

**CORRIGENDUM -1, Date:04/08/2012**  
**TO TENDR SPECIFICATION BHEL PSSR SCT 1503**  
**CLARIFICATIONS FOR 2 X 600 MW SHREE SHINGAJI THERMAL POWER PROJECT**

Some of bidders sought clarification in the above tender and BHEL clarifications are furnished below for information

<b>SNO</b>	<b>REFERENCE CLAUSE OF TENDER DOCUMENT</b>	<b>PREVAILING CONDITIONS IN THE TENDER</b>	<b>QUERY</b>	<b>BHEL'S CLARIFICATION</b>
1.	1.2.1.10	Supply of all consumables required for installation as detailed elsewhere in the contract.	We would like to confirm that consumables which we have considered are welding rods, lugs, ferrules, PVC sleeves, Cable Tags, Cable Ties, hardware, paints for structural steels & Red oxide for our scope of works.	Consumables to be arranged as per CL 1.3.6 in TCC
2.	1.2.1.11	Installation of any other items that have not been specifically indicated, but required for completing installation.	Please note that our price shall be as per the B.O.M provided. Other items which have not been specifically mentioned in the B.O.M but required for completing the installation shall be costed extra accordingly.	Refer Note:5 of Chapter-IX and CL 1.10.11 of Chapter 10 in TCC
3.	1.2.2.3	Final painting including supply of paints.	We would like you to confirm that BHEL shall supply the paints, as the quantity of paints is not mentioned in B.O.M.	Supply of paint is in contractor scope as per Chapter 16 in TCC. QTY. TO BE ESTIMATED BY THE CONTRACTOR as per standard practice.
4.	1.2.3	The above exclusions should not be concluded as final.	At extra cost as per unit rate mentioned in BOM/ equivalent to Item mentioned in the BOM.	Refer Note:5 of Chapter-IX and CL 1.10.11 of Chapter 10 in TCC

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5.	1.3.6.3	Provision for Temporary Scaffoldings.	We request you to provide scaffoldings since it is not indicated in the B.O.M.	BHEL WILL NOT PROVIDE Scaffolding materials. Required Scaffoldings to be arranged by the bidder within the quoted cost for erection purpose
6.	B.O.Q	* , \$ and * \$	Please indicate the description for this two symbols as it is not indicated in the B.O.M.	\$= Rate is to be quoted only for checking/ commissioning.  * =Lump sum rate is to be quoted per set
7.	1.10.8	During the course of erection, testing and commissioning C&I work certain rework / modification / rectification / repairs / fabrication etc. may be necessary on account of feedback from other power stations or units already commissioned and/ or units under erection and commissioning and also on account of design changes and manufacturing incompatibilities and site operation / maintenance requirements.	We request you to provide Prior engineering inputs required if there is any repair work to be carried out.	WILL BE PROVIDED DURING THE COURSE OF ERECTION BY BHEL-SITE
8.	1.10.43	Electrical inspectorate's approval:	Not applicable	AS PER IE RULES, ELECTRICAL INSPECTOR'S CLEARANCE IS

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				REQUIRED FOR ANY ENERGISATION.IF NEED THE C&I CONTRACTOR HAS TO ARRANGE AT HIS COST.
9.	1.13.1.7	All the panels and JB's shall be electrically earthed to the nearest earth grid by means of GI wire/Flats as per the instructions of BHEL engineer.	Scope of supply of earthing material not mention like GI-wire and flats is not shown in BOM. Hence kindly confirm the same.	SUPPLY WILL BE BY BHEL.CONTRACTOR TO DO INSTALLATIONS ONLY. IF REQD PAYMENT WILL BE MADE as per the unit rate in BOM or as per CL 1.10.11 of Chapter 10 in TCC
10.	1.13.4.20	Temporary protection by thermocol, polythene sheet, GI sheets shall be provided by the contractor for safe guarding the instruments against damages. The protective materials shall be supplied by the contractor at no extra cost.	Since supply of instruments is not in our scope, protection of instruments by thermocol shall be provided by BHEL for instruments.	Tender conditions prevail
11.	1.13.10.16	The approximate number of termination for the purpose of estimation to be assumed as follows:  The average RUN length shall be considered as 150 Mtrs. However, for 10% of the 2 pair and below, the average length shall be considered as 30 Mtrs.	Please clarify this point.	This clause is for information and estimation purpose only

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12.	1.13.11.1	For routing of trays standard tray accessories supplied by BHEL shall be used.  However if above standard tray accessories are not supplied, the same shall be fabricated and installed at no extra cost.	Since these quantities are not specified in B.O.M these work shall be done at extra charges as applicable.	CLAUSE MAY BE READ AS "TRAY ACCESSORIES LIKE BENDS, TEES ETC. WILL HAVE TO BE FABRICATED FROM STANDARD TRAY SECTIONS, IF REQUIRED. NO EXTRA PAYMENT WILL BE MADE.
13.	1.13.11.1	Tray covers are to be erected after completion of cable laying and no separate payment will be made for fixing these covers. GI strip clamps are to be used for fixing the tray covers.	GI strips quantities are not indicated in B.O.M. Kindly provide the same.	GI STRIPS WILL BE PROVIDED BY BHEL. USUALLY AT EVERY 1.5 MTR OF TRAYS TO BE DONE AS PER INSTRUCTION OF BHEL-ENGINEER
14.	1.15.10	Rework/repair/rectification/modification/fabrication etc. is required because of contractor's faulty erection which is noticed during commissioning at any stage, the same has to be rectified by the contractor at his cost.	We request BHEL to indicate the rectification during erection itself. Kindly confirm the same.	CONTRACTOR TO INTERACT BHEL ENGINEERS AND ENSURE FOR NO RE-WORK
15.	1.15.11	During commissioning activities and carrying out various tests, if any of the instruments has to be temporarily erected and commissioned to suit the commissioning activities, the contractor have to carry out the erection of the same. After	At extra cost as per unit rate shown in BOM.	Tender conditions prevail

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		completion of activities the temporary systems have to be removed and returned to stores and no extra rate shall be paid for this.		
16.	1.15.15	The mobilization of testing team shall be planned in time and shall be undertaken round the clock. The contractor shall discuss on day to day / weekly / monthly basis the requirement of testing manpower, consumables, tools and tackles with BHEL engineer and arrange for the same. If at any time the requisite manpower, consumables, T & P are not arranged then BHEL shall make alternate arrangements and the cost shall be recovered from contractor.	Manpower shall be provided depending on time to time requirement.	Tender conditions prevail
17.	1.15.18	Commissioning Engineers also shall be identified separately for each package and the minimum requirement shall be as indicated below.	Manpower shall be provided depending on time to time requirement.	Tender conditions prevail
18.	1.15.31	In case, any rework is required because of contractor's faulty erection, which is noticed during pre-commissioning and commissioning, the same has to be rectified by the contractor at his cost. If any equipment / part is required to be inspected	We request BHEL to indicate the rectification during erection itself.	Tender conditions prevail

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		during pre-commissioning and commissioning, the contractor will dismantle / open up the equipment / part and reassemble / redo the work without any extra claim.		
19.	1.15.34	After synchronization, the commissioning activities will continue. It shall be the responsibility of the contractor to provide manpower including necessary consumables, hand tools and supervision as part commissioning assistance till handing over of sets to customer.	Since our scope is considered till commissioning, after commissioning activities shall be charged accordingly.	Tender conditions prevail
20.	1.16.1	The quoted rate / price shall be inclusive of supply and application of final painting of all the erected equipments as per the painting specifications of customer / BHEL like supports, racks, frames, canopy, LIE/LIR/LGB, impulse pipes etc. carried out by the contractor. Painting shall be carried out for any bare copper tube also.	Supply of paint not in our scope as it is not indicated in B.O.M. Hence confirm the same.	The supply and application of FINAL painting is included in the contractor scope .SCOPE IS GIVEN IN VOLUME-1A, PARTI,CHAP-XVI(PAINTING) QTY. TO BE ESTIMATED BY THE CONTRACTOR AS PER STANDARD PRACTICE.

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21.	2.1.16.e	The drain valve shall be connected to the common drain header which finally is terminated at plant operation drain system.	Since the quantities are not shown in BOM, it shall be done at extra cost as per running meter.	COMMON DRAIN HEADER IS LOCATED BELOW THE INSTRUMENT RACK . NO EXTRA COST
22.	BOQ	Some of the items qty in Rate schedule is mentioned as "0"	Please clarify	<b>Revised Rate Schedule (Revision-01) enclosed.</b>
23.	NIT	Mode of Award of work	Request to consider the mode of award of work as both packages for a single bidder instead of splitting to two bidders	Tender conditions prevail

Note

1. BIDDERS TO SUBMIT THE PRICE BIDS OF **PACKAGE -A & PACKAGE -B** SEPARATELY IN SEPARATE SEALED COVER SUPERSCRIBING THE PACKAGE AND TENDER SPECIFICATION DETAILS
2. ALL OTHER CONDITIONS REMAIN SAME

AGM/CONTRACTS  
BHEL/PSSR/CHENNAI

# TENDER SPECIFICATION

BHEL: PSSR: SCT: 1503

FOR

Handling at Site Stores / Storage yard, Transportation to Site of Work, Erection, Testing and Commissioning of **Controls and Instrumentation Package** including Supply & Applications of touch-up, preservation and final painting for **Package –A (Unit- 1) & Package –B (Unit- 2)**

at

**SHREE SINGAJI THERMAL POWER PROJECT,  
MALWA, KHANDWA DT, PURNI VILLAGE, MP.**

## VOLUME –II

**RATE SCHEDULE PACKAGE-A  
Revision-01**



**BHARAT HEAVY ELECTRICALS LIMITED**

(A Government of India Undertaking)

Power Sector – Southern Region

690, Anna Salai, Nandanam, Chennai – 600 035.

