

1 x 660 MW PANKI TPS : 400kV SWITCHYARD		
LIST OF MANDATORY SPARES/ MAINTENANCE EQUIPMENT FOR UPRVUNL PANKI		
SL. NO.	DESCRIPTION	QUANTITY
A	LIST OF MANDATORY SPARES	
I	400 kV ISOLATORS	
1	Copper contact fingers for female & male contacts for each rating	3 Sets
2	Aux. Relays, power contactors, MCBs, switch fuses, push buttons and resistors for electrical control circuit as per approved schematic	2 Nos.
3	Terminal connectors	2 Sets
4	Limit switch and auxiliary contact (complete for one MOM box of isolator)	2 Sets
5	Motor housing bearing assembly	2 Sets
6	Corona shielding ring	1 Set
7	Bearings	1 Set
8	Interlocking coil, timers, key interlock	2 Sets
II	400 kV CIRCUIT BREAKER	
1	One pole complete with grading capacitor complete with column and interrupter with MB and operating mechanism and without support structure	1 No.
2	SF6 Gas	2 Cylinder
3	Rubber gaskets, 'O' rings and seals (complete replacement for one breaker)	1 Set
4	Trip coils with resistor	3 Nos.
5	Closing coils with resistor	3 Nos.
6	Terminal connectors	3 Nos.
7	Molecular filter for SF6 circuit for Single Pole of CB	3 Sets
8	Density monitor for SF6 circuit for Single Pole of CB	2 Nos.
9	Corona rings	1 Set
10	Aux. Relays, power contactors, switch fuse units, limit switches, push buttons, timers & MCBs, etc.	2 Sets
11	Aux. Switch assembly	2 Nos.
12	Operation counter	2 Nos.
13	Spring operated closing mechanism	1 Set
III	400 kV CTs and VTs	
1	Single Phase, CT complete in all respects. (Number of core as per the system requirement)	1 No.
2	Single Phase, 3 Winding, CVT complete in all respects	1 No.
IV	400 kV LIGHTNING ARRESTER	
1	Surge Arrestor complete with insulating base and surge monitor	1 No.
V	400 kV INSULATORS & HARDWARE	
1	String / Strain insulators with hardware (1 no. of each type)	1 Set
VI	Bus post insulators	3 Nos.
VII	Clamps, spacers and connectors including equipment terminal connectors.	10% of total qty. of each type
VIII	SUBSTATION AUTOMATION SYSTEM AND PROTECTION SYSTEM FOR SWITCHYARD (FOR ST, LINE, BUS BAR PROTECTION):	
1	Relays of each type/range/rating	1 No.
2	Indication Meters viz. Frequency Meter, MVAR, Ammeter etc	1 No.
3	Transducers	1 No. each type & rating/range
4	Main Aux. CTs/PTs	1 No. each type & rating/range
5	Distribution Recorder	1 Set
6	PMU (Complete with all necessary accessories, cables as per specifications)	1 No.
7	Cards/Modules of Disturbance recorder in case of standalone.	1 Set
8	Bay Control Units	2 No
IX	LV SWITCHGEAR NOTE: Quantity mentioned in percentage (%) is the % of total installed. If percentage comes as fraction next higher integer should be considered for the purpose of quantity required].	
1	Complete pole of breaker	1 no of each type and rating
2	Spring charging motors	6 nos.
3	Aux. contact set	12 set.
4	Limit switches	6 nos.
5	Arc chutes	4 nos.

