

Corrigendum 1 dated 09-06-2022 to Tender Specification BHEL PSSR SCT 2025

Tender Specification BHEL PSSR SCT 2025 - Erection, Testing & Commissioning including Handling of materials at site BHEL stores/storage yard, transporting to site of erection and supply & application of final painting of Control and Instrumentation (C&I) works for Package-A (Unit 1 & 2) and Package-B (Unit 3 & 4) of 5x800 MW Yadadri Thermal Power Plant at Veerlapalem Village, Damercherla Mandal, Nalgonda DT., TSGENCO, Telangana, India.

A. WEIGHT SCHEDULE/BOQ - VOLUME-IA PART – I CHAPTER – IX of TECHNICAL CONDITIONS OF CONTRACT (TCC) may be read as per attachment in next pages.

All other conditions of the tender specification remain unchanged.

Bidders are requested to consider this corrigendum as part of tender specification and quote accordingly.

-Sd-

Shailendra Kumar

Senior Engineer / Subcontracts

TECHNICAL CONDITIONS OF CONTRACT (TCC)

VOLUME-IA PART – I CHAPTER - IX WEIGHT SCHEDULE/BOQ

1.9.0.0 C&I - BILL OF QUANTITY (BOQ)

1.9.1.0 BOQ of PACKAGE – A

SL.NO.	DESCRIPTION	UOM	UNIT # 1	UNIT # 2
A	EDN SCOPE			
A.1.0	Shifting from Stores to UCR, placement & erection of SG Package- Valmet DNA Control Cabinets			
A.1.1	Suit of two Cubicles Size: 1500 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 800 kg. CJF75&CJF76, CJF34&35	Nos	2	2
A.1.2	Suit of two Cubicles Size: 1500 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 800 kg. CAF41&CAF42	Nos	1	0
A.1.3	Suit of two Cubicles Size: 1500 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 800 kg. CAF46&CAF47	Nos	1	0
A.1.4	Suit of three Cubicles Size: 2250 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 1200 kg.CJF06,07,08	Nos	1	1
A.1.5	Suit of three Cubicles Size: 2250 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 1200 kg.CAF43,44,45 & CAF50,51,52	Nos	2	0
A.1.6	Suit of four Cubicles Size: 3000 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 1600 kg. CJF23/24-CAF20/21, CJF25/26- CAF22/23 & CJF27/28-CAF24/25 & CJF29/30-CAF26/27	Nos	4	4
A.1.7	Suit of five Cubicles Size: 3750 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 2000 kg. CJF01,02,03,04,05 & CJF58,59,60,61,62	Nos	2	2
A.1.0.1	Alignment, Electrical Interconnection, Testing and Commissioning of SG Package-Valmet DNA Control Cabinets			
A.1.1.1	Suit of two Cubicles Size: 1500 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 800 kg. CJF75&CJF76, CJF34&35	Nos	2	2
A.1.2.1	Suit of two Cubicles Size: 1500 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 800 kg. CAF41&CAF42	Nos	1	0
A.1.3.1	Suit of two Cubicles Size: 1500 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 800 kg. CAF46&CAF47	Nos	1	0
A.1.4.1	Suit of three Cubicles Size: 2250 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 1200 kg.CJF06,07,08	Nos	1	1
A.1.5.1	Suit of three Cubicles Size: 2250 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 1200 kg.CAF43,44,45 & CAF50,51,52	Nos	2	0

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A.1.6.1	Suit of four Cubicles Size: 3000 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 1600 kg. CJF23/24-CAF20/21, CJF25/26- CAF22/23 & CJF27/28-CAF24/25 & CJF29/30-CAF26/27	Nos	4	4
A.1.7.1	Suit of five Cubicles Size: 3750 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 2000 kg. CJF01,02,03,04,05 & CJF58,59,60,61,62	Nos	2	2
A.2.0	Shifting from Stores to UCR, placement & erection of TG Package- (Non-Core) Valmet DNA control cabinets			
A.2.1	Single Cubicle Size: 750 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 400 kg. CJJ08, CJJ41 & CWW01	Nos	3	3
A.2.2	Suit of two Cubicles Size: 1500 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 800 kg. CCA10 & CCA11	Nos	1	1
A.2.3	Suit of three Cubicles Size: 2250 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 1200 kg. CJJ03,CJJ04 & CJJ53	Nos	1	1
A.2.4	Suit of four Cubicles Size: 3000 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 1600 kg. CJJ01,02,05,06, CCA01,02,03,04, CJJ20,21,22,23 & CJJ30,31,32,33	Nos	4	4
A.2.0.1	Alignment, Electrical Interconnection, Testing and Commissioning of TG Package- (Non-Core) Valmet DNA control cabinets			
A.2.1.1	Single Cubicle Size: 750 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 400 kg. CJJ08, CJJ41 & CWW01	Nos	3	3
A.2.2.1	Suit of two Cubicles Size: 1500 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 800 kg. CCA10 & CCA11	Nos	1	1
A.2.3.1	Suit of three Cubicles Size: 2250 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 1200 kg. CJJ03,CJJ04 & CJJ53	Nos	1	1
A.2.4.1	Suit of four Cubicles Size: 3000 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 1600 kg. CJJ01,02,05,06, CCA01,02,03,04, CJJ20,21,22,23 & CJJ30,31,32,33	Nos	4	4
A.3.0	Shifting from Stores to UCR, placement & erection of STN C&I Valmet DNA Control Cabinets			
A.3.1	Single Cubicle Size: 750 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 400 kg. CRE61/CTE01/CTE02/CTE03	Nos	4	4
A.3.2	Single Cubicle Size: 750 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 400 kg. CTE04	Nos	1	0
A.3.3	Suit of two Cubicles Size: 1500 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 800 kg. CRE51/52, CRE81/82, CRE53/54, CRE83/84, CRE55/56, CRE57/58, CRE59/60	Nos	7	7

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A.3.4	Suit of two Cubicles Size: 1500 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 800 kg. CRE85/86	Nos	1	0
A.3.5	Suit of three Cubicles Size: 2250 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 1200 kg. CRE41/42/43, CRE48/49/50, CRE62/63/64, CRE65/66/67, CRE68/69/70	Nos	5	5
A.3.6	Suit of three Cubicles Size: 2250 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 1200 kg. CRW01-03, 04-06, 11-13, 71-73, 74-76	Nos	5	0
A.3.7	Suit of three Cubicles Size: 2250 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 1200 kg. CRR91-93,94-96 & 97-99	Nos	3	0
A.3.8	Suit of four Cubicles Size: 3000 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 1600 kg. CRE 01-04,05-08, 09-12,13-16,17-20,21-24,25-28,29-32,33-36,37-40,44-47	Nos	11	11
A.3.9	Suit of four Cubicles Size: 3000 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 1600 kg. CRW07-10	Nos	1	0
A.3.0.1	Alignment, Electrical Interconnection, Testing and Commissioning of STN C&I Valmet DNA Control Cabinets			
A.3.1.1	Single Cubicle Size: 750 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 400 kg. CRE61/CTE01/CTE02/CTE03	Nos	4	4
A.3.2.1	Single Cubicle Size: 750 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 400 kg. CTE04	Nos	1	0
A.3.3.1	Suit of two Cubicles Size: 1500 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 800 kg. CRE51/52, CRE81/82, CRE53/54, CRE83/84, CRE55/56, CRE57/58, CRE59/60	Nos	7	7
A.3.4.1	Suit of two Cubicles Size: 1500 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 800 kg. CRE85/86	Nos	1	0
A.3.5.1	Suit of three Cubicles Size: 2250 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 1200 kg. CRE41/42/43, CRE48/49/50, CRE62/63/64, CRE65/66/67, CRE68/69/70	Nos	5	5
A.3.6.1	Suit of three Cubicles Size: 2250 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 1200 kg. CRW01-03, 04-06, 11-13, 71-73, 74-76	Nos	5	0
A.3.7.1	Suit of three Cubicles Size: 2250 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 1200 kg. CRR91-93,94-96 & 97-99	Nos	3	0
A.3.8.1	Suit of four Cubicles Size: 3000 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 1600 kg. CRE 01-04,05-08, 09-12,13-16,17-20,21-24,25-28,29-32,33-36,37-40,44-47	Nos	11	11
A.3.9.1	Suit of four Cubicles Size: 3000 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 1600 kg. CRW07-10	Nos	1	0
A.4.0	Shifting from Stores to UCR, placement & erection of CPU C&I Valmet DNA Control Cabinets			

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A.4.1	Single Cubicle Size: 750 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 400 kg. CTE11, CTE12, CTE14 & CTE15	Nos	4	0
A.4.2	Suit of two Cubicles Size: 1500 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 800 kg. CRA10/11	Nos	1	0
A.4.3	Suit of three Cubicles Size: 2250 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 1200 kg. CRA01-03, 04-06, 12-14	Nos	3	0
A.4.0.1	Alignment, Electrical Interconnection, Testing and Commissioning of CPU C&I Valmet DNA Control Cabinets			
A.4.1.1	Single Cubicle Size: 750 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 400 kg. CTE11, CTE12, CTE14 & CTE15	Nos	4	0
A.4.2.1	Suit of two Cubicles Size: 1500 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 800 kg. CRA10/11	Nos	1	0
A.4.3.1	Suit of three Cubicles Size: 2250 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 1200 kg. CRA01-03, 04-06, 12-14	Nos	3	0
A.5.0	Shifting from Stores to UCR, placement & erection of SCR C&I Valmet DNA Control Cabinets			
A.5.1	Suit of three Cubicles Size: 2250 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 1200 kg. CBB01-03 & 04-06	Nos	2	2
A.5.2	Suit of three Cubicles Size: 2250 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 1200 kg. CBB11-13 & 14-16	Nos	2	0
A.5.0.1	Alignment, Electrical Interconnection, Testing and Commissioning of SCR C&I Valmet DNA Control Cabinets			
A.5.1.1	Suit of three Cubicles Size: 2250 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 1200 kg. CBB01-03 & 04-06	Nos	2	2
A.5.2.1	Suit of three Cubicles Size: 2250 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 1200 kg. CBB11-13 & 14-16	Nos	2	0
A.6.0	Shifting from Stores to UCR, placement & erection of T&AVT/EIS Control Cabinets & Network Panels/Network Enclosures			
A.6.1	Single Cubicle Size: 750 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 400 kg. CFA01	Nos	1	0
A.6.2	Suit of two Cubicles Size: 1500 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 800 kg. CXA01-02 & 03-04	Nos	1	0
A.6.3	Suit of three Cubicles Size: 2250 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 1200 kg. CXA03-05	Nos	1	0
A.6.4	EIS Control Panel of Single Cubicle Size: 750 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 400 kg. CYJ01	Nos	1	1
A.6.0.1	Alignment, Electrical Interconnection, Testing and Commissioning of T&AVT/EIS Control Cabinets & Network Panels/Network Enclosures			

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A.6.1.1	Single Cubicle Size: 750 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 400 kg. CFA01	Nos	1	0
A.6.2.1	Suit of two Cubicles Size: 1500 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 800 kg. CXA01-02 & 03-04	Nos	1	0
A.6.3.1	Suit of three Cubicles Size: 2250 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 1200 kg. CXA03-05	Nos	1	0
A.6.4.1	EIS Control Panel of Single Cubicle Size: 750 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 400 kg. CYJ01	Nos	1	1
A.6.0.2	Erection and Commissioning of Network Panels and Network Enclosures.			
A.6.0.2.1	Network Panel of Single Cubicle Size: 750 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 400 kg. CNP11/21/41	Nos	3	3
A.6.0.2.2	Network Panel (LAN-I/II) of Single Cubicle Size: 750 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 400 kg. CNP51/52	Nos	1	0
A.6.0.2.3	Network Panel (Common System) of Single Cubicle Size: 750 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 400 kg. CNP31/32/33/35/36/37	Nos	2	0
A.6.0.2.4	Network Enclosures for LAN & BOP Systems of Size: 600 mm(W) X 500 mm(D) x 600 mm(H); Approx. weight 20 kg.	Nos	18	0
A.7.0	TURBINE SUPERVISORY SYSTEM FOR MAIN TURBINE			
A.7.1	Meggitt VM600 system with 19" Rack Control Cabinet- 2 Nos. (with power supply unit, back panel, CPU module, I/O cards, relay cards, protection cards), TFT monitors, server, A3 Colour printer, Ethernet to FO convertor, interconnecting cables, etc. Approx. Size and Weight of the Panel 750 x 800 x 2117 mm; 400 kg.	Set	1	1
A.7.2	Total loose supplied items to be mounted in the cabinet is as follows: Absolute Bearing Vibration sensors with isolators qty: 16; Relative Shaft Vibration sensors with isolators qty: 16; Absolute shaft expansion (HP & LP Rotor) with isolators qty: 4 each; Axial shaft/shaft position with isolators qty: 3; Reference phase measurement sensors with isolators qty: 1 No and Junction boxes qty: 12 Nos.	Set	1	1
A.8.0	HART MANAGEMENT SYSTEM (SUPERVISION OF E&C BY OEM)			
A.8.1	Hart Management System (HMS) Comprising of the following: HART Panel- 02 Nos., Workstation PC with 24" TFT Monitor-02 Nos., Colour laser Printer 01 No., and other loose supplied items like Hart / back plane communication modules, Patch cards/ 20 way FRC intra panel cables 69 set, RS485/RS232 Convertor, interconnecting Cables, etc. Approx. Size and Weight of the Panel 800(L) x 800(W) x 2415(H) mm; 400 Kg each.	Set	1	1

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A.9.0	INSTRUMENTS			
A.9.1	Pressure Transmitter	Nos	297	195
A.9.2	Differential Pressure Transmitter	Nos	147	128
A.9.3	Ultrasonic type level transmitter	Nos	69	27
A.9.4	Flow Transmitter (DP type)	Nos	129	121
A.9.5	Guided Wave Radar Type Level Transmitter	Nos	24	24
A.9.6	Temperature Elements	Nos	330	330
A.9.7	Pressure Gauge	Nos	244	151
A.9.8	Differential Pressure Gauge	Nos	24	20
A.9.9	Pressure and Differential Pressure switches	Nos	60	60
A.9.10	Temperature Gauge	Nos	130	130
A.9.11	Level Gauge	Set	1	1
A.9.12	Level Switch- Conductivity Type for CRH drain pots consists of two nos of level probes, field mounted electronic control units-1 No., interconnecting cables 10 mtr	Nos	4	4
A.9.13	Coal Bunker Level Monitoring System - 3D Scanner on Bunker top, 2 Nos. Panel at Bunker Floor/Unit, 1 No. Computer in CER/Unit.	Set	8	8
A.9.14	I/P Converters for Burner Tilt & SADC	Nos	33	33
A.10.0	FLUE GAS ANALYZERS			
A.10.1	High temperature Oxygen Analyzer (in situ type) make: SECO; Consisting of insitu, flange mounted zirconium oxide type probe and electronics-1 cabinet, Verification gas cylinder and analyser accessories such as Ref.air+Verification gas kit cabinet, signal and power cables (10m), SS tubings and fittings, Junction box, Glands for Electronics and JB, mounting flanges. App.weight of analyser is 22 Kg	Set	2	2
A.10.2	Low temperature Oxygen Analyzer (in situ type) make: AICPL; Consisting of insitu, flange mounted zirconium oxide type probe and electronics-1 cabinet, Auto Calibration unit for three calibration cylinders, Zero span and one span cylinders along with accessories, 2/1 metre probe protectors and wall mounted panel for Analyzer. App.weight of analyser is 22 Kg	Set	11	9
A.10.3	CO Analyser (In-Situ type) Consisting of CO Sensor head , High Temperature Probe (1800 mm app.), Protection tube (1800 mm app.), Temperature/Pressure Transmitters, Digital Display Unit, Air Dryer panel (App. size 760x760x210 mm), Power Supply Unit, Calibration Gas Cylinder filled with CO & Nitrogen, Pressure Switch for purge air blower, Air compressor-1 No. & connecting cables. App. weight of analyser is 22 kg.	Set	6	6
A.10.4	HF analyser Consists of Process & Purge tubes (1500 mm app.)-02 Nos, Transmitter/Receiver units-02 Nos, HF Gas Analyser Unit-01 No., Analyser Panel	Set	1	1

