

पावर ग्रिड कारपोरेशन ऑफ इंडिया लिमिटेड

(भारत सरकार का उद्यम)

POWER GRID CORPORATION OF INDIA LIMITED

(A Government of India Enterprise)



पावरग्रिड

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संदर्भ संख्या/Ref. Number

C/ENGG/HVDC/NER-NR/500/ 433 4

Date: 30.04.2014

ABB AB
HVDC
SE-771 80 Ludvika
Sweden

Kind Attn.: Mr. Goran Isacsson, Project Manager
Ms. Renuka Gera (GM) TBG, BHEL New-Delhi

Subject: ± 800 KV, 6000 MW HVDC Multi Terminal NER/ER – NR/WR Interconnector - I –
BOM for 415V MCC for Valve cooling for AGR (BHEL)

NOA No.: C-61901R-S056-8/NOA-I/3659, C-61901R-S056-8/NOA-II/3660,
C-61901R-S056-8/NOA-III/3661, C-61901R-S056-8/N
OA-IV/3662 C-61901R-S056-8/NOA-V/3663 all dated 21st March 2011

Dear Sir,

In reference to your letter/document TM-NEA1-14729 dated 02.04.14. We are here in conveying comments/ approval on the drawings/ documents listed in attached sheet. For approval/ comments code of each drawing/ documents, please refer the category indicated in remarks column.

In case of any modification other than those desired by us are carried out, the same shall be highlighted clearly in the Drawing / Document with full justification thereof and resubmitted for approval.

Approval/ comments conveyed herein neither relieves the Contractor of his contractual obligation and his responsibilities for correctness of dimensions, material of constructions, weight, quantities, design details, assemble fits, performance particulars and conformity of the supplies with the Indian Statutory Laws as may be applicable, nor does it limits the Purchaser's right under the Contract..

Thanking you,

Yours faithfully

(Rakesh Kumar)
AGM (Engg-HVDC)

SI No.	Document No./ Drawing No.	Document Title	Category of Approval	Remarks
1	J-673-301-01 Rev. 05	Bill of Material (BOM) of 415V MCC (Motor Control Centre) for Valve Cooling System for AGR (BHEL)	IV	

CATEGORIES: -

- I Approved.
- II Approved with comments.
- III Returned for correction.
- IV For Information.

ABB AB
HVDC

**±800 kV, 6000 MW HVDC Multi Terminal NER/ER - NR/WR
Interconnector - I**

Document Transmittal

ABB AB
Dept. PSDC/DCOC - NEA800
SE-771 80 Ludvika

Doc No: **TM-NEA1-14729**
Date: **2014-04-02**
Reg./ Class No: **NEA-D**
Dealt with by: **Balaji R**

To: **POWERGRID (NEA800) - Engineering**
Attn: **Mr. Madan Mohan Goswami**
Copy to: **Mr. Oommen Chandy, Mr. Bhoj Paul, Mr. Göran Isacsson, Mrs. Renuka Gera & Mr. Abhay Kumar**

Document No & Rev	Document Description	Document Type	Station	Action	Before	Class No X	Class No Y
J-673-100-CLAR-02 Rev. 00	Clarifications to Bill of Material (BOM) of 415V MCC (Motor Control Centre) for Valve Cooling System Rev. 03 for AGR (BHEL)	Question and Answer	Agra	Information		DD	211
J-673-301-01 Rev. 05	Bill of Material (BOM) of 415V MCC (Motor Control Centre) for Valve Cooling System for AGR (BHEL)	Bill of Quantities	Agra	Approval	2014-04-16	DD	211

Best regards,
Pamela Isacsson
Document Control Manager



Clarifications to POWERGRID's comments received vide letter no. C/ENGG/HVDC/NER-NR/221/3768 dated 24/01/2014 against our Transmittal No. TM-NEA1-14429 dated 13/01/2014.

