capacitive Voltage Transformer , 1 Ph., 245 kV, 4400 PF, complete with Line terminal connector	Nos.	18			
4.0	Isolators 245 kV , 3 phase double break, motor operated (Tandem / Standard - mechanically ganged) complete with 9 Nos. support insulators per Isolator, Rigid / Expansion type terminal connectors for Al tube / ACSR Moose conductor.					
(a)	1600A, 40 KA, Isolator with one E/S	Nos	7			
(b)	1600A, 40 KA, Isolator with two E/S	Nos	7			
(c)	2500A, 40 KA, Isolator with two E/S	Nos.	2			
(d)	1600 A, 40KA, Tandem Isolator without E/S	Nos	13			
5.0	216 kV Surge Arrestors(gapless)(1ph)	No.	18			
	Surge Arrester 216 kV , Gapless, Metal Oxide, 1 Phase, complete with surge counter,leakage current meter, insulating base, connecting cable, Line terminal connector .					
6.0	Bus Bar Material					
a i)	400 kV Bus Post Insulators with corona ring and terminal connectors	Nos.	28			
a ii)	220 kV Bus Post Insulators with corona ring and terminal connectors	Nos.	91			
b)	400 kV Double Tension (2X25 discs) hardware suitable for Quad ACSR MOOSE Conductor with subconductor spacing of 450 mm with/without turn-buckle.	Nos.	12			
c)	400 kV Double Tension (2X25 discs) hardware suitable for Twin ACSR MOOSE Conductor with subconductor spacing of 450 mm with/without turn-buckle.	Nos.	24			
d)	400 kV Single Suspension (1X25 discs) hardware suitable for Twin ACSR MOOSE Conductor with drop clamp with subconductor spacing of 450 mm	Nos.	24			
e)	400 kV Single Suspension (1X25 discs) hardware suitable for Twin ACSR MOOSE Conductor with straight clamp with subconductor spacing of 450 mm	Nos.	6			

Sl. No.	DESCRIPTION	UNIT	QTY	RATE	AMOUNT	REMARKS
f)	220 kV Double Tension (2X15 discs) hardware suitable for Quad ACSR MOOSE Conductor with subconductor spacing of 250 mm with/without turn-buckle.	Nos.	42			
g)	220 kV Double Tension (2X15 discs) hardware suitable for Twin ACSR MOOSE Conductor with subconductor spacing of 250 mm with/without turn-buckle.	Nos.	54			
h)	220 kV Single Suspension (1X15 discs) hardware suitable for Quad ACSR MOOSE Conductor with drop clamp with subconductor spacing of 250 mm	Nos.	3			
i)	220 kV Single Suspension (1X15 discs) hardware suitable for Quad ACSR MOOSE Conductor with straight clamp with subconductor spacing of 250 mm	Nos.	12			
j)	220 kV Single Suspension (1X15 discs) hardware suitable for Twin ACSR MOOSE Conductor with drop clamp with subconductor spacing of 250 mm	Nos.	36			
k)	220 kV Single Suspension (1X15 discs) hardware suitable for Twin ACSR MOOSE Conductor with straight clamp with subconductor spacing of 250 mm	Nos.	12			
l)	ACSR Conductor MOOSE along with spacers, Tee connectors, PG Clamps etc.	M	17500			
m)	4" IPS Al Tube ETC of Aluminium tubes include Aluminium Welding. Welding Sleeve tube will be supplied by BHEL. Electrodes, Welding machines and any other equipment will be in ETC Contractor scope.	M	2000			
n)	Overhead shielding wire alongwith Shield wire connectors etc.	M	1850			
7.0	Station Earthing (above ground)					
a)	40mm 3 m long Pipe Electrode	Nos.	12			
b)	75x12 mm GI Flat	Metres	16000			
c)	50x6 mm GI Flat	Metres	2500			
d)	25X3 mm GI Flat	Metres	100			
Note for Earthing: The earthing includes earthing of all 400 kV switchyard equipment, towers and LM's, pipe structures, transformer neutrals, cable trenches, fence and Control room equipments using necessary Connectors for earthing flats.						
8.0	Trench Material					
	Cable Trench Material - Consisting of cable rack assemblies eg., 1/2/3/4 tiers normal or under hung type in various combinations at an interval of 750mm whereevr cables are to be supported without the use of cable trays, such as in trenches, while at all other places these will be at an interval of 2000mm.	MT	30			
	Perforated cable trays	m	20			

Sl. No.	DESCRIPTION	UNIT	QTY	RATE	AMOUNT	REMARKS
9.0	72.5/36/11 kV EQUIPMENT					
9.1	72.5kV Isolator (For 800KVA LT Transformer)					
	Isolators 72.5 kV , 3 phase double break, motor operated (Tandem / Standard - mechanically ganged) complete with 9 Nos. support insulators per Isolator, Rigid / Expansion type terminal connectors for Al tube / ACSR Moose conductor.		1			
9.2	72.5kV, 1250A, 25 kA Circuit Breaker	Nos.	1			
9.2 (a)	72.5 kV Circuit Breakers , 3 Ph., alongwith Support Structure, Rigid / Expansion type terminal connectors for Al tube / ACSR Moose, Breaker Control Cabinets and interpole cabling					
9.2 (b)	Capacitive Voltage Transformer , 1 Ph., 72.5 kV complete with Line terminal connector	Nos.	3			
9.2 (c)	Current Transformer 72.5 kV , (5 core) CT, 1 Phase, complete with Rigid / Expansion type terminal connectors for Al tube / ACSR conductor	Nos.	3			
9.2 (d)	Relay Panel for 800 kVA LT Transformer having one no. triple pole Over current relay and one no. open delta protection relay alongwith interposing VTs, necessary auxiliaries and tripping relays as required for completeness of scheme.	Nos.	1			
9.3	11kV Horn Gap fuse (For 630kVA LT Transformer)	Nos.	3			
9.4	11 kV 3 Ph. Isolator without E/S (For 630KVA LT Transformer)	Nos.	1			
9.5	11kV Surge Arrestors (For 630KVA LT Transformer)	Nos.	3			
10.0	CONTROL & RELAY PANELS					
10.1	400 kV (Simplex type panels)					
10.1.1	Circuit Breaker Relay Panel					
a)	With Auto Reclose	Nos.	4			
b)	With out Auto Reclose	Nos.	2			
10.1.2	Line Protection Panel	Sets	2			
10.1.3	Transformer Protection Panel (For both HV & MV side)	Sets	2			
10.1.4	Bus Bar Protection Panel					
(a)	400kV (Duplicate bus bar protection) for One & half breaker system	Set	1			
10.2	220 kV (Simplex Panels)					
10.2.1	Circuit Breaker Relay Panel					
a)	With Auto Reclose	Nos.	5			
b)	With out Auto Reclose	Nos.	3			
10.2.2	Line Protection Panel	Nos.	4			
10.2.3	Bus Bar Protection Panel					
(a)	220kV (Single bus bar protection) for DMT scheme	Set	1			