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	(App.Size 600x600x2000 mm)-01 No. (Wt. 200 kg), Air Purification unit-01 No., Power Supply unit-01 No., Canopies for Transmitter/Receiver/Power Supply unit (as applicable), Purge air unit-01 No., fail safe shutter with 10 mtr cable, Air Compressor Unit 2 nos with air distribution Hose for purge air connection, inter connecting power & control cables etc. The analyser mounting at elevation 65 mts and temperature transmitter at 64.75 mtrs on chimney. Location of cross duct monitor is at about 106 mtr elevation in chimney.			
A.10.5	Opacity Analyser (In Situ type) Consisting of Transceiver unit -02 No each with air purge connections, Signal processor unit, power supply unit, display control unit, fail safe shutter with 10 mtr cable against power or purge air failure, Air Compressor Unit 2 nos with air distribution Hose for purge air connection, inter connecting power & control cables etc. The analyser mounting at elevation 65 mts and temperature transmitter at 64.75 mtrs on chimney. Location of cross duct monitor is at about 106 mtr elevation in chimney.	Set	1	1
A.10.6	SOX/NOX/CO (Combined) analyser system Consisting of in-situ dilution Probe (long 1500 mm) flange mounted, umbilical cord 1x1/4 inch teflon & 3 x 1/4th nylon pvc jacketing 100 mtr long , span/back flush, dilution air, Dilution control unit with auto calibration solenoids, pressure gauges, flow meter, air dryer with filter arrangement, calibration gas cylinders 10 ltr capacity 4 sets with rack stand, Analyser panel (800mm x 800mm x 1915mm) fitted air condition & 19 inch racks, tubing & sampling panel + analysers. The tubing/ signal, control, power cabling between probe and Analyser panel is approx 100 mtrs long, 800 mmx 2100 mm (H). The probe is located at approx. 82 mt Elevation on chimney+ flue. Local PC based DAS consist of 24-inch monitor, i3 processor with key board and accessories.	Set	1	1
A.10.7	Mercury analyser consist of sample probe with heated filter, mounting flange, heated sample tubes with RTD (length 50 mtrs), span zero gas calibration cylinders, peristaltic pumps 2 nos, outdoor PLC panel size 1200mm(w) x 600mm (d) x 2000mm (h) aprox weight of panel 300 Kg, mounted on chimney at 41 mtr elevation.	Set	1	1
A.10.8	Gas Flow analyser (InSitu non-contact Cross duct type) Consisting of Transceiver unit -02 No each with air purge connections, Signal processor unit, power supply unit, display control unit, fail safe shutter with 10 mtr cable against power or purge air failure, Air	Set	1	1

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	Compressor Unit 2 nos with air distribution Hose for purge air connection, inter connecting power & control cables etc. The analyser mounting at elevation 65 mts and temperature transmitter at 64.75 mtrs on chimney. Location of cross duct monitor is at about 106 mtr elevation in chimney.			
A.11.0	STEAM AND WATER ANALYSIS (SWAS): The scope of work includes erection of main system along with the equipments and loose items indicated below, if any, interconnection pipes between cooler, chiller and wet panel, cooling water connection pipes between cooler, chiller and wet panel etc.			
A.11.1	Sample Handling System: Sampling handling system consisting of: a. Primary Rack # 1: 01 Nos.Dim.1500(L)x800(D)x2100(H) in mm) App.overall weight 400 kg. b. Primary Rack # 2: 01 Nos.Dim.700(L)x800(D)x2000(H) in mm) App.overall weight 200 kg. c. Self Standing Racks # 3/4: 02 Nos. (App. Dim.600(L)x600(D)x1800(H) in mm) App.overall weight 150 kg. d. Wet panel:01 No.(App.Dim.5000 (L)x1600 (D)x2115(H) in mm) App.weight: 3000 kg. e. Analyser panel:01 No.(App. Dim.6500(L)x800(D)x2115(H) in mm) App.overall weight 2000 kg. f. Self Standing Rack (Sampling Skid) # 5: 01 Nos. (App. Dim.2500(L)x1500(D)x2200(H) in mm) App.overall weight 850 kg. g. Self Standing Racks # 6: 01 Nos. (App. Dim.800(L)x800(D)x2000(H) in mm) App.overall weight 200 kg. h. Chiller unit (redundant):01 No. (App. Dim 2200(L)x1200(D)x1275(H) in mm) and App.Overall weight: 850 kg.	Set	1	1
A.11.2	Sampling Sensors and Devices: The following analysers and sensors are to be assembled in the above said panels (or) as per the direction of BHEL Site engineer. a. Specific Conductivity Analysers: 08 Sets b. Cation Conductivity Analysers: 5 Sets c. pH Analysers: 10 Sets d. Dissolved O2 Analysers: 5 Sets e. Silica Analysers: 02 Sets f. Sodium Analysers: 01 Sets g. Chloride Analysers: 01 Set h. Turbidity Analysers: 01 Set i. Iron Analysers: 01 Sets j. Degassed Cation Conductivity Analyzers-02 Sets k. Hydrazine Analyser - 02 Sets	Set	1	1

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A.11.3	A 106 Gr. 2" NB SCH 40 for Cooling water for SWAS includes Tees and bends	Mtrs	140	140
A.11.4	SS316, 2" NB SCH 40 for Cooling water for SWAS includes Tees and bends	Mtrs	60	60
A.11.5	Tubing with connectors (SS316 1/4" OD) Between wet and dry panel	Mtrs	420	420
A.11.6	Special cables for sensors between wet and dry panel	Mtrs	1100	1100
A.11.7	Laying and Termination of Power Cables to SWAS Panel/Chiller	Mtrs	50	50
A.12.0	VIBRATION MONITORING SYSTEMS			
A.12.1	Vibration Monitoring System for SG&TG at CER:			
A.12.1.1	Bearing Casing Vibration Sensors with block/pad & 10 Metre extension cables.	Set	166	166
A.12.1.2	Non-Contact type Probe (Shaft Biv+Axial Shift+Phase Marker) along with extension cable & drive mounting brackets and probe Holders:	Set	67	67
A.12.1.3	Junction boxes	Nos	127	127
A.12.1.4	Vibration monitoring racks with modules: (To be mounted in the VMS panels)	Set	8	8
A.12.1.5	Single Bay VMS panel App. Size: 750 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 400 kg.	Nos	2	1
A.12.1.6	Three Bay VMS panel App. Size: 2250 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 1200 kg.	Nos	1	1
A.12.1.7	VMS Server/User PC	Nos	2	2
A.12.1.8	Printer	Nos	1	1
A.12.1.9	Ethernet Cable	Mtrs	200	200
A.12.2	Vibration Monitoring System for CWP/ACWP at CWP Control Room:			
A.12.2.1	Bearing Casing Vibration Sensors with block/pad & 10 Metre extension cables:	Set	57	57
A.12.2.2	Non-Contact type Probe (Shaft Biv+Axial Shift+Phase Marker) along with extension cable & drive mounting brackets and probe Holders:	Set	2	2
A.12.2.3	Junction boxes	Nos	37	37
A.12.2.4	Vibration monitoring racks with modules: (To be mounted in the VMS panels)	Set	2	2
A.12.2.5	Single Bay VMS panel App. Size: 750 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 400 kg.	Nos	1	1
A.12.2.8	FO Cable	Mtrs	1200	1200
A.12.2.9	Ethernet Cable	Mtrs	100	100
A.12.3	Vibration Monitoring System for APH Wash Pumps at Clarified Water Pump House and RW Pumps at RWPB Control Room:			
A.12.3.1	Bearing Casing Vibration Sensors with block/pad & 10 Metre extension cables:	Set	72	0
A.12.3.2	Non-Contact type Probe (Shaft Biv+Axial Shift+Phase Marker) along with extension cable & drive mounting brackets and probe Holders:	Set	7	0
A.12.3.3	Junction boxes	Nos	49	0

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A.12.3.4	Vibration monitoring racks with modules: (To be mounted in the VMS panels)	Set	6	0
A.12.3.5	Single Bay VMS panel App. Size: 750 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 400 kg.	Nos	2	0
A.12.3.6	FO Cable	Mtrs	6300	0
A.12.3.7	Ethernet Cable	Mtrs	100	0
A.13.0	UPS WITH ACDB & BATTERY BANK			
A.13.1	Main Plant & St-I & II: 2 X180 KVA UPS parallel redundant comprising of the following: UPS-1 , UPS 2, Rectifier Panel, inverter panels and Aux panel 1,2 ,with Input also. Transformer overall size 6400 mm (L) x 1000 mm(W) x 2100 mm(H) aprox weight 8000 Kg. wall mounted Battery isolation JB's size 600mm x 300mm x800mm weight 80 Kg aprox. Wall mounted BHMS Display boxes aprox size 450mm x 500mm x 150mm and accessories.	Set	2	1
A.13.2	415 V ACDB of size app. 6400(L)x1000(W)x2100(H) in mm and app. Wt. 850 kg.	Nos	2	2
A.13.3	Laying of cable size UN 0000 - Uninyvin Cable (Equivalent to 1Cx109 Sqmm Copper Cable) from UPS to Battery	Mtrs	600	600
A.13.4	Laying of cable size UN 0000 - Uninyvin Cable (Equivalent to 1Cx109 Sqmm Copper Cable) UPS to ACDB	Mtrs	1200	1200
A.13.5	Laying and termination of 4C Shielded communication cable from MODBUS to TCP/IP	Mtrs	50	50
A.13.6	Laying and termination of 4C Shielded communication cable from UPS to Battery Monitoring System	Mtrs	5460	5460
A.13.7	Battery Health Monitoring System Panels of App.size 600 (L)x 400(W) x 600(H) and Wt. 200 kg	Nos	2	2
A.13.8	UPS BATTERY: 1285 AH/ 360 V Lead Acid Plante Batteries (two banks) each bank is made up of 110 cells, housed in wooden racks along with inter cell connectors, inter block connectors, inter row connectors, cell mounting insulators,petroleum jelly and Ms lead plated fasteners, Discharge resistor bank, Each Cell dimension: 433(L) x 368(W) x 682(H). App.Cell weight without electrolyte: 134 Kg & 204 kg with electrolyte. Total Qty of electrolyte: 21000 litre.	Set	2	2
A.13.9	RWPH: 2 X10 KVA UPS parallel redundant comprising of thefollowing: UPS-1 , UPS 2, Rectifier Panel, inverterpanels and Aux panel 1,2 ,with Input Iso. Transformeroverall size 2200 mm (L) x 900 mm(W) x 1870 mm(H)aprox weight 3000 kg. wall mounted Battery isolation JB'ssize 600mm x 300mm x800mm weight 80 Kg aprox. Wallmounted BHMS Display boxes aprox size 450mm x 500mmx 150mm and accessories.	Set	1	0

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A.13.10	415 V ACDB of size app. 750(L)x300(W)x1250(H) in mm and app. Wt. 200 kg.	Nos	2	0
A.13.11	Laying of cable size UN 4 - Uninyvin Cable (Equivalent to 1Cx21.5 Sqmm Copper Cable) from UPS to Battery	Mtrs	160	0
A.13.12	Laying of cable size UN 4 - Uninyvin Cable (Equivalent to 1Cx21.5 Sqmm Copper Cable) UPS to ACDB	Mtrs	60	0
A.13.13	Laying and termination of 4C Shielded communication cable from MODBUS to TCP/IP	Mtrs	50	0
A.13.14	Laying and termination of 4C Shielded communication cable from UPS to Battery Monitoring System	Mtrs	3360	0
A.13.15	Battery Health Monitoring System Panels of App.size 600 (L)x 400(W) x 600(H) and Wt. 200 kg	Nos	2	0
A.13.16	UPS BATTERY: 200 AH/ 220 V Lead Acid Plante Batteries (two banks) each bank is made up of 110 cells, housed in wooden racks along with inter cell connectors, inter block connectors, inter row connectors, cell mounting insulators,petroleum jelly and Ms lead plated fasteners, Discharge resistor bank, Each Cell dimension: 134(L) x 203(W) x 406(H). App.Cell weight without electrolyte: 13.5 Kg & 21 kg with electrolyte. Total Qty of electrolyte: 1600 litre.	Set	1	0
A.13.17	FOPH/FOUS: 2 X10 KVA UPS parallel redundant comprising of the following: UPS-1 , UPS 2, Rectifier Panel, inverter panels and Aux panel 1,2 ,with Input Iso. Transformer overall size 2200 mm (L) x 900 mm(W) x 1870 mm(H) aprox weight 3000 kg. wall mounted Battery isolation JB's size 600mm x 300mm x800mm weight 80 Kg aprox. Wall mounted BHMS Display boxes aprox size 450mm x 500mm x 150mm and accessories.	Set	1	0
A.13.18	415 V ACDB of size app. 750(L)x300(W)x1250(H) in mm and app. Wt. 200 kg.	Nos	2	0
A.13.19	Laying of cable size UN 4 - Uninyvin Cable (Equivalent to 1Cx21.5 Sqmm Copper Cable) from UPS to Battery	Mtrs	160	0
A.13.20	Laying of cable size UN 4 - Uninyvin Cable (Equivalent to 1Cx21.5 Sqmm Copper Cable) UPS to ACDB	Mtrs	60	0
A.13.21	Laying and termination of 4C Shielded communication cable from MODBUS to TCP/IP	Mtrs	50	0
A.13.22	Laying and termination of 4C Shielded communication cable from UPS to Battery Monitoring System	Mtrs	3360	0
A.13.23	Battery Health Monitoring System Panels of App.size 600 (L)x 400(W) x 600(H) and Wt. 200 kg	Nos	2	0
A.13.24	UPS BATTERY: 200 AH/ 220 V Lead Acid Plante Batteries (two banks) each bank is made up of 110 cells, housed in wooden racks along with inter cell connectors, inter block connectors, inter row connectors, cell mounting insulators,petroleum jelly	Set	1	0

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	and Ms lead plated fasteners, Discharge resistor bank, Each Cell dimension: 134(L) x 203(W) x 406(H). App.Cell weight without electrolyte: 13.5 Kg & 21 kg with electrolyte. Total Qty of electrolyte: 1600 litre.			
A.13.25	Power Distribution Boards for Gas Cl2/PT Plant App.Dimension 400(L)x300(W)x600(H) and app. Wt. 500 kg.	Nos	2	0
A.13.26	SMALL UPS SYSTEM			
A.13.26.1	1 kVA UPS System 230 V output, 30-90 min back up with 2/3 pin power socket with auto voltage regulator	Nos	5	0
A.14.0	LOCAL INSTRUMENT ENCLOSURES/RACKS			
A.14.1	Local Instrument Enclosures (Type - A)-Size: 1450(W) x 1000(D) x 2200 (H)mm; Approximate weight: 900 kg each	Set	22	20
A.14.2	Local Instrument Enclosures (Type - B)-Size: 1100(W) x 1000(D) x 2200 (H)mm; Approximate weight: 600 kg each	Set	40	36
A.14.3	Local Instrument Enclosures (Type - C)-Size: 700(W) x 1000(D) x 2200 (H)mm; Approximate weight: 400 kg each	Set	26	20
A.14.4	Local Instrument Racks (Type - A)-Size: 1400(W) x 650(D) x 2200(H) mm; Approximate weight: 600 kg each	Set	26	24
A.14.5	Local Instrument Racks (Type - B)-Size: 1100(W) x 650(D) x 2200(H) mm; Approximate weight: 400 kg each	Set	47	42
A.14.6	Local Instrument Racks (Type - C)-Size: 800(W) x 650(D) x 1500(H) mm; Approximate weight: 250 kg each	Set	24	18
A.14.7	Local Instrument Racks (Type - D)-Size: 1600(W) x 650(D) x 2200(H) mm; Approximate weight: 700 kg each	Set	7	6
A.15.0	LAYING AND TERMINATION OF CABLES			
A.15.1	Thermocouple Extension Cables			
A.15.1.1	2 Pair, 16 AWG, KX Type TC Extension Cable	Mtrs	10620	10620
A.15.1.2	6 Pair, 16 AWG, KX Type TC Extension Cable	Mtrs	29295	29295
A.15.1.3	2 Pair, 16 AWG, RX Type TC Extension Cable	Mtrs	2000	2000
A.15.2	Extruded HRPVC with FRLS, Armoured, Over All Shielded, Copper Cables			
A.15.2.1	2 pair x 0.5 sqmm	Mtrs	9270	9270
A.15.2.2	4 pair x 0.5 sqmm	Mtrs	25290	25290
A.15.2.3	8 pair x 0.5 sqmm	Mtrs	14535	13770
A.15.3	Extruded HRPVC with FRLS, Armoured, Individually and overall shielded, Copper Cables			
A.15.3.1	2 pair x 0.5 sqmm	Mtrs	11970	10890
A.15.3.2	4 pair x 0.5 sqmm	Mtrs	37876	36526
A.15.3.3	6 pair x 0.5 sqmm	Mtrs	600	600
A.15.3.4	8 pair x 0.5 sqmm	Mtrs	8055	8055
A.15.3.5	12 pair x 0.5 sqmm	Mtrs	2000	2000