**BHARAT HEAVY ELECTRICALS LIMITED**  
**(A Government of India Undertaking)**  
**Power Sector, Southern Region**  
**690, Anna Salai, Nandanam, Chennai – 35**

**Tender Specification No. BHEL: PSSR: SCT: 1503**

for

Handling at Site Stores / Storage yard, Transportation to Site of Work, Erection, Testing and Commissioning, Supply & Applications of touch-up, preservation and final painting of **Controls & Instrumentation works** of 2 X 600 MW for **Package –A (Unit- 1) & B (Unit- 2)** at Shree Singaji Thermal Power Project, Malwa, Khandwa DT, Purni Village, MP.

One set of Tender documents consisting of

- |                                 |            |
|---------------------------------|------------|
| 1) TECHNOCOMMERCIAL BID         | - 2 copies |
| 2) RATE SCHEDULE (each package) | - 2 copies |

Book Sl no .....

Issued to  
M/s

Refer NIT for Last date of submission

Please note this tender document is not transferable

For and on behalf of  
BHARAT HEAVY ELECTRICALS LIMITED

ADDL GENERAL MANAGER / CONTRACTS

Place: Chennai -35

Date:

**SHREE SINGAJI TPP (2X600 MW) UNIT-1**

**RATE SCHEDULE FOR ERECTION, TESTING & COMMISSIONING OF C&I PACKAGE (A)-Revision-01**

SL.NO.	BOM REF.	DESCRIPTION	UNIT	QTY	Unit Rate		Total	
					In figures	In words	In figures	In words
<b>ERECTION/COMMISSIONING OF LOCAL/FIELD MOUNTED INSTRUMENTS</b> <i>For Scope of Work, Refer relevant Clause</i>								
1	A.1.1	PD Type Flow meter	sets*	2				
2	A.1.4,A.2.2,A.2.3, A.3.2, A.3.3, A.4.2, A.4.4, A.4.8.5, B.1.1, C.1.1, D.3.2.1, D.3.2.2, E.2.1.1, E.2.1.2, E.3.1, F.2.2, F.2.3, G.1.2.1, G.1.4.2, G.1.5.1, G.2.1.9, G.2.6.3	Pressure Gauges/ DP Gauges	Nos.	610				
3	A.1.6, A.3.5, A.4.3, A.4.8.4, B.1.2, B.2.2, C.1.2, D.3.2.3, E.2.1.6, E.3.3, E.5.1.4, G.1.2.2, G.1.4.5, G.1.5.4, G.2.1.3, G.2.6.2	Temperature Gauges with Thermowell (capillary/ stem type)	Nos.	427				
4	B.1.5	Thermocouple Assembly for APH	sets*	4				
5	A.4.7	Thermocouple Assembly for Smart Soot Blowing System	sets*	48				
6	A.4.8.1, B.1.3,B.2.1, D.3.2.4, D.3.2.5, E.1.1.1, E.2.1.7, E.2.1.8, E.4.1, G.1.2.8, G.1.2.10, G.1.4.4, G.1.5.3, G.2.1.1, G.2.1.2	RTDs/ Thermocouples with thermowell	Nos.	800				
7	A.4.9.1, A.4.9.2, A.4.9.3	MTM T/Cs of route length 10 to 18 Mtrs (6 mm OD)	Nos.	30				
8	A.4.9.4, A.4.9.5, A.4.9.6, A.4.9.7, A.4.9.8	MTM T/Cs of route length 20 to 28 Mtrs (6 mm OD)	Nos.	210				
9	A.4.9.9, A.4.9.10, A.4.9.11	MTM T/Cs of route length 30 to 36 Mtrs (6 mm OD)	Nos.	34				
10	A.1.3,A.1.5,A.2.1,A.2.4, A.3.1, A.3.4, A.4.1, A.4.5, B.1.4, C.1.3, D.1.2.3, D.1.2.4, D.3.2.6, D.3.2.7, E.2.1.4, E.2.1.5, F.1.2, F.1.3, F.2.5, F.2.6, G.1.2.9, G.1.4.1, G.1.4.3, G.1.5.2, G.2.1.7	Pressure/ DP Switches	Nos.	230				
11	A.1.7, A.4.8.2, G.1.2.3, G.2.1.4	Temperature Switches	Nos.	11				
12	A.1.2, C.1.4, D.3.2.12, E.3.2, G.2.1.11, G.2.6.1	Level Switches (float type)	Nos.	30				
13	D.3.2.11, G.1.2.7	Level switches (capacitance type)	Nos.	15				
14	D.3.2.13, G.2.1.13	Level Switches (conductivity type) with electrodes, vessels and electronic units etc.	sets*	4				
15	D.3.2.15, D.3.2.18, D.3.2.19, D.3.2.20, E.2.1.3, E.2.1.13, F.1.1, F.2.4, G.1.2.4, G.1.2.5, G.1.2.6, G.2.1.5, G.2.1.6, G.2.1.14	Pressure Transmitters, DP Transmitters for Flow / Level/ Differential Pressure	Nos.	476				

SIGNATURE OF BIDDER

SL.NO.	BOM REF.	DESCRIPTION	UNIT	QTY	Unit Rate		Total	
					In figures	In words	In figures	In words
16	D.3.2.14	Guided Wave Radar Type Level Transmitter	Nos.	14				
17	D.3.2.16	Hydrostatic Level Transmitter	Nos.	1				
18	D.3.2.17	Ultrasonic Type Level Transmitter	Nos.	2				
19	E.2.1.10, G.2.1.10	Level Transmitters with probes, electronic units etc.	sets*	13				
20	D.3.2.8	Flow Transmitter (Annubar Type)	set*	1				
21	A.4.6, G.2.1.15	Temperature Transmitters	Nos.	4				
22	G.1.5.5	Moisture Sensor Probes	Nos.	2				
23	G.2.1.12	Position Transmitter for Extraction NRV	Nos.	16				
24	A.3.8	Pneumatic Pressure Controllers with Pneumatic Transmitter	Sets*	2				
25	A.1.8	Speed Regulator/ Air Lock Valves/ Air Sets	sets*	20				
26	A.1.10, A.2.5, A.3.6, D.1.2.2, D.3.2.22	Air Filter Regulators	Nos.	67				
27	D.1.2.1, D.3.2.21, E.2.1.12	I/P Converters	Nos.	31				
28	A.3.7	Purge Meter cum DP regulator	Nos.	18				
29	A.1.13	Flame Scanner Head Assembly	sets*	32				
30	A.1.11	FSSS Local Oil Gun Maintenance Switch Box	Nos.	20				
31	A.1.12	H.E.A. Excitor box Assembly with accessories	sets*	20				
32	A.2.12	Burner Tilt Shear Pin Failure Indication Box	Nos.	4				
33	A.2.13	Heavy Duty Limit Switch (for Burner Tilt )	Nos.	20				
34	A.3.9	Ultrasonic Coal Flow Monitor, along with accessories	sets*	9				
35	A.1.14	8 Nos. Flame scanner amplifier Racks	set*	1				
36	D.3.2.9	Level Gauge (float and chord type)	set*	1				
37	D.3.2.10, E.2.1.9	Level Gauge (direct mounting type)	Nos.	2				
38	A.4.11	ERV Controller with Pressure Switch	sets*	4				
39	A.4.12	Electronic Water Level Indicator along with Display Units, Ascetor Unit and other accessories.	sets*	2				
40	A.4.13	Sonic tube leak detection system along with Panel and other accessories.	set*	1				
41	A.4.14.1	Furnace Flame Viewing System along with Local Control Unit, Remote panel and other accessories.	set*	1				
42	B.1.6	Rotor Stoppage System with accessories	sets*	2				
43	B.1.7	ON/OFF Switch Box including light assembly	Nos.*	2				
44	E.2.1.11	Speed measuring loop for BFPDT Governing System	sets*	12				
45	D.2.2.1	Control Cabinet, along with loose supplied items for Turbine Supervisory System for Main Turbine	set*	1				
46	D.3.6.1	Control Cabinets, along with loose supplied items for Vibration Monitoring System for Pumps, Fans & Motors.	set*	5				