Sl. No.	DESCRIPTION	UNIT	QTY	RATE	AMOUNT	REMARKS
10.3	Other/common equipments pertaining to C&R system					
(a)	Time Synchronisation equipment	No.	1			
10.4	Complete Substation automation system for 400/230kV S/S, including hardware and software for remote control station alongwith associated equipments and Kiosks.	Set	1			
a)	400kV bays - 06 Nos.					
b)	230kV bays - 08 Nos.					
11.0	PLCC					
11.1	Line Traps					
	2000A , 40kA Wave Traps 1 ph complete with support insulators (3 nos per wave trap), Rigid / Expansion type terminal connectors for Aluminium tube/ ACSR Moose and	Nos	4			
	1600A , 40kA Wave Traps 1 ph complete with support insulators (3 nos per wave trap), Rigid / Expansion type terminal connectors for Aluminium tube/ ACSR Moose and	Nos	4			
11.2	Coupling device with HF cable	Nos.	2			
11.3	Carrier Equipment (for speech+protection and for speech+Data)	Nos.	6			
11.4	Protection Coupler	Sets	4			
11.5	EPAX (24/8) with 24 telephones, cables etc.	Set	1			
11.6	Testing & Maintenance equipment	Set	1			
12.0	LT SWITCHGEAR					
12.1	415V Main switchboard	Set	1			
12.2	415V ACDB	Set	1			
12.3	415V MLDB	Set	1			
12.4	415V Emergency LDB	Set	1			
12.5	220V DCDB	Sets	2			
12.6	50V DCDB	Sets	2			
13.0	Batteries					
13.1	220V, 500 AH	Nos.	2			
13.2	50V , 600 AH	Nos.	2			
14.0	Battery Charger					
14.1	220V ,80 A	Nos.	2			
14.2	50V , 150 A	Nos.	2			
15.0	DG Set along with control panel (250 kVA)	Set	1			

Sl. No.	DESCRIPTION	UNIT	QTY	RATE	AMOUNT	REMARKS
16.0	CABLES					
16.1	Power Cables (1100 V grade)					
a)	1C x 150 sqmm	Meters	2600			Cable in Trenches with trefoil clamps
b)	3.5C x 70 sqmm	Meters	3500			Cable in Trenches
c)	3.5C x 35 sqmm	Meters	12000			Cable in Trenches
d)	4C x 16 sqmm	Meters	8000			Cable in Trenches
e)	4C x 6 sqmm	Meters	8500			Cable in Trenches
f)	2C x 6 sqmm	Meters	20000			Cable in Trenches
g)	2C x 2.5 sqmm	Meters	6500			Cable in Trenches
	NOTE : The above lengths are subject to change at contract stage. Also these lengths will be laid in various part lengths may be from 15 metres to 500 metres with termination at both ends complete with glands etc.					
16.2	Power Cables (XLPE) (1100 V grade)					
	1CX630 sqmm		3500			Burried Cable with trefoil clamps
	1CX300 sqmm	Meters	4500			
	3.5C x 300 sqmm	Meters	5500			
	NOTE : The above lengths are subject to change at contract stage. Also these lengths will be laid in various part lengths may be from 15 metres to 500 metres with termination at both ends complete with glands etc.					Burried Trench shall be under ETC contractor's scope.
16.3	Control Cables (PVC)					
a)	2Cx2.5 sqmm	Meters	3000			Cable in Trenches
b)	3Cx2.5 sqmm	Meters	500			Cable in Trenches
c)	5Cx2.5 sqmm	Meters	14000			Cable in Trenches
d)	7Cx2.5 sqmm	Meters	2500			Cable in Trenches
e)	10Cx2.5 sqmm	Meters	32000			Cable in Trenches
f)	14Cx2.5 sqmm	Meters	15000			Cable in Trenches
g)	19Cx2.5 sqmm	Meters	8500			Cable in Trenches
h)	27Cx2.5 sqmm	Meters	500			Cable in Trenches
	NOTE : The above lengths are subject to change at contract stage. Also these lengths will be laid in various part lengths may be from 15 metres to 500 metres with termination at both ends complete with glands etc.					
16.4	Laying of PVC Conduits/GI including excavation, backfilling, making and repairing of walls in trenches, cutting, threading, fixing of sockets/ bends where required etc. complete (payment will be made for the as erected pipe length).					
a)	PVC pipe, 50 NB	Meter	5000			
b)	PVC pipe, 110 NB	Meter	4000			
c)	GI pipe 50 NB	Meter	4000			
d)	GI Pipe 110 NB	Meter	4000			

Sl. No.	DESCRIPTION	UNIT	QTY	RATE	AMOUNT	REMARKS
17	Steel Structures for 400kV and 230 kV S/S					
a)	Lattice Structure (excluding CB support structure)	MT	350			
b)	Pipe Structure	MT	145			
II. 400kV UDUMALPET SUB-STATION (EXTENSION)						
A	400 kV EQUIPMENT					
1.0	420kV circuit breakers (3 Ph.) with support structure					
a)	420 kV Circuit Breakers , 3 Ph., 2000A, 40 KA, without closing resistor alongwith Support Structure, Rigid / Expansion type terminal connectors for Al tube / ACSR Moose, Breaker Control Cabinets and interpole cabling	No.	2			
b)	420 kV Circuit Breakers , 3 Ph., 2000A, 40 KA, with closing resistor alongwith Support Structure, Rigid / Expansion type terminal connectors for Al tube / ACSR Moose, Breaker Control Cabinets and interpole cabling	No.	1			
2.0	Current Transformer (1 Ph.)					
2.1	Current Transformer 420 kV , (5 core) CT, 2000A, 40 KA with 120% extended current rating 1 Phase, complete with Rigid / Expansion type terminal connectors for Al tube / ACSR conductor	No.	12			
3.0	Capacitive Voltage Transformer (1 Ph.)					
3.1	Capacitive Voltage Transformer , 1 Ph., 420 kV, 4400 PF, complete with Line terminal connector	Nos.	6			
4.0	Isolators					
4.1	Isolators 420 kV , 2000A, 40 kA, 3 phase double break, with one earth switch, motor operated (Tandem/Standard mechanically ganged) complete with 9 Nos. support insulators per Isolator, Rigid / Expansion type terminal connectors for Al tube / ACSR Moose conductor.	No.	8			
5.0	390kV Surge Arrester (Gapless)(1-ph)	No.	6			
	Surge Arrester 390 kV , Gapless, Metal Oxide, 1 Phase, complete with surge counter, leakage current meter, insulating base, connecting cable, Line terminal connector .					
6.0	Bus Bar Material					
a)	400 kV Bus Post Insulators with corona ring and terminal connectors	Nos.	46			
b)	400 kV Double Tension (2X25 discs) hardwares suitable for Twin ACSR MOOSE Conductor with subconductor spacing of 450 mm with/without turn-buckle.	Nos.	42			
c)	400 kV Single Suspension (1X25 discs) hardwares suitable for Twin ACSR MOOSE Conductor with drop clamp with subconductor spacing of 450 mm	Nos.	18			