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A.15.3.6	2 Troid x 0.5 sqmm	Mtrs	11677	11677
A.15.4	Extruded HRPVC with FRLS, Armoured, Copper control Cables			
A.15.4.1	3 C x 2.5 sqmm	Mtrs	6615	2520
A.15.4.2	5 C x 2.5 sqmm	Mtrs	3330	3330
A.15.5	TG Special Cables			
A.15.5.1	Special Cable 5 x1.5 sqmm	Mtrs	1000	1000
A.15.5.2	FEP Insulated 2x2x0.5 sqmm type-1 Cable	Mtrs	5400	5400
A.15.5.3	FEP Insulated 2x4x0.5 sqmm type-2 Cable	Mtrs	2000	2000
A.15.5.4	CAT 6/Ethernet UTP Cable	Mtrs	17700	12200
A.15.5.5	Laying of Optic Fiber cable for offsite PLC/ DCS systems and MIS connectivity	Mtrs	30000	10000
A.15.5.6	HDPE Conduits for laying OFC cables	Mtrs	6000	6000
A.15.5.7	Splicing of Optical Fibre Cable	Nos	350	200
A.16.0	CABLE TRAYS			
A.16.1	50 mm Perforated Trays with Cover	Mtrs	1500	1500
A.16.2	100 mm Perforated Trays with Cover	Mtrs	1500	1500
A.16.3	50 mm Perforated Trays without Cover	Mtrs	2000	2000
A.16.4	100 mm Perforated Trays without Cover	Mtrs	2000	2000
A.17.0	JUNCTION BOXES			
A.17.1	12 way JB	Nos	23	16
A.17.2	24 way JB	Nos	68	54
A.17.3	36 way JB	Nos	30	30
A.17.4	48 way JB	Nos	32	22
A.17.5	64 way JB	Nos	5	5
A.17.6	72 way JB	Nos	2	2
A.17.7	96 way JB	Nos	6	6
A.17.8	128 way JB	Nos	5	5
A.18.0	IMPULSE PIPES, FITTINGS, MANIFOLDS AND ACCESSORIES.			
A.18.1	ASTM A335 P91 - 1/2" NB 160	Mtrs	865	865
A.18.2	ASTM A106 Gr C - 1/2" NB SCH 160	Mtrs	2422	2422
A.18.3	ASTM A106 Gr C - 1/2" NB SCH 80	Mtrs	8217	8217
A.18.4	ASTM A106 Gr C - 1" NB SCH 80	Mtrs	259	259
A.18.5	ASTM A106 Gr C - 3/4" NB SCH 80	Mtrs	6568	6568
A.18.6	ASTM A335 P22 - 3/4" NB SCH 80	Mtrs	1038	1038
A.18.7	ASTM A312 TP316- 1/2" NB SCH 40	Mtrs	242	242
A.18.8	ASTM A312 TP316H - 1/2" NB SCH 80	Mtrs	605	605
A.18.9	ASTM A312 TP316H - 1/2" NB SCH 160	Mtrs	951	951
A.19.0	INSTRUMENT VALVES AND ACCESSORIES			
A.19.1	FGV A105 :1/2" NB-SW 800	Nos	7	7
A.19.2	FGV ASTM A182 F91 :1/2"NB-SW 3000SPL	Nos	5	5
A.19.3	FGV ASTM A182 F22 :1/2"NB-SW, CL-1500	Nos	11	11
A.20.0	MASTER AND SLAVE CLOCK SYSTEM			
A.20.1	Reduntant GPS Based Master Clock System (Card Rack System) along with Fully wired Master clock System Panel (App.Size: 800 x 800 x 2415 mm; wt. 300 kg) - 01 No., power supply unit, battery system,	Set	1	0

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	signal boosters, Signal Conditioners, multiplexer, FO Accessories (LIU, Duplex etc.)			
A.20.2	42 U Panel of size 800 mm (L)x1000mm(W)x2115(H)for housing the servers, network switches	Nos	1	0
A.20.3	Slave clock (Rs 485 based)/NTP based Approximate Size: 750(W) x56(D) x 170(H) mm for various locations	Nos	25	0
A.20.4	Reduntant GPS antenna (built in LA) along with around 200 Mtrs antenna cable from antenna to GPS receiver unit and antenna fixing accessories.	Set	2	0
A.20.5	Reduntant GPS Receiver/Master Clock-A and Master Clock-B with comparator and out put cards.	Set	1	0
A.20.6	Laying and termination of RG 58 Coaxial Cable FRLS armoured (Clock panel to IRIG B interfacing equipment and Clock panel to various pulses interfacing equipments)	Mtrs	5000	0
A.20.7	Laying and termination of Armoured Power Cable 3Cx2.5 sqmm	Mtrs	3600	0
A.20.8	Laying and termination of Armoured Signal Cable 2Px0.5 sqmm	Mtrs	5400	0
A.20.9	Cable - CAT 5e/CAT6 for NTP / SNTP output	Mtrs	280	0
A.20.10	FO Cable (4F) connecting FO NTP outpus multimode armoured cable	Mtrs	3500	0
A.20.11	Splicing of Optical Fibre Cable	Nos	10	0
A.20.12	Flexible GI conduit Pipe	Mtrs	200	0
A.20.13	Junction Boxes	Nos	8	0
A.21.0	LARGE VIDEO SCREEN SYSTEMS			
A.21.1	67" - 80" Large Video Screen having resolution 1920X1080 pixels with LED based rear projection along with CPU and other loose supplied items like Video display controller, Border binder, interconnecting power & communication cables, Mounting stand 1200 mm height / arrangement etc. in Unit Control room	Set	11	5
A.21.2	67" - 80" Large Video Screen having resolution 1920X1080 pixels with LED based rear projection along with CPU and other loose supplied items like Video display controller, Border binder, interconnecting power & communication cables, Mounting stand 1200 mm height /arrangement etc. for AHP system.	Set	4	0
A.21.3	67" - 80" Large Video Screen having resolution 1920X1080 pixels with LED based rear projection along with CPU and other loose supplied items like Video display controller, Border binder, interconnecting power & communication cables, Mounting stand 1200 mm height /arrangement etc. for CHP system.	Set	4	0

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A.21.4	67" - 80" Large Video Screen having resolution 1920X1080 pixels with LED based rear projection along with CPU and other loose supplied items like Video display controller, Border binder, interconnecting power & communication cables, Mounting stand 1200 mm height /arrangement etc. for FOPH system.	Set	2	0
A.22.0	HMI & PIS SYSTEM PACKAGE			
A.22.1	HMIPIIS for Unit DDCMIS			
A.22.1.1	Operator WorkStation	Nos	40	10
A.22.1.2	Historical Storage & Retrieval (Information) WorkStation	Nos	2	2
A.22.1.3	Programmer cum documentation station	Nos	2	2
A.22.1.4	LaserJet Colour Printer (A4 size)	Nos	3	3
A.22.1.5	LaserJet B/W Printer (A4 size)	Nos	3	3
A.22.2	HMIPIIS for AHP DDCMIS			
A.22.2.1	Operator WorkStation	Nos	2	0
A.22.2.2	Programmer cum documentation station	Nos	2	0
A.22.2.3	LaserJet Colour Printer (A4 size)	Nos	1	0
A.22.3	HMIPIIS for CHP DDCMIS			
A.22.3.1	Operator WorkStation	Nos	2	0
A.22.3.2	Programmer cum documentation station	Nos	2	0
A.22.3.3	LaserJet Colour Printer (A4 size)	Nos	1	0
A.22.4	HMIPIIS for Mill Reject System			
A.22.4.1	Operator WorkStation	Nos	1	0
A.22.4.2	Programmer cum documentation station	Nos	1	0
A.22.4.3	LaserJet Colour Printer (A4 size)	Nos	1	0
A.22.5	HMIPIIS for FOPH			
A.22.5.1	Operator WorkStation	Nos	2	0
A.22.5.2	Programmer cum documentation station	Nos	2	0
A.22.6	HMIPIIS for CPU			
A.22.6.1	Operator WorkStation	Nos	1	0
A.22.6.2	Programmer cum documentation station	Nos	1	0
A.22.7	HMIPIIS for CW/ACW SYSTEM			
A.22.7.1	Operator WorkStation	Nos	4	0
A.22.7.2	Programmer cum documentation station	Nos	3	0
A.22.7.3	LaserJet Colour Printer (A4 size)	Nos	3	0
A.22.8	HMIPIIS for Compressed Air System			
A.22.8.1	Operator WorkStation	Nos	1	0
A.22.8.2	Programmer cum documentation station	Nos	1	0
A.22.8.3	LaserJet Colour Printer (A4 size)	Nos	1	0
A.23.0	Performance Analysis Diagnostics and Optimization (PADO) Package			
A.23.1	Computer Table	Nos	3	3
A.23.2	Chairs	Nos	3	3
A.23.3	Printer Table	Nos	1	1
A.24.0	LAB INSTRUMENTS - To be demonstrated and handing over to Customer			
A.24.1	Lab Instruments - I:			

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A.24.1.1	Dead Weight Tester - 2 Nos, Standard Quality Pressure Gauges - 3 Set, Laboratory Type Manometer - 2 Set, Inclined Tube Manometer - 2 Set, Manometer - 2 Set, Pressure and Vacuum Air Pump - 2 Set, Portable Pressure Comparator - 1 Set, Temperature Calibration Bath - 1 Nos, Temperature Calibrator - 3 Nos, Temperature Calibrator (Table Mounted) - 2 Nos, Hot air Blower - 1 Nos, Barometers - 1 Nos, Surface Pyrometer - 1 Nos, Pneumatic Test Bench - 2 Nos, Portable Flue Gas Analyser - 1 Set, Furnace - 1 Nos, Mercury Thermometer - 2 Set, Tool Kit Box - 12 Nos, Oil Condition Monitor - 1 Nos, Portable Ultrasonic Flowmeter - 2 Nos, Wet & Dry Bulb Hygrometer - 1 Nos, Flowmeter Calibration - 1 Set, Air Sets - 1 Nos, Welding Machine - 1 Nos, Jewellers Lathe - 1 Nos, Grinding Machine - 1 Set, Feeler Gauge - 1 Nos, Anemometer (Portable) - 1 Nos, Stop Watch - 1 Nos, Vibration Calibrator - 1 Nos, Precision Instrument Radial Drilling Machine - 3 Nos, Portable Drilling Machine - 1 Nos, Universal Digital Thermometer - 1 Nos, Low and Medium Pressure Controller - 1 Set, Portable Pneumatic Hydraulic Calibrator - 1 Set, Bench Vice & Hand Vice - 3 Set, Vacuum Cleaner - 1 Nos, Screw Gauge - 1 Nos, Pitot Tube - 2 Nos, Test Thermocouple - 2 Nos.	SET	1	0
A.24.2	Lab Instruments-II:			
A.24.2.1	Portable Multifunction Calibrator (Microprocessor based) - 3 Nos, Decade Resistance Box - 2 Nos, AC Universal Bridge - 1 Nos, Signal Generator - 2 Nos, Hand Tachometer - 2 Nos, Insulation tester of Different range - 1 Nos, DC Regulated Power Supply - 4 Nos, Stop Watch (Digital Type) - 2 Nos, Continuity Tester - 10 Nos, Tong Tester - 3 Nos, High Range Tong Tester - 1 Nos, Stabilised Power Supply - 2 Nos, Stroboscope - 1 Nos, Portable Trend Recorder - 1 Nos, Electronic Test Bench with computerized calibration system - 2 Nos, Digital Oscilloscope - 2 Nos, Decade Resistance Box - 2 Nos, Digital Multimeter - 2 Nos, Function Generator - 2 Nos, Chartless Recorder - 2 Nos, Variable DC Stabilized Power Supply - 2 Nos, Variable AC Stabilized Power Supply (0-260 V, 10A) - 2 Nos, Step Down Transformer (110V, 2A) - 2 Nos, Continuity Tester - 2 Nos, Fixed Power Supply (+/- 48 V DC, 3A, +/- 24V DC, 6A, +/- 12V DC, 10A, +/- 5V DC, 5A) - 2 Nos, Electronically Operated Air Gun - 2 Nos, Digital LCR-Q Bridge - 2 Nos, Card IC Tester - 2 Nos, Soldering Station & Desoldering Station - 2 Nos, Power meter with Harmonic Analysis - 2 Nos, One set of tool box with screw driver set, Spanner, Plier Cutter - 2 Nos, Portable digital multimeter - 10 Nos, Field	SET	1	0

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	Transmitter Calibrator - 2 Nos, Soldering Iron with Solder Sucker - 8 Nos, DE Soldering Station - 1 Nos, VARIAC - 1 Nos, Power Pack - 2 Nos, Vibration Analyzer Balancer Instrument - 2 Nos, Portable Meter Calibrator - 2 Nos, Digital Cable Identification System - 6 Nos, Dual Beam Portable Digital Storage Oscilloscope - 2 Nos, Hand Held Thermocouple and PT-100 Ohm Simulator and Indicator - 1 Nos, Insertion and Extraction tools for various Pin Numbers 14,16 and 48 - 2 Nos, Rheostats - 1 Nos, Desktop Digital Multimeter - 2 Nos, Phase Sequence Meter - 1 Nos, Frequency Meter - 1 Nos, Mini Scope Meter - 1 Nos, Vibration Meter Sould Level Monitor - 1 Nos, Portable pH Calibrator - 2 Nos, Module Tester - 1 Nos, DC Regulated Power Source - 2 Nos, Auto Transformer - 1 Nos, Nickel Cadmium Cell - 1 Nos, Scanner - 1 Nos, Torximitor - 2 Nos, Laptop - 2 Nos, Portable mA Calibrator - 3 Nos, Table Mounted mA Calibrator - 2 Nos, Portable mV Calibrator - 2 Nos, Test RTD - 2 Nos, Frequency counter/Timer - 1 Nos.			
A.25.0	COMPUTER FURNITURES			
A.25.1	Unit Operator Desk (8 Section) Angular installation dimension 7960mm (W) x 1050mm (D) x 750mm (H) including fixing of power Sockets, MCBs, ethernet switches hardware etc	Set	1	1
A.25.2	Common Operator Desk (8 Section) Straight installation dimension 7600mm (W) x 1050mm (D) x 750mm (H) including fixing of power Sockets, MCBs, ethernet switches hardware etc	Set	2	0
A.25.3	Simulator Operator Desk (6 Section) Straight installation dimension 5700mm (W) x 1050mm (D) x 750mm (H) including fixing of power Sockets, MCBs, ethernet switches hardware etc	Set	1	0
A.25.4	Simulator Operator Desk (3 Section) Straight installation dimension 2850mm (W) x 1050mm (D) x 750mm (H) including fixing of power Sockets, MCBs, ethernet switches hardware etc	Set	1	0
A.25.5	VOID			
A.25.6	Common & other area Operator Desk (2 Section) Straight installation dimension 1900mm (W) x 1050mm (D) x 750mm (H) including fixing of power Sockets, MCBs, ethernet switches hardware etc	Set	7	0
A.25.7	Computer tables with Shelf for each Unit 1000mm(L)X1650MM(H)X950MM(D)	Set	31	31
A.25.8	Computer tables with Shelf for Common & Other areas 1000mm(L)X1650MM(H)X950MM(D)	Set	5	0
A.25.9	Computer tables with Shelf for common areas 1000mm(L)X1650MM(H)X950MM(D)	Set	35	0

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A.25.10	Computer tables with Shelf for MIS Clients 1000mm(L)X1650MM(H)X950MM(D)	Set	40	40
A.25.11	Computer tables without Shelf 1000mm(L)x750mm(H)x1050mm(D)	Set	8	2
A.25.12	PC Rack 1000mm(L)x1900mm(H)x900mm(D) including fixing of power sockets, MCBs, Ethernet Switches hardware, etc	Set	2	2
A.25.13	Printer Tables 735mmx900mmx600mm including fixing of power sockets, MCBs, Ethernet Switches , hardware,etc	Set	13	13
A.25.14	Printer Tables 900mm(L)x735mm(H)x590mm(D) including fixing of power sockets, MCBs, Ethernet Switches , hardware,etc	Set	18	0
A.25.15	Printer Tables for Simulator 900mm(L)x735mm(H)x590mm(D) including fixing of power sockets, MCBs, Ethernet Switches , hardware,etc	Set	2	0
A.25.16	Printer Tables for MIS Clients 900mm(L)x735mm(H)x590mm(D) including fixing of power sockets, MCBs, Ethernet Switches , hardware,etc	Set	40	40
A.25.17	Printer Tables for MIS Servers 900mm(L)x735mm(H)x590mm(D) including fixing of power sockets, MCBs, Ethernet Switches , hardware,etc	Set	2	2
A.25.18	Computer Chair Medium back with cushioned arms	Set	105	55
A.25.19	Computer Chair Medium back with cushioned arms for MIS Clients	Set	40	40
A.25.20	Almira 1780mm x 839mm x 380mm with glass window	Set	1	1
A.25.21	Safety lock key pad 350mm x 250mm x 250mm weight 10 kg, safety rack 1830mm x 410mm x 457mm	Set	1	1
A.26.0	TERMINATION OF POWER CABLES			
A.26.1	Termination of cable size UN 0000 - Uninyvin Cable (Equivalent to 1Cx109 Sqmm Copper Cable) from UPS to Battery	Nos	14	14
A.26.2	Termination of cable size UN 0000 - Uninyvin Cable (Equivalent to 1Cx109 Sqmm Copper Cable) UPS to ACDB	Nos	26	26
A.26.3	Termination of cable size UN 4 - Uninyvin Cable (Equivalent to 1Cx21.5 Sqmm Copper Cable) from UPS to Battery	Nos	4	0
A.26.4	Termination of cable size UN 4 - Uninyvin Cable (Equivalent to 1Cx21.5 Sqmm Copper Cable) UPS to ACDB	Nos	2	0
A.26.5	Termination of cable size UN 4 - Uninyvin Cable (Equivalent to 1Cx21.5 Sqmm Copper Cable) from UPS to Battery	Nos	4	0

