

PROJECT: 220/33kV Switchyard for Kishanganga (3x110MW) HEP

ANNEXURE-4 : MANDATORY SPARES TO BE HANDLED & STORED

1	Mandatory Spares of 312 kVA, 11/0.433 kV, ONAN, Dyn1, 3-phase LT Transformer		
1.1	Winding temperature protection equipment(DTT) for the auxiliary transformer(if applicable) (10 no. of each used type)	No.	10
1.2	11kV, terminal bushing	No.	3
1.3	415V, terminal bushing	No.	4
1.4	transformer 10% extra oil for topping up in non returnable containers suitable for outdoor storage	LOT	1
2	Mandatory Spares of 220kV SF6 Circuit Breaker		
2.1	ONE COMPLETE POLE OF 220KV CIRCUIT BREAKER WITH INTERRUPTER UNIT, SUPPORT INSULATORS, OPERATING MECHANISM AND TIE ROD ETC.	No.	1
2.2	TRIP COILS FOR 220KV CIRCUIT BREAKERS	No.	6
2.3	CLOSING COILS FOR 220KV CIRCUIT BREAKER	No.	6
2.4	Spare SF6 Gas (20% of total gas used for above circuit breakers-220kV)	LOT	1
3	Special Tools of 220kV SF6 Circuit Breaker		
3.1	HANDLING DEVICES & TOOLS FOR ASSEMBLING AND DISMANTLING THE OPERATING MECHANISMS OF 220KV CIRCUIT BREAKERS	SET	1
4	Testing Equipment of 220kV SF6 Circuit Breaker		
4.1	Micro Ohm meter for resistance measurement	No.	1
5	Mandatory Spares of 33kV SF6 Circuit Breaker		
5.1	VACUUM BOTTLE OR SF6 GAS INTERRUPTER FOR 33KV CIRCUIT BREAKER	No.	3
5.2	TRIP & CLOSING COILS FOR 33KV CIRCUIT BREAKER	SET	4
5.3	Spare SF6 Gas (20% of total gas used for above circuit breakers-33kV)	LOT	1
5.4	HANDLING DEVICES & TOOLS FOR ASSEMBLING AND DISMANTLING THE OPERATING MECHANISMS OF 33KV CIRCUIT BREAKERS	SET	1
6	Mandatory Spares of 220kV HDB Isolators		
6.1	COMPLETE DRIVE MECHANISM INCLUDING MOTOR FOR 220KV ISOLATOR	No.	1
6.2	COMPLETE DRIVE MECHANISM INCLUDING MOTOR FOR 220KV EARTH SWITCH	No.	1
7	Mandatory Spares of 33kV HDB Isolators		
7.1	FIXED AND MOVING CONTACTS (EACH SET COMPRISES OF 3 FIXED AND 3 MOVING CONTACTS) FOR 33KV ISOLATOR	SET	2
8	Mandatory Spares of 198kV SURGE ARRESTER		
8.1	198KV, 10KA, CLASS-III SURGE ARRESTER COMPLETE WITH SURGE MONITOR AND INSULATING BASE AND ALL ACCESSORIES AS PER SPECIFICATION (SPARE)	No.	1
9	Mandatory Spares of 220 kV CVT, 8800PF SINGLE PHASE CVT		
9.1	220 kV CVT, 8800PF SINGLE PHASE CVT	No.	1
10	Mandatory Spares of Control and Protection panels		
10.1	Control and Protection panels : Mandatory Spares (as per enclosed approved List of Spares, Drg. No. KSG/PRS/01/RS/001/R03 (4 pages) as per enclosed Annexure – 10	Lot	1
11	Mandatory Spares of 220kV XLPE Cable		
11.1	Supply: 220kV cable sealing end (indoor type) suitable for terminating the cables for interconnection with Generator transformer bushing	Nos.	2
11.2	Supply: 220kV cable sealing end (outdoor type) suitable for terminating the cables in the Air insulated switchyard	Nos.	1
11.3	Supply: 220 kV Straight through joints for 220kV cable	Nos.	2
11.4	Supply: Single pole link box without SVL at GT side	Nos.	1
11.5	Supply: Single pole link box with SVL	Nos.	1
11.6	Supply: Sheath Voltage Limiter	Nos.	3
12	Mandatory Spares, TOOLS & TACKLES of 11kV Cable Termination Kits		
12.1	11kV Heat Shrinkable type cable terminations for OUTDOOR installation for 185 mm ² single core, armoured, XLPE insulated Copper cable with all accessories and consumables	Nos.	1
