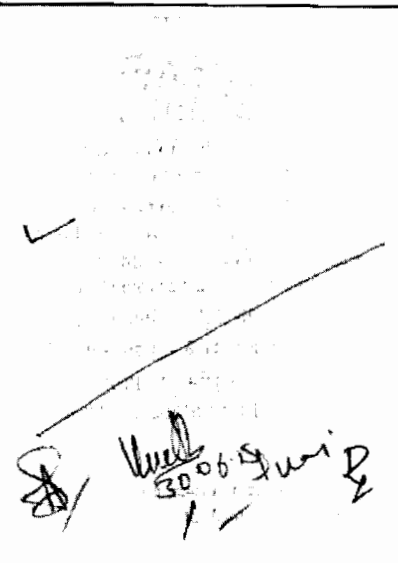



Mandatory Spares of  
Control and Protection panels :

Annexure - 10

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		Name				Name				Name			
		Date				Date				Date			
		Name				Name				Name			
		Date				Date				Date			
3	Revised in line with NHPC observation's.	Name		AA		Name		DP		Name		PKI	
		Date		12.06.2015		Date		12.06.2015		Date		12.06.2015	
2	Revised in line with NHPC observation's.	Name		AA		Name		DP		Name		PKI	
		Date		11.03.2015		Date		11.03.2015		Date		11.03.2015	
1	Revised in line with NHPC comments received on dated 17th Feb'15.	Name		AA		Name		DP		Name		PKI	
		Date		21.02.2015		Date		21.02.2015		Date		21.02.2015	
REV.	DESCRIPTION	DRAWN		SIGN.		CHECKED		SIGN.		APPROVED		SIGN.	
COUNSULTANT :		<b>NHPC LIMITED</b> <b>( A GOVT. OF INDIA ENTERPRISE)</b>											
PROJECT :		<b>3x110MW KISHANGANGA HYDROELECTRIC PROJECT</b>											
CUSTOMER :		 <b>BHARAT HEAVY ELECTRICALS LTD.</b>											
TITLE :		<b>LIST OF SPARES</b>											
		DRAWING No.				TOTAL SHEETS		SHEET NO		REV			
		KSG/PRS/01/RS/001/R03											
						3		01		3			

SPARES LIST OF GRP & SWITCHYARD PROTECTION PANELS FOR 3*110MW KISHANGANGA HEP OF M/S NHPC Ltd.				
Sl.NO.	UNIT QTY.	DESCRIPTION		
		A) GENERAL : 1) Customer : M/S NHPC Ltd. 2) Project : 3*110MW Kishanganag HEP 3) SCOPE OF SUPPLY :Spares		
Spares as per clause 15.8 of PTS				
A	Protection Relay			
1	1 SET	Numerical Multi-functional Generator Protection Relay, type Micom P345917A3M0360K. Rating: 5A, 110V, 50HZ. Auxiliary Supply: 220V DC. Case size : 80TE The relay shall have 24 user configurable digital inputs, 24 user configurable outputs besides relay fail watchdog contact and user configurable LEDs.	Alstom	PI240937314 CG4955107002
2	1 SET	Numerical IDMT 3 over current ,1 E/F or REF or Generator split phase differential protection relay type Micom P141917N3M0510J with high set instantaneous unit with built in LBB protection. Rating: 1A / 5A, 50HZ CT secondary. Auxiliary Supply: 220V DC. Case size : 40TE The relay shall have 8 user configurable inputs and 8 user configurable outputs besides relay fail contact and user configurable LEDs	Alstom	PI240937314 CG4955107088
3	1 SET	Numerical, triple pole, Four Winding Transformer Protection Relay, type Micom P645917A3M0050M. Rating: 1A / 5A, 50HZ CT secondary. Auxiliary Supply: 220V DC. Case size : 60TE The relay shall have 16 user configurable inputs and 16 user configurable outputs besides relay fail contact and user configurable LEDs	Alstom	PI240937314 CG4995107029
4	1 SET	Numerical, triple pole, Three Winding Transformer Protection Relay, type Micom P643917A3M0050M. Rating: 1A / 5A, 50HZ CT secondary. Auxiliary Supply: 220V DC. Case size : 60TE The relay shall have 16 user configurable inputs and 16 user configurable outputs besides relay fail contact and user configurable LEDs	Alstom	PI240937314 CG4995107010
5	1 SET	Numerical Multi-functional Distance Protection Relay, type Micom P44291EB3M0550K. Rating: 5A, 110V, 50HZ. Auxiliary Supply: 220V DC. Case size : 60TE The relay shall have 16 user configurable digital inputs, 21 user configurable outputs besides relay fail watchdog contact and user configurable LEDs.	Alstom	PI240937314 CG4995107053
6	1 SET	Numerical Multi-functional Distance Protection Relay, type Micom P44391EA3M0750K. Rating: 5A, 110V, 50HZ. Auxiliary Supply: 220V DC. Case size : 80TE The relay shall have 16 user configurable digital inputs, 24 user configurable outputs besides relay fail watchdog contact and user configurable LEDs.	Alstom	PI240937314 CG4995107061
7	1 SET	Triple pole numerical low impedance type high speed , Busbar protection relay type Micom:P746 Rating: 1A / 5A, 50HZ CT secondary. Auxiliary Supply: 220V DC.	Alstom	PI240937314 CG4995107126
B	Thermal Overload Relay			