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A.26.6	Termination of cable size UN 4 - Uninyvin Cable (Equivalent to 1Cx21.5 Sqmm Copper Cable) UPS to ACDB	Nos	2	0
A.27.0	COMMISSIONING OF THE FOLLOWING			
A.27.1	Commissioning of Transducers- Removal and recalibration of Power, Voltage, Current, Frequency out put 4-20 mA	Nos	25	25
A.28.0	STRUCTURAL MATERIALS			
A.28.1	ISMC 100, ANGLE 50X50X6 & 2.5MM THICK Plates	MT	10.5	11.5
B	BHEL TRICHY SCOPE OF SUPPLY			
B.1.0	FUEL OIL SYSTEM			
B.1.1	PD Type Mass flow meter in HFO,LDO/HSD & HFO return line with mounting flanges, electronics amplifier box, inter connecting cabling, etc.	Set	3	3
B.1.2	Pressure Gauges	Nos	68	45
B.1.3	Temperature Indicator	Nos	16	6
B.1.4	Pressure Switches	Nos	22	22
B.1.5	Level Indicator	Nos	2	1
B.1.6	Temperature Elements	Nos	2	0
B.1.7	FSSS Local Oil Gun Maintenance Switch Box	Nos	18	18
B.1.8	H.E.A Exciter box 240 V AC alongwith retractor assembly 240 V AC solenoid, flexible spark rod 133 inch, spark top, flexible cable assembly 3 mtr long, SS hose 6.35mmx1000mmm, Air Filter Regulator 1/4 inch etc.	Set	16	16
B.1.9	Flame Scanner Head Assembly consisting fibre optic cable L130" lense barrel, flame processor module, Flame module, pigtail cable, pico fuse, card extender module, power supply module, 6 way JB, etc	Set	32	32
B.1.10	Microprocessor based flame scanner amplifier 8 Nos. of 19" racks of size 482x263x134 (WxDxH) to be mounted in flame scanner panel (CJF49/CJF50) supplied by EDN	Set	1	1
B.2.0	ACOUSTIC STEAM LEAK DETECTOR			
B.2.1	ASLD panel assembly and computer with monitor panel size 800mmx2315mmx800mm & App.Wt. 200 kg	Set	1	1
B.2.2	ASLD sensor assembly -30 Nos + Sonic Tube + Field Amplifier box with Module- 32 Set+ Power Supply Units-4 Nos+ JB- 1No, Calibrator-1 No, Sensor Pig tail cable-450 mtr	Set	1	1
B.3.0	FURNACE CCTV SYSTEM			
B.3.1	High Temperature Furnace Camera CCTV head assembly with advance retract mechanism and Local Control Unit panels (800mmx1000mmx300mm) with inter connecting pipes, air filter regulators, ss hose mounted at boiler 45 M elevation. Remote Control Box (600 mm x500 mmx 300 mm) with 24" monitor and accessories at CCR, 40" LED monitor & Multiplexer.	Set	2	2

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B.4.0	PNEUMATIC POWER CYLINDERS (REGULATING TYPE) Installation and Commissioning			
B.4.1	Pneumatic Power Cylinders with Position Transmitters controlled from SADC (App.Weight 20 kg each)	Set	132	132
B.4.2	Pneumatic Power Cylinders with SMART Positioners controlled from DDCMIS (App.Weight 20 kg each)	Set	16	16
B.4.3	PA/ID/FD Fans Blade Pitch Control Damper with SMART Positioner controlled from DDCMIS (App.Wt. 90 kg)	Set	6	6
B.4.4	Cold Air Regulating Dampers with SMART positioner alongwith linkage rod (App.Wt. 95 kg)	Set	8	8
B.4.5	Hot Air Regulating Dampers with SMART positioner alongwith linkage rod (App.Wt. 175 kg)	Set	8	8
B.4.6	Dynavane Filter Pressure Control Damper with SMART positioner	Set	1	1
B.5.0	GRAVIMETRIC FEEDER PANEL			
B.5.1	Gravimetric Feeder Remote Power Cabinet Size 1200x2315x600 and Wt.300 kg	Nos	8	8
B.5.2	Feeder Coal flow monitor assembly flange mounted	Nos	8	8
B.5.3	Feeder Electronics including 3 Nos. of Calibration probe with cable and 100 Nos. of Retro-Reflective Tape	Set	1	1
B.6.0	STEAM/WATER/PULVERIZER/AIR/FLUE GAS LINE INSTRUMENTS			
B.6.1	Pressure Indicators	Nos	15	15
B.6.2	DP Switches	Nos	1	1
B.6.3	Temperature Indicator	Nos	8	8
B.6.4	K-Type MTM Thermocouple 8MM OD & 8 M DUPLEX	Nos	8	8
B.6.5	K-Type MTM Thermocouple 8MM OD & 10 M DUPLEX	Nos	33	33
B.6.6	K-Type MTM Thermocouple 8MM OD & 12 M DUPLEX	Nos	38	38
B.6.7	K-Type MTM Thermocouple 8MM OD & 14 M DUPLEX	Nos	41	41
B.6.8	K-Type MTM Thermocouple 8MM OD & 16 M DUPLEX	Nos	37	37
B.6.9	K-Type MTM Thermocouple 8MM OD & 18 M DUPLEX	Nos	40	40
B.6.10	K-Type MTM Thermocouple 8MM OD & 20 M DUPLEX	Nos	63	63
B.6.11	K-Type MTM Thermocouple 8MM OD & 22 M DUPLEX	Nos	57	57
B.6.12	K-Type MTM Thermocouple 8MM OD & 24 M DUPLEX	Nos	47	47
B.6.13	K-Type MTM Thermocouple 8MM OD & 26 M DUPLEX	Nos	57	57
B.6.14	K-Type MTM Thermocouple 8MM OD & 28 M DUPLEX	Nos	16	16

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B.6.15	K-Type MTM Thermocouple 8MM OD & 30 M DUPLEX	Nos	12	12
B.6.16	DP Switches	Nos	2	2
B.6.17	Level Switches High/Low	Nos	20	20
B.6.18	DP Switches High/Low	Nos	17	17
B.6.19	ERV Controller with Pressure Switch App.Dimension(mm): 400x350x190; App.Wt: 10 kg	Set	4	4
B.7.0	LAYING AND TERMINATION OF CABLES (PVC,FRLS,ARMOURED CABLES FOR SCANNER, MILL FEEDER, AC CONTROLS AND INSTRUMENTATION)			
B.7.1	FLAME SCANNER CABLE-P/O SHIELED	Mtrs	8280	8280
B.7.2	2P X 0.5 SQMM O/A SHIELED INST.CABLE	Mtrs	1500	1500
B.7.3	4P X 0.5 SQMM O/A SHIELED INST.CABLE	Mtrs	4950	4950
B.7.4	8P X 0.5 SQMM O/A SHIELED INST.CABLE	Mtrs	32400	32400
B.7.5	12P X 0.5 SQMM O/A SHIELED INST.CABLE	Mtrs	5850	5850
B.7.6	2P X 1.5 SQMM P/O SHIELED INST.CABLE	Mtrs	9900	9900
B.7.7	2P X 0.5 SQMM P/O SHIELED INST.CABLE	Mtrs	3150	3150
B.7.8	4P X 0.5 SQMM P/O SHIELED INST.CABLE	Mtrs	8820	8820
B.7.9	8P X 0.5 SQMM P/O SHIELED INST.CABLE	Mtrs	7200	7200
B.7.10	12P X 0.5 SQMM P/O SHIELED INST.CABLE	Mtrs	4320	4320
B.7.11	3C X 2.5 SQ.MM. ARM. CONTROL CABLE	Mtrs	500	500
B.7.12	5C X 2.5 SQ.MM. ARM. CONTROL CABLE	Mtrs	500	500
B.7.13	7C X 2.5 SQ.MM. ARM. CONTROL CABLE	Mtrs	1000	1000
B.7.14	9CX 2.5 SQ.MM. ARM. CONTROL CABLE	Mtrs	1000	1000
B.7.15	12CX 2.5 SQ.MM. ARM. CONTROL CABLE	Mtrs	1000	1000
B.7.16	12P X 1.31 SQ. MM. EXTN. CABLE - KX	Mtrs	2700	2700
B.7.17	2P X 0.5 SQ.MM PTFE INST. CABLE - G	Mtrs	2700	2700
B.7.18	4P X 0.5 SQ.MM PTFE INST. CABLE - G	Mtrs	2880	2880
B.7.19	8P X 0.5 SQ.MM PTFE INST. CABLE - G	Mtrs	2000	2000
B.7.20	4P X 0.5 SQ.MM PTFE INST. CABLE - F	Mtrs	750	750
B.7.21	3C X 2.5 SQ.MM PTFE CONTROL CABLE	Mtrs	550	550
B.7.22	5C X 2.5 SQ.MM PTFE CONTROL CABLE	Mtrs	2000	2000
B.7.23	2P X 0.5 SQ.MM PTFE INST. CABLE - F	Mtrs	2600	2600
B.7.24	2P X 1.31 SQ.MM PTFE EXTENSION CABLE	Mtrs	3600	3600
B.8.0	CABLE TRAY			
B.8.1	CABLE TRAY-50 MM WIDTH	Mtrs	1750	1750
B.8.2	CABLE TRAY-100 MM WIDTH	Mtrs	5875	5875
B.8.3	CABLE TRAY-150 MM WIDTH	Mtrs	3750	3750
B.9.0	JUNCTION BOXES			
B.9.1	24 WAY FRP JUNCTION BOX WITH CANOPY	Nos	80	80
B.9.2	48 WAY FRP JUNCTION BOX WITH CANOPY	Nos	65	65
B.9.3	72 WAY FRP JUNCTION BOX WITH CANOPY	Nos	60	60
B.9.4	24 WAY MTM FRP JUNCTION BOX WITH CANOPY	Nos	5	5
B.9.5	48 WAY MTM FRP JUNCTION BOX WITH CANOPY	Nos	35	35
B.9.6	72 WAY MTM FRP JUNCTION BOX WITH CANOPY	Nos	10	10
B.10.0	MISCELLENEOUS RACKS/PANELS			
B.10.1	Local Instrument Enclosures/Racks with Junction Boxes, App. Size: 1650x2150x800 (mm) and App.Wt: 500 kg	Set	15	15

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B.10.2	Pulveriser Dynamic Classifier - VFD Cabinet App. Size: 900x2100x700 (mm) and App.Wt: 100 kg	Nos	8	8
B.10.3	HWL-1&2 and MEF Controller JB App. Size: 600x600x250 (mm) and App.Wt: 50 kg	Nos	3	3
B.11.0	HARDWARES FOR TUBING			
B.11.1	1/4" Air Filter Regulators (for mill system)	Nos	8	8
B.11.2	1" Air Filter Regulators (for SADC System)	Nos	8	8
B.11.3	Purge Meter cum DP Regulator	Nos	16	16
B.11.4	1" OD SS TUBE	Mtrs	40	40
B.11.5	1/4" OD SS TUBE	Mtrs	4800	4800
B.11.6	3/4" OD SS TUBE	Mtrs	20	20
B.11.7	3/8" OD SS TUBE	Mtrs	55	55
B.11.8	1/4" TEFLON HOSE- 2 METER PER PIECE	Nos	135	135
B.11.9	1" TEFLON HOSE- 3 METER PER PIECE	Nos	5	5
B.11.10	1/2" TEFLON HOSE- 1 METER PER PIECE	Nos	18	18
B.12.0	MISCELLENEOUS ITEMS			
B.12.1	Structural Steel for fabrication of Supports consisting of angles, channels (ISA ISMC 100x50x6 wt 1250 kg, ISA 50x50x6 Wt. 800 kg,etc)	MT	2	2
B.12.2	1/2" GI Pipe	Mtrs	1215	1215
B.13.0	Commissioning of the following (including cabling, tubing, fixing AFR, Speed Regulators as applicable, checking and commissioning)			
B.13.1	Heavy Duty Limit Switches for Burner Tilt Shear Pin Failure Indication Purpose	Nos	32	32
B.13.2	HWL 1 & 2 & MEFCV Motor Starter Panel	Set	1	1
B.13.3	Motor Operated Valves (MOV) Actuators (On/Off) in Various Applications	Nos	78	78
B.13.4	Motor Operated Valves Actuators (MOV) (inching) in Various Applications	Nos	35	35
B.13.5	Electric Actuators for Various Dampers (Open/Close)	Nos	16	16
B.13.6	Pneumatic Actuators for Various Dampers(Open/Close)	Nos	17	17
B.13.7	Limit Switches (Cabling and Checking) for manually operated dampers	Nos	44	44
B.13.8	Solenoids (different ratings) of Pneumatic Valves of Various applications - tubing, Cabling & Commissioning	Nos	213	213
B.13.9	Burner Tilt Shear Pin failure indication junction box App.Dimension: 280(H)x600(L)x200(D): weight 12 kg each	Nos	16	16
B.13.10	Calibration/Commissioning of Gravimetric Feeder Comprising of Feeder C&I Equipment like motion monitor sensor, micro switches, etc. along with Feeder Integral Cabinet of App.Size 600x750x350 and Wt.75 kg , LT Motors, etc.	Set	8	8
B.14	SCR PACKAGE			
B.14.1	INSTRUMENTS			
B.14.1.1	Pressure Indicators	Nos	13	3
B.14.1.2	Level Switches H/HH	Nos	10	6

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B.14.1.3	Level Transmitters	Nos	10	6
B.14.1.4	Differential Pressure Transmitters	Nos	10	8
B.14.1.5	Pressure Transmitters	Nos	49	25
B.14.1.6	Temperature Elements	Nos	42	28
B.14.1.7	Temperature Indicator	Nos	5	3
B.14.1.8	Ammonia Leak Detector	Nos	9	4
B.14.1.9	Density Analyzer	Nos	2	2
B.14.1.10	pH Analyzer	Nos	1	1
B.14.1.11	Oxygen Analyzer: Consisting of insitu, flange mounted probe and electronics-1 cabinet, Verification gas cylinder and analyser accessories such as Ref.air+Verification gas kit cabinet, signal and power cables (10m), SS tubings and fittings, Junction box, Glands for Electronics and JB, mounting flanges. App.weight of analyser is 22 Kg	Set	4	4
B.14.1.12	NoX Analyzer: Consisting of insitu, flange mounted probe and electronics-1 cabinet, Verification gas cylinder and analyser accessories such as Ref.air+Verification gas kit cabinet, signal and power cables (10m), SS tubings and fittings, Junction box, Glands for Electronics and JB, mounting flanges. App.weight of analyser is 22 Kg	Set	6	6
B.14.1.13	SoX Analyzer: Consisting of insitu, flange mounted probe and electronics-1 cabinet, Verification gas cylinder and analyser accessories such as Ref.air+Verification gas kit cabinet, signal and power cables (10m), SS tubings and fittings, Junction box, Glands for Electronics and JB, mounting flanges. App.weight of analyser is 22 Kg	Set	4	4
B.14.1.14	NH3 Analyzer: Consisting of insitu, flange mounted probe and electronics-1 cabinet, Verification gas cylinder and analyser accessories such as Ref.air+Verification gas kit cabinet, signal and power cables (10m), SS tubings and fittings, Junction box, Glands for Electronics and JB, mounting flanges. App.weight of analyser is 22 Kg	Set	2	2
B.14.1.15	Flow Elements	Nos	14	14
B.14.1.16	Flow Transmitters	Nos	20	20
B.14.2	CABLES			
B.14.2.1	4P X 0.5 SQ.MM. O/A SHIELDED INST. CABLE	Mtrs	7200	7200
B.14.2.2	8P X 0.5 SQ.MM. O/A SHIELDED INST. CABLE	Mtrs	5400	5400
B.14.2.3	12P X 0.5 SQ.MM O/A SHIELDED INST. CABLE	Mtrs	900	900
B.14.2.4	2P X 0.5 SQ.MM. P/O SHIELDED INST. CABLE	Mtrs	2200	2200
B.14.2.5	4P X 0.5 SQ.MM. P/O SHIELDED INST. CABLE	Mtrs	7200	7200
B.14.2.6	8P X 0.5 SQ.MM. P/O SHIELDED INST. CABLE	Mtrs	5760	5760
B.14.2.7	3C X 2.5 MM ² ARMoured CONTROL CABLE	Mtrs	2430	2430
B.14.2.8	5C X 2.5 MM ² ARMoured CONTROL CABLE	Mtrs	8100	8100
B.14.2.9	9C X 2.5 MM ² ARMoured CONTROL CABLE	Mtrs	1500	1500
B.14.2.10	12C X 2.5 MM ² ARMoured CONTROL CABLE	Mtrs	5400	5400