Sl. No.	DESCRIPTION	UNIT	QTY	RATE	AMOUNT	REMARKS
d)	400 kV Single Suspension (1X25 discs) hardwares suitable for Twin ACSR MOOSE Conductor with straight clamp with subconductor spacing of 450 mm	Nos.	9			
e)	ACSR Conductor MOOSE along with spacers, Tee connectors, PG Clamps etc.	M	3000			
f)	4" IPS Al Tube ETC of Aluminium tubes include Aluminium Welding. Welding Sleeve tube will be supplied by BHEL. Electrodes, Welding machines and any other equipment will be in ETC Contractor scope	M	800			
7.0	Station Earthing (above ground)					
a)	75x12 mm GI Flat	Metres	3000			
b)	50x6 mm GI Flat	Metres	2000			
c)	25X3 mm GI Flat	Metres	100			
Note for Earthing: The earthing includes earthing of all 400 kV switchyard equipment, towers and LM's, pipe structures, transformer neutrals, cable trenches, fence and Control room equipments using necessary Connectors for earthing flats.						
B	CONTROL & RELAY PANELS					
1.0	400 kV (Simplex type panels)					
1.1	Control Panel For :					
a)	Diameter (For One-half Breaker Scheme)	Nos.	1			
1.2	Circuit Breaker Relay Panel					
a)	With Auto Reclose	Nos.	3			
1.3	Line Protection Panel	Sets	2			
1.4	Bus Bar Protection Panel					
(a)	Augmentation of existing bus bar protection scheme for 2 bays	LS	1			
C	PLCC					
1.0	Line Traps					
a)	2000A , 40kA Wave Traps 1 ph complete with support insulators (3 nos per wave trap), Rigid / Expansion type terminal connectors for Aluminium tube / ACSR Moose and	Nos.	4			
2.0	Coupling device with HF cable	Nos.	2			
3.0	Carrier Equipment (for speech+protection and for speech+Data)	Nos.	6			
4.0	Protection Coupler	Sets	4			
D	LT SWITCHGEAR					
1.1	Extension of 415V ACDB1 & ACDB2	Set	1			
1.2	Extension 220V DCDB1 & DCDB2	Set	1			
1.3	Extension 50V DCDB1 & DCDB2	Set	1			
E	Batteries					
1.1	50V , 300 AH	Nos.	2			
F	Battery Charger					
1.1	50V (Float - 60 A , Boost -30 A)	Nos.	2			

Sl. No.	DESCRIPTION	UNIT	QTY	RATE	AMOUNT	REMARKS
G	CABLES along with associated accessories like clamps, glands, lugs and straight joints etc.					
1.1	1.1kV grade Power Cables (PVC)					
a)	3.5Cx35 sqmm	Metres	2000			Cable in Trenches
b)	4Cx16 sqmm	Metres	2000			Cable in Trenches
c)	4Cx6 sqmm	Metres	2000			Cable in Trenches
d)	2Cx6 sq.mm	Metres	5000			Cable in Trenches
	NOTE : The above lengths are subject to change at contract stage. Also these lengths will be laid in various part lengths may be from 15 metres to 500 metres with termination at both ends complete with glands etc.					
1.2	1.1kV grade Control Cable (PVC)					
a)	2Cx2.5 sqmm	Metres	2000			Cable in Trenches
b)	3Cx2.5 sqmm	Metres	500			Cable in Trenches
c)	5Cx2.5 sqmm	Metres	8000			Cable in Trenches
d)	7Cx2.5 sqmm	Metres	1000			Cable in Trenches
e)	10Cx2.5 sqmm	Metres	20000			Cable in Trenches
f)	14Cx2.5 sqmm	Metres	10000			Cable in Trenches
g)	19Cx2.5 sqmm	Metres	6000			Cable in Trenches
h)	27Cx2.5 sqmm	Metres	500			Cable in Trenches
	NOTE : The above lengths are subject to change at contract stage. Also these lengths will be laid in various part lengths may be from 15 metres to 500 metres with termination at both ends complete with glands etc.					
H	Laying of PVC Conduits/GI including excavation, backfilling, making and repairing of walls in trenches, cutting, threading, fixing of sockets/ bends where required etc. complete (payment will be made for the as erected pipe length).					
a)	PVC pipe, 50 NB	Meter	500			
b)	PVC pipe,110 NB	Meter	500			
c)	GI pipe 50 NB	Meter	500			
d)	GI Pipe 110 NB	Meter	500			
I	Steel Structures for 400kV S/S					
a)	Lattice Structure (excluding CB support structure)	MT	108			
b)	Pipe Structure	MT	43			
	TOTAL AMOUNT (Rs.)					
Notes for ETC works :						
1	Loading / Unloading, handling, shifting to & from stores, proper storage,assembly, installation, pre-commissioning test and commissioning tests are included in the scope.					
2	MS welding - apply red lead paint then aluminium paint then bitumen after welding.					
3	GI welding - apply 2 coats of cold galvanising anti corrosive paint after welding.					
4	10% welding joints in Aluminum tube shall be tested for dye penetration test.					
5	Quoted rates are deemed to be inclusive of miscellaneous works, viz.. Erection of clamps and connectors, phase colour discs etc.					
6	Lot quantity may vary from 1% to 20% of the main equipment supply.					
7	In Udumalpet Substation suitable arrangement are under the sciope of bidder to fit the new beams in the exiting					

BILL OF QUANTITIES FOR ERECTION, TESTING AND COMMISSIONING

PROJECT : 400/230 KV SUBSTATION AT ARASUR

CUSTOMER : POWERGRID CORPORATION OF INDIA LTD.