12.2	11kV Heat Shrinkable type cable terminations for INDOOR installation for 185 mm ² single core, armoured, XLPE insulated Copper cable with all accessories and consumables	Nos.	1
12.3	11kV Heat Shrinkable type cable straight through joint for 185 mm ² single core, armoured, XLPE insulated Copper cable with all accessories and consumables	Nos.	1
12.4	11kV Heat Shrinkable type cable terminations for OUTDOOR installation for 70 mm ² three core, armoured, XLPE insulated Copper cable with all accessories and consumables	Nos.	1
12.5	11kV Heat Shrinkable type cable terminations for INDOOR installation for 70 mm ² three core, armoured, XLPE insulated Copper cable with all accessories and consumables	Nos.	1
12.6	11kV Heat Shrinkable type cable straight through joint for 70 mm ² three core, armoured, XLPE insulated Copper cable with all accessories and consumables	Nos.	1
12.7	11kV Heat Shrinkable type cable straight through joint for 70 mm ² three core, armoured, XLPE insulated Copper cable with all accessories and consumables	Nos.	1
12.8	5% of all hardware consumables such as plumbing metal, sealing compound, tapes and other material, required for making of terminal connection for future use by the owner	Lot	1

13	Mandatory Spares , Accessories and tools of 220V Battery		
13.1	Hydrometer	Nos	1
13.2	Set of hydrometer syringes suitable for the vent holes in different cells	Nos	1
13.3	Acid mixings jars	Nos	1
13.4	Specific gravity correction chart	Nos	1
13.5	Rubber apron	Nos	1
13.6	Pair of rubber hand gloves	Nos	1
13.7	No smoking notice	Nos	1
13.8	Goggles (industrial)	Nos	1
13.9	First charge/Installation Instruction card	Nos	1
13.10	Minimum and maximum temperature indicator	Nos	1
13.11	Set of spanners	Nos	1
13.12	Cell testing voltmeter(3-0-3V)	Nos	1
13.13	Wall mounting type holder for hydrometer thermometer	Nos	1
13.14	Thermometer for measuring electrolyte temperature	Nos	1
13.15	Plastic funnel	Nos	1
13.16	Rubber syphon	Nos	1
13.17	Plastic Jug 2 liters	Nos	1
13.18	Rubber boot knee height	Nos	1
13.19	Vent plug/caps/hardware of each type(10 % of the installed quantity)	10% of the installed quantity	10
13.20	Completely assembled cell(dry) (5% of the installed capacity)	5% of installed capacity	5
13.21	Acid/ Alkali level indicator float	Nos	5
13.22	Inter cell connectors	Nos	20
13.23	Inter row connectors (10 % of installed quantity)	10% of the installed quantity	10
13.24	Connector Bolts & Nuts (20 % of installed quantity)	20% of installed quantity	20
13.25	Cell Lifting Straps for Battery Handling	Nos	2
13.26	Eye Wash Station(only basin) (HCC scope of supply and ETC)	Nos	1
13.27	Safety Showers with hand showers connected with a long pipe installed in Battery Room of Switchyard Control Room Building(HCC scope of supply and ETC)	Set	1
14	Mandatory Spares , Accessories and tools of 220V Battery Charger		
14.1	Ammeter and Voltmeter	Nos	2Nos. of each used type
14.2	Shunt Resister	Nos	2Nos. of each used type
14.3	Diode/thyristor module	Sets	6 sets of each used type
14.4	Printed circuit cards	Sets	6 sets of each used type
14.5	Auxiliary fuse	Nos	20% of installed quantity
14.6	Semi conducting type Fast Fuse	Nos	20% of installed quantity
14.7	Auto transformer (transformer/rectifier transformer/any other type of transformer used in battery charger as per design)	Nos	2 nos.