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B.14.2.11	2P X 1.31 MM ² EXTENSION CABLE - KX	Mtrs	100	100
B.14.2.12	4P X 1.31 MM ² EXTENSION CABLE - KX	Mtrs	800	800
B.14.3	JUNCTION BOXES			
B.14.3.1	24 WAY JUNCTION BOX	Nos	12	12
B.14.3.2	48 WAY JUNCTION BOX	Nos	17	17
B.14.3.3	24 WAY JUNCTION BOX-FLAME PROOF	Nos	10	10
B.14.3.4	48 WAY JUNCTION BOX-FLAME PROOF	Nos	10	10
B.14.3.5	72 WAY JUNCTION BOX-FLAME PROOF	Nos	6	6
B.14.4	PUSHBUTTON STATIONS			
B.14.4.1	E-STOP PUSH BUTTON STATION	Nos	10	10
B.14.4.2	FOGGING PUSH BUTTON STATION	Nos	5	5
B.14.5	CABLE TRAYS			
B.14.5.1	Cable Trays - 50mm Perforated with accessories	Mtrs	250	250
B.14.5.2	Cable Trays - 100mm Perforated with accessories	Mtrs	125	125
B.14.6	MISCELLANEOUS RACKS/PANELS			
B.14.6.1	Local Instrument Enclosures/Racks with Junction Boxes, App. Size: 1650x2150x800 (mm) and App.Wt: 1000 kg	Set	7	7
B.14.7	SUPPORTING MATERIALS			
B.14.7.1	ANGLE (50X50X6)/CHANNEL(100X50)	MT	3	3
B.14.8	EARTHING MATERIALS			
B.14.8.1	Earth Flat (50x6)	Mtrs	125	125
B.14.8.2	Earth Wire 1.219 mm GI	Mtrs	350	350
B.14.9	IMPULSE TUBE OD 6.35X1.6X9500-SA213TP304H with accessories	Mtrs	320	320
B.14.10	Commissioning of the following (including cabling, tubing, fixing AFR, Speed Regulators as applicable, checking and commissioning)			
B.14.10.1	Motor Operated Valve (MOV) Actuators (On/Off) in various locations	Nos	12	8
B.14.10.2	Motor Operated Valves Actuators (MOV) (Regulating) in Various Locations	Nos	3	1
B.14.10.3	Unit Directional Drives	Nos	19	19
B.14.10.4	Pneumatic Operated On/Off/Control Valves with accessories	Set	44	11
C	BHEL-PIPING CENTRE SCOPE OF SUPPLY			
C.1.0	Local Instruments			
C.1.1	Pressure Gauges	Nos	40	40
C.1.2	Temperature Gauges	Nos	104	104
C.1.3	Thermowells (Screwed and Welded)	Nos	197	197
C.1.4	Level Gauges	Nos	7	5
C.1.5	Sight Flow Glasses	Nos	56	56
C.1.6	Averaging Pitot Tube	Set	3	3
C.2.0	Commissioning of the following (including cabling, tubing, fixing AFR, Speed Regulators as applicable, checking and commissioning)			
C.2.1	Control Valves - for LP Start Up Systems & SCAPH Sysyems - including Air Filter Regulators, Positioners, Testing upto DCS	Set	5	5
C.2.2	MOV Actuators for SCAPH, CW Aux Steam,etc	Nos	16	16

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C.2.3	LT Drives: Condensate Drain Pumps, Emergency Fill Pumps	Nos	5	5
D	BHEL RANIPET SCOPE OF SUPPLY			
D.1	OPACITY MONITOR (Installation and Commissioning)			
D.1.1	Opacity Monitoring System consisting of Sender/Receiver/Ref/Control Unit 1 No. each, 5 Metre Slave wire cable-1 No., Purge Air Blower with filter-1 No., Power JB-1 No., Weather Hood Cover for Purge Air Blower JB-1 No. Fully auto. Electric Operated Fail Safe Shutter-2 Nos., Differential Pressure Switch-2 Nos., Mounting Flange With Pipe - 2 Nos., Weather Hood Cover for Sender/Receiver Units - 2 Nos., Weather Hood Cover for Power JB-2 Nos. & Purge Air Hose	Set	4	4
D.2.0	AUTOMATIC LEAKAGE CONTROL SYSTEM-Air Pre Heater			
D.2.1	ALCS DCS panel 750x750x2067 mm. App. Wt.90 kg	Nos	1	1
D.2.2	ALCS Drive Control Panel 680x400x1053 mm App.Wt.50 kg	Nos	6	6
D.2.3	ALCS Controller with panel 370x210x520 mm App. Wt. 5 kg	Nos	6	6
D.2.4	Sensor Electronic with Enclosure 140x100x70 mm	Nos	6	6
D.2.5	Interfacing Box 140x100x70 mm App.Wt.5 kg.	Nos	6	6
D.2.6	Shielded Teflon Cable for ALCS	Mtrs	30	30
D.3.0	Instruments of APH/Fans/Gates & Dampers			
D.3.1	Pressure Switches	Nos	4	4
D.3.2	Pressure Indicators	Nos	24	24
D.3.3	RTD With Thermowell	Nos	8	8
D.3.4	Temperature Indicator	Nos	10	10
D.3.5	Flow Indicating Switch	Nos	4	4
D.3.6	Go Switch	Nos	2	2
D.3.7	Dial Thermometer	Nos	2	2
D.3.8	Temperature Elements	Nos	12	12
D.3.9	Thermocouple with Thermowell	Nos	56	56
D.3.10	On/Off Switch Box including light assembly and interconnecting heat resistant cable	Set	2	2
D.3.11	Temperature Indicators-Fans	Nos	24	24
D.3.12	RTDs with Thermowell-Fans	Nos	64	64
D.3.13	Pressure Gauges-Fans	Nos	2	2
D.3.14	Pressure Transmitters-Fans	Nos	2	2
D.3.15	Angular Position Transmitters-For FD/ID/PA Fans	Nos	6	6
D.3.16	Pressure Switches-GAD	Nos	10	10
D.4.0	Commissioning of the following (including cabling, tubing, fixing AFR, Speed Regulators as applicable, checking and commissioning)			
D.4.1	Electric Actuators for Various Dampers (Open/Close)	Nos	76	76
D.4.2	Pneumatic Actuators for Various Dampers (Open/Close)	Nos	27	27
D.4.3	Solenoid Valves for APH	Nos	2	2
D.4.4	Lub Oil Skids for Air Preheater: The scope of work includes removal of instruments, calibration, refixing,	Set	4	4

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	checking cable connection from JB to instruments etc. The app. Quantity of instruments for each skids given below: Pressure Gauges-2 Nos. Temperature Gauges-2 Nos., Flow Switches-2 Nos.			
D.4.5	Fan Motor Bearing Temperature Indicators for all fans (Removal, Calibration and refixing only)	Nos	24	24
D.4.6	Fan Motor Bearing/Winding RTDs (Checking of healthiness only)	Nos	64	64
D.4.7	Lub Oil Skids for FD Fans: The scope of work includes removal of instruments calibration, refixing, checking cable connection from JB to instruments etc. The approximate total quantityof instruments for the skid put together is given below: Tank instrumentation Level transmitters (contact type guided wave)-3 Nos. Temperature Sensing Elements: -3 Nos, Temp. Gauge - 2 Nos, DP Transmitter - 1 No., DP Indicator-01 No., Pr. Gauge-3 Nos, Pr. Transmitters-2 Nos, Flow Indicator with flow transmitters - 02 No.	Set	2	2
D.4.8	Lub Oil Skids for ID Fans: The scope of work includes removal of instruments for calibration, refixing, checking cable connection from JB to instruments etc. The approximate total quantityof instruments for the skid put together is given below: Tank instrumentation Level transmitters (contact type guided wave)-3 Nos. Temperature Elements - 3 Nos, Temp. Gauge - 2 Nos, DP Transmitter - 1 No., DP Indicator-1No.,Pr. Gauge-6 Nos, Pr. Transmitters-2 Nos, Flow Indicator with flow transmitters - 05 Nos.	Set	2	2
D.4.9	Lub Oil Skids for PA Fans: The scope of work includes removal of instruments calibration, refixing, checking cable connection from JB to instruments etc. The approximate total quantityof instruments for the skid put together is given below: Tank instrumentation Level transmitters (contact type guided wave)-3 Nos. Temperature Elements- 3 Nos, Temp. Gauge - 2 Nos, DP Transmitter - 1 No., DP Indicator-1 No., Pr. Gauge-6 Nos, Pr. Transmitters-2 Nos, Flow Indicator with flow transmitters - 05 Nos.	Set	2	2
E	BHEL-HYDERABAD SCOPE OF SUPPLY			
E.1.0	TG INSTRUMENTS			
E.1.1	Pressure Gauges	Nos	46	46
E.1.2	Differential Pressure Gauges	Nos	4	4
E.1.3	Pressure Transmitters	Nos	46	46
E.1.4	Pressure Switches	Nos	3	3
E.1.5	RTDs with Thermowell	Nos	18	18
E.1.6	Chromel alumel Type Thermocouple	Nos	15	15
E.1.7	Level Gauges (Reflex Type)	Nos	1	1
E.1.8	Level Transmitters (Guide Wave Radar Type, top mounted)	Nos	2	2

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E.1.9	Speed Measuring Loop with probe	Nos	3	3
E.1.10	Proximeter Units, Local Field Cable etc. for Governing Sytem	Set	18	18
E.1.11	E/P Transducers	Nos	4	4
E.2.0	DRIP PUMP/CWP/TDBFP/CEP INSTRUMENTS			
E.2.1	Temperature Gauge	Nos	2	2
E.2.2	Pressuer Gauges	Nos	10	10
E.2.3	Pressure Switch	Nos	5	5
E.2.4	Flow Transmitters	Nos	5	5
E.2.5	Reverse Rotation Indicators	Nos	2	2
E.2.6	Flow Glass Indicators	Nos	5	5
E.2.7	Level Glass Indicators	Nos	5	5
E.2.8	Temperature Elements (RTDs)	Nos	81	81
E.2.9	Thermowells	Nos	6	6
E.3.0	HEAT EXCHANGERS (LP & HP Heaters) &DEAERATORS			
E.3.1	Pressure Gauges	Nos	12	12
E.3.2	Level Gauges	Nos	14	14
E.3.3	Level Switches	Nos	3	3
E.3.4	Thermowell	Nos	8	8
E.3.5	Bimetallic Temperature Gauges	Nos	6	6
E.4.0	PANEL/FIELD MOUNTED INSTRUMENTS			
E.4.1	TSI System for BFP Drive Turbine and gear box consisting of the following: Configuration of Laptop with software-1 No., Monitor Rack with Modules (to be mounted on CWW panel) app. Wt. 40 kg per rack-1 Set, relative shaft vibration sensor probes 8mm reverse mounted Turbine and gear box-8 Nos, Axial Displacement Probes-3 Nos., Eccentricity Probe-1 No., Zero Speed Probe - 1 No., Key phasor-1 No., Bearing housing vibration Probes-4 Nos., Differential Expn. Probe -1 No., Casing Expansion-1 No., with probe extension cables-18 Nos., Probe drivers for VIBR-17 Nos., Driver Housing -12 No., JB - 3 Nos., Flexible conduits-150 Mtr., Cable seal, Cable connectors, Mounting brackets for vibration/differential exp/brg housings, RS485 cable with connector for DCS 35 Mtr long etc and calibration kit.	Set	2	2
E.4.2	Fabrication of Local Instrument Racks, each of size 1500x1700mm with the following materials Channel (100x50mm), Angle (50x50x6mm), 4mm Thick Sheet (400x120mm) and 10mm Thick Plate (375x770mm).	MT	2	2
E.4.3	Temperature Indicators of BFP, CEP (Removal, Calibration & Refixing only)	Nos	8	8
E.4.4	Erection and Commissioning of Oil Purification Control Panel of Size 550 (W)x250(D)x1315(H) of App. Wt. 100 kg	Nos	1	1
E.5.0	LOCAL GAUGE BOARD (LGB) / LOCAL I NSTRUMENT RACK (LIR) (including removal, calibration and re-fix ing of LGB mounted instruments)/JB			

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E.5.1	LGB (LGB -1)Assembly for Feed Water Service for TDBFP/MD BFP including instruments, tubing, valves, fittings, junction boxes and wiring from switches to JBs. Approximate Size 1100 x900 x 2200 mm ; Weight = 600 kg each.Quantity of instruments per set is Pressure Gauge: 4 Nos.DP Gauges: 2 Nos.Temperature Gauges: 2 Nos.	Set	3	3
E.5.2	LGB (LGB-2) Assembly for SW & Cooling Water Service of TD/MD Booster Pump & BFP including instruments, tubing, valves, fittings, junction boxes and wiring from switches to JBs. Approximate Size 1100 x 900 x 2200 mm ; Weight = 600 kg each.Quantity of instruments per set is Temperature Gauges: 8 Nos. Pressure Gauge - 1 Nos. DP Gauges - 3	Set	3	3
E.5.3	LGB (LGB-2) Assembly for Lub oil service of TD / MD Booster Pump & BFP including instruments, tubing, valves, fittings, junction boxes and wiring from switches to JBs.Approximate Size 1100 x 900 x 2200 mm ; Weight = 600 kg each.Quantity of instruments per set is Temperature Gauges: 4 Nos. Pressure Gauge - 4 Nos.	Set	3	3
E.5.4	LGB (LGB-1) Assembly for 3 Nos. CEP instruments, tubing, valves, fittings, junction boxes and wiring from switches to JBs.Quantity of instruments per set is Pressure Gauges: 6 Nos..Diff. pressure Gauges: 3 Nos.temp. gauge qty 3 nos Approximate Size 1100 x 900 x 2200 mm; Weight = 600 kg each	Set	1	1
E.5.5	Local instrument rack (LIR) assembly for TDBFP/MD BFP Transmitters. This LIR includes PT & DPTs,tubing , fittings, JBs, Main-fold valves and wiring from JBs to transmitters. Approximate Size 2000 x 650 x 2150 mm; Weight = 350 kg. Quantity of instruments per set is DP transmitters: 05 Nos.Pressure transmitter : 05 Nos.	Set	3	3
E.5.6	Local Instrument Rack (LIR) assembly for CEP-A,B&C pumps to mount Pr. Transmitters. This LIR includes Transmitters, tubing, fittings, JBs, Manifolds Valves Approximate Size: 2000 x 600 x 2150 mm;and wiring from JBs to transmitters Weight = 300 kg Quantity of instruments per set is Pressure transmitters: 9 Nos, DP transmitters : qty 3 nos	Set	1	1
E.5.7	24 Terminals JB for Thrust Bearing RTDs	Nos	6	6
E.6.0	SUPPORT MATERIALS			
E.6.1	Structural steel (ISMC 100 x 50 mm qty 20 mtrs, Angle 45 x 45 x 5 mm-qty 24 mtrs etc.)	MT	0.5	0.5
E.6.2	Impulse Tube Dia 16X2.6 (CS) for BFP/CEPs	Mtrs	1900	1900
E.6.3	SS tube 12.7x2.1	Mtrs	750	750
E.6.4	SS tube 6x1.5	Mtrs	35	35

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E.7.0	Cables/Cable Trays for BFP/CEPs			
E.7.1	4 Pair x 0.5 sqmm cable	Mtrs	500	500
E.7.2	Perforated Cable Tray 50 mm Wide	Mtrs	80	80
E.7.3	Perforated Cable Tray 150 mm Wide	Mtrs	45	45
E.8.0	Commissioning of the following (including cabling, tubing, fixing AFR, Speed Regulators as applicable, checking and commissioning)			
E.8.1	Mill Motor Temperature Indicators (Removal, Calibration & Fixing)	Nos	16	16
E.8.2	Mills Lub Oil System: - Removal, Calibration and re-fixing of following instruments, Checking of Wiring from skid Junction Box to Equipment in Lub Oil skid. Equipment per Set: Level Transmitter-03 Nos., Temperature Elements-09 Nos., Temp.Gauges-02 Nos., DP Transmitters- 01 No., DP Indicator-01 No., Pressure Gauge-3 Nos., Pressure Transmitters- 03 Nos. and Flow Transmitter-06 Nos.	Set	8	8
E.8.3	LT Drives of Lub Oil Skid of Mills	Nos	16	16
E.8.4	Turbine Lub Oil Purification Skid: - Removal, Calibration and re-fixing of following instruments, Checking of Wiring from skid Junction Box to Equipment in Lub Oil skid. Equipment per Set: Level Switch-02 Nos., Temperature Elements-02 Nos., Temp.Gauges-03 Nos., DPI with Switch- 01 No., Pressure Gauge-04 Nos.	Set	2	2
E.8.5	LT Drives of Oil Purification Skid of Turbine	Nos	2	2
E.8.6	Control Valves with Smart Positioner, AFR, Limit Switches, inbuilt Position Transmitters, Junction Box,etc	Set	8	8
E.8.7	TDBFP Lub Oil System: - Removal, Calibration and re-fixing of following instruments, Checking of Wiring from skid Junction Box to Equipment in Lub Oil skid. Equipment per Set: Level Transmitter-02 Nos., Temperature Elements-09 Nos., Temp.Gauges-15 Nos., DP Transmitters- 02 No., DP Indicator-02 No., Pressure Gauge-17 Nos., Pressure Transmitters- 08 Nos. and Pressure Switch-02 Nos.	Set	2	2
E.8.8	LT Drives of TDBFP System	Nos	18	18
E.8.9	MOV Actuators for TDBFP System	Nos	26	26
E.8.10	MDBFP Lub Oil System: - Removal, Calibration and re-fixing of following instruments, Checking of Wiring from skid Junction Box to Equipment in Lub Oil skid and commissioning of the system. Equipment per Set: Level Transmitter-01 Nos., Temperature Elements-33 Nos., Temp.Gauges-18 Nos., DP Transmitters- 01 No., DP Indicator-01 No., Pressure Gauge-08 Nos. and Pressure Transmitters- 02 Nos.	Set	1	1
E.8.11	LT Drives of MDBFP System	Nos	9	9
E.8.12	Hydraulic Coupling of MDBFP: The scope of work covers a) Removal, calibration & re-fixing of following	Set	1	1