B	MANDATORY SPARES TO BE HANDLED & STORED	UNIT	QUANTITY	Rate	Amount (Rs)
A	<u>400/230kV ARASUR SUB-STATION</u>				
I	420 kV , SF6 Circuit Breaker				
1	One pole of circuit breaker with grading capacitor complete with pole column interrupter with MB but without support structure and operating mechanism	No.	1		
2	SF6 Gas	Kg	40% of total		
3	Trip coils with resistor	Nos.	2		
4	Closing coils with resistor	Nos.	2		
5	Terminal pad and connectors	No.	1		
6	Molecular filter for SF6 Circuit for 1 pole of CB	No.	1		
7	Density/Pressure monitor for SF6 circuit for 1 pole of CB	No.	1		
8	Corona rings (1 no. of each type)	Set	1		
9	Relays, power contactors, switch fuse units, limit switches, push buttons, timers & MCB	Set	1		
10	Pressure switches (for one CB)	Set	1		
11	Pressure gauges and coupling devices (1 no. of each type)	Set	1		
12	Aux. Switch assembly	No.	1		
13	Operation counter	No.	1		
II	420 kV Isolators				
1	One complete pole with 1 earth switch and support insulators excluding structure and motor operating mechanism	No.	1		
2	Copper contact fingers for female & male contacts (for one phase)	Set	1		
3	Open /close contractor assembly ,timers , key interlock ,push button switch ,etc.	Set	1		
4	Limit Switch and auxilliary contact	Set	1		
5	Motor housing bearing assembly	No	1		
6	Motor with gear and level gear assembly	No	1		
7	Corona Shield rings (1 no. of each type)	Set	1		
8	Hinge pins, if applicable	Nos.	2		
9	Bearings (1 no. of each type)	Set	1		
10	Current Carrying assembly	Nos.	2		
11	Interlocking coil with resistor	No	1		
12	Terminal pad and connectors	Set	1		
III	420 kV Current Transformers				
1.	Current Transformer with 120% extended rating	Nos.	2		
IV	420 kV Capacitor Voltage Transformers				
1.	Capacitive voltage Transformer	Nos	2		
V	390 kV Surge Arresters				
1.	390kV surge Arrester with insulating base with surge counter and accessories	No.	1		

B	MANDATORY SPARES TO BE HANDLED & STORED	UNIT	QUANTITY	Rate	Amount (Rs)
VI	245 kV , SF6 Circuit Breaker				
1	One pole of circuit breaker with grading capacitor complete with pole column interrupter with MB but without support structure and operating mechanism	No.	1		
2	SF6 Gas	Kg	40% of total		
3	Trip coils with resistor	Nos.	2		
4	Closing coils with resistor	Nos.	2		
5	Terminal pad and connectors	No.	1		
6	Molecular filter for SF6 Circuit for 1 pole of CB	Set	1		
7	Density/Pressure monitor for SF6 circuit for 1 pole of CB	Nos.	1		
8	Corona rings (1 no. of each type)	Set	1		
9	Relays, power contactors, switch fuse units, limit switches, push buttons, timers & MCB	Set	1		
10	Pressure switches (for one CB)	Set	1		
11	Pressure gauges and coupling devices (1 no. of each type)	Set	1		
12	Aux. Switch assembly	Nos.	1		
13	Operation counter	No.	1		
VII	245 kV Isolators				
1	One complete pole with 1 earth switch and support insulators excluding structure and motor operating mechanism	Nos.	1		
2	Copper contact fingers for female & male contacts (for one phase)	Set	1		
3	Open /close contractor assembly ,timers , key interlock ,push button switch ,etc.	Set	1		
4	Limit Switch and auxilliary contact	Set	1		
5	Motor housing bearing assembly	No	1		
6	Motor with gear and level gear assembly	No	1		
7	Corona Shield rings (1 no. of each type)	Set	1		
8	Hinge pins, if applicable	Nos.	1		
9	Bearings (1 no. of each type)	Set	1		
10	Current Carrying assembly	No.	1		
11	Interlocking coil with resistor	No	1		
VIII	245 kV Current Transformers				
1.	1600 A , Current Transformer with 120% extended rating	No.	1		
2.	2500 A , Current Transformer with 120% extended rating	No.	1		
IX	245 kV Capacitor Voltage Transformers				
1.	Capacitive voltage Transformer	Nos	2		
X	216 kV Surge Arresters				
1.	216kV surge Arrestor with insulating base with surge counter and accessories	Nos	2		
XI	Control & Relay Panel				
1	Ammeter with transducer	Nos.	0		
2	Wattmeter with transducer	No.	0		
3	Varmeter with transducer	No.	0		
4	Voltmeter with transducer	Nos.	0		

B	MANDATORY SPARES TO BE HANDLED & STORED	UNIT	QUANTITY	Rate	Amount (Rs)
5	Voltmeter selector switch	No.	0		
6	Control switch for breaker	No.	0		
7	Control switch for isolator	No.	0		
8	Seamphore for isolators	Nos.	0		
9	Red/Green/White indicating lamp (With complete assembly) - (3 nos. of each colour)	Set	0		
10	Bulbs (for indication lamps)	Nos.	0		
11	Annunciations windows with necessary annunciation relay	Nos.	0		
12	Push Button (Red ,Yellow,Black,Green)	Set	0		
13	Trip transfer switch (if applicable)	No.	0		
14	Synchronising socket (Male & Female)	No.	0		
15	Synchronising selector switch (if applicable)	Nos.	0		
16	Bulbs (for annunciation windows)	No.	0		
2.0	Breaker Relay panel spares				
1.	Breaker failure relay	Nos.	1		
2.	Trip circuit supervision relay	Nos.	2		
3.	Auto reclose relay with check synchronising relay and dead line charging relay	Nos.	1		
4.	Self reset trip relay (1 no. of each type)	Set	1		
5.	Hand reset trip relay (1 no. of each type)	Set	1		
6.	Timer relay (1 no. of each type)	Set	1		
7.	DC Supervision relay (1no. of each type)	Set	1		
8.	Flag relays (1 no. of each type)	Set	1		
9.	Auxiliary relays (1 no. of each type)	Set	1		
3.0	Line Protection Panel Equipment spares				
1	Over voltage protection relay with timers (stage-1 & stage-2)	Set	1		
2	Disturbance Recorder comprising of evaluation and acquisition units (if stand alone)	Set	1		
3	Distance to fault locator excluding mutual compensation unit (if stand alone)	Set	1		
4	Main I Relay (Excluding Trip Relay)	Set	1		
5	Main II Relay (Excluding Trip Relay)	Set	1		
4.0	Transformers Protection Panel spares				
1	Transformers differential protection relay including all aux. CTs and associated software in case of numerical relays with modem	No.	1		
2	Restricted earth fault protection relay with non-linear resistor	No.	1		
3	Back up protection relay with 3 O/C and 1 E/F element	Set	1		
4	Over Fluxing relay	Set	1		
5	CVT selection relay	Set	1		
6	Over load spare relay with liner	No.	1		
5.0	Common Spares				
1	Power supply module for B/B Protection	Set	1		
2	Metrosil (Non linear resistor)	Set	1		
3	Interposing CT & PT	Set	1		