SIGNATURE OF BIDDER

SL.NO.	BOM REF.	DESCRIPTION	UNIT	QTY	Unit Rate		Total	
					In figures	In words	In figures	In words
47	D.3.6.2	Vibration Monitoring System for Pumps, Fans & Motors, along with 233 Nos. of Vibration Sensors, 98 Nos. JB's for velocity transducers, 37 Nos. sensor drivers and other accessories. <b>Note:</b> Installation of sensors will be carried out by vendor.	set*	1				
48	E.2.2.1	Vibration Monitoring System for BFP Drive Turbine with 16 Nos. probes, Monitor, and other accessories	Sets*	2				
50	D.2.3.1	HART Panel along with loose supplied items.	set*	1				
51	B.2.4	Opacity Monitoring System	sets*	4				
52	D.3.4.1	Coal Bunker Level Monitoring System along with accessories.	sets*	1				
53	D.3.3.1	Low temperature O2 Analyser	sets*	5				
54	D.3.3.2	High temperature O2 Analyser	sets*	2				
55	D.3.3.3	Opacity Analyser to be installed at 71.5 ML of chimney.	set*	1				
56	D.3.3.4	SOX/NOX/CO analyzer to be installed at 71.5ML of chimney	set*	1				
57	D.3.5.1	Steam and water analysis system, SWAS consisting of: Primary Cooler Rack: 2Nos., Chiller Unit:1 No., Wet Panel: 1 No., Dry panel: 2 Nos., Conductivity Racks: 2 Nos., sensors/ analysers and other accessories <b>Master and Slave Clock System</b>	set*	1				
58	D.3.15.1	Master clock control panel	Nos.	1				
59	D.3.15.2	Slave clock	Nos.	25				
60	D.3.15.3	GPS Antenna along with around 100 Mtrs antenna cable from antenna to GPS Receiver	No.	1				
61	D.3.15.4	Slave Booster	Nos.	5				
62	D.3.15.5	Line Driver / Receiver	Sets	2				
		<b>CCTV System</b>						
63	D.3.16.1	CCTV System Local Control Panel	Nos.	10				
<b>ERECTION/COMMISSIONING OF UCB/CONTROL ROOM MOUNTED INSTRUMENTS</b> <i>For Scope of Work, Refer relevant Clause</i>								
64	G.1.6.1	Electronic /Digital Indicators	Nos.	10				
65	D.2.1.7, G.1.6.2	Bar Graph Indicators / 3 Point recorder	Nos.	6				
<b>REMOVAL, CALIBRATION, REFIXING AND COMMISSIONING OF INSTRUMENTS</b> <i>For Scope of Work, Refer relevant Clause</i>								
66	G.1.3.1, G.1.3.2	Pressure/ DP Gauges	Nos.	15				
67	B.2.3, E.1.1.2, E.4.2, G.1.3.3	Temperature Gauges	Nos.	95				
68	G.1.3.6, G.2.1.8	Pressure/ DP Switches	Nos.	19				
69	G.1.3.7	Level Switches	Nos.	7				
70	G.1.3.4, G.1.3.5	Pressure/ DP Transmitters	Nos.	15				
71	G.3.4	Position Transmitter	Nos.	20				
72	G.1.3.9	Conductivity Cells	Nos.	2				

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					In figures	In words	In figures	In words
73	G.1.3.10	PW Conductivity Indicator	No.	1				
<b>CALIBRATION (AS REQUIRED), ERECTION, REMOVAL AND NORMALIZATION FOR EDTA CLEANING</b>								
<i>For Scope of Work, Refer relevant Clause</i>								
74	H.1.1	MTM thermocouple length 10 mtrs	Nos.	12				
75	H.1.2	Junction boxes - 12 way/ 6 way/ 24 way	Nos.	10				
76	H.1.3	Compensating cables 2 P x 0.5 sq. mm	Mtrs.	200				
77	H.1.4	Compensating cables 6 P x 0.5 sq. mm	Mtrs.	300				
78	H.1.5	Pressure gauges	Nos.	5				
79	H.1.6	Drum MTM thermocouple adaptor fabrication - 1/4 inch NPT(M) x 1/4 inch OD SS	Sets	2				
80	H.1.7	16 P x 0.5 sqmm cable for Teletel Drum level indication	Mtrs.	500				
81	H.1.8	3c x 2.5 sqmm power cable Teletel Drum level indication	Mtrs.	100				
82	H.1.9	9 port lamp indication at control room and 9 port switching at Drum floor	Set	1				
83	H.1.10	Switchboards with switches	Nos.	3				
<b>ERECTION/COMMISSIONING OF PNEUMATIC POWER CYLINDERS (REGULATING TYPE)</b>								
<i>For Scope of Work, Refer relevant Clause</i>								
84	A.2.14.3	ID Fans I/L Damper	Nos.	2				
85	A.2.14.2 , A.2.14.4	PA Fan & FD Fan Blade Pitch control Dampers / Cold Air Regulating Dampers	Nos.	13				
86	A.2.14.5	Hot Air Regulating Dampers	Nos.	9				
87	A.2.14.1	Power Cylinders for SADC	Nos.	80				
88	A.2.14.6	Dynavane Filter Bleed Air Damper	No.	1				
<b>ERECTION/COMMISSIONING OF PNEUMATIC ACTUATORS (ON/OFF TYPE)</b>								
<i>For Scope of Work, Refer relevant Clause</i>								
89	A.2.15.1	Scanner Air Emergency Damper	No.	1				
<b>ERECTION/COMMISSIONING OF UPS/ BATTERY/ BATTERY CHARGER WITH DBs</b>								
<i>For Scope of Work, Refer relevant Clause</i>								
92	D.3.7.3	UPS Battery, NiCd, 291 cells, along with wooden rack, and other accessories	sets*	2				
94	D.3.8.2 , D.3.8.4	24V DC Battery for SG/TG & BOP Package	sets*	4				
95	D.3.8.5 , D.3.8.7	24V DC Float Cum Boost Charger with in-built DCDB for FOPH & CWPH	set*	2				
96	D.3.8.6 , D.3.8.8	24V DC Battery for FOPH & CWPH	set*	2				
<b>ERECTION/COMMISSIONING OF PANELS</b>								
<i>For Scope of Work, Refer relevant Clause</i>								
97	A.3.10	Gravimetric Feeder Panel	Nos.	9				
98	F.2.1	PLC panel for Condenser Tube Cleaning system, along with other accessories.	No.	1				
99	G.1.1.1	Generator Instrumentation Cabinet	No.	1				
100	G.1.1.2	Gas Analyser Cabinet including sensor, analyser etc.	sets *	2				

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					In figures	In words	In figures	In words
101	G.1.1.3	Generator End Winding Vibration Monitoring System	No.	1				
102	G.1.1.4	Moisture Measurement System for Generator	set*	1				
103	G.1.1.5	Grounding Brush Monitor	No.	1				
<b>ERECTION/COMMISSIONING OF DCS PACKAGE / PADO SYSTEM</b> <i>For Scope of Work, Refer relevant Clause</i>								
104	D.2.1.1, D.2.1.2, D.3.1.1, D.3.1.2, D.4.4	Single Cubicles	Nos.	16				
105	D.1.1.1, D.2.1.3, D.3.1.3, D.3.1.4	Suite of Two Cubicles	Nos.	34				
106	D.1.1.2, D.2.1.4, D.3.1.5	Suite of Three Cubicles	Nos.	13				
107	D.1.1.3, D.2.1.5	Suite of Four cubicles	Nos.	2				
108	D.4.1	CRT Desk	No.	1				
109	D.4.2	6 nos. of 67" Large Video Screen along with CPU and other loose supplied items.	set*	6				
110	D.4.3, D.5.2	<b>Computer Stations :</b> Engineer Workstation, 'maxStorian' Station, Operator Work Stations, maxLINK Stations, Operator Workstations for PADO System, etc.	sets*	73				
111	D.4.5	Network Enclosures (Wall Mounted type), along with loose supplied Ethernet switches.	Nos.	4				
112	D.5.1	PADO Servers along with 24" monitors and other loose supplied items.	set*	2				
113	D.5.3	Power Distribution Boards 15A/ 5A	Nos.	2				
114	D.5.5	Conduit for laying Ethernet cable	Mtrs.	350				
115	D.5.6	Wall mounted Rack / 6U Wall mounted rack	Nos.	3				
<b>ERECTION/TESTING OF LOCAL INSTRUMENT ENCLOSURES/ RACKS (LIE/LIR)/GAUGE BOARDS</b> <i>For Scope of Work, Refer relevant Clause</i>								
116	D.3.9.1	LIE of size: 1450 x 800 x 2300 mm; Approximate weight: 900 kg	Nos.	18				
117	D.3.9.2	LIE of size: 1100 x 800 x 2300 mm; Approximate weight: 660 kg	Nos.	14				
118	D.3.9.3	LIE of size: 700 x 600 x 2100 mm; Approximate weight: 370 kg	Nos.	5				
119	D.3.9.4	LIR of size 1600 x 850 x 2150 mm; Approximate weight: 400 kg	Nos.	9				
120	D.3.9.5	LIR of size 1300 x 850 x 2150 mm; Approximate weight: 300 kg	Nos.	39				
121	D.3.9.6	LIR of size 800 x 850 x 1600 mm; Approximate weight: 200 kg	Nos.	22				
122	A.5.6.1	LIR of 1650 x 850 x 2150 mm; Approximate weight: 600 kg	Nos.	13				