S. No.	POWERGRID's Comments	BHEL's clarifications
1	Drawing No. J - 673 - 301 – 01, Rev 03 - 415V MCC FOR VALVE COOLING SYSTEM – BILL OF MATERIAL 1. Incorporate all the comments and make the changes in line with comments on GA, General notes and schematics. 2. All material provided by Sub-vendors shall be of Powergrid approved Makes only.	1. All Comments incorporated in revised submission. Rev05 of the document is submitted for Powergrid approval. <i>Rev04 was for internal review.</i> 2. Supplier shall follow standard MQP No. LTU111/rev-2 approved by Powergrid.

BILL OF MATERIAL FOR 415V MCC

S. No.	Cat. No./Type	MATERIAL DESCRIPTION	MAKE	INCOMER-1&2		BUS COUPLER		DOL STARTER		MPCB O/G		CABLE ALLEY	SHIPPING SECTION	TOTAL QTY.		
		MODULE TYPE		H		HTR	VCF	X	K BUS TERMINAL MODULES							
				RATING	630A					630A						
											QTY.				2	1
1		MOULDED CASE CIRCUIT BREAKER, 20KA, WITH THERMAL MEGNATIC REL. (O/L & S/C) THERMAL SETTING 80-100% WITH MOTOR MECHANISM, CLOSING COIL & SHUNT TRIP, 220V DC & 2C/O AUX CONTACTS	L&T / C&S / ABB / SCHNEIDER / SIEMENS / HAVELLS / GE / LEGRAND (MDS) / INDOASAIN													
		630A FP		1	1									3		
2		MPCB, 20KA WITH THERMAL MAGNETIC RELEASE WITH ROTARY OPERATING HANDLE & 1NO+1NC AUX. CONTACT BLOCK.	L&T / C&S / ABB / SCHNEIDER / SIEMENS / HAVELLS / GE / LEGRAND (MDS) / INDOASAIN													
		55-58A, TP				1								4		
		16-20A, TP					1							40		
		4-6.3A, TP							1					2		
		1-1.6A, TP						1						8		
3		MINIATURE CIRCUIT BREAKER (AC), 10KA, 'C' CURVE	ABB / C&S / SCHNEIDER / LEGRAND(MDS) / HAVELLS / INDOASIAN / GE													
		6A FP, WITH 1C/O AUX. CONTACTS		1										2		
		6A, DP								1				2		
		6A, SP				1	1	1						52		
4		POWER CONTACTOR, TP, AC-3 DUTY, COIL VOLTAGE 240V AC, WITH 2NO+2NC ADD ON AUX. CONTACT	L&T / C&S / SCHNEIDER / SIEMENS / ABB / GE / BCH / SPRECHER SCHUH													
		70A				1								4		
		25A					1							40		
5		AUX. CONTACTOR WITH LACH BLOCK	L&T / C&S / SCHNEIDER / SIEMENS / ABB / GE / BCH / SPRECHER SCHUH													
		AUX. CONTACTOR 2NO+2NC, COIL VOLTAGE 220V DC WITH LACH BLOCK (ELECTRICAL RESET TYPE)		1	1									3		
6		AUX. CONTACTOR	L&T / C&S / SCHNEIDER / SIEMENS / ABB / GE / BCH / SPRECHER SCHUH													
		AUX. CONTACTOR SUITABLE FOR 220V DC COIL WITH 2NO+2NC CONTACT												4		

INDIAN OF INDIA LTD.			
Terminal Interconnector 1			
II	III	IV	
Verified by		Reviewed by	
17/5/14 OF 5			