B	MANDATORY SPARES TO BE HANDLED & STORED	UNIT	QUANTITY	Rate	Amount (Rs)
XII	Substation Automation System				
1	Bay IED with configuration software	Set	1		
2	Switch (One of each type)	Set	1		
3	Longest length of optical fibre cable with end equipment	Set	1		
XIII	PLCC Equipments				
1.	Set of prints for carrier terminal	Set	1		
2.	Set of prints for protection coupler	Set	1		
3.	Coupling Device (Ph to Ph)	Set	1		
4.	Telephone 4 wire	Set	2		
5.	Telephone 2 wire	Nos.	4		
6.	Co-axial connector	Set	2		
7.	Straight through joint	Set	1		
8.	PLCC toll kit including extender card , impedance box for signal loss measurment , etc.	Set	1		
9.	Co-axial cable	M	500		
10.	Set of prints for EPAX	Set	1		
XIV	LT Switchgear				
1.	Relays (1 no. of each type)	Set	1		
2.	CT, PT (1no. of each type)	Set	1		
3.	Switches , push buttons and meters (2 nos. of each type and size)	Set	1		
4.	MCCB/TPN Switch/MCB (1 No. of each rating and type)	Set	1		
5.	LT CB spares for each rating				
a)	Spring charging motor	Nos.	1		
b)	Aux. Contact set (for complete CB)	Set	2		
c)	Bus bar seal off insulator	Nos.	5		
d)	Arc chutes	Nos.	1		
e)	Moving contact	Nos.	1		
f)	Arcing contact	Nos.	1		
g)	Spring (closing/opening) (each type)	Nos.	1		
h)	Closing coil	Nos.	1		
i)	Tripping coil	Nos.	1		
XV	Batteries (220V)				
1.	Dry and uncharge cells	Nos.	10		
2.	Inter cell connectors (with bolt & nuts)	Nos.	10		
XVI	Batteries (50V)				
1.	Dry and uncharge cells	Nos.	5		
2.	Inter cell connectors (with bolt & nuts)	Nos.	10		
XVII	Battery Charger (220V)				
1.	Set of control cards (All PCB cards)	Set	1		
2.	Set of relays (1 no. of each type)	Set	1		
3.	Set of contactor (1 no. of each type)	Set	1		
4.	Micro switches (if applicable) (for one charger)	Set	1		
5.	Filter capacitor	Nos	1		
6.	Three phase full wave bridge rectifier (Thyristor/diode)	Nos	1		
7.	Set of wound resistor (if applicable) (for one charger)	Set	1		

B	MANDATORY SPARES TO BE HANDLED & STORED	UNIT	QUANTITY	Rate	Amount (Rs)
8.	Set of switches (1 no. of each type)	Set	1		
9.	Potentiometer	Nos	1		
10.	Fuses of thyristor with indicator	Nos	6		
XVIII	Battery Charger (50V)				
1.	Set of control cards (All PCB card)	Set	1		
2.	Set of relays (1 no. of each type)	Set	1		
3.	Set of contactor (1 no. of each type)	Set	1		
4.	Micro switches (if applicable) (for one charger)	Set	1		
5.	Filter capacitor	Nos	1		
6.	Three phase full wave bridge rectifier (Thyristor/diode)	Nos	1		
7.	Set of wound resistor (if applicable) (for one charger)	Set	1		
8.	Set of switches (1 no. of each type)	Set	1		
9.	Potentiometer	Nos	1		
10.	Fuses of thyristor with indicator	Nos	6		
XIX	DG Set				
1.	Set of filters (Lub oil/fuel/air) (complete for DG set)	Set	1		
2.	Solenoid Coil assembly	Nos.	1		
3.	Self starter assembly with clutch engaging and disengaging arrangements complete with motors	Nos.	1		
4.	Lube oil pressure safety control	Nos.	1		
5.	High water temp. safety control	Nos.	1		
XX	AC & Ventilation				
	One Complete Unit	Nos	1		
XXI	Fire Fighting System				
1.0	HVW Pumps				
1.	Shaft Sleeves (for one pump)	Set	1		
2.0	Diesel engine drive				
1	Self Starter	Set	1		
3.0	Jockey Pump				
1	Shaft sleeves	Set	1		
4.0	Hydrant Pumps & Jockey Pumps				
1.	Shaft Sleeves (for one pump)	Set	1		
2.	Gland Packing (for one pump)	Set	1		
XXII	General				
1.	Quartzoid bulb detector	No.	10% of total population		
2.	Projectors (Nozzles)	No.	10% of total population		
3.	Smoke detectors				
a)	Photo electric type	No.	10% of total population		
b)	Ionisation type	No.	10% of total population		
4	Heat detectors	No.	10% of total population		
5	Level switch	No.	1		
6	Pressure switch	No.	1		