SIGNATURE OF BIDDER

SL.NO.	BOM REF.	DESCRIPTION	UNIT	QTY	Unit Rate		Total	
					In figures	In words	In figures	In words
123	E.1.5.1, E.1.5.2, E.1.5.3, E.1.5.4	LGB Assembly for BFPs/ CEPs (along with instruments) Approximate size 1400 x 550 x 1900 mm; 200 kg	Nos.	8				
124	E.1.5.5, E.1.5.6, E.1.5.7	LIR assembly for BFPs/ CEPs (along with transmitters) Approximate Size 2000 x 650 x 2200 mm; 300 kg	Nos.	5				
<b>ASSEMBLY AND ERECTION OF JB MOUNTING FRAMES</b> <i>For Scope of Work, Refer relevant Clause</i>								
125	D.2.7.1 TO D.2.7.9	Assembly and installation of Mounting Frames with loose supplied prefabricated materials like slotted angles, channels etc.	Nos.	21				
<b>ASSEMBLY / WELDING / ERECTION OF PRESSURE INSTRUMENT RACKS</b> <i>For Scope of Work, Refer relevant Clause</i>								
126	G.2.2.1, G.2.2.2	Assembly/welding and installation of Instrument Racks with loose supplied prefabricated materials of suitable size, like angles, stands etc. Total wt. of loose supplied items (for 13 racks): Approx. 3 Tonnes	Nos.	13				
<b>LAYING, TERMINATION &amp; TESTING OF CABLES</b> <i>For Scope of Work, Refer relevant Clause</i>								
		<b>Laying of LT Power Cables</b>						
127	D.3.7.4	1X 109/120 sq.mm Copper cable	Mtrs.	800				
		<b>Termination of LT Power Cables</b>						
128	D.3.7.5	1X 109/120 sq.mm Copper cable	Nos.	64				
		<b>Laying and Termination of Power / Control / Instrumentation Cables</b>						
129	A.5.1.1, A.5.1.2, A.5.1.3, A.5.1.4, A.5.1.5, D.2.4.1, D.3.10.6, D.3.10.12, D.3.10.17, D.3.10.18, F.3.5, F.3.9	Flame Scanner / Heat Flux Sensor / 1Pair X 1.5 / 2Pair X 0.5/ 2Pair X 1.5 sq. mm cable	Mtrs.	55300				
130	A.5.1.6, A.5.1.7, A.5.1.13, C.3.1, D.2.4.2, D.3.10.7, D.3.10.11, D.3.10.13, E.1.4.2, F.3.1, F.3.6	4Pair X 0.5 sq. mm / 2 Triad X 0.5 sq.mm cable	Mtrs.	344150				
131	D.2.4.7, D.3.10.8, E.1.4.1	6Pair x 0.5 sq.mm / 4 Triad x 0.5 sq. mm cable	Mtrs.	3550				
132	A.5.1.8, A.5.1.9, D.3.10.9, D.3.10.14, F.3.2, F.3.7	8Pair X 0.5 sq. mm cable	Mtrs.	11000				
133	A.5.1.10, A.5.1.11, D.3.10.10, D.3.10.15, F.3.3, F.3.8	12 pair x 0.5 sq. mm / 16 P X 0.5 sq. mm cable	Mtrs.	49650				
134	D.3.10.16, F.3.4	20 Pair x 0.5 sq.mm / 24P X 0.5 sq.mm cable	Mtrs.	8050				
135	A.5.1.12, D.2.4.4, D.2.4.5, D.3.10.1, D.3.10.5	2 Pair x 0.5 sq. mm to 1.5 sq.mm compensating cables	Mtrs.	21600				
136	D.3.10.2, D.3.10.3	4 Pair x 0.5/1.5 sq.mm compensating cable	Mtrs.	7200				

SIGNATURE OF BIDDER

SL.NO.	BOM REF.	DESCRIPTION	UNIT	QTY	Unit Rate		Total	
					In figures	In words	In figures	In words
137	D.3.10.4	6 Pair x 1.5 sq.mm compensating cable	Mtrs.	10000				
138	D.3.10.19, D.3.15.8	2 C/ 3C x 1.5/2.5 sq. m, cable	Mtrs.	7050				
139	D.2.4.3, D.4.7	4 C/ 5C x 1.5/2.5 sq. mm, control cable	Mtrs.	2500				
140	D.4.6, D.5.4, D.3.15.9	Ethernet Cable	Mtrs.	12500				
141	D.3.15.6	RG 58 Coaxial Cable	Mtrs.	1750				
142	D.3.15.7	RS 232 /485 Data Cable	Mtrs.	500				
143.a	D.2.4.6.a	Fibre optical Cable laying, clamping and dressing.	Mtrs.	6000				
143.b	D.2.4.6.b	Laying if HDPE Pipe 1"	Mtrs.	4000				
143.c	D.2.4.6.c	Termination including splicing, etc.	Nos.	112				
<b>ERECTION OF CABLE TRAYS &amp; DUCTS</b>								
<i>For Scope of Work, Refer relevant Clause</i>								
144	A.5.2.1, D.3.11.1, E.1.4.3	50 mm wide Cable Tray	Mtrs.	4720				
145	A.5.2.2, D.3.11.2	100 mm wide Cable Tray	Mtrs.	7200				
146	A.5.2.3, E.1.4.4	150 mm wide Cable Tray	Mtrs.	2545				
147	A.5.2.4	300 mm wide Cable Tray	Mtrs.	100				
	<b>Cable Ducts With Covers</b>							
148	D.2.6.1	60 x 60 x 1000 mm	Nos.	200				
149	D.2.6.2	180 x 100 x 1000 mm	Nos.	200				
150	D.2.6.3	250 x 100 x 1000 mm	Nos.	200				
<b>ERECTION OF JUNCTION BOXES/PB BOXES</b>								
<i>For Scope of Work, Refer relevant Clause</i>								
151	A.2.10, A.5.3.1, A.5.3.2, A.5.3.3, C.2.1, C.2.2, D.2.5.2, D.2.5.3, D.3.12.1, D.3.12.2, D.3.12.3, D.3.15.11, E.1.3.1, E.1.3.2, G.2.4.4,	Junction Boxes, 12 way to 36 way, including RJCBs	Nos.	273				
152	A.5.3.4, D.2.5.1, D.3.12.4, D.3.12.5, D.3.12.6, D.3.12.7, G.2.4.2, G.2.4.3	Junction Box, 48 way to 96 way	Nos.	165				
153	G.2.4.1	Junction Box (Pedestal and Proximeter JB)	Nos.	17				
154	A.2.11, A.4.10, D.2.1.6	Push Button Boxes/ Fire Protection Switch Box	Nos.	10				
<b>ERECTION/TESTING OF IMPULSE PIPES</b>								
155	G.1.7.5, G.2.3.7	AS Pipe, 13.5 x 2.6	Mtrs.	70				
156	G.1.7.2, G.2.3.6	AS pipe, 21.3 x 2.3 / 21.3 x 2.77	Mtrs.	735				
157	A.5.5.3	AS Pipe, 21.3 x 4.78	Mtrs.	200				
158	D.3.13.5	A335 P22- ½" NB XXS (AS Pipe)	Mtrs.	650				
159	E.1.2.1, G.1.7.4, G.1.7.7, G.2.3.1	CS pipe, 13.5 x 2.6/ 16 x 2.6 / 17.2 x 1.8	Mtrs.	2574				
160	G.1.7.1, G.2.3.3	CS pipe, 21.3 x 2.3	Mtrs.	710				
161	A.5.5.2, C.5.1, E.2.3.1	CS pipe, 21.3 x 3.73 ( ½" SCH 80 )	Mtrs.	5815				
162	D.3.13.4	A106 Gr C- ½" NB SCH 80 ( CS Pipe )	Mtrs.	4200				
162.a	A.5.5.5, D.3.13.3	A106 Gr C- ½" NB SCH 160 ( CS/AS Pipe )	Mtrs.	1500				
163	A.5.5.4, D.3.13.1	¾" SCH 80 IMPULSE PIPE, MATL ASTM-A106 ( CS Pipe )	Mtrs.	3100				
164	D.3.13.2, A.5.5.1	ASTM A106 Gr C 1" NB SCH 80 (CS Pipe)	Mtrs.	2025				

SIGNATURE OF BIDDER

SL.NO.	BOM REF.	DESCRIPTION	UNIT	QTY	Unit Rate		Total	
					In figures	In words	In figures	In words
165	E.2.3.2	CS Pipe, 60.3 x 3.91	Mtrs.	310				
166	G.2.3.2	CS Tube, DN-80	Mtrs.	40				
167	E.2.3.4, G.1.7.6, G.2.3.5	SS tube, 12.7 x 2.1 mm/ 13.5 x 2.6 mm	Mtrs.	430				
168	D.3.13.6	A213 TP 316 - ½" NB SCH160	Mtrs.	650				
169	D.3.13.7	A213 TP316H- ½" NB SCH 80	Mtrs.	750				
170	D.3.13.8, G.1.7.3, G.2.3.4	A312 TP316L GR C ½" NB SCH 40 / 21.3 x 2.3 / 21.3 x 2.6 ( SS tube )	Mtrs.	2630				
171	E.2.3.3	Cr-Al Pipe 21.3 x 3.73	Mtrs.	660				
<b>ERECTION OF EARTHING MATERIALS</b> <i>For Scope of Work, Refer relevant Clause</i>								
172	A.5.4.2	GI Flat, 50 X 6 mm	Mtrs.	300				
<b>ERECTION OF HOSES, TUBES etc.</b> <i>For Scope of Work, Refer relevant Clause</i>								
173	A.1.9, A.2.6, A.2.7, D.3.14.4	Copper Tube/SS Tube, OD 8 mm / ¼" / ½"	Mtrs.	3295				
174	E.2.3.5	SS tube, 6 x 1.5 mm	Mtrs.	60				
175	A.2.8	¼" size Teflon Hose of 2M length	Nos.	80				
176	A.2.9	1" size Teflon Hose of 3M length	Nos.	40				
177	D.3.15.10	GI conduit pipe, 19mm OD.	Mtrs.	500				
<b>ERECTION/TESTING OF GI PIPE (HEAVY DUTY)</b> <i>For Scope of Work, Refer relevant Clause</i>								
178	C.4.1, D.3.14.2	NB 15 x 3.25 / ½" heavy duty GI pipes	Mtrs.	5900				
179	C.4.2, D.3.14.3	NB 25 x 4.05 / 1" heavy duty GI pipes	Mtrs.	1970				
180	C.4.3	NB 40 x 4.05	Mtrs.	270				
181	C.4.4	NB 50 x 4.05	Mtrs.	500				
182	C.4.5	NB 80 x 4.8	Mtrs.	100				
183	C.4.6	NB 100 x 5.4	Mtrs.	250				
<b>FABRICATION/ERECTION OF STRUCTURAL STEEL</b> <i>For Scope of Work, Refer relevant Clause</i>								
184	A.5.4.1, D.3.14.1, E.1.6.1, E.2.2.2, G.2.5	Structural Steel for fabrication of supports/ LIRs/ canopy	MT	25.5				
<b>CHECKING &amp; COMMISSIONING OF THE FOLLOWING ERECTED BY OTHER AGENCY</b> <i>For Scope of Work, Refer relevant Clause</i>								
185	B.1.8.2, B.2.5.2, E.4.3.2	Lub Oil Skids for Pulveriser, FD/ ID/ PA Fans, Air Preheater	sets* <sup>\$</sup>	19				
186	C.6.2, F.4.3, F.4.4, F.4.5	HP / LP Dosing Skids	sets* <sup>\$</sup>	4				
187	E.1.7.2	Hydraulic Coupling of MDBFP	set <sup>\$</sup>	1				
188	G.3.1	Condenser Vacuum Pump, including CVP PLC and related field instruments	sets* <sup>\$</sup>	2				
189	A.3.11.1	Gravimetric Feeders	sets* <sup>\$</sup>	9				
190	A.4.15.2	Direct Water Level Gauges	Nos. <sup>\$</sup>	2				
191	A.2.16.1	Burner Tilt Power Cylinders	Nos. <sup>\$</sup>	4				