6	Fixed contact set	6 sets
7	Moving contact set	6 sets
8	Arcing contact	6 sets
9	Charging spring	3 nos.
10	Current transformer (metering)	3 nos.
11	Current transformer (protection)	3 nos.
12	Closing coil	12 nos.
13	Trip coil	12 nos.
14	CT for Bimetal O/L relays	1 no. of each type and rating
15	Voltage transformer	3 nos. each
16	Control supply transformer	1 no each rating.
17	Ammeter	1 no of each rating and size.
18	Voltmeter	1 no of each rating and size.
19	Relays	1 no of each type and rating .
20	Power contactor	5 nos of each rating.
21	Coil of above contactor	10 nos.
22	Air break switches	10 % of each rating.
23	DP air break switches (DC)	2 nos. each
24	Control & selector switches	5% of each type and size.
25	Control fuses & neutral links	30 % Of population for fuses,10% of population for link
26	Indicating lamps	20% of installed quantity
27	Bus bar support insulators(each type)	5% of installed quantity
28	Bus duct flexible connectors	1 no of each type.
29	Primary disconnect in MCC(Male/ female contact)	1 set of each rating.
30	Push buttons	10 % of each type.
31	Power fuses	50 % of each type.
32	Thermal bimetal relays	6 nos. of each rating and size.
33	Indication Lamp Holders complete	20% of installed quantity
34	Maintenance tools and accessories for Maintenance (bidder to list)	3 nos.
35	Terminal blocks	10% of installed quantity
36	Busbar aluminium flat pieces	12 meters of each size.
37	Busbar angles/formed pieces for breaker	1 no.
VIII	LT TRANSFORMER (DRY TYPE)	
1	Limb of complete LT & HT of temperature sensing devices	1 Set
2	Bushing (in case of separate item on transformers offered) HV, LV and LV neutral	3 Nos.
3	Battery spares shall be provided for each set of battery being supplied i.e. for each 220V DC & 48V DC Battery set.	1 Set
IX	BATTERY <i>NOTE: Battery spares shall be provided for each set of battery being supplied i.e. for each 220V DC & 48V DC Battery set.</i>	
1	Battery cell	5 Nos.
2	cell container of each type	5 Nos.
3	Level indicator	2 Nos.
4	Vent plugs	5 Nos.
5	Inter-cell connector	5 Nos.
6	Set of nuts, bolts and washer	5 Nos.
7	Teakwood cable clamps with hardware	6 Nos.
X	BATTERY CHARGERS <i>NOTE: Battery Charger spares shall be provided for each set of charger being supplied i.e. for each 220V DC & 48V DC Battery Charger set.</i>	
1	Electronic Cards of each type and rating (with all components mounted)	1 Set
2	Fuses of each type and rating	25% of total capacity for each type & rating of fuses used in the system.
3	SCR of each type and rating	2 Nos.
4	Blocking Diode of each type and rating	1 Set
5	Potentiometer of each type and rating (Pulse transformer)	1 Set
XI	POWER AND CONTROL CABLES <i>NOTES:</i> <i>a. Quantity mentioned in percentage (%) is the % of total installed.</i> <i>b. If percentage comes as fraction next higher integer should be considered for the purpose of quantity required.</i>	
1	1.1 KV Grade power cables for each type and size.	10% of installed quantity