14.8	Foundation bolts, fixing channels for mounting the charger on the floor	Lot	1
14.9	Terminals with lugs for connecting cables from battery, cables from DC board and control cables	Lot	1
15	Mandatory Spares of LT Switchgear (AC & DC boards)		
15.1	MCCB of type used(4 Nos. of each used type)	Set	1
15.2	Current Transformers of type used (4 Nos. of each used type)	Set	1
15.3	Supporting insulator of type used (6 Nos. of each used type)	Set	1
15.4	Indication lamps used including assemblies (10 Nos. of each used type)	Set	1
15.5	Fuses (10 Nos. of each used type)	Set	1
15.6	Control and instrumentation switches (3 Nos. of each used type)	Set	1
15.7	Contactors (2 Nos. of each used type)	Set	1
15.8	Indicating instruments (2 Nos. of each used type)	Set	1
15.9	Under voltage relays (2 Nos. of each used type)	Set	1
16	Mandatory Spares of Illumination System		NIL
16.1	Multiple plug power sockets suitable for 63A/32A/16A	5% of installed quantity	5
16.2	Multiple plug power sockets suitable for 15A/5A	5% of installed quantity	5
16.3	Multi plug suitable for 63A/32A/16A	5% of installed quantity	5
16.4	Multi plug suitable for 15A/5A	5% of installed quantity	5
16.5	High Pressure Mercury vapour lamps complete with all accessories and fittings (if applicable)	5% of installed quantity	5
16.6	High Pressure Sodium vapour lamps complete with all accessories and fittings	5% of installed quantity	5
16.7	Fluorescent lamps complete with all accessories and fittings	20% of installed quantity	20
16.8	DC lamps complete with all accessories and fittings	20% of installed quantity	20
16.9	HPMV lamps and chokes(if applicable)	15% of installed quantity	15
16.10	HPSV lamps and chokes(if applicable)	15% of installed quantity	15
16.11	Low wattage lamps(24V)	20% of installed quantity	20
16.12	All type of switches,contactors,terminal blocks,screws	10% of installed quantity	10
16.13	All type of cables, wires	10% of installed quantity	10
17	Mandatory Spares of Clamps and connectors		
17.1	220KV CIRCUIT BREAKER ITEM NO. B1.1	Nos	2
17.2	220KV CIRCUIT BREAKERITEM NO. B1.2	Nos	2
17.3	220KV CIRCUIT BREAKERITEM NO. B1.3	Nos	2
17.4	220KV CAPACITOR VOLTAGE TRANSF ITEM NO. B7	Nos	1
17.5	220KV TEE CLAMP ITEM NO. F1	Nos	3
17.6	220KV TEE CLAMP ITEM NO. F2	Nos	3
17.7	220KV TEE CLAMP ITEM NO. F3	Nos	3
17.8	220KV TEE CLAMP ITEM NO. F4	Nos	3
17.9	220KV TEE CLAMP ITEM NO. F5	Nos	3
18	Mandatory Spares:120 kN Disc Insulators		
18.1	Disc Insulators string 24 sets of 220kV(120 kN Disc Insulators)	Nos	424
18.2	Disc Insulators string 5 sets of 33kV(120 kN Disc Insulators)	Nos	15

19	Mandatory Spares : String Insulator hardware fittings		
19.1	220kV single tension single anchoring 120 kN disc string insulator each string comprising 1 x 18 discs complete with hardware suitable for twin "moose" conductor with sub conductor spacing of 250 mm with turn-buckle	Nos	4
19.2	220kV single tension single anchoring 120 kN disc string insulator each string comprising 1 x 18 discs complete with hardware suitable for twin "moose" conductor with sub conductor spacing of 250 mm without turn-buckle	Nos	4
19.3	220kV single tension single anchoring 120 kN disc string insulator each string comprising 1 x 18 discs complete with hardware suitable for single "moose" conductor with turn-buckle	Nos	4
19.4	220kV single tension single anchoring 120 kN disc string insulator each string comprising 1 x 18 discs complete with hardware suitable for single "moose" conductor without turn-buckle	Nos	4
19.5	220kV single suspension 120 kN disc string insulator each string comprising 1 x 17 discs complete with hardware with drop clamps suitable for twin "moose" conductor with sub conductor spacing of 250mm	Nos	1