BILL OF MATERIAL FOR 415V MCC

S. No.	Cat. No./Type	MATERIAL DESCRIPTION	MAKE	INCOMER-1&2	BUS COUPLER	DOL STARTER			MPCB O/G	K BUS TERMINAL MODULES		CABLE ALLEY	SHIPPING SECTION	TOTAL QTY.
		MODULE TYPE		H	HTR	VCF		X						
		RATING		630A	630A	30KW	2.8KW	0.5KW	4-6.3A					
		QTY.		2	1	4	40	8	2	2	11	6		
7		ADD ON BLOCK FOR AUX. CONTACTOR	L&T / C&S / SCHNEIDER / SIEMENS / ABB / GE / BCH / SPRECHER SCHUH											
		ADD ON BLOCK 1NO+1NC CONTACT		1	1									3
8		INTERPOSING RELAY 240V AC WITH 2C/O CONTACTS & BASE	PLA / OMRON / OEN / FTC / HONYWELL			2	2	3						112
9		ANALOG AMMETER, 96 SQ. MM, CTR-1A, ACC CLASS-1.5	AE / RISHABH / IMP / MECO / VAISHNO / CONZERV / NIPPAN ELECTRICAL											
		0-600A		1										2
10		ANALOG VOLTMETER, 96 SQ. MM, PTR-415/110V, AC ACC CLASS-1.5	AE / RISHABH / IMP / MECO / VAISHNO / CONZERV / NIPPAN ELECTRICAL											
		0-500V		1										2
11		SELECTOR SWITCHES	KAYCEE / SALZER / HPL / GE											
		AMMETER SELECTOR SWITCH 6A, 4 POSITION		1										2
		VOLTMETER SELECTOR SWITCH 6A, 4 POSITION		1										2
		SELECTOR SWITCH DP, 16A ON-OFF			2									2
		L/R SELECTOR SWITCH 4POLE, 2WAY, W/O OFF-6A			1									1
		SELECTOR SWITCH, 2POLE 3WAY WITH OFF, 16A			1									1
		L/R SELECTOR SWITCH, 1POLE, 2WAY, WITH OFF, 6A				1	1							44
12		SELECTOR ACTUATOR 3POSITION(1-0-2), SPRING RETURN WITH 1NO+1NC LEFT SIDE & 1NO+1NC RIGHT SIDE CONTACT	VAISHNO / L&T / TEKNIC / SCHNEIDER / SIEMENS / CONCORD / ESSAN DIENKI					1						8
13		METERING CT RESIN CAST TYPE, CL-1.0, 15VA, INSULATION CLASS - E OR BETTER	C&S / AE / PRECISE / KAPPA / G&M / INTRANS / MATRIX CONTROL / NIPPAN ELECTRICAL / INDCOIL											
		600/1A		3										6
14		POTENTIAL TRANSFORMER RESIN CAST	C&S / AE / PRECISE / KAPPA / G&M / LOGIC STAT / INDCOIL											
		POTENTIAL TRANSFORMER 415/√3 / 110V/√3, CL-1.0, 50VA, SINGLE SECONDARY CORE		3										6

BILL OF MATERIAL FOR 415V MCC

S. No.	Cat. No./Type	MATERIAL DESCRIPTION	MAKE	INCOMER-1&2		BUS COUPLER		DOL STARTER			MPCE O/G	K BUS TERMINAL MODULES		CABLE ALLEY	SHIPPING SECTION	TOTAL QTY.
		MODULE TYPE														
		RATING														
		QTY.														
15		CURRENT TRANSDUCER	AE / RISHABH													
		CURRENT TRANSDUCER, SINGLE PHASE, CTR-1A, O/P-4-20mA, DUAL OUTPUT, AUX. SUPPLY 220V DC		1												2
16		VOLTAGE TRANSDUCER	AE / RISHABH													
		VOLTAGE TRANSDUCER, SINGLE PHASE, I/P-110V AC, O/P-4-20mA, DUAL OUTPUT, AUX. SUPPLY 220V DC		1												2
17	VMR	VOLTAGE MONITORING RELAY BASE MOUNTED, 110V AC, 1NO+1NC AUX. CONTACT, AUX. SUPPLY 110V AC	PIC / MINILEC / TECHNICA / RISHABH	1												2
18		INDICATING LIGHT 22.5 Ø, 240V AC	VAISHNO / L&T / TEKNIC / SCHNEIDER / SIEMENS / CONCORD / ESSAN DIENKI													
		RED				1	1	1								52
		GREEN				1	1	1								52
		AMBER					1									40
19		INDICATING LIGHT 22.5 Ø, 63.5V AC	VAISHNO / L&T / TEKNIC / SCHNEIDER / SIEMENS / CONCORD / ESSAN DIENKI													
		RED		1												2
		YELLOW		1												2
		BLUE		1												2
20		INDICATING LIGHT 22.5 Ø, 220V DC	VAISHNO / L&T / TEKNIC / SCHNEIDER / SIEMENS / CONCORD / ESSAN DIENKI													
		RED		1	1											3
		GREEN		1	1											3
21		PUSH BUTTON	VAISHNO / L&T / TEKNIC / SCHNEIDER / SIEMENS / CONCORD / ESSAN DIENKI													
		PUSH BUTTON RED WITH 1NO+1NC ELEMENTS		1	1											3
		PUSH BUTTON GREEN WITH 1NO+1NC ELEMENTS		1	1											3
		ILLUMINATED RESET PUSH BUTTON YELLOW WITH 1NO+1NC CONTACTS, 240V AC					1									40