B	MANDATORY SPARES TO BE HANDLED & STORED	UNIT	QUANTITY	Rate	Amount (Rs)
7	Bronze pipe fitted with nozzle and guide coupling	No.	2		
8	Hydrant valve	No.	1		
9	Isolation valves	Set	1 for each type		
10	Electrical control Panel : Annunciation printed circuits (for solid state annunciation)	Set	1 for each type		
11	Deluge Valve	No.	1		
12	Pressure gauge	No.	1		
13	Safety Valve for Hydro pneumatic system	No.	1		
XXIII	Erection Hardware Items				
	5% spares of the actual quantities for Disc Insulator string & Hardware, BPI, clamps & connectors(excluding connectors for CB, Isolator, CT, CVT and SA), ACSR bersimis, spacers, corona bell, welding sleeves etc.	LOT	1		
XXIV	LT Transformer				
	800 kVA				
1	All bushings with metal parts (1 no. of each type and voltage)	Set	1		
2	Oil Temperature indicator with sensing device	Set	1		
3	Tap changer contacts	Set	1		
4	Set of valves (1 no. each type)	Set	1		
5	Buchholz relay	no.	1		
6	Explosion vent diaphragm	no.	1		
XXV	630 kVA				
1	All bushings with metal parts (1 no. of each type and voltage)	Set	1		
2	Oil Temperature indicator with sensing device	Set	1		
3	Tap changer contacts	Set	1		
4	Set of valves (1 no. each type)	Set	1		
5	Buchholz relay	no.	1		
6	Explosion vent diaphragm	no.	1		
7	11 kV Isolators	no.	1		
8	11 kV Surge Arrestors	no.	1		
XXVI	Illumination System				
1	Single Pole MCB	Lot	1		
2	Triple Pole MCB	Lot	1		
3	Fluorescent Tube & Starter				
	Choke	Lot	1		
	Bottom Strip	Lot	1		
	Top Cover & Reflector	Lot	1		
	Holders	Lot	1		
4	Sodium Vapour & Mercury Vapour Lamps				
	Lamp	Lot	1		
	Ballast	Lot	1		
	Condenser	Lot	1		
	Lamp Holder	Lot	1		
	Cover & Reflector	Lot	1		
	Complete Fittings	Lot	1		
	Switches & Sockets	Lot	1		
	Junction Box	Lot	1		
5	Incandescent Lamps				

B	MANDATORY SPARES TO BE HANDLED & STORED	UNIT	QUANTITY	Rate	Amount (Rs)
	Bulbs	Lot	1		
	Holders	Lot	1		
	Complete Fittings of all types	Lot	1		
6	Switch and sockets	Lot	1		
7	Junction Boxes	Lot	1		
XXVII	MANDATORY SPARES FOR 315 MVA AUTO TRANSFORMERS				
1	Oil cooler pump with motor	no.	1		
2	Buchholz relay (Main tank) complete with contacts	no.	1		
3	Set of valves	Set	1		
4	Aux. Transformers for control power for control cabinet	Set	1		
5	Local winding temperature indicator	no.	1		
6	Remote winding temperature indicator (OTI) with contacts	no.	1		
7	Oil temperature indicator (OTI) with contracts	no.	1		
8	Pressure relief device	no.	1		
9	Magnetic oil level gauge	no.	1		
10	Cooler fan with motor	no.	1		
11	Starters , contractors , switches and relays for electrical control panels (One set of each type)	Set	1		
12	Remote tap position indicator	no.	1		
13	Oil flow indicator with flow switch	Set	1		
14	Breather assembly for conservator and OLTC	no.	1		
15	Oil surge relay for OLTC	no.	1		
16	Oil storage tank (30 kL)	nos.	2		
17	Stainless steel oil sampling bottles	no.	12		
	TOTAL AMOUNT (Rs.)				

BILL OF QUANTITIES FOR ERECTION, TESTING AND COMMISSIONING

PROJECT : 400KV SUBSTATION AT UDUMALPET
CUSTOMER : POWERGRID CORPORATION OF INDIA LTD.

B	MANDATORY SPARES TO BE HANDLED & STORED	UNIT	QTY	Rate	Amount (Rs)
I	420 kV , SF6 Circuit Breaker				
1	One pole of circuit breaker with grading capacitor complete with pole column interrupter with MB but without support structure and operating mechanism	No.	0		
2	SF6 Gas	Kg	40% of total		
3	Trip coils with resistor	Nos.	2		
4	Closing coils with resistor	Nos.	1		
5	Terminal pad and connectors	No.	1		
6	Molecular filter for SF6 Circuit for 1 pole of CB	No.	1		
7	Density/Pressure monitor for SF6 circuit for 1 pole of CB	No.	1		
8	Corona rings (1 no. of each type)	Set	1		
9	Relays, power contactors, switch fuse units, limit switches, push buttons, timers & MCB	Set	1		
10	Pressure switches (for one CB)	Set	1		
11	Pressure gauges and coupling devices (1 no. of each type)	Set	1		
12	Aux. Switch assembly	No.	1		
13	Operation counter	No.	1		
II	420 kV Isolators				
1	One complete pole with 1 earth switch and support insulators excluding structure and motor operating mechanism	No.	1		
2	Copper contact fingers for female & male contacts (for one phase)	Set	1		
3	Open /close contractor assembly ,timers , key interlock ,push button switch ,etc.	Set	1		
4	Limit Switch and auxilliary contact	Set	1		
5	Motor housing bearing assembly	No	1		
6	Motor with gear and level gear assembly	No	1		
7	Corona Shield rings (1 no. of each type)	Set	1		
8	Hinge pins, if applicable	Nos.	1		
9	Bearings (1 no. of each type)	Set	1		
10	Current Carrying assembly	Nos.	1		
11	Interlocking coil with resistor	No	1		
12	Terminal pad and connectors	Set	1		
III	420 kV Current Transformers				
1.	Current Transformer with 120% extended rating	Nos.	1		
IV	420 kV Capacitor Voltage Transformers				
1.	Capacitive voltage Transformer	Nos	1		
V	390 kV Surge Arresters				
1.	390kV surge Arrester with insulating base with surge counter and accessories	No.	1		