19.6	220kV single suspension 120 kN disc string insulator each string comprising 1 x 17 discs complete with hardware with drop clamps suitable for single "moose" conductor	Nos	4
19.7	220kV single suspension 120 kN disc string insulator each string comprising 1 x 17 discs complete with hardware with straight clamps suitable for twin "moose" conductor with sub conductor spacing of 250mm	Nos	3
19.8	33kV single tension single anchoring 120 kN disc string insulator each string comprising 1 x 3 discs complete with hardware suitable for single "moose" conductor with turn-buckle	Nos	3
19.9	33kV single tension single anchoring 120 kN disc string insulator each string comprising 1 x 3 discs complete with hardware suitable for single "moose" conductor without turn-buckle	Nos	2
20	Mandatory Spares : ACSR Moose Conductor		
20.1	ACSR Moose Conductor	KM	0.5
21	Mandatory Spares : HVAC system		
21.1	Air filter bank type & size used	1 set of each type used	1
21.2	V – belts of type & size used	2 nos. of each type used	2
21.3	Air handling fan motor set	1 no. of each type used	1
21.4	Blower Fan motor set	1 no. of each type used	1
21.5	Cooling coil of type & size used	2 nos. of each type used	2
21.6	Circuit breakers & starters for motor starter panels	1 no. each for AHUs	1
22	Mandatory Spares : Firefighting system		
22.1	Detectors	5 sets of each used type	5
22.2	Electric plug in cards for the sub panels / local panel	2 sets of each used type	2
22.3	Bulbs & LED installed in the system	10% of the installed quantity	10
22.4	Manual call point	5 % of instlled quantity	5
22.5	Hydrant valve	5 % of instlled quantity	5
23	Mandatory Spares :11kV XLPE Cable		
23.1	12/12 kV, 1-core, 185 mm ² copper conductor XLPE cable	M	10% of the installed quantity
23.2	12/12 kV, 3-core, 70 mm ² copper conductor XLPE cable	M	10% of the installed quantity
24	Mandatory Spares : Cable glands of 1.1kV Power and Control cables		
24.1	Cable glands of each size	Nos.	20% of the installed quantity
25	Mandatory Spares :1.1kV Power and Control cables		
25.1	1.1kV Power cables of each type	M	10% of the installed quantity
25.2	1.1kV Control cables of each type	M	10% of the installed quantity
26	Mandatory Spares : Bolted Type Cable Supports, hardware etc. used in 220kV/33kV Switchyard		
26.1	Cable Supports, hardware etc.	Nos.	20% of the installed quantity
27	Mandatory Spares : Cable Tray of each size used in 220kV/33kV Switchyard		
27.1	Cable Tray of each size	Nos.	10% of the installed quantity
28	Mandatory Spares : 220KV/33KV, 12MVA POWER TRANSFORMER		
28.1	HV bushings complete with gaskets	No.	1
28.2	HV Neutral bushings complete with gaskets	No.	1
28.3	LV bushings complete with gaskets	No.	2
28.4	Complete set of gaskets for tank cover and fittings, valves etc. used for one transformer	sets	2
28.5	Temperature indicator, RTD	No.	1 no. of each used type
28.6	Buchholz relays	No.	1
28.7	Oil level indicator	No.	1 no. of each used type
28.8	Pressure relief device	No.	1
28.9	Conservator Air Bag	No.	1
30	Mandatory Spares : 33KV/11KV, 6MVA 3 PHASE POWER TRANSFORMER		
30.1	HV bushings complete with gaskets	No.	1
30.2	HV Neutral bushings complete with gaskets	No.	1
30.3	LV bushings complete with gaskets	No.	2
30.4	Complete set of gaskets for tank cover and fittings, valves etc. used for one transformer	sets	2
30.5	Temperature indicator, RTD	No.	1 no. of each used type
30.6	Buchholz relays	No.	1
30.7	Oil level indicator	No.	1 no. of each used type
30.8	Pressure relief device	No.	1
30.9	Conservator Air Bag	No.	1