BILL OF MATERIAL FOR 415V MCC

S. No.	Cat. No./Type	MATERIAL DESCRIPTION	MAKE	INCOMER-1&2		BUS COUPLER		DOL STARTER			MPCB O/G		K BUS TERMINAL MODULES	CABLE ALLEY	SHIPPING SECTION	TOTAL QTY.
		MODULE TYPE		H	630A	630A	30KW	2.8KW	0.5KW	4-6.3A	X					
RATING	2	1	4	40	8	2	2	11	6							
QTY.																
22		ON DELAY TIMER 240V AC, 1C/O, CONTACT 0.5-1.0Sec.	L&T / GE / ABB / SCHNEIDER / SIEMENS / SPRECHER SCHUH / ESSEN DINKI / PIC					1								40
23		CONTROL FUSE BASE	C&S / L&T / GE / INDOASAIN / BUSHMAN / SIEMENS / ESSEN DENKI / HAVELLS													
	20A	7		5								1	1		36	
24	CONTROL FUSE LINKS															
	16A			1									1		7	
	10A			4	4										12	
	6A		3									1		17		
25		NEUTRAL LINK-15A	C&S / L&T / ESSEN DENKI / MASTER	2	1	1	1	1				1				68
26	BK5120	CAN OPEN "ECONOMY PLUS" BUSCOUPLER FOR UPTO 64 BUS TERMINALS (225 WITH K-BUS EXTENSION)	BECKHOFF OR EQV.									3				6
27	KS1408	8 CHANNEL DIGITAL INPUT TERMINAL 24V DC, IEC61131-2, TYPE 3, FILTER 3.0ms, 1 WIRE SYSTEM	BECKHOFF OR EQV.									19				38
28	KS2652	2 CHANNEL RELAY OUTPUT TERMINAL 230V AC, 300V DC, 1A	BECKHOFF OR EQV.									33				66
29	KL9010	BUS END TERMINAL	BECKHOFF OR EQV.									3				6
30		TROLLY LIMIT SWITCH, 2C/O, 5A AC	REPUTED			1	1									44
31	T2, T3 & T4	TERMINAL BLOCK (UD MTK 5-P/P OR EQV.)	PHOENIX / CONNECTWELL / ELMEX / WAGO CONTROLS / JAINSONS									190				380
32		SPACE HEATER, 240V AC (100W)	SOFIA / KONTACT PYDS TELELEC / AUTOMETIC MEDIA / HOTWELL										1			11
33		THERMOSTATE (30-110 DEGREE)	ANCO / AUTOMATIC INSTRUMENTS / TEMPRTROF / KONTACT PYADS										1			11
34		TOGGLE SWITCH	REPUTED										1			11

BILL OF MATERIAL FOR 415V MCC

S. No.	Cat. No./Type	MATERIAL DESCRIPTION	MAKE	INCOMER-1&2		BUS COUPLER		DOL STARTER			MPCB O/G	X BUS TERMINAL MODULES		CABLE ALLEY	SHIPPING SECTION	TOTAL QTY.
		MODULE TYPE		H	HTR	VCF	X									
		RATING														
		QTY.														
		35			DOOR SWITCH	KAYCEE / SURAJ / IEC / ISI MARKED								1		11
36		ILLUMINATION LAMP HOLDER	ISI MARKED								1		11			
37		15A, 3PIN SWITCH SOCKET, COMBIEND	ISI MARKED									1		6		
			QTY.													
1		415V MCC	1	2	1	4	40	8	2	2	11	6	45			