SIGNATURE OF BIDDER

SL.NO.	BOM REF.	DESCRIPTION	UNIT	QTY	Unit Rate		Total	
					In figures	In words	In figures	In words
192	A.2.16.2, A.2.16.3, A.2.16.4, A.2.16.5, A.2.16.6, A.2.16.7, E.4.3.3, E.4.3.4	Pneumatic Actuators of ON/OFF Type	Nos. \$	85				
193	A.1.15.2	Pneumatic Valves: Trip Valves	Nos. \$	71				
194	A.1.15.3, A.4.15.3, C.6.1, E.2.4.1, F.4.1	Pneumatic Valves: Control Valves	Nos. \$	72				
195	G.3.3	NRV Valves, Stop Valves, Control Valves, HP/LP Bypass Valves	Nos. \$	40				
196	B.1.8.1, G.3.6	Solenoid Valves	Nos. \$	32				
197	E.2.4.2	Position Transmitters	Nos. \$	8				
198	B.2.5.1, E.1.7.1, E.4.3.1, E.5.1.7, G.1.3.12	Checking the healthiness of Temperature Elements (RTDs)	Nos. \$	596				
199	A.4.8.3, A.4.15.1, G.1.3.8, G.1.3.11,	Flow Indicators/ Flow Meters/ Flow Switches	Nos. \$	24				
200	A.1.15.1, A.3.11.2, E.1.7.3, G.3.5	Checking of Limit Switches	Nos. \$	201				
<b>Instrument Racks</b> <i>Removal, calibration and refixing of rack mounted instruments,</i>								
201	E.2.4.3	Governing Console Board for BFPDT	sets*\$	2				
202	G.3.2	Oil Centrifuge Unit	Nos. \$	2				
203	G.3.7	Hydraulic Speed Control Equipment Rack	set*\$	1				
204	G.3.8	LP Bypass Control Rack	set*\$	1				
205	G.3.9	Supply Unit Racks for HP Valve-1, HP Valve-2, IP Valves	sets*\$	3				
206	G.3.10, G.3.11	Seal Oil Rack / Stator Water Rack	set*\$	2				
207	G.3.12, G.3.13	Seal Oil Level / Pr Transmitter Instrument Rack, Stator Water DP Instrument Rack	set*\$	2				
208	G.3.14	H2 Dryer Unit	set*\$	1				
209	G.3.15, G.3.16	Gland Steam And Seal Steam Oil Supply Units / TD BFP Pump Coupling Engage Oil Supply Unit	sets*\$	4				
		<b>TOTAL</b>						

Note: \$= Rate is to be quoted only for checking/ commissioning.

\* =Lump sum rate is to be quoted per set

SIGNATURE OF BIDDER

# TENDER SPECIFICATION

BHEL: PSSR: SCT: 1503

FOR

Handling at Site Stores / Storage yard, Transportation to Site of Work, Erection, Testing and Commissioning of **Controls and Instrumentation Package** including Supply & Applications of touch-up, preservation and final painting for **Package –A (Unit- 1) & Package –B (Unit- 2)**

at

**SHREE SINGAJI THERMAL POWER PROJECT,  
MALWA, KHANDWA DT, PURNI VILLAGE, MP.**

## VOLUME –II

**RATE SCHEDULE PACKAGE-B  
Revision-01**



**BHARAT HEAVY ELECTRICALS LIMITED**

(A Government of India Undertaking)

Power Sector – Southern Region

690, Anna Salai, Nandanam, Chennai – 600 035.

**BHARAT HEAVY ELECTRICALS LIMITED**  
**(A Government of India Undertaking)**  
**Power Sector, Southern Region**  
**690, Anna Salai, Nandanam, Chennai – 35**

**Tender Specification No. BHEL: PSSR: SCT: 1503**

for

Handling at Site Stores / Storage yard, Transportation to Site of Work, Erection, Testing and Commissioning, Supply & Applications of touch-up, preservation and final painting of **Controls & Instrumentation works** of 2 X 600 MW for **Package –A (Unit- 1) & B (Unit- 2)** at Shree Singaji Thermal Power Project, Malwa, Khandwa DT, Purni Village, MP.

One set of Tender documents consisting of

- |                                 |            |
|---------------------------------|------------|
| 1) TECHNOCOMMERCIAL BID         | - 2 copies |
| 2) RATE SCHEDULE (each package) | - 2 copies |

Book Sl no .....

Issued to  
M/s

Refer NIT for Last date of submission

Please note this tender document is not transferable

For and on behalf of  
BHARAT HEAVY ELECTRICALS LIMITED

ADDL GENERAL MANAGER / CONTRACTS

Place: Chennai -35

Date:

**SHREE SINGAJI TPP (2X600 MW) UNIT-2**

**RATE SCHEDULE FOR ERECTION, TESTING & COMMISSIONING OF C&I PACKAGE (B)-Revision-01**

SL.NO.	BOM REF.	DESCRIPTION	UNIT	QTY	Unit Rate		Total	
					In figures	In words	In figures	In words
<b>ERECTION/COMMISSIONING OF LOCAL/FIELD MOUNTED INSTRUMENTS</b> <i>For Scope of Work, Refer relevant Clause</i>								
1	A.1.1	PD Type Flow meter	sets*	2				
2	A.1.4,A.2.2,A.2.3, A.3.2, A.3.3, A.4.2, A.4.4, A.4.8.5, B.1.1, C.1.1, D.3.2.1, D.3.2.2, E.2.1.1, E.2.1.2, E.3.1, F.2.2, F.2.3, G.1.2.1, G.1.4.2, G.1.5.1, G.2.1.9, G.2.6.3	Pressure Gauges/ DP Gauges	Nos.	634				
3	A.1.6, A.3.5, A.4.3, A.4.8.4, B.1.2, B.2.2, C.1.2, D.3.2.3, E.2.1.6, E.3.3,, G.1.2.2, G.1.4.5, G.1.5.4, G.2.1.3, G.2.6.2	Temperature Gauges with Thermowell (capillary/ stem type)	Nos.	427				
4	B.1.5	Thermocouple Assembly for APH	sets*	4				
5	A.4.7	Thermocouple Assembly for Smart Soot Blowing System	sets*	48				
6	A.4.8.1, B.1.3,B.2.1, D.3.2.4, D.3.2.5, E.1.1.1, E.2.1.7, E.2.1.8, E.4.1, , G.1.2.8, G.1.2.10, G.1.4.4, G.1.5.3, G.2.1.1, G.2.1.2	RTDs/ Thermocouples with thermowell	Nos.	800				
7	A.4.9.1, A.4.9.2, A.4.9.3	MTM T/Cs of route length 10 to 18 Mtrs (6 mm OD)	Nos.	30				
8	A.4.9.4, A.4.9.5, A.4.9.6, A.4.9.7, A.4.9.8	MTM T/Cs of route length 20 to 28 Mtrs (6 mm OD)	Nos.	210				
9	A.4.9.9, A.4.9.10, A.4.9.11	MTM T/Cs of route length 30 to 36 Mtrs (6 mm OD)	Nos.	34				
10	A.1.3,A.1.5,A.2.1,A.2.4, A.3.1, A.3.4, A.4.1, A.4.5, B.1.4, C.1.3, D.1.2.3, D.1.2.4, D.3.2.6, D.3.2.7, E.2.1.4, E.2.1.5, F.1.2, F.1.3, F.2.5, F.2.6, G.1.2.9, G.1.4.1, G.1.4.3, G.1.5.2, G.2.1.7	Pressure/ DP Switches	Nos.	234				
11	A.1.7, A.4.8.2, G.1.2.3, G.2.1.4	Temperature Switches	Nos.	11				
12	A.1.2, C.1.4, D.3.2.12, E.3.2, G.2.1.11, G.2.6.1	Level Switches (float type)	Nos.	30				
13	D.3.2.11, G.1.2.7	Level switches (capacitance type)	Nos.	19				
14	D.3.2.13, G.2.1.13	Level Switches (conductivity type) with electrodes, vessels and electronic units etc.	sets*	4				
15	D.3.2.15, D.3.2.18, D.3.2.19, D.3.2.20, E.2.1.3, E.2.1.13, F.1.1, F.2.4, G.1.2.4, G.1.2.5, G.1.2.6, G.2.1.5, G.2.1.6, G.2.1.14	Pressure Transmitters, DP Transmitters for Flow / Level/ Differential Pressure	Nos.	481				
16	D.3.2.14	Guided Wave Radar Type Level Transmitter	Nos.	14				
17	D.3.2.16	Hydrostatic Level Transmitter	Nos.	1				
18	D.3.2.17	Ultrasonic Type Level Transmitter	Nos.	4				
19	E.2.1.10, G.2.1.10	Level Transmitters with probes, electronic units etc.	sets*	13				
20	D.3.2.8	Flow Transmitter (Annubar Type)	set*	1				
21	A.4.6, G.2.1.15	Temperature Transmitters	Nos.	4				