2	1.1 KV Grade control cables for each type and size.	10% of installed quantity
XII	LIGHTING SYSTEM	
1	Lighting fixtures of each type (without lamps)	10% of installed quantity
2	Lighting Panels:	10% of installed quantity:-
3	Switch-fuse	unit of each type & rating
4	MCB of each type & rating	5 Nos.
5	Contactor of each type & rating	5 Nos.
6	Switches of each type & rating	5 Nos.
7	Receptacles with plug	5 Nos.
8	Rotary switches	1 No.
9	Junction boxes of each type	10% of installed quantity
XIII	FIRE FIGHTING SYSTEM	
1	FIRE HOSES WITH COUPLINGS	
1.1	7.5m long fire hoses with end connectors	10% of population
1.2	15 m long fire hoses with end connectors	10% of population
2	BRANCH PIPES WITH NOZZLES	
2.1	Nozzles with branch pipes quick coupling ends	10% of population
2.2	Nozzles of water monitors	10% of population
3	DELUGE VALVE ASSEMBLIES	
3.1	Complete deluge valve assembly alongwith internals	10% of population each type
3.2	Clapper assembly complete (consisting of clapper seat rubber, screws, etc.)	10% of population
3.3	Solenoid coils	10% of population each type
4	VALVES (GLOBE/BUTTERFLY/NRV)	
4.1	Complete valves	10% of population of each type and size with minimum 1 No.
4.2	Reduction gear operator (globe/butterfly)	10% -do-
4.3	Flap/Door with pin (NRV)	10% -do-
4.4	Disc (butterfly/globe)	5% -do-
4.5	Gate (gate valve)	5% -do-
4.6	Stem (all types)	5% -do-
4.7	Seal rings (all types)	10% -do-
4.8	Flap rings (NRV)	10% -do-
4.9	Gaskets	10% -do-
4.10	Bearing (butterfly valve)	10% -do-
5	Y-TYPE STRAINERS	
5.1	Strainers elements with O-rings and stiffners.	20% -do-
6	HVW SPRAY SYSTEM	
6.1	Spray nozzles	10% -do-
6.2	QB Detectors	20% -do-
7	HYDRANT VALVE	
7.1	Hydrant valve complete (internal) single headed with instantaneous female coupling	20% of population
7.2	Hydrant valve complete (external) single headed with instantaneous female coupling	20% -do-
7.3	Hydrant valve complete(double headed) with instantaneous female coupling	10% -do-
7.4	Water monitor sets with nozzle branch pipe etc.	10% -do-
7.5	Spindle with nuts of Hydrant valve	10% -do-
7.6	Bonnet, gland nut, rubber assembly of hydrant valve	10% -do-
7.7	Seat, check nut, washer assembly of hydrant valve	10% -do-
7.8	Rubber washer for female coupling	20% -do-
7.9	Instantaneous female coupling assembly complete for hydrant valve	20% -do-
7.10	Lock pin assy for hydrant valve	20% -do-
8	SMOKE / HEAT DETECTORS	
8.1	Photo-electric type detector(Addressable)	10% of population
8.2	Ionisation type detectors(Addressable)	10% -do-
8.3	Indicators assembly for smoke detectors provided in false ceiling	5% -do-
9	FIRE ALARM CONTROL/ANNUNCIATION PANELS (Addressable)	
9.1	Auxiliary relays/Contactors	10% of population
9.2	Control cards for annunciation facia, fire detection system, gas extinguishing etc of each type	10% -do-
9.3	All PCB assembly cards, loop cards including mother boards etc.	10% -do-
9.4	LCD display units of panels	10% -do-
9.5	Interface units/ modules for non-addressable devices, output relay modules, supervisory control modules etc	10% -do-

9.6	Power supply modules	10% -do-
10	PORTABLE EXTINGUISHERS	
10.1	Portable extinguishers	10% of each type & size
	a) Water Type	
	b) Foam Type	
	c) CO ₂ Type	
	d) Dry Chemical Type	
11	INERT GAS EXTINGUISHING SYSTEM	
11.1	Nozzles	2 No. of each type & size
11.2	Automatic & Manual release system	1 No. of each type & size
11.3	Cylinder valve with safety pressure relief device	1 No. of each type & size
11.4	Gas cylinder	5 No. of each type & size
11.5	Flexible hoses(if applicable)	2 No. of each type & size
11.6	Solenoid coils	2 No. of each type & size
XIV	AIR CONDITIONING & VENTILATION SYSTEM	
1	PAC Unit for each model	
1.1	V Belts for PAC Unit blower	2 sets
1.2	PAC Unit blower bearing	1 set for each AC unit
1.3	Blower motor bearing	1 set for each rating of AC unit (both for condenser & Indoor Unit)
1.4	Filters at suction and discharge of units	25% of installed population
1.5	HP/LP cut out	1 Nos.
1.6	Anti-freeze thermostat	2 Nos.
2	Ventilation system	
2.1	Supply air fan (wall mounted) (Of each type / Rating /Capacity)	5%of total population or 1 number whichever is higher
2.2	Exhauster Fan (Wall mounted) (Of each type / Rating /Capacity)	5%of total population or 1 number whichever is higher
3	Electrical items – PDB panel	
3.1	Aux. contact set	4 Nos.
3.2	Current transformer (metering)	1 No.
3.3	Current transformer (Protection)	1 No.
3.4	CT for Bimetal O/L relays	1 no. of each type & rating
3.5	Relays	1 no. of each type & rating
3.6	Control fuses & neutral links (if applicable)	30 % Of population for fuses, 10 % of population for link.
3.7	Indicating lamps	20 % of installed quantity.
3.8	Bus bar support insulators(each type)	5 % of installed quantity.
3.9	Bus duct flexible connectors	1 no. of each type
3.10	MCCB	1 no. of each type
3.11	Power fuses (if applicable)	10% of each type
3.12	Thermal bimetal relays	6 nos. of each rating and size.
3.13	Terminal blocks	10 % of installed quantity
3.14	Busbar aluminium flat pieces	12 meters of each size.
XV	LIGHTING SYSTEM	
1	Lighting fixtures of each type (without lamps)	10% of installed quantity
2	Lighting Panels:	10% of installed quantity:-
3	Switch-fuse	unit of each type & rating
4	MCB of each type & rating	5 Nos.
5	Contactor of each type & rating	5 Nos.
6	Switches of each type & rating	5 Nos.
7	Receptacles with plug	5 Nos.
8	Rotary switches	1 No.
9	Junction boxes of each type	10% of installed quantity
B	LIST OF MANDATORY MAINTENANCE EQUIPMENT	
I	FOR CIRCUIT BREAKER	
1	SF6 Gas filling and evacuating plant (portable - 300 Lts.)	1 No.
2	SF6 gas leak detector	2 No.
3	Operation analyzer with DCRM kit	1 No.
II	FOR SURGE ARRESTER	
1	Leakage current analyzer (for Gapless Surge Arrester)	1 No.