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	instruments. Pressure Indicators: 2 Nos. DP Indicator: 1 No. Temperature Indicators: 14 Nos. Pressure Transmitters: 6 Nos. Level transmitter: 1 No. DP transmitter: 1 No. RTDs (Checking only): 18 Nos. B) Fixing of I/P Convertors, Air filter, Copper tubing & feedback transmitter, adjustment and calibration of scoop mechanism etc. C) Commissioning of Speed Indicators etc.			
E.8.13	Governing Console Board: The scope includes removal, calibration and refixing of Instruments, wiring etc. Size of panel 1200 x 1650 x 450 mm The approximate quantity of instruments is Pressure Gauges: 10 Nos. Pressure Switches: 24 Nos.	Set	1	1
F	BHEL-BHPV VIZAG SCOPE OF SUPPLY			
F.1	Erection and Commissioning of the following Instrumentation items			
F.1.1	Flame Scanner Head Assembly, mounting flange accessories, flexible hoses, fibre optic cable, Lens Barrel Assembly, Miniature 6 way Junction box, etc	Set	1	0
F.1.2	Microprocessor based flame scanner amplifier 19" racks of size 482x263x134 (WxDxH) to be mounted in flame scanner panel supplied by BHEL-EDN	Set	1	0
F.1.3	H.E.A Exciter box alongwith retractor assembly, flexible spark rod, spark tip, flexible cable assembly, maintenance switch, SS hose, Air Filter Regulator, etc.,	Set	1	0
F.1.4	Pressure Gauges	Nos	28	0
F.1.5	Temperature Gauges	Nos	10	0
F.1.6	Reflex Type Level Gauges	Nos	4	0
F.1.7	Direct Water Level Gauges	Nos	2	0
F.1.8	24 Way Junction Boxes	Nos	3	0
F.1.9	48 Way Junction Boxes	Nos	1	0
F.1.10	Cable Tray 50 mm Width Perforated type	Mtrs	100	0
F.1.11	Cable Tray 150 mm Width Perforated type	Mtrs	100	0
F.1.12	Impulse Pipes and fittings 21.3x3.73-SA106Gr B	Mtrs	110	0
F.1.13	Structural Steel for fabrication of Supports consisting of angles, channels (ISA ISMC 100x50x6, ISA 50x50x6)	MT	1	0
F.1.14	Pneumatic actuator with feedback smart positioner and transmitter for FD Fan inlet damper with linkage rod	Set	2	0
F.2	Commissioning of the following (including cabling, tubing, fixing AFR, Speed Regulators as applicable, checking and commissioning)			
F.2.1	Trip Valves, Control Valves along with Positioner, AFR etc. -LO PC, SB Drain, Feed Water CV, DM Water CV, Spray CV	Set	14	0
F.2.2	Furnace to WB DP Control Damper with feedback smart positioner and transmitter	Set	2	0
F.2.3	Sootblower/LO Trip valve with solenoids, AFR etc	Set	2	0
F.2.4	Electric Actuators for FD Fan outlet	Nos	2	0

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F.2.5	LT Drives (0.27 kW to 132 kW)	Nos	13	0
F.2.6	MOV Actuators	Nos	16	0
G	BHEL-HARIDWAR SCOPE OF SUPPLY			
G.1.0	GENERATOR AUXILIARY CONTROL CABINETS-INSTALLATION AND COMMISSIONING			
G.1.1	Moisture Measurement System for Generator, including indicator cum controller placed in control room 144 x 72 and sampling system in field 760 x 600 x 210 . Weight : 100 Kg	Set	2	2
G.1.2	Gen end vibration monitoring cabinet (CXW01E) dimension 800mm(W) x 600mm (D) x 2200mm (H) Including preamplifier units, special cables interconnecting, PC based monitor and printer computer table etc.aprox weight 150 kg	Set	1	1
G.1.3	Grounding Brush Monitor (Wall mounted) Approx. size & weight : 235 x 235 x 285 mm; 100 Kg.	Set	1	1
G.2.0	INSTALLATION AND COMMISSIONING OF GENERATOR INSTRUMENTS:			
G.2.1	Pressure Gauges	Nos	33	33
G.2.2	Temperature Gauges	Nos	15	15
G.2.3	Pressure Transmitters	Nos	29	29
G.2.4	Differential Pressure Transmitters	Nos	1	1
G.2.5	Differential Pressure Indicators	Nos	2	2
G.2.6	Differential Pressure Switch	Nos	6	6
G.2.7	Flow Meters	Nos	8	8
G.2.8	Flow Switches	Nos	2	2
G.2.9	Level Indicator	Nos	1	1
G.2.10	Level Transmitter	Nos	1	1
G.2.11	Position Transmitters	Nos	2	2
G.2.12	Level Switches (capacitance type)	Nos	19	19
G.2.13	RTDs	Nos	165	165
G.2.14	Pressure Switches	Nos	2	2
G.2.15	Thermocouples (NiCrNi) (Generator Bearing Temp: 4 Nos.& Exciter Bearing Temp: 2 Nos.)	Nos	18	18
G.2.16	Conductivity Sensor with Transmitter	Nos	4	4
G.2.17	Limit Switches	Nos	8	8
G.3.0	REMOVAL, CALIBRATION & REFIXING OF GENERATOR INSTRUMENTS			
G.3.1	Pressure Gauges	Nos	13	13
G.3.2	DP Gauges	Nos	2	2
G.3.3	Temperature Gauges	Nos	8	8
G.3.4	Pressure Transmitter	Nos	5	5
G.3.5	DP Transmitter	Nos	5	5
G.3.6	Pressure Switches	Nos	8	8
G.3.7	Level Switches	Nos	6	6
G.3.8	Flow Meters	Nos	8	8
G.3.9	Conductivity Cells	Nos	3	3
G.3.10	PW Conductivity Indicator	Nos	1	1
G.3.11	Checking the healthiness of the RTDs/Thermocouples	Nos	180	180
G.4.0	LAYING AND TERMINATION OF POWER CABLES FOR 24 V SOLENOIDS			

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G.4.1	4Cx2.5 Sqmm	Mtrs	12960	12960
G.5.0	LOOSE SUPPLIED INSTRUMENTS TO BE INSTALLED AND COMMISSIONED ON GENERATOR PIPINGS			
G.5.1	Vacuum Switches	Nos	2	2
G.5.2	Pressure Gauges	Nos	7	7
G.5.3	Pressure Switches	Nos	1	1
G.5.4	PT RTD, Duplex Type	Nos	2	2
G.5.5	Dial Thermometer	Nos	5	5
G.6.0	LOOSE SUPPLIED INSTRUMENTS TO BE INSTALLED AND COMMISSIONED ON H2 COOLER PIPINGS			
G.6.1	Pressure Gauges	Nos	8	8
G.6.2	Pressure Switches	Nos	1	1
G.6.3	PT RTD, Duplex Type	Nos	17	17
G.6.4	Moisture Sensor Probe	Nos	2	2
G.6.5	Dial Thermometer	Nos	6	6
G.7.0	LOOSE ITEMS TO BE INSTALLED AND COMMISSIONED ON UCB			
G.7.1	Analog/Digital Indicators	Nos	10	10
G.7.2	Bar Graph Indicators	Nos	5	5
G.7.3	Pressure Indicators (Moving Coil Type)	Nos	2	2
G.7.4	Temperature Indicator (Moving Coil Type)	Nos	2	2
G.7.5	Vibration Indicator along with Selector Switch	Nos	4	4
G.8.0	TURBINE INSTRUMENTATION GAUGES AND SENSORS			
G.8.1	RTDs	Nos	13	13
G.8.2	Thermocouples (for MAV,LBA,LBB,LBG,PGB,MAW,MAA,MAB,MAN etc	Nos	138	138
G.8.3	Thermocouples routed alongwith innercasing as per drawing only installation and healthiness checking for TSE, IPC exhaust, LPC outer, LPC-2 outer etc	Nos	9	9
G.8.4	Temperature Gauges	Nos	19	19
G.8.5	Pressure Transmitters / Absolute Pressure Transmitters	Nos	70	70
G.8.6	Differential Pressure Transmitter	Nos	6	6
G.8.7	Pressure Switches	Nos	13	13
G.8.8	Temperature Switch (Main oil Tank)	Nos	2	2
G.8.9	Differenital Pressure Switches	Nos	6	6
G.8.10	Pressure Gauges	Nos	47	47
G.8.11	Level Transmitters with amplifire, bar probe	Nos	6	6
G.8.12	Level Switches	Nos	18	18
G.8.13	Limit Switches	Nos	11	11
G.8.14	Positon Transmitters	Nos	36	36
G.8.15	Speed Sensors	Nos	9	9
G.8.16	Level Indicator	Nos	6	6
G.8.17	Emergency Push Button at CCR, Turbine Hall, LPBP	Nos	12	12
G.9.0	PRESSURE INSTRUMENTS RACKS			
G.9.1	Instrument rack TYPE A 2150mm(W) x 700mm(D) x 2150mm(H)	Set	6	6
G.9.2	Instrument rack TYPE B 1250mm(W) x 700mm(D) x 880mm(H)	Set	4	4

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G.10.0	IMPULSE PIPES - TURBINE			
G.10.1	SEAMLESS C.S.TUBE 21.3X2.3 ST-BQ-A1-CDS-TUBE	Mtrs	200	200
G.10.2	CARBON STEEL TUBE 88.9x4 ST-B-HFSPIPES (RACK OF COND.INST.)	Mtrs	80	80
G.10.3	SEAMLESS C.S. TUBE 21.3X2.3 ST-BQ-A1-CDS-TUBE (RACK OF EXT & GLAND SEAL INS)	Mtrs	150	150
G.10.4	SEAMLESS C.S.TUBE 21.3x2.3 ST-BQ-A1-CDS-TUBE (RACK OF WATER INJECTION INST.)	Mtrs	120	120
G.10.5	SEAMLESS A.S. TUBE D=13.5X2.6 ST-2.25 CR-1MO-TUBE (TEMP. & PR. CONNECTION)	Mtrs	17	17
G.10.6	S.L TUBES (GR.T22)21.3X2.77 ST-2.25 CR-1MO-TUBE (RACK OF EXT & GLAND SEAL INS)	Mtrs	52	52
G.10.7	GR:T91 (13.5X2.6) HTS -ALY- ST-TUBE (TEMP. &PR. CONNECTION)	Mtrs	10	10
G.10.8	SEAMLESS TUBE GR.T91 21.3x7.47 HTS -ALY-ST-TUBE (RACK OF MS PR.INSTRUMENTS)	Mtrs	303	303
G.10.9	SEAMLESS A.S. TUBE 21.3X2.77 HTS -ALY- ST-TUBE (RACK OF HRH/MS PR.INSTRUMENTS)	Mtrs	173	173
G.11.0	JUNCTION BOXES-TO BE INSTALLED AND COMMISSIONED			
G.11.1	Junction Box (to be mounted as per hardwar drg)	Nos	16	16
G.11.2	JB for thermocouple HPT, IPT, LPT1&2, TSE, IPC exhaust, LPC outer etc	Nos	12	12
G.11.3	Push button for TG and lube oil room	Nos	12	12
G.11.4	STRUCTURAL STEEL (for both turbine and generator instruments) 50x50x6 angle	MT	1	1
G.12.0	INSTRUMENTS FOR HEAT EXCHANGERS (CONDENSER, GSC, LP HEATER-1, TOC, CFC)-TO BE COMMISSIONED			
G.12.1	Level Switches (Float type)	Nos	12	12
G.12.2	Temperature Gauges	Nos	16	16
G.12.3	Pressure Gauges	Nos	4	4
G.12.4	Level Gauges	Nos	8	8
G.12.5	MIS type Thermometer	Nos	12	12
G.12.6	Thermowell (125/175/325)	Nos	52	52
G.13.0	VOID			
G.14.0	VOID			
G.15.0	Commissioning of the following (including cabling, tubing, fixing AFR, Speed Regulators as applicable, checking and commissioning)			
G.15.1	Condenser Vacuum Pump Removal, calibration and commissioning of CVP skid mounted instruments including CVP PLC and motor mounted on the skid. The approximate quantity of skid mounted instruments shall be Pressure Transmitters - 02 Nos., Pressure Indicators – 04 Nos., Temperature Transmitters - 03 Nos., Temperature Indicators - 04 Nos., Flow Indicator cum Switch – 01 No., Level Indicator-1 No., Rotameter-01 No., Level Switches – 02 Nos., DP Switch – 1 , Diff. Pr.Indicator-01 No., Junction Box-1	Set	2	2

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	No. & Temperature Element-02 Nos., Pneumatic Butterfly Valve-01 No.,			
G.15.2	LT drives for Vacuum pump, Recirculation pump,	Nos	4	4
G.15.3	Oil Centrifuge Unit - Removal, calibration and refixing of all instruments mounted on centrifugal unit, checking and commissioning of the system.	Set	2	2
G.15.4	NRV Valves, Stop Valves, Control Valves, HP/LP Bypass Valves with accessories	Set	40	40
G.15.5	Position Transmitters (Removal, calibration and re-fixing)	Nos	19	19
G.15.6	Limit Switch (checking only)	Nos	76	76
G.15.7	Solenoid Valves (checking only) (steam turbine ext.valves & condenser)	Nos	61	61
G.15.8	Motorized temperature control valve with accessories for cold gas	Set	1	1
G.15.9	Motorized temperature control valve with accessories for primary water	Set	1	1
G.15.10	Turbine speed monitor consisting of switch amplifier, measuring converter diode clamp Hydraulic Speed Control Equipment Rack (LR1)	Set	1	1
G.15.11	Governing System Control rack : Removal, calibration and refixing of rack mounted instruments, checking solenoid valves, drives, including wiring on the rack etc. The approximate quantity of instruments is as below: Pressure Gauges : 9 Nos. Pressure Switches : 4 Nos.	Set	2	2
G.15.12	LP Bypass Control Rack/Skid : Removal, calibration and refixing of rack mounted instruments, checking solenoid valves, drives, including wiring on the rack etc. The approximate quantity of instruments is as below Transmitters(Pressure, Temp &Level)-7 Nos. Switches(Pressure, DP& Flow)-6 Nos. Pressure gauges:5 Nos	Set	1	1
G.15.13	Supply Unit Racks for HP Valve-1, HP Valve-2, IP Valves (SU1, SU2 & SU3) Removal, calibration and refixing of rack mounted instruments, checking solenoid valves, drives, including wiring on the rack etc. Total quantity of instruments for all 3 racks is as below: Pressure Gauges : 8 Nos. Pressure Switches: 5 Nos DP Switches : 2 Nos. Pressure transmitters :3 Limit switch:3	Set	1	1
G.15.14	Seal Oil Rack	Set	1	1
G.15.15	Stator Water Rack	Set	1	1
G.15.16	Seal Oil Level / PrTsr Instrument Rack	Set	1	1
G.15.17	Stator Water DP Instrument Rack	Set	1	1
G.15.18	H2 Dryer Unit	Set	1	1
G.16.0	LAYING AND TERMINATION OF INSTRUMENTATION CABLES			
G.16.1	Overall Shielded Cable			
G.16.1.1	2P x 0.5 sqmm	Mtrs	13500	13500

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G.16.1.2	4P x 0.5 sqmm	Mtrs	9450	9450
G.16.1.3	8P x 0.5 sqmm	Mtrs	3150	3150
G.16.1.4	12P x 0.5 sqmm	Mtrs	1350	1350
G.16.1.5	2P x 0.5 sqmm (Cu braided)	Mtrs	5850	5850
G.16.1.6	4P x 0.5 sqmm (Fire Survival)	Mtrs	3150	3150
G.16.2	Individual & Overall Shielded Cable			
G.16.2.1	4P x 0.5 sqmm	Mtrs	6300	6300
G.16.2.2	8P x 0.5 sqmm	Mtrs	11700	11700
H	BHEL-BHOPAL SCOPE OF SUPPLY			
H.1.0	Commissioning of the following (including cabling, tubing, fixing AFR, Speed Regulators as applicable, checking and commissioning)			
H.1.1	PT 100 Simplex/Duplex - 3 Wire/4 Wire RTD Sensors for winding/bearings of MDBFP/Drip Pump/CEP/CWP/Mill/DMCW/ACW,etc Motors	Nos	901	757
H.1.2	Electric Actuators for various sizes of Valves	Nos	68	39
H.1.3	11 kV HT Drives ID/FD/PA/MDBFP - Each 2 Nos., CW Pump- 5 Nos	Nos	7	7
H.1.4	3.3 kV HT Drives DMCW(TG)/CEP/ACW - 3 Nos each., Mills-8 Nos, BCW-1 No., Drip Motor 2 Nos.	Nos	22	22
H.1.5	3.3 kV HT Drives of other applications (Stage wise)	Nos	17	0
I	VOID			
J	BHEL-PEM SCOPE OF SUPPLY			
J.1.0	Instruments			
J.1.1	Ultrasonic Flow Transmitter with Controller (Raw Water/Ash Water/CW & ACW)	Nos	9	0
J.2.0	Laying and Termination of I/O Shielded, Screened, Twisted Pair, Type F Armoured Instrumentation Cables			
J.2.1	4 Pair x 0.5 sqmm	Mtrs	59400	59400
J.2.2	8 Pair x 0.5 sqmm	Mtrs	40500	40500
J.2.3	12 Pair x 0.5 sqmm	Mtrs	8640	8640
J.2.4	20 Pair x 0.5 sqmm	Mtrs	8640	8640
J.3.0	Laying and Termination of Overall Shielded, Screened, Twisted Pair, Type G Armoured Instrumentation Cables			
J.3.1	2 Pair x 0.5 sqmm	Mtrs	50580	50580
J.3.2	4 Pair x 0.5 sqmm	Mtrs	40680	40680
J.3.3	8 Pair x 0.5 sqmm	Mtrs	102960	102960
J.3.4	12 Pair x 0.5 sqmm	Mtrs	20700	20700
J.4.0	Commissioning of the following (including cabling, tubing, fixing AFR, Speed Regulators as applicable, checking and commissioning)			
J.4.1	Control Valves with Smart Positioner, AFR, Air Lock Valve etc., LO TCV, Gland Steam inlet and dump	Set	29	29
J.4.2	Electric Actuators for Butterfly Valves	Nos	2	2
J.4.3	Oxygen Dosing Skid for CPU/Dearator O/L - Approximate qty of instruments per skid is Pressure Gauges: 03 Nos., Mass flow controllers- 02 Nos., Pressure Safety Valve - 2 nos. Pressure Transmitter: 6 Nos., Solenoid Valves : 5 No. Junction boxes: 2 Nos, oxygen cylinders - 8 Nos + 11 loose cylinders	Set	2	2