SL.NO.	BOM REF.	DESCRIPTION	UNIT	QTY	Unit Rate		Total	
					In figures	In words	In figures	In words
22	G.1.5.5	Moisture Sensor Probes	Nos.	2				
23	G.2.1.12	Position Transmitter for Extraction NRV	Nos.	16				
24	A.3.8	Pneumatic Pressure Controllers with Pneumatic Transmitter	Sets*	2				
25	A.1.8	Speed Regulator/ Air Lock Valves/ Air Sets	sets*	20				
26	A.1.10, A.2.5, A.3.6, D.1.2.2, D.3.2.22	Air Filter Regulators	Nos.	67				
27	D.1.2.1, D.3.2.21, E.2.1.12	I/P Converters	Nos.	31				
28	A.3.7	Purge Meter cum DP regulator	Nos.	18				
29	A.1.13	Flame Scanner Head Assembly	sets*	32				
30	A.1.11	FSSS Local Oil Gun Maintenance Switch Box	Nos.	20				
31	A.1.12	H.E.A. Excitor box Assembly with accessories	sets*	20				
32	A.2.12	Burner Tilt Shear Pin Failure Indication Box	Nos.	4				
33	A.2.13	Heavy Duty Limit Switch (for Burner Tilt )	Nos.	20				
34	A.3.9	Ultrasonic Coal Flow Monitor, along with accessories	sets*	9				
35	A.1.14	8 Nos. Flame scanner amplifier Racks	set*	1				
36	D.3.2.9	Level Gauge (float and chord type)	set*	1				
37	D.3.2.10, E.2.1.9	Level Gauge (direct mounting type)	Nos.	3				
38	A.4.11	ERV Controller with Pressure Switch	sets*	4				
39	A.4.12	Electronic Water Level Indicator along with Display Units, Ascetor Unit and other accessories.	sets*	2				
40	A.4.13	Sonic tube leak detection system along with Panel and other accessories.	set*	1				
41	A.4.14.1	Furnace Flame Viewing System along with Local Control Unit, Remote panel and other accessories.	set*	1				
42	B.1.6	Rotor Stoppage System with accessories	sets*	2				
43	B.1.7	ON/OFF Switch Box including light assembly	Nos.*	2				
44	E.2.1.11	Speed measuring loop for BFPDT Governing System	sets*	12				
45	D.2.2.1	Control Cabinet, along with loose supplied items for Turbine Supervisory System for Main Turbine	set*	1				
46	D.3.6.1	Control Cabinets, along with loose supplied items for Vibration Monitoring System for Pumps, Fans & Motors.	set*	5				
47	D.3.6.2	Vibration Monitoring System for Pumps, Fans & Motors, along with 233 Nos. of Vibration Sensors, 98 Nos. JB's for velocity transducers, 37 Nos. sensor drivers and other accessories. <b>Note:</b> Installation of sensors will be carried out by vendor.	set*	1				
48	E.2.2.1	Vibration Monitoring System for BFP Drive Turbine with 16 Nos. probes, Monitor, and other accessories	Sets*	2				
50	D.2.3.1	HART Panel along with loose supplied items.	set*	1				
51	B.2.4	Opacity Monitoring System	sets*	4				
52	D.3.4.1	Coal Bunker Level Monitoring System along with accessories.	sets*	1				
53	D.3.3.1	Low temperature O2 Analyser	sets*	5				
54	D.3.3.2	High temperature O2 Analyser	sets*	2				
55	D.3.3.3	Opacity Analyser to be installed at 71.5 ML of chimney.	set*	1				
56	D.3.3.4	SOX/NOX/CO analyzer to be installed at 71.5ML of chimney	set*	1				

SL.NO.	BOM REF.	DESCRIPTION	UNIT	QTY	Unit Rate		Total	
					In figures	In words	In figures	In words
57	D.3.5.1	Steam and water analysis system, SWAS consisting of: Primary Cooler Rack: 2Nos., Chiller Unit:1 No., Wet Panel: 1 No., Dry panel: 2 Nos., Conductivity Racks: 2 Nos., sensors/ analysers and other accessories	set*	1				
<b>Master and Slave Clock System</b>								
58	D.3.15.1	Master clock control panel	Nos.	0				
59	D.3.15.2	Slave clock	Nos.	0				
60	D.3.15.3	GPS Antenna along with around 100 Mtrs antenna cable from antenna to GPS Receiver	No.	0				
61	D.3.15.4	Slave Booster	Nos.	0				
62	D.3.15.5	Line Driver / Receiver	Sets	0				
<b>CCTV System</b>								
63	D.3.16.1	CCTV System Local Control Panel	Nos.	0				
<b>ERECTION/COMMISSIONING OF UCB/CONTROL ROOM MOUNTED INSTRUMENTS</b> <i>For Scope of Work, Refer relevant Clause</i>								
64	G.1.6.1	Electronic /Digital Indicators	Nos.	10				
65	D.2.1.7, G.1.6.2	Bar Graph Indicators / 3 Point recorder	Nos.	6				
<b>REMOVAL, CALIBRATION, REFIXING AND COMMISSIONING OF INSTRUMENTS</b> <i>For Scope of Work, Refer relevant Clause</i>								
66	G.1.3.1, G.1.3.2	Pressure/ DP Gauges	Nos.	15				
67	B.2.3, E.1.1.2, E.4.2, G.1.3.3	Temperature Gauges	Nos.	95				
68	G.1.3.6, G.2.1.8	Pressure/ DP Switches	Nos.	19				
69	G.1.3.7	Level Switches	Nos.	7				
70	G.1.3.4, G.1.3.5	Pressure/ DP Transmitters	Nos.	15				
71	G.3.4	Position Transmitter	Nos.	20				
72	G.1.3.9	Conductivity Cells	Nos.	2				
73	G.1.3.10	PW Conductivity Indicator	No.	1				
<b>CALIBRATION (AS REQUIRED), ERECTION, REMOVAL AND NORMALIZATION FOR EDTA CLEANING</b> <i>For Scope of Work, Refer relevant Clause</i>								
74	H.1.1	MTM thermocouple length 10 mtrs	Nos.	12				
75	H.1.2	Junction boxes - 12 way/ 6 way/ 24 way	Nos.	10				
76	H.1.3	Compensating cables 2 P x 0.5 sq. mm	Mtrs.	200				
77	H.1.4	Compensating cables 6 P x 0.5 sq. mm	Mtrs.	300				
78	H.1.5	Pressure gauges	Nos.	5				
79	H.1.6	Drum MTM thermocouple adaptor fabrication - 1/4 inch NPT(M) x 1/4 inch OD SS	Sets	2				
80	H.1.7	16 P x 0.5 sqmm cable for Teletel Drum level indication	Mtrs.	500				
81	H.1.8	3c x 2.5 sqmm power cable Teletel Drum level indication	Mtrs.	100				
82	H.1.9	9 port lamp indication at control room and 9 port switching at Drum floor	Set	1				
83	H.1.10	Switchboards with switches	Nos.	3				
<b>ERECTION/COMMISSIONING OF PNEUMATIC POWER CYLINDERS (REGULATING TYPE)</b> <i>For Scope of Work, Refer relevant Clause</i>								
84	A.2.14.3	ID Fans I/L Damper	Nos.	2				