SI.NO.	UNIT QTY.	DESCRIPTION		
8	2 SET	Static, VT Fuse Failure Relay (Voltage Balance Scheme), type B68 of ER make. Rating 63.5V (Phase to Neutral), 50HZ. Contacts: 2 N/O + 2 NC self reset. Case - E2.	ER	PI240937328 CG4905127246 /CG4905127254
<b>C</b>	<b>Single Phase Metrosil</b>			
9	5 NO	Metrosil (1A)	Alstom	PI240937314 CG4955107100
10	5 NO	Metrosil (5A)	Alstom	
<b>D</b>	<b>Test Block</b>			
11	2 NO	Universal Test Block, type ERMLG of Easun Reyrolle	ER	Swgr Stock BP9048103584
<b>E</b>	<b>Tripping Relay</b>			
12	2 SET	High Speed Tripping Relay, type TR221H2 of ER make, high burden type with 16 N/O+ 6 N/C H/R Contacts (besides the coil cut-off contacts) & operation indicator for each element/coil. Rating: 220V DC. Case - E4	ER	PI240937328 CG4905127122
12.A	2 SET	High Speed Tripping Relay, type MVAJ203LA1004A of Alstom make, high burden type with 16 N/O+ 6 N/C H/R Contacts (besides the coil cut-off contacts) & operation indicator for each element/coil. Rating: 220V DC. Case - E4.	Alstom	CG4985317438
13	2 SET	High Speed Relay, type TR212 of ER make, high burden type with 11 N/O S/R Contacts & operation indicator for each element/coil. Rating: 220V DC. Case - E4.	ER	PI240937328 CG4905127157
<b>F</b>	<b>Trip Circuit Supervision Relay</b>			
14	2 SET	Trip circuit Supervision Relay, type XR351 of ER make, with H/R reverse operation indicator. Rating: 220V DC. Contacts: 2 N/O + 2 N/C S/R. Case - E4.	ER	PI240937328 CG4905127130/ CG4905127203
<b>G</b>	<b>Auxiliary Relay</b>			
15	5 SET	Two Element Auxiliary Relay, type AR111X2. Each element of the relay shall have 4 N/O Self Reset Contacts and a Self Reset Operation Indicator (Flag). CASE SIZE:E4 Rating: 220V DC. Operating voltage: 80% to 120% of 220V DC rated voltage.	ER	PI240937328 CG4905127211
<b>H</b>	<b>Auxiliary relay socket</b>			
16	5 SET	Bistable Relay, type TR231+AR101 of ER make, with E/R operation indicator. Rating: 220V DC. Contacts: 8 N/O + 2 N/C S/R. Case - E4.	ER	PI240937328 CG4905127190
16.A	5 SET	Two Element Auxiliary Relay, type MVAAM21D18A2541A of Alstom make. Each element of the relay shall have 2 C/O & 2 N/O Self Reset Contacts and a Self Reset Operation Indicator (Flag). CASE SIZE:E4 Rating: 220V DC. Operating voltage: 80% to 120% of 220V DC rated voltage.	Alstom	CG4985317438
17	5 SET	DC supply monitoring relay with 100-200ms time delay on drop-out, type AR121T3. Rating: 220V DC. Contacts: 2 N/O + 2 N/C S/R with H/R reverse operation indicator. Case - E2.	ER	PI240937328 CG4905127149
<b>Recommended Spares as per clause 3.1.2 of specification</b>				

SI.NO.	UNIT QTY.	DESCRIPTION		
18	2 SET	Bistable Relay, type TR231+AR101 of ER make, with E/R operation indicator. Rating: 220V DC. Contacts: 8 N/O + 2 N/C S/R. Case - E4.	ER	PI240937328 CG4905127190
19	2 SET	Static, VT Fuse Failure Relay (Voltage Balance Scheme), type B68 of ER make. Rating 63.5V (Phase to Neutral), 50HZ. Contacts: 2 N/O + 2 NC self reset. Case - E2.	ER	PI240937328 CG4905127246 /CG4905127254
20	2 SET	Two Element Auxiliary Relay, type MVAAM21D1BA2541A of Alstom make. Each element of the relay shall have 2 C/O & 2 N/O Self Reset Contacts and a Self Reset Operation Indicator (Flag). CASE SIZE:E4 Rating: 220V DC. Operating voltage: 80% to 120% of 220V DC rated voltage.	Alstom	CG4985317519
21	5 NO	Stabilising resistor, 0-1000 ohm	Alstom	PI240937314 CG4955107096
22	2 NO	Universal Test Block, type MPG of Alstom.	Alstom	BP9048103592
NOTES:	1	Item with SI. No.1,2,3,8,9,10,12,12.A,15,16,16.A,17,18,19, & 22 shall Supplied as per SCS BBU Ref: SCS/99510/AKA/366/01/Rev01 dated 20/02/15 SI .No:14.5.		
	2	Item with SI. No.4,5,6,7,11,13,14,20 & 21 shall Supplied as per TBG BBU Ref: SCS/99514/370/AKARev01 dated 20/02/15 SI No.:11.1,2.		