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J.4.4	Ammonia Dosing Skid - Approximate qty of instruments per skid is Pressure Gauges: 08 Nos., Level Gauge- 04 Nos, Pressure Transmitter: 04 Nos, level Transmitter: 06 Nos Differential Pressure indicating Transmitter - 02 Nos & Solenoid Operated Gate Valves - 06 Nos.	Set	1	1
J.4.5	NaOH Dosing Skid - Approximate qty of instruments per skid is., Pressure Gauges-03 Nos., Level Gauge-01 Nos, Level Transmitters: 02 Nos. Pressure transmitter-02 Nos. & Solenoid Operated Gate Valves - 02 Nos.	Set	1	1
J.4.6	Hydrazine dosing system Approximate qty of instruments per skid is Pressure Gauges: 08 Nos., Level Gauge- 04 Nos, Pressure Transmitter: 04 Nos, level Transmitter: 06 Nos Differential Pressure Transmitter-02 Nos. & Solenoid Operated Gate Valves - 06 Nos.	Set	1	1
J.5.0	Citric Acid Cleaning for Boiler - Installation and Removal			
J.5.1	Temp. Gauges	Nos	2	2
J.5.2	Pressuer Gauges	Nos	2	2
J.5.3	Thermocouple Stem type and MTM	Nos	8	8
J.5.4	Junction Boxes	Nos	3	3

1.9.2.0 BOQ of PACKAGE-B

SL.NO.	DESCRIPTION	UOM	UNIT # 3	UNIT # 4
A	EDN SCOPE			
A.1.0	Shifting from Stores to UCR, placement & erection of SG Package- Valmet DNA Control Cabinets			
A.1.1	Suit of two Cubicles Size: 1500 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 800 kg. CJF75&CJF 76, CJF34&35	Nos	2	2
A.1.2	Suit of two Cubicles Size: 1500 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 800 kg. CAF41& CAF42	Nos	1	0
A.1.3	Suit of three Cubicles Size: 2250 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 1200 kg.CJF06,07,08	Nos	1	1
A.1.4	Suit of four Cubicles Size: 3000 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 1600 kg. CJF23/24-CAF20/21, CJF25/26- CAF22/23 & CJF27/28-CAF24/25 & CJF29/30-CAF26/27	Nos	4	4
A.1.5	Suit of five Cubicles Size: 3750 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 2000 kg. CJF01,02,03,04,05 & CJF58,59,60,61,62	Nos	2	2
A.1.0.1	Alignment, Electrical Interconnection, Testing and Commissioning of SG Package- Valmet DNA Control Cabinets			

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A.1.1.1	Suit of two Cubicles Size: 1500 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 800 kg. CJF75&CJF76, CJF34&35	Nos	2	2
A.1.2.1	Suit of two Cubicles Size: 1500 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 800 kg. CAF41&CAF42	Nos	1	0
A.1.3.1	Suit of three Cubicles Size: 2250 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 1200 kg. CJF06,07,08	Nos	1	1
A.1.4.1	Suit of four Cubicles Size: 3000 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 1600 kg. CJF23/24-CAF20/21, CJF25/26- CAF22/23 & CJF27/28-CAF24/25 & CJF29/30-CAF26/27	Nos	4	4
A.1.5.1	Suit of five Cubicles Size: 3750 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 2000 kg. CJF01,02,03,04,05 & CJF58,59,60,61,62	Nos	2	2
A.2.0	Shifting from Stores to UCR, placement & erection of TG Package- (Non-Core) Valmet DNA control cabinets			
A.2.1	Single Cubicle Size: 750 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 400 kg. CJJ08, CJJ41 & CWW01	Nos	3	3
A.2.2	Suit of two Cubicles Size: 1500 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 800 kg. CCA10 & CCA11	Nos	1	1
A.2.3	Suit of three Cubicles Size: 2250 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 1200 kg. CJJ03,CJJ04 & CJJ53	Nos	1	1
A.2.4	Suit of four Cubicles Size: 3000 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 1600 kg. CJJ01,02,05,06, CCA01,02,03,04, CJJ20,21,22,23 & CJJ30,31,32,33	Nos	4	4
A.2.0.1	Alignment, Electrical Interconnection, Testing and Commissioning of TG Package- (Non-Core) Valmet DNA control cabinets			
A.2.1.1	Single Cubicle Size: 750 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 400 kg. CJJ08, CJJ41 & CWW01	Nos	3	3
A.2.2.1	Suit of two Cubicles Size: 1500 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 800 kg. CCA10 & CCA11	Nos	1	1
A.2.3.1	Suit of three Cubicles Size: 2250 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 1200 kg. CJJ03,CJJ04 & CJJ53	Nos	1	1
A.2.4.1	Suit of four Cubicles Size: 3000 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 1600 kg. CJJ01,02,05,06, CCA01,02,03,04, CJJ20,21,22,23 & CJJ30,31,32,33	Nos	4	4
A.3.0	Shifting from Stores to UCR, placement & erection of STN C&I Valmet DNA Control Cabinets			

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A.3.1	Single Cubicle Size: 750 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 400 kg. CRE61/CTE01/CTE02/CTE03	Nos	4	4
A.3.2	Single Cubicle Size: 750 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 400 kg. CTE04	Nos	1	0
A.3.3	Suit of two Cubicles Size: 1500 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 800 kg. CRE51/52, CRE81/82, CRE53/54, CRE83/84, CRE55/56, CRE57/58, CRE59/60	Nos	7	7
A.3.4	Suit of two Cubicles Size: 1500 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 800 kg. CRE77/78	Nos	1	0
A.3.5	Suit of three Cubicles Size: 2250 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 1200 kg. CRE41/42/43, CRE48/49/50, CRE62/63/64, CRE65/66/67, CRE68/69/70	Nos	5	5
A.3.6	Suit of three Cubicles Size: 2250 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 1200 kg. CRW01-03, 04-06, 11-13, 71-73, 74-76	Nos	5	0
A.3.7	Suit of four Cubicles Size: 3000 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 1600 kg. CRE 01-04,05-08, 09-12,13-16,17-20,21-24,25-28,29-32,33-36,37-40,44-47	Nos	11	11
A.3.8	Suit of four Cubicles Size: 3000 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 1600 kg. CRW07-10	Nos	1	0
A.3.0.1	Alignment, Electrical Interconnection, Testing and Commissioning of STN C&I Valmet DNA Control Cabinets			
A.3.1.1	Single Cubicle Size: 750 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 400 kg. CRE61/CTE01/CTE02/CTE03	Nos	4	4
A.3.2.1	Single Cubicle Size: 750 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 400 kg. CTE04	Nos	1	0
A.3.3.1	Suit of two Cubicles Size: 1500 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 800 kg. CRE51/52, CRE81/82, CRE53/54, CRE83/84, CRE55/56, CRE57/58, CRE59/60	Nos	7	7
A.3.4.1	Suit of two Cubicles Size: 1500 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 800 kg. CRE77/78	Nos	1	0
A.3.5.1	Suit of three Cubicles Size: 2250 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 1200 kg. CRE41/42/43, CRE48/49/50, CRE62/63/64, CRE65/66/67, CRE68/69/70	Nos	5	5
A.3.6.1	Suit of three Cubicles Size: 2250 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 1200 kg. CRW01-03, 04-06, 11-13, 71-73, 74-76	Nos	5	0
A.3.7.1	Suit of four Cubicles Size: 3000 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 1600 kg. CRE 01-04,05-08, 09-12,13-16,17-20,21-24,25-28,29-32,33-36,37-40,44-47	Nos	11	11

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A.3.8.1	Suit of four Cubicles Size: 3000 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 1600 kg. CRW07-10	Nos	1	0
A.4.0	Shifting from Stores to UCR, placement & erection of CPU C&I Valmet DNA Control Cabinets			
A.4.1	Single Cubicle Size: 750 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 400 kg. CTE11, CTE12, CTE13, CTE14 & CTE16	Nos	5	0
A.4.2	Suit of two Cubicles Size: 1500 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 800 kg. CRA10/11	Nos	1	0
A.4.3	Suit of three Cubicles Size: 2250 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 1200 kg. CRA01-03, 04-06, 07-09, 12-14	Nos	4	0
A.4.0.1	Alignment, Electrical Interconnection, Testing and Commissioning of CPU C&I Valmet DNA Control Cabinets			
A.4.1.1	Single Cubicle Size: 750 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 400 kg. CTE11, CTE12, CTE13, CTE14 & CTE16	Nos	5	0
A.4.2.1	Suit of two Cubicles Size: 1500 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 800 kg. CRA10/11	Nos	1	0
A.4.3.1	Suit of three Cubicles Size: 2250 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 1200 kg. CRA01-03, 04-06, 07-09, 12-14	Nos	4	0
A.5.0	Shifting from Stores to UCR, placement & erection of SCR C&I Valmet DNA Control Cabinets			
A.5.1	Suit of three Cubicles Size: 2250 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 1200 kg. CBB01-03 & 04-06	Nos	2	2
A.5.0.1	Alignment, Electrical Interconnection, Testing and Commissioning of SCR C&I Valmet DNA Control Cabinets			
A.5.1.1	Suit of three Cubicles Size: 2250 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 1200 kg. CBB01-03 & 04-06	Nos	2	2
A.6.0	Shifting from Stores to UCR, placement & erection of T&AVT/EIS Control Cabinets & Network Panels/Network Enclosures			
A.6.1	Single Cubicle Size: 750 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 400 kg. CFA01	Nos	1	0
A.6.2	Suit of two Cubicles Size: 1500 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 800 kg. CXA01-02 & 03-04	Nos	2	0
A.6.3	EIS Control Panel of Single Cubicle Size: 750 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 400 kg. CYJ01	Nos	1	1
A.6.0.1	Alignment, Electrical Interconnection, Testing and Commissioning of T&AVT/EIS Control Cabinets & Network Panels/Network Enclosures			
A.6.1.1	Single Cubicle Size: 750 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 400 kg. CFA01	Nos	1	0
A.6.2.1	Suit of two Cubicles Size: 1500 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 800 kg. CXA01-02 & 03-04	Nos	2	0

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A.6.3.1	EIS Control Panel of Single Cubicle Size: 750 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 400 kg. CYJ01	Nos	1	1
A.6.0.2	Erection and Commissioning of Network Panels and Network Enclosures.			
A.6.0.2.1	Network Panel of Single Cubicle Size: 750 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 400 kg. CNP11/21/41	Nos	3	3
A.6.0.2.2	Network Panel (LAN-I/II) of Single Cubicle Size: 750 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 400 kg. CNP51/52	Nos	1	0
A.6.0.2.3	Network Panel (Common System) of Single Cubicle Size: 750 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 400 kg. CNP31/32/33/35/36/37	Nos	3	0
A.6.0.2.4	Network Enclosures for LAN & BOP Systems of Size: 600 mm(W) X 500 mm(D) x 600 mm(H); Approx. weight 20 kg.	Nos	6	0
A.7.0	TURBINE SUPERVISORY SYSTEM FOR MAIN TURBINE			
A.7.1	Meggitt VM600 system with 19" Rack Control Cabinet- 2 Nos. (with power supply unit, back panel, CPU module, I/O cards, relay cards, protection cards), TFT monitors, server, A3 Colour printer, Ethernet to FO convertor, interconnecting cables, etc. Approx. Size and Weight of the Panel 750 x 800 x 2117 mm; 400 kg.	Set	1	1
A.7.2	Total loose supplied items to be mounted in the cabinet is as follows: Absolute Bearing Vibration sensors with isolators qty: 16; Relative Shaft Vibration sensors with isolators qty: 16; Absolute shaft expansion (HP & LP Rotor) with isolators qty: 4 each; Axial shaft/shaft position with isolators qty: 3; Reference phase measurement sensors with isolators qty: 1 No and Junction boxes qty: 12 Nos.	Set	1	1
A.8.0	HART MANAGEMENT SYSTEM (SUPERVISION OF E&C BY OEM)			
A.8.1	Hart Management System (HMS) Comprising of the following: HART Panel- 02 Nos., Workstation PC with 24" TFT Monitor-02 Nos., Colour laser Printer 01 No., and other loose supplied items like Hart / back plane communication modules, Patch cards/ 20 way FRC intra panel cables 69 set, RS485/RS232 Convertor, interconnecting Cables, etc. Approx. Size and Weight of the Panel 800(L) x 800(W) x 2415(H) mm; 400 Kg each.	Set	1	1
A.9.0	INSTRUMENTS			
A.9.1	Pressure Transmitter	Nos	265	195
A.9.2	Differential Pressure Transmitter	Nos	141	128
A.9.3	Ultrasonic type level transmitter	Nos	48	27
A.9.4	Flow Transmitter (DP type)	Nos	128	121
A.9.5	Guided Wave Radar Type Level Transmitter	Nos	24	24
A.9.6	Temperature Elements	Nos	330	330

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A.9.7	Pressure Gauge	Nos	151	151
A.9.8	Differential Pressure Gauge	Nos	20	20
A.9.9	Pressure and Differential Pressure switches	Nos	60	60
A.9.10	Temperature Gauge	Nos	130	130
A.9.11	Level Gauge	Set	1	1
A.9.12	Level Switch- Conductivity Type for CRH drain pots consists of two nos of level probes, field mounted electronic control units-1 No., interconnecting cables 10 mtr	Nos	4	4
A.9.13	Coal Bunker Level Monitoring System - 3D Scanner on Bunker top, 2 Nos. Panel at Bunker Floor/Unit, 1 No. Computer in CER/Unit.	Set	8	8
A.9.14	I/P Coverters for Burner Tilt & SADC	Nos	33	33
A.10.0	FLUE GAS ANALYZERS			
A.10.1	High temperature Oxygen Analyzer (in situ type) make: SECO; Consisting of insitu,flange mounted zirconium oxide type probe and electronics-1 cabinet, Verification gas cylinder and analyser accessories such as Ref.air+Verification gas kit cabinet, signal and power cables (10m), SS tubings and fittings, Junction box, Glands for Electronics and JB, mounting flanges. App.weight of analyser is 22 Kg	Set	2	2
A.10.2	Low temperature Oxygen Analyzer (in situ type) make: AICPL; Consisting of insitu,flange mounted zirconium oxide type probe and electronics-1 cabinet, Auto Calibration unit for three calibration cylinders, Zero span and one span cylinders along with accessories, 2/1 metre probe protectors and wall mounted panel for Analyzer. App.weight of analyser is 22 Kg	Set	9	9
A.10.3	CO Analyzer (In-Situ type) Consisting of CO Sensor head , High Temperature Probe (1800 mm app.), Protection tube (1800 mm app.), Temperature/Pressure Transmitters, Digital Display Unit, Air Dryer panel (App. size 760x760x210 mm), Power Supply Unit, Calibration Gas Cylinder filled with CO & Nitrogen, Pressure Switch for purge air blower, Air compressor-1 No. & connecting cables. App. weight of analyser is 22 kg.	Set	6	6
A.10.4	HF analyser Consists of Process & Purge tubes (1500 mm app.)-02 Nos, Transmitter/Receiver units-02 Nos, HF Gas Analyser Unit-01 No., Analyser Panel (App.Size 600x600x2000 mm)-01 No. (Wt. 200 kg), Air Purification unit-01 No., Power Supply unit-01 No., Canopies for Transmitter/Receiver/Power Supply unit (as applicable), Purge air unit-01 No., fail safe shutter with 10 mtr cable, Air Compressor Unit 2 nos with air distribution Hose for purge air connection, inter connecting power & control cables etc. The analyser mounting at elevation 65 mts and temperature	Set	1	1

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	transmitter at 64.75 mtrs on chimney. Location of cross duct monitor is at about 106 mtr elevation in chimney.			
A.10.5	Opacity Analyser (In Situ type) Consisting of Transceiver unit -02 No each with air purge connections, Signal processor unit, power supply unit, display control unit, fail safe shutter with 10 mtr cable against power or purge air failure, Air Compressor Unit 2 nos with air distribution Hose for purge air connection, inter connecting power & control cables etc. The analyser mounting at elevation 65 mts and temperature transmitter at 64.75 mtrs on chimney. Location of cross duct monitor is at about 106 mtr elevation in chimney.	Set	1	1
A.10.6	SOX/NOX/CO (Combined) analyser system Consisting of in-situ dilution Probe (long 1500 mm) flange mounted, umbilical cord 1x1/4 inch teflon & 3 x 1/4th nylon pvc jacketing 100 mtr long , span/back flush, dilution air, Dilution control unit with auto calibration solenoids, pressure gauges, flow meter, air dryer with filter arrangement, calibration gas cylinders 10 ltr capacity 4 sets with rack stand, Analyser panel (800mm x 800m x 1915mm) fitted air condition & 19 inch racks, tubing & sampling panel + analysers. The tubing/ signal, control, power cabling between probe and Analyser panel is approx 100 mtrs long, 800 mmx 2100 mm (H). The probe is located at approx. 82 mt Elevation on chimney+ flue. Local PC based DAS consist of 24-inch monitor, i3 processor with key board and accessories.	Set	1	1
A.10.7	Mercury analyser consist of sample probe with heated filter, mounting flange, heated sample tubes with RTD (length 50 mtrs), span zero gas calibration cylinders, peristaltic pumps 2 nos, outdoor PLC panel size 1200mm(w) x 600mm (d) x 2000mm (h) aprox weight of panel 300 Kg, mounted on chimney at 41 mtr elevation.	Set	1	1
A.10.8	Gas Flow analyser (InSitu non-contact Cross duct type) Consisting of Transceiver unit -02 No each with air purge connections, Signal processor unit, power supply unit, display control unit, fail safe shutter with 10 mtr cable against power or purge air failure, Air Compressor Unit 2 nos with air distribution Hose for purge air connection, inter connecting power & control cables etc. The analyser mounting at elevation 65 mts and temperature transmitter at 64.75 mtrs on chimney. Location of cross duct monitor is at about 106 mtr elevation in chimney.	Set	1	1
A.11.0	STEAM AND WATER ANALYSIS (SWAS): The scope of work includes erection of main system along with the equipments and loose items indicated below, if any,			