SL.NO.	BOM REF.	DESCRIPTION	UNIT	QTY	Unit Rate		Total	
					In figures	In words	In figures	In words
85	A.2.14.2 , A.2.14.4	PA Fan & FD Fan Blade Pitch control Dampers / Cold Air Regulating Dampers	Nos.	13				
86	A.2.14.5	Hot Air Regulating Dampers	Nos.	9				
87	A.2.14.1	Power Cylinders for SADC	Nos.	80				
88	A.2.14.6	Dynavane Filter Bleed Air Damper	No.	1				
<b>ERECTION/COMMISSIONING OF PNEUMATIC ACTUATORS (ON/OFF TYPE)</b> <i>For Scope of Work, Refer relevant Clause</i>								
89	A.2.15.1	Scanner Air Emergency Damper	No.	1				
<b>ERECTION/COMMISSIONING OF UPS/ BATTERY/ BATTERY CHARGER WITH DBs</b> <i>For Scope of Work, Refer RELEVANT Clause</i>								
90	D.3.7.1	2x150 KVA, UPS comprising of Servo controlled voltage stabilizer cubicle, Input isolation transformer cubicle 02 nos., UPS panel 02 nos., BHMS, Battery/Tie Isolation box, etc	set*	1				
91	D.3.7.2	ACDB	Nos.	2				
92	D.3.7.3	UPS Battery, NiCd, 291 cells, along with wooden rack, and other accessories	sets*	2				
93	D.3.8.1, D.3.8.3	24V DC Float Cum Boost Charger with DCDB for SG/TG & BOP Package.	sets*	2				
94	D.3.8.2 , D.3.8.4	24V DC Battery for SG/TG & BOP Package	sets*	4				
95	D.3.8.5 , D.3.8.7	24V DC Float Cum Boost Charger with in-built DCDB for FOPH & CWPB	set*	4				
96	D.3.8.6 , D.3.8.8	24V DC Battery for FOPH & CWPB	set*	4				
<b>ERECTION/COMMISSIONING OF PANELS</b> <i>For Scope of Work, Refer relevant Clause</i>								
97	A.3.10	Gravimetric Feeder Panel	Nos.	9				
98	F.2.1	PLC panel for Condenser Tube Cleaning system, along with other accessories.	No.	1				
99	G.1.1.1	Generator Instrumentation Cabinet	No.	1				
100	G.1.1.2	Gas Analyser Cabinet including sensor, analyser etc.	sets *	2				
101	G.1.1.3	Generator End Winding Vibration Monitoring System	No.	1				
102	G.1.1.4	Moisture Measurement System for Generator	set*	1				
103	G.1.1.5	Grounding Brush Monitor	No.	1				
<b>ERECTION/COMMISSIONING OF DCS PACKAGE / PADO SYSTEM</b> <i>For Scope of Work, Refer RELEVANT Clause</i>								
104	D.2.1.1, D.2.1.2, D.3.1.1, D.3.1.2, D.4.4	Single Cubicles	Nos.	14				
105	D.1.1.1, D.2.1.3, D.3.1.3, D.3.1.4	Suite of Two Cubicles	Nos.	30				
106	D.1.1.2, D.2.1.4, D.3.1.5	Suite of Three Cubicles	Nos.	13				
107	D.1.1.3, D.2.1.5	Suite of Four cubicles	Nos.	2				
108	D.4.1	CRT Desk	No.	1				
109	D.4.2	6 nos. of 67" Large Video Screen along with CPU and other loose supplied items.	set*	6				

SL.NO.	BOM REF.	DESCRIPTION	UNIT	QTY	Unit Rate		Total	
					In figures	In words	In figures	In words
110	D.4.3, D.5.2	<b>Computer Stations :</b> Engineer Workstation, 'maxStorian' Station, Operator Work Stations, maxLINK Stations, Operator Workstations for PADO System, etc.	sets*	26				
111	D.4.5	Network Enclosures (Wall Mounted type), along with loose supplied Ethernet switches.	Nos.	4				
112	D.5.1	PADO Servers along with 24" monitors and other loose supplied items.	set*	2				
113	D.5.3	Power Distribution Boards 15A/ 5A	Nos.	24				
114	D.5.5	Conduit for laying Ethernet cable	Mtrs.	350				
115	D.5.6	Wall mounted Rack / 6U Wall mounted rack	Nos.	3				
<b>ERECTION/TESTING OF LOCAL INSTRUMENT ENCLOSURES/ RACKS (LIE/LIR)/GAUGE BOARDS</b> <i>For Scope of Work, Refer relevant Clause</i>								
116	D.3.9.1	LIE of size: 1450 x 800 x 2300 mm; Approximate weight: 900 kg	Nos.	18				
117	D.3.9.2	LIE of size: 1100 x 800 x 2300 mm; Approximate weight: 660 kg	Nos.	14				
118	D.3.9.3	LIE of size: 700 x 600 x 2100 mm; Approximate weight: 370 kg	Nos.	5				
119	D.3.9.4	LIR of size 1600 x 850 x 2150 mm; Approximate weight: 400 kg	Nos.	9				
120	D.3.9.5	LIR of size 1300 x 850 x 2150 mm; Approximate weight: 300 kg	Nos.	39				
121	D.3.9.6	LIR of size 800 x 850 x 1600 mm; Approximate weight: 200 kg	Nos.	17				
122	A.5.6.1	LIR of 1650 x 850 x 2150 mm; Approximate weight: 600 kg	Nos.	13				
123	E.1.5.1, E.1.5.2, E.1.5.3, E.1.5.4	LGB Assembly for BFPs/ CEPs (along with instruments) Approximate size 1400 x 550 x 1900 mm; 200 kg	Nos.	8				
124	E.1.5.5, E.1.5.6, E.1.5.7	LIR assembly for BFPs/ CEPs (along with transmitters) Approximate Size 2000 x 650 x 2200 mm; 300 kg	Nos.	5				
<b>ASSEMBLY AND ERECTION OF JB MOUNTING FRAMES</b> <i>For Scope of Work, Refer relevant Clause</i>								
125	D.2.7.1 TO D.2.7.9	Assembly and installation of Mounting Frames with loose supplied prefabricated materials like slotted angles, channels etc.	Nos.	21				
<b>ASSEMBLY / WELDING / ERECTION OF PRESSURE INSTRUMENT RACKS</b> <i>For Scope of Work, Refer RELEVANT Clause</i>								
126	G.2.2.1, G.2.2.2	Assembly/welding and installation of Instrument Racks with loose supplied prefabricated materials of suitable size, like angles, stands etc. Total wt. of loose supplied items (for 13 racks): Approx. 3 Tonnes	Nos.	13				
<b>LAYING, TERMINATION &amp; TESTING OF CABLES</b> <i>For Scope of Work, Refer relevant Clause</i>								
<b>Laying of LT Power Cables</b>								
127	D.3.7.4	1X 109/120 sq.mm Copper cable	Mtrs.	800				
<b>Termination of LT Power Cables</b>								
128	D.3.7.5	1X 109/120 sq.mm Copper cable	Nos.	64				

SL.NO.	BOM REF.	DESCRIPTION	UNIT	QTY	Unit Rate		Total	
					In figures	In words	In figures	In words
		<b>Laying and Termination of Power / Control / Instrumentation Cables</b>						
129	A.5.1.1, A.5.1.2, A.5.1.3, A.5.1.4, A.5.1.5, D.2.4.1, D.3.10.6, D.3.10.12, D.3.10.17, D.3.10.18, F.3.5, F.3.9	Flame Scanner / Heat Flux Sensor / 1Pair X 1.5 / 2Pair X 0.5/ 2Pair X 1.5 sq. mm cable	Mtrs.	61800				
130	A.5.1.6, A.5.1.7, A.5.1.13, C.3.1, D.2.4.2, D.3.10.7, D.3.10.11, D.3.10.13, E.1.4.2, F.3.1, F.3.6	4Pair X 0.5 sq. mm / 2 Triad X 0.5 sq.mm cable	Mtrs.	436150				
131	D.2.4.7, D.3.10.8, E.1.4.1	6Pair x 0.5 sq.mm / 4 Triad x 0.5 sq. mm cable	Mtrs.	3550				
132	A.5.1.8, A.5.1.9, D.3.10.9, D.3.10.14, F.3.2, F.3.7	8Pair X 0.5 sq. mm cable	Mtrs.	130000				
133	A.5.1.10, A.5.1.11, D.3.10.10, D.3.10.15, F.3.3, F.3.8	12 pair x 0.5 sq. mm / 16 P X 0.5 sq. mm cable	Mtrs.	62650				
134	D.3.10.16, F.3.4	20 Pair x 0.5 sq.mm / 24P X 0.5 sq.mm cable	Mtrs.	11050				
135	A.5.1.12, D.2.4.4, D.2.4.5, D.3.10.1, D.3.10.5	2 Pair x 0.5 sq. mm to 1.5 sq.mm compensating cables	Mtrs.	21600				
136	D.3.10.2, D.3.10.3	4 Pair x 0.5/1.5 sq.mm compensating cable	Mtrs.	7200				
137	D.3.10.4	6 Pair x 1.5 sq.mm compensating cable	Mtrs.	10000				
138	D.3.10.19, D.3.15.8	2 C/ 3C x 1.5/2.5 sq. m, cable	Mtrs.	9550				
139	D.2.4.3, D.4.7	4 C/ 5C x 1.5/2.5 sq. mm, control cable	Mtrs.	2500				
140	D.4.6, D.5.4, D.3.15.9	Ethernet Cable	Mtrs.	13700				
141	D.3.15.6	RG 58 Coaxial Cable	Mtrs.	1750				
142	D.3.15.7	RS 232 /485 Data Cable	Mtrs.	500				
143.a	D.2.4.6.a	Fibre optical Cable laying, clamping and dressing.	Mtrs.	6000				
143.b	D.2.4.6.b	Laying if HDPE Pipe 1"	Mtrs.	4000				
143.c	D.2.4.6.c	Termination including splicing, etc.	Nos.	112				
<b>ERECTION OF CABLE TRAYS &amp; DUCTS</b>								
<i>For Scope of Work, Refer relevant Clause</i>								
144	A.5.2.1, D.3.11.1, E.1.4.3	50 mm wide Cable Tray	Mtrs.	4720				
145	A.5.2.2, D.3.11.2	100 mm wide Cable Tray	Mtrs.	7200				
146	A.5.2.3, E.1.4.4	150 mm wide Cable Tray	Mtrs.	2545				
147	A.5.2.4	300 mm wide Cable Tray	Mtrs.	100				
<b>Cable Ducts With Covers</b>								
148	D.2.6.1	60 x 60 x 1000 mm	Nos.	200				
149	D.2.6.2	180 x 100 x 1000 mm	Nos.	200				
150	D.2.6.3	250 x 100 x 1000 mm	Nos.	200				
<b>ERECTION OF JUNCTION BOXES/PB BOXES</b>								
<i>For Scope of Work, Refer relevant Clause</i>								
151	A.2.10, A.5.3.1, A.5.3.2, A.5.3.3, C.2.1, C.2.2, D.2.5.2, D.2.5.3, D.3.12.1, D.3.12.2, D.3.12.3, D.3.15.11, E.1.3.1, E.1.3.2, G.2.4.4,	Junction Boxes, 12 way to 36 way, including RJCBs	Nos.	268				
152	A.5.3.4, D.2.5.1, D.3.12.4, D.3.12.5, D.3.12.6, D.3.12.7, G.2.4.2, G.2.4.3	Junction Box, 48 way to 96 way	Nos.	165				
153	G.2.4.1	Junction Box (Pedestal and Proximeter JB)	Nos.	17				