B	MANDATORY SPARES TO BE HANDLED & STORED	UNIT	QTY	Rate	Amount (Rs)
VI	245 kV , SF6 Circuit Breaker				
1	One pole of circuit breaker with grading capacitor complete with pole column interrupter with MB but without support structure and operating mechanism	No.	0		
2	SF6 Gas	Kg	0		
3	Trip coils with resistor	Nos.	0		
4	Closing coils with resistor	Nos.	0		
5	Terminal pad and connectors	No.	0		
6	Molecular filter for SF6 Circuit for 1 pole of CB	Set			
7	Density/Pressure monitor for SF6 circuit for 1 pole of CB	Nos.	0		
8	Corona rings (1 no. of each type)	Set	0		
9	Relays, power contactors, switch fuse units, limit switches, push buttons, timers & MCB	Set	0		
10	Pressure switches (for one CB)	Set	0		
11	Pressure gauges and coupling devices (1 no. of each type)	Set	0		
12	Aux. Switch assembly	Nos.	0		
13	Operation counter	No.	0		
VII	245 kV Isolators				
1	One complete pole with 1 earth switch and support insulators excluding structure and motor operating mechanism	Nos.	0		
2	Copper contact fingers for female & male contacts (for one phase)	Set	0		
3	Open /close contractor assembly ,timers , key interlock ,push button switch ,etc.	Set	0		
4	Limit Switch and auxilliary contact	Set	0		
5	Motor housing bearing assembly	No	0		
6	Motor with gear and level gear assembly	No	0		
7	Corona Shield rings (1 no. of each type)	Set	0		
8	Hinge pins, if applicable	Nos.	0		
9	Bearings (1 no. of each type)	Set	0		
10	Current Carrying assembly	No.	0		
11	Interlocking coil with resistor	No	0		
VIII	245 kV Current Transformers				
1.	1600 A , Current Transformer with 120% extended rating	No.	0		
2.	2500 A , Current Transformer with 120% extended rating	No.	0		
IX	245 kV Capacitor Voltage Transformers				
1.	Capacitive voltage Transformer	Nos	0		
X	216 kV Surge Arresters				
1.	216kV surge Arrestor with insulating base with surge counter and accessories	Nos	0		
XI	Control & Relay Panel				
1	Ammeter with transducer	Nos.	2		
2	Wattmeter with transducer	No.	1		

B	MANDATORY SPARES TO BE HANDLED & STORED	UNIT	QTY	Rate	Amount (Rs)
3	Varmeter with transducer	No.	1		
4	Voltmeter with transducer	Nos.	2		
5	Voltmeter selector switch	No.	1		
6	Control switch for breaker	No.	1		
7	Control switch for isolator	No.	1		
8	Seamphore for isolators	Nos.	5		
9	Red/Green/White indicating lamp (With complete assembly) - (3 nos. of each colour)	Set	5		
10	Bulbs (for indication lamps)	Nos.	50		
11	Annunciations windows with necessary annunciation relay	Nos.	6		
12	Push Button (Red ,Yellow,Black,Green)	Set	1		
13	Trip transfer switch (if applicable)	No.	1		
14	Synchronising socket (Male & Female)	No.	1		
15	Synchronising selector switch (if applicable)	Nos.	1		
16	Bulbs (for annunciation windows)	No.	100		
2.0	Breaker Relay panel spares				
1.	Breaker failure relay	Nos.	1		
2.	Trip circuit supervision relay	Nos.	2		
3.	Auto reclose relay with check synchronising relay and dead line charging relay	Nos.	1		
4.	Self reset trip relay (1 no. of each type)	Set	1		
5.	Hand reset trip relay (1 no. of each type)	Set	1		
6.	Timer relay (1 no. of each type)	Set	1		
7.	DC Supervision relay (1no. of each type)	Set	1		
8.	Flag relays (1 no. of each type)	Set	1		
9.	Auxiliary relays (1 no. of each type)	Set	1		
3.0	Line Protection Panel Equipment spares				
1	Over voltage protection relay with timers (stage-1 & stage-2)	Set	1		
2	Disturbance Recorder comprising of evaluation and acquisition units (if stand alone)	Set	1		
3	Distance to fault locator excluding mutual compensation unit (if stand alone)	Set	1		
4	Main I Relay (Excluding Trip Relay)	Set	1		
5	Main II Relay (Excluding Trip Relay)	Set	1		
4.0	Transformers Protection Panel spares				
1	Transformers differential protection relay including all aux. CTs and associated software in case of numerical relays with modem	No.	0		
2	Restricted earth fault protection relay with non-linear resistor	No.	0		
3	Back up protection relay with 3 O/C and 1 E/F element	Set	0		
4	Over Fluxing relay	Set	0		
5	CVT selection relay	Set	0		
6	Over load spare relay with liner	No.	0		
5.0	Common Spares				
1	Power supply module for B/B Protection	Set	0		
2	Metrosil (Non linear resistor)	Set	0		
3	Interposing CT & PT	Set	0		

B	MANDATORY SPARES TO BE HANDLED & STORED	UNIT	QTY	Rate	Amount (Rs)
XII	Substation Automation System				
1	Bay IED with configuration software	Set	0		
2	Switch (One of each type)	Set	0		
3	Longest length of optical fibre cable with end equipment	Set	0		
XIII	PLCC Equipments				
1.	Set of prints for carrier terminal	Set	1		
2.	Set of prints for protection coupler	Set	1		
3.	Coupling Device (Ph to Ph)	Set	1		
4.	Telephone 4 wire	Set	2		
5.	Telephone 2 wire	Nos.	4		
6.	Co-axial connector	Set	2		
7.	Straight through joint	Set	1		
8.	PLCC toll kit including extender card , impedance box for signal loss measurment , etc.	Set	1		
9.	Co-axial cable	M	500		
10.	Set of prints for EPAX	Set	1		
XIV	LT Switchgear				
1.	Relays (1 no. of each type)	Set	0		
2.	CT, PT (1no. of each type)	Set	0		
3.	Switches , push buttons and meters (2 nos. of each type and size)	Set	0		
4.	MCCB/TPN Switch/MCB (1 No. of each rating and type)	Set	0		
5.	LT CB spares for each rating				
a)	Spring charging motor	Nos.	0		
b)	Aux. Contact set (for complete CB)	Set	0		
c)	Bus bar seal off insulator	Nos.	0		
d)	Arc chutes	Nos.	0		
e)	Moving contact	Nos.	0		
f)	Arcing contact	Nos.	0		
g)	Spring (closing/opening) (each type)	Nos.	0		
h)	Closing coil	Nos.	0		
i)	Tripping coil	Nos.	0		
XV	Batteries (220V)				
1.	Dry and uncharge cells	Nos.	0		
2.	Inter cell connectors (with bolt & nuts)	Nos.	0		
XVI	Batteries (50V)				
1.	Dry and uncharge cells	Nos.	5		
2.	Inter cell connectors (with bolt & nuts)	Nos.	10		
XVII	Battery Charger (220V)				
1.	Set of control cards (All PCB cards)	Set	0		
2.	Set of relays (1 no. of each type)	Set	0		
3.	Set of contactor (1 no. of each type)	Set	0		
4.	Micro switches (if applicable) (for one charger)	Set	0		
5.	Filter capacitor	Nos	0		
6.	Three phase full wave bridge rectifier (Thyristor/diode)	Nos	0		
7.	Set of wound resistor (if applicable) (for one charger)	Set	0		
8.	Set of switches (1 no. of each type)	Set	0		

B	MANDATORY SPARES TO BE HANDLED & STORED	UNIT	QTY	Rate	Amount (Rs)
9.	Potentiometer	Nos	0		
10.	Fuses of thyristor with indicator	Nos	0		
XVIII	Battery Charger (50V)				
1.	Set of control cards (All PCB card)	Set	1		
2.	Set of relays (1 no. of each type)	Set	1		
3.	Set of contactor (1 no. of each type)	Set	1		
4.	Micro switches (if applicable) (for one charger)	Set	1		
5.	Filter capacitor	Nos	1		
6.	Three phase full wave bridge rectifier (Thyristor/diode)	Nos	1		
7.	Set of wound resistor (if applicable) (for one charger)	Set	1		
8.	Set of switches (1 no. of each type)	Set	1		
9.	Potentiometer	Nos	1		
10.	Fuses of thyristor with indicator	Nos	6		
XIX	DG Set				
1.	Set of filters (Lub oil/fuel/air) (complete for DG set)	Set	0		
2.	Solenoid Coil assembly	Nos.	0		
3.	Self starter assembly with clutch engaging and disengaging arrangements complete with motors	Nos.	0		
4.	Lube oil pressure safety control	Nos.	0		
5.	High water temp. safety control	Nos.			
XX	AC & Ventilation				
	One Complete Unit	Nos	0		
XXI	Fire Fighting System				
1.0	HVW Pumps				
1.	Shaft Sleeves (for one pump)	Set	0		
2.0	Diesel engine drive				
1	Self Starter	Set	0		
3.0	Jockey Pump				
1	Shaft sleeves	Set	0		
4.0	Hydrant Pumps & Jockey Pumps				
1.	Shaft Sleeves (for one pump)	Set	0		
2.	Gland Packing (for one pump)	Set	0		
XXII	General				
1.	Quartzoid bulb detector	No.	0		
2.	Projectors (Nozzles)	No.	0		
3.	Smoke detectors				
a)	Photo electric type	No.	0		
b)	Ionisation type	No.	0		
4	Heat detectors	No.	0		
5	Level switch	No.	0		
6	Pressure switch	No.	0		
7	Bronze pipe fitted with nozzle and guide coupling	No.	0		
8	Hydrant valve	No.	0		
9	Isolation valves	Set	0		
10	Electrical control Panel : Annunciation printed circuits (for solid state annunciation)	Set	0		
11	Deluge Valve	No.	0		

B	MANDATORY SPARES TO BE HANDLED & STORED	UNIT	QTY	Rate	Amount (Rs)
12	Pressure gauge	No.	0		
13	Safety Valve for Hydro pneumatic system	No.	0		
XXIII	Erection Hardware Items				
	5% spares of the actual quantities for Disc Insulator string & Hardware, BPI, clamps & connectors(excluding connectors for CB, Isolator, CT, CVT and SA), ACSR bersimis, spacers, corona bell, welding sleeves etc.	LOT	1		
XXIV	LT Transformer				
	800 kVA				
1	All bushings with metal parts (1 no. of each type and voltage)	Set	0		
2	Oil Temperature indicator with sensing device	Set	0		
3	Tap changer contacts	Set	0		
4	Set of valves (1 no. each type)	Set	0		
5	Buchholz relay	no.	0		
6	Explosion vent diaphragm	no.	0		
XXV	630 kVA				
1	All bushings with metal parts (1 no. of each type and voltage)	Set	0		
2	Oil Temperature indicator with sensing device	Set	0		
3	Tap changer contacts	Set	0		
4	Set of valves (1 no. each type)	Set	0		
5	Buchholz relay	no.	0		
6	Explosion vent diaphragm	no.	0		
7	11 kV Isolators	no.	0		
8	11 kV Surge Arrestors	no.	0		
XXVI	Illumination System				
1	Single Pole MCB	Lot	1		
2	Triple Pole MCB	Lot	1		
3	Fluorescent Tube & Starter		1		
	Choke	Lot	1		
	Bottom Strip	Lot	1		
	Top Cover & Reflector	Lot	1		
	Holders	Lot	1		
4	Sodium Vapour & Mercury Vapour Lamps				
	Lamp	Lot	0		
	Ballast	Lot	0		
	Condenser	Lot	0		
	Lamp Holder	Lot	0		
	Cover & Reflector	Lot	0		
	Complete Fittings	Lot	0		
	Switches & Sockets	Lot	0		
	Junction Box	Lot	0		
5	Incandescent Lamps		0		
	Bulbs	Lot	0		
	Holders	Lot	0		
	Complete Fittings of all types	Lot	0		
			0		
6	Switch and sockets	Lot	0		

B	MANDATORY SPARES TO BE HANDLED & STORED	UNIT	QTY	Rate	Amount (Rs)
			0		
7	Junction Boxes	Lot	0		
			0		
XXVII	MANDATORY SPARES FOR 315 MVA AUTO TRANSFORMERS		0		
			0		
1	Oil cooler pump with motor	no.	0		
2	Buchholz relay (Main tank) complete with contacts	no.	0		
3	Set of valves	Set	0		
4	Aux. Transformers for control power for control cabinet	Set	0		
5	Local winding temperature indicator	no.	0		
6	Remote winding temperature indicator (OTI) with contacts	no.	0		
7	Oil temperature indicator (OTI) with contracts	no.	0		
8	Pressure relief device	no.	0		
9	Magnetic oil level gauge	no.	0		
10	Cooler fan with motor	no.	0		
11	Starters , contractors , switches and relays for electrical control panels (One set of each type)	Set	0		
12	Remote tap position indicator	no.	0		
13	Oil flow indicator with flow switch	Set	0		
14	Breather assembly for conservator and OLTC	no.	0		
15	Oil surge relay for OLTC	no.	0		
16	Oil storage tank (30 kL)	nos.	0		
17	Stainless steel oil sampling bottles	no.	0		
	TOTAL AMOUNT (Rs.)				