SL.NO.	BOM REF.	DESCRIPTION	UNIT	QTY	Unit Rate		Total	
					In figures	In words	In figures	In words
154	A.2.11, A.4.10, D.2.1.6	Push Button Boxes/ Fire Protection Switch Box	Nos.	10				
<b>ERECTION/TESTING OF IMPULSE PIPES</b> <i>For Scope of Work, Refer relevant Clause</i>								
155	G.1.7.5, G.2.3.7	AS Pipe, 13.5 x 2.6	Mtrs.	70				
156	G.1.7.2, G.2.3.6	AS pipe, 21.3 x 2.3 / 21.3 x 2.77	Mtrs.	735				
157	A.5.5.3	AS Pipe, 21.3 x 4.78	Mtrs.	200				
158	D.3.13.5	A335 P22- ½" NB XXS (AS Pipe)	Mtrs.	650				
159	E.1.2.1, G.1.7.4, G.1.7.7, G.2.3.1	CS pipe, 13.5 x 2.6/ 16 x 2.6 / 17.2 x 1.8	Mtrs.	2574				
160	G.1.7.1, G.2.3.3	CS pipe, 21.3 x 2.3	Mtrs.	710				
161	A.5.5.2, C.5.1, E.2.3.1	CS pipe, 21.3 x 3.73 ( ½" SCH 80 )	Mtrs.	5815				
162	D.3.13.4	A106 Gr C- ½" NB SCH 80 ( CS Pipe )	Mtrs.	4200				
162.a	A.5.5.5, D.3.13.3	A106 Gr C- ½" NB SCH 160 ( CS /AS Pipe )	Mtrs.	1500				
163	A.5.5.4, D.3.13.1	¾" SCH 80 IMPULSE PIPE, MATL ASTM-A106 ( CS Pipe )	Mtrs.	3100				
164	D.3.13.2, A.5.5.1	ASTM A106 Gr C 1" NB SCH 80 (CS Pipe)	Mtrs.	2025				
165	E.2.3.2	CS Pipe, 60.3 x 3.91	Mtrs.	310				
166	G.2.3.2	CS Tube, DN-80	Mtrs.	40				
167	E.2.3.4, G.1.7.6, G.2.3.5	SS tube, 12.7 x 2.1 mm/ 13.5 x 2.6 mm	Mtrs.	430				
168	D.3.13.6	A213 TP 316 - ½" NB SCH160	Mtrs.	650				
169	D.3.13.7	A213 TP316H- ½" NB SCH 80	Mtrs.	750				
170	D.3.13.8, G.1.7.3, G.2.3.4	A312 TP316L GR C ½" NB SCH 40 / 21.3 x 2.3 / 21.3 x 2.6 ( SS tube )	Mtrs.	2630				
171	E.2.3.3	Cr-Al Pipe 21.3 x 3.73	Mtrs.	660				
<b>ERECTION OF EARTHING MATERIALS</b> <i>For Scope of Work, Refer relevant Clause</i>								
172	A.5.4.2	GI Flat, 50 X 6 mm	Mtrs.	300				
<b>ERECTION OF HOSES, TUBES etc.</b> <i>For Scope of Work, Refer relevant Clause</i>								
173	A.1.9, A.2.6, A.2.7, D.3.14.4	Copper Tube/SS Tube, OD 8 mm / ¼" / ½"	Mtrs.	3295				
174	E.2.3.5	SS tube, 6 x 1.5 mm	Mtrs.	60				
175	A.2.8	¼" size Teflon Hose of 2M length	Nos.	80				
176	A.2.9	1" size Teflon Hose of 3M length	Nos.	40				
177	D.3.15.10	GI conduit pipe, 19mm OD.	Mtrs.	1000				
<b>ERECTION/TESTING OF GI PIPE (HEAVY DUTY)</b> <i>For Scope of Work, Refer relevant Clause</i>								
178	C.4.1, D.3.14.2	NB 15 x 3.25 / ½" heavy duty GI pipes	Mtrs.	5900				
179	C.4.2, D.3.14.3	NB 25 x 4.05 / 1" heavy duty GI pipes	Mtrs.	3155				
180	C.4.3	NB 40 x 4.05	Mtrs.	270				
181	C.4.4	NB 50 x 4.05	Mtrs.	600				
182	C.4.5	NB 80 x 4.8	Mtrs.	100				
183	C.4.6	NB 100 x 5.4	Mtrs.	685				
<b>FABRICATION/ERECTION OF STRUCTURAL STEEL</b> <i>For Scope of Work, Refer relevant Clause</i>								
184	A.5.4.1, D.3.14.1, E.1.6.1, E.2.2.2, G.2.5	Structural Steel for fabrication of supports/ LIRs/ canopy	MT	25.5				

SL.NO.	BOM REF.	DESCRIPTION	UNIT	QTY	Unit Rate		Total	
					In figures	In words	In figures	In words
<b>CHECKING &amp; COMMISSIONING OF THE FOLLOWING ERECTED BY OTHER AGENCY</b>								
<i>For Scope of Work, Refer relevant Clause</i>								
185	B.1.8.2, B.2.5.2, E.4.3.2	Lub Oil Skids for Pulveriser, FD/ ID/ PA Fans, Air Preheater	sets* <sup>§</sup>	19				
186	C.6.2, F.4.3, F.4.4, F.4.5	HP / LP Dosing Skids	sets* <sup>§</sup>	4				
187	E.1.7.2	Hydraulic Coupling of MDBFP	set <sup>§</sup>	1				
188	G.3.1	Condenser Vacuum Pump, including CVP PLC and related field instruments	sets* <sup>§</sup>	2				
189	A.3.11.1	Gravimetric Feeders	sets* <sup>§</sup>	9				
190	A.4.15.2	Direct Water Level Gauges	Nos. <sup>§</sup>	2				
191	A.2.16.1	Burner Tilt Power Cylinders	Nos. <sup>§</sup>	4				
192	A.2.16.2, A.2.16.3, A.2.16.4, A.2.16.5, A.2.16.6, A.2.16.7, E.4.3.3, E.4.3.4	Pneumatic Actuators of ON/OFF Type	Nos. <sup>§</sup>	85				
193	A.1.15.2	Pneumatic Valves: Trip Valves	Nos. <sup>§</sup>	71				
194	A.1.15.3, A.4.15.3, C.6.1, E.2.4.1, F.4.1	Pneumatic Valves: Control Valves	Nos. <sup>§</sup>	72				
195	G.3.3	NRV Valves, Stop Valves, Control Valves, HP/LP Bypass Valves	Nos. <sup>§</sup>	40				
196	B.1.8.1, G.3.6	Solenoid Valves	Nos. <sup>§</sup>	32				
197	E.2.4.2	Position Transmitters	Nos. <sup>§</sup>	8				
198	B.2.5.1, E.1.7.1, E.4.3.1, G.1.3.12	Checking the healthiness of Temperature Elements (RTDs)	Nos. <sup>§</sup>	512				
199	A.4.8.3, A.4.15.1, G.1.3.8, G.1.3.11,	Flow Indicators/ Flow Meters/ Flow Switches	Nos. <sup>§</sup>	24				
200	A.1.15.1, A.3.11.2, E.1.7.3, G.3.5	Checking of Limit Switches	Nos. <sup>§</sup>	201				
<b>Instrument Racks</b>								
<i>Removal, calibration and refixing of rack mounted instruments,</i>								
201	E.2.4.3	Governing Console Board for BFPDT	sets* <sup>§</sup>	2				
202	G.3.2	Oil Centrifuge Unit	Nos. <sup>§</sup>	2				
203	G.3.7	Hydraulic Speed Control Equipment Rack	set* <sup>§</sup>	1				
204	G.3.8	LP Bypass Control Rack	set* <sup>§</sup>	1				
205	G.3.9	Supply Unit Racks for HP Valve-1, HP Valve-2, IP Valves	sets* <sup>§</sup>	3				
206	G.3.10, G.3.11	Seal Oil Rack / Stator Water Rack	set* <sup>§</sup>	2				
207	G.3.12, G.3.13	Seal Oil Level / Pr Transmitter Instrument Rack, Stator Water DP Instrument Rack	set* <sup>§</sup>	2				
208	G.3.14	H2 Dryer Unit	set* <sup>§</sup>	1				
209	G.3.15, G.3.16	Gland Steam And Seal Steam Oil Supply Units / TD BFP Pump Coupling Engage Oil Supply Unit	sets* <sup>§</sup>	4				
<b>TOTAL</b>								

Note: <sup>§</sup>= Rate is to be quoted only for checking/ commissioning.

\* =Lump sum rate is to be quoted per set