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	interconnection pipes between cooler, chiller and wet panel, cooling water connection pipes between cooler, chiller and wet panel etc.			
A.11.1	Sample Handling System: Sampling handling system consisting of: a. Primary Rack # 1: 01 Nos. Dim.1500(L)x800(D)x2100(H) in mm) App. overall weight 400 kg. b. Primary Rack # 2: 01 Nos. Dim.700(L)x800(D)x2000(H) in mm) App. overall weight 200 kg. c. Self Standing Racks # 3/4: 02 Nos. (App. Dim.600(L)x600(D)x1800(H) in mm) App. overall weight 150 kg. d. Wet panel:01 No.(App.Dim.5000 (L)x1600 (D)x2115(H) in mm) App.weight: 3000 kg. e. Analyser panel:01 No.(App. Dim.6500(L)x800(D)x2115(H) in mm) App. overall weight 2000 kg. f. Self Standing Rack (Sampling Skid) # 5: 01 Nos. (App. Dim.2500(L)x1500(D)x2200(H) in mm) App. overall weight 850 kg. g. Self Standing Racks # 6: 01 Nos. (App. Dim.800(L)x800(D)x2000(H) in mm) App. overall weight 200 kg. h. Chiller unit (redundant):01 No. (App. Dim 2200(L)x1200(D)x1275(H) in mm) and App. Overall weight: 850 kg.	Set	1	1
A.11.2	Sampling Sensors and Devices: The following analysers and sensors are to be assembled in the above said panels (or) as per the direction of BHEL Site engineer. a. Specific Conductivity Analysers: 08 Sets b. Cation Conductivity Analysers: 5 Sets c. pH Analysers: 10 Sets d. Dissolved O2 Analysers: 5 Sets e. Silica Analysers: 02 Sets f. Sodium Analysers: 01 Sets g. Chloride Analysers: 01 Set h. Turbidity Analysers: 01 Set i. Iron Analysers: 01 Sets j. Degassed Cation Conductivity Analyzers-02 Sets k. Hydrazine Analyser - 02 Sets	Set	1	1
A.11.3	A 106 Gr. 2" NB SCH 40 for Cooling water for SWAS includes Tees and bends	Mtrs	140	140
A.11.4	SS316, 2" NB SCH 40 for Cooling water for SWAS includes Tees and bends	Mtrs	60	60
A.11.5	Tubing with connectors (SS316 1/4" OD) Between wet and dry panel	Mtrs	420	420
A.11.6	Special cables for sensors between wet and dry panel	Mtrs	1100	1100

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A.11.7	Laying and Termination of Power Cables to SWAS Panel/Chiller	Mtrs	50	50
A.12.0	VIBRATION MONITORING SYSTEMS			
A.12.1	Vibration Monitoring System for SG&TG at CER:			
A.12.1.1	Bearing Casing Vibration Sensors with block/pad & 10 Metre extension cables	Set	166	166
A.12.1.2	Non-Contact type Probe (Shaft Biv+Axial Shift+Phase Marker) along with extension cable & drive mounting brackets and probe Holders:	Set	67	67
A.12.1.3	Junction boxes	Nos	127	127
A.12.1.4	Vibration monitoring racks with modules: (To be mounted in the VMS panels)	Set	8	8
A.12.1.5	Single Bay VMS panel App. Size: 750 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 400 kg.	Nos	2	1
A.12.1.6	Three Bay VMS panel App. Size: 2250 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 1200 kg.	Nos	1	1
A.12.1.7	VMS Server/User PC	Nos	2	2
A.12.1.8	Printer	Nos	1	1
A.12.1.9	Ethernet Cable	Mtrs	200	200
A.12.2	Vibration Monitoring System for CWP/ACWP at CWP Control Room:			
A.12.2.1	Bearing Casing Vibration Sensors with block/pad & 10 Metre extension cables:	Set	57	57
A.12.2.2	Non-Contact type Probe (Shaft Biv+Axial Shift+Phase Marker) along with extension cable & drive mounting brackets and probe Holders:	Set	2	2
A.12.2.3	Junction boxes	Nos	37	37
A.12.2.4	Vibration monitoring racks with modules: (To be mounted in the VMS panels)	Set	2	2
A.12.2.5	Single Bay VMS panel App. Size: 750 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 400 kg.	Nos	1	1
A.12.2.8	FO Cable	Mtrs	1200	1200
A.12.2.9	Ethernet Cable	Mtrs	100	100
A.12.3	Vibration Monitoring System for APH Wash Pumps at Clarified Water Pump House and RW Pumps at RWPH Control Room:			
A.12.3.1	Bearing Casing Vibration Sensors with block/pad & 10 Metre extension cables:	Set	96	0
A.12.3.2	Non-Contact type Probe (Shaft Biv+Axial Shift+Phase Marker) along with extension cable & drive mounting brackets and probe Holders:	Set	7	0
A.12.3.3	Junction boxes	Nos	49	0
A.12.3.4	Vibration monitoring racks with modules: (To be mounted in the VMS panels)	Set	6	0
A.12.3.5	Single Bay VMS panel App. Size: 750 mm(W) X 800 mm(D) x 2117 mm(H); Approx. weight 400 kg.	Nos	2	0
A.12.3.6	FO Cable	Mtrs	6300	0
A.12.3.9	Ethernet Cable	Mtrs	100	0
A.13.0	UPS WITH ACDB & BATTERY BANK			
A.13.1	Main Plant & St-I & II: 2 X180 KVA UPS parallel redundant comprising of the following: UPS-1 , UPS 2,	Set	2	1

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	Rectifier Panel, inverter panels and Aux panel 1,2 ,with Input also. Transformer overall size 6400 mm (L) x 1000 mm(W) x 2100 mm(H) aprox weight 8000 Kg. wall mounted Battery isolation JB's size 600mm x 300mm x800mm weight 80 Kg aprox. Wall mounted BHMS Display boxes aprox size 450mm x 500mm x 150mm and accessories.			
A.13.2	415 V ACDB of size app. 6400(L)x1000(W)x2100(H) in mm and app. Wt. 850 kg.	Nos	2	2
A.13.3	Laying of cable size UN 0000 - Uninyvin Cable (Equivalent to 1Cx109 Sqmm Copper Cable) from UPS to Battery	Mtrs	600	600
A.13.4	Laying of cable size UN 0000 - Uninyvin Cable (Equivalent to 1Cx109 Sqmm Copper Cable) UPS to ACDB	Mtrs	1200	1200
A.13.5	Laying and termination of 4C Shielded communication cable from MODBUS to TCP/IP	Mtrs	50	50
A.13.6	Laying and termination of 4C Shielded communication cable from UPS to Battery Monitoring System	Mtrs	5460	5460
A.13.7	Battery Health Monitoring System Panels of App.size 600 (L)x 400(W) x 600(H) and Wt. 200 kg	Nos	2	2
A.13.8	UPS BATTERY: 1285 AH/ 360 V Lead Acid Plante Batteries (two banks) each bank is made up of 110 cells, housed in wooden racks along with inter cell connectors, inter block connectors, inter row connectors, cell mounting insulators,petroleum jelly and Ms lead plated fasteners, Discharge resistor bank, Each Cell dimension: 433(L) x 368(W) x 682(H). App.Cell weight without electrolyte: 134 Kg & 204 kg with electrolyte. Total Qty of electrolyte: 21000 litre.	Set	2	2
A.13.9	RWPH: 2 X10 KVA UPS parallel redundant comprising of thefollowing: UPS-1 , UPS 2, Rectifier Panel, inverterpanels and Aux panel 1,2 ,with Input Iso. Transformeroverall size 2200 mm (L) x 900 mm(W) x 1870 mm(H)aprox weight 3000 kg. wall mounted Battery isolation JB'ssize 600mm x 300mm x800mm weight 80 Kg aprox. Wallmounted BHMS Display boxes aprox size 450mm x 500mmx 150mm and accessories.	Set	1	0
A.13.10	415 V ACDB of size app. 750(L)x300(W)x1250(H) in mm and app. Wt. 200 kg.	Nos	2	0
A.13.11	Laying of cable size UN 4 - Uninyvin Cable (Equivalent to 1Cx21.5 Sqmm Copper Cable) from UPS to Battery	Mtrs	160	0
A.13.12	Laying of cable size UN 4 - Uninyvin Cable (Equivalent to 1Cx21.5 Sqmm Copper Cable) UPS to ACDB	Mtrs	60	0
A.13.13	Laying and termination of 4C Shielded communication cable from MODBUS to TCP/IP	Mtrs	50	0

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A.13.14	Laying and termination of 4C Shielded communication cable from UPS to Battery Monitoring System	Mtrs	3360	0
A.13.15	Battery Health Monitoring System Panels of App.size 600 (L)x 400(W) x 600(H) and Wt. 200 kg	Nos	2	0
A.13.16	UPS BATTERY: 200 AH/ 220 V Lead Acid Plante Batteries (two banks) each bank is made up of 110 cells, housed in wooden racks along with inter cell connectors, inter block connectors, inter row connectors, cell mounting insulators,petroleum jelly and Ms lead plated fasteners, Discharge resistor bank, Each Cell dimension: 134(L) x 203(W) x 406(H). App.Cell weight without electrolyte: 13.5 Kg & 21 kg with electrolyte. Total Qty of electrolyte: 1600 litre.	Set	1	0
A.13.17	Power Distribution Boards for BOP Plant App.Dimension 400(L)x300(W)x600(H) and app. Wt. 500 kg.	Nos	2	0
A.13.18	1 kVA UPS System 230 V output, 30-90 min back up with 2/3 pin power socket with auto voltage regulator	Nos	5	0
A.14.0	LOCAL INSTRUMENT ENCLOSURES/RACKS			
A.14.1	Local Instrument Enclosures (Type - A)-Size: 1450(W) x 1000(D) x 2200 (H)mm; Approximate weight: 900 kg each	Set	20	20
A.14.2	Local Instrument Enclosures (Type - B)-Size: 1100(W) x 1000(D) x 2200 (H)mm; Approximate weight: 600 kg each	Set	36	36
A.14.3	Local Instrument Enclosures (Type - C)-Size: 700(W) x 1000(D) x 2200 (H)mm; Approximate weight: 400 kg each	Set	20	20
A.14.4	Local Instrument Racks (Type - A)-Size: 1400(W) x 650(D) x 2200(H) mm; Approximate weight: 600 kg each	Set	24	24
A.14.5	Local Instrument Racks (Type - B)-Size: 1100(W) x 650(D) x 2200(H) mm; Approximate weight: 400 kg each	Set	42	42
A.14.6	Local Instrument Racks (Type - C)-Size: 800(W) x 650(D) x 1500(H) mm; Approximate weight: 250 kg each	Set	18	18
A.14.7	Local Instrument Racks (Type - D)-Size: 1600(W) x 650(D) x 2200(H) mm; Approximate weight: 700 kg each	Set	6	6
A.15.0	LAYING AND TERMINATION OF CABLES			
A.15.1	Thermocouple Extension Cables			
A.15.1.1	2 Pair, 16 AWG, KX Type TC Extension Cable	Mtrs	10620	10620
A.15.1.2	6 Pair, 16 AWG, KX Type TC Extension Cable	Mtrs	29295	29295
A.15.1.3	2 Pair, 16 AWG, RX Type TC Extension Cable	Mtrs	2000	2000
A.15.2	Extruded HRPVC with FRLS, Armoured, Over All Shielded, Copper Cables			
A.15.2.1	2 pair x 0.5 sqmm	Mtrs	9270	9270
A.15.2.2	4 pair x 0.5 sqmm	Mtrs	25290	25290

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A.15.2.3	8 pair x 0.5 sqmm	Mtrs	14535	13770
A.15.3	Extruded HRPVC with FRLS, Armoured, Individually and overall shielded, Copper Cables			
A.15.3.1	2 pair x 0.5 sqmm	Mtrs	11970	10890
A.15.3.2	4 pair x 0.5 sqmm	Mtrs	37877	36527
A.15.3.3	6 pair x 0.5 sqmm	Mtrs	600	600
A.15.3.4	8 pair x 0.5 sqmm	Mtrs	8055	8055
A.15.3.5	12 pair x 0.5 sqmm	Mtrs	2000	2000
A.15.3.6	2 Troid x 0.5 sqmm	Mtrs	11677	11677
A.15.4	Extruded HRPVC with FRLS, Armoured, Copper control Cables			
A.15.4.1	3 C x 2.5 sqmm	Mtrs	6615	2520
A.15.4.2	5 C x 2.5 sqmm	Mtrs	3330	3330
A.15.5	TG Special Cables			
A.15.5.1	Special Cable 5 x1.5 sqmm	Mtrs	1000	1000
A.15.5.2	FEP Insulated 2x2x0.5 sqmm type-1 Cable	Mtrs	5400	5400
A.15.5.3	FEP Insulated 2x4x0.5 sqmm type-2 Cable	Mtrs	2000	2000
A.15.5.4	CAT 6/Ethernet UTP Cable	Mtrs	17700	12200
A.15.5.5	Laying of Optic Fiber cable for offsite PLC/ DCS systems and MIS connectivity	Mtrs	30000	10000
A.15.5.6	HDPE Conduits for laying OFC cables	Mtrs	6000	6000
A.15.5.7	Splicing of Optical Fibre Cable	Nos	350	200
A.16.0	CABLE TRAYS			
A.16.1	50 mm Perforated Trays with Cover	Mtrs	1500	1500
A.16.2	100 mm Perforated Trays with Cover	Mtrs	1500	1500
A.16.3	50 mm Perforated Trays without Cover	Mtrs	2000	2000
A.16.4	100 mm Perforated Trays without Cover	Mtrs	2000	2000
A.17.0	JUNCTION BOXES			
A.17.1	12 way JB	Nos	16	16
A.17.2	24 way JB	Nos	54	54
A.17.3	36 way JB	Nos	30	30
A.17.4	48 way JB	Nos	22	22
A.17.5	64 way JB	Nos	5	5
A.17.6	72 way JB	Nos	2	2
A.17.7	96 way JB	Nos	6	6
A.17.8	128 way JB	Nos	5	5
A.18.0	IMPULSE PIPES, FITTINGS, MANIFOLDS AND ACCESSORIES.			
A.18.1	ASTM A335 P91 - 1/2" NB 160	Mtrs	1000	1000
A.18.2	ASTM A106 Gr C - 1/2" NB SCH 160	Mtrs	2800	2800
A.18.3	ASTM A106 Gr C - 1/2" NB SCH 80	Mtrs	9500	9500
A.18.4	ASTM A106 Gr C - 1" NB SCH 80	Mtrs	300	300
A.18.5	ASTM A106 Gr C - 3/4" NB SCH 80	Mtrs	7600	7600
A.18.6	ASTM A335 P22 - 3/4" NB SCH 80	Mtrs	1200	1200
A.18.7	ASTM A312 TP316- 1/2" NB SCH 40	Mtrs	280	280
A.18.8	ASTM A312 TP316H - 1/2" NB SCH 80	Mtrs	700	700
A.18.9	ASTM A312 TP316H - 1/2" NB SCH 160	Mtrs	1100	1100
A.19.0	INSTRUMENT VALVES AND ACCESSORIES			
A.19.1	FGV A105 :1/2" NB-SW 800	Nos	7	7
A.19.2	FGV ASTM A182 F91 :1/2"NB-SW 3000SPL	Nos	5	5

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A.19.3	FGV ASTM A182 F22 :1/2"NB-SW, CL-1500	Nos	11	11
A.20.0	MASTER AND SLAVE CLOCK SYSTEM			
A.20.1	Redundant GPS Based Master Clock System (Card Rack System) along with Fully wired Master clock System Panel (App.Size: 800 x 800 x 2415 mm; wt. 300 kg) - 01 No., power supply unit, battery system, signal boosters, Signal Conditioners, multiplexer, FO Accessories (LIU, Duplex etc.)	Set	1	0
A.20.2	42 U Panel of size 800 mm (L)x1000mm(W)x2115(H)for housing the servers, network switches	Nos	1	0
A.20.3	Slave clock (Rs 485 based)/NTP based Approximate Size: 750(W) x56(D) x 170(H) mm for various locations	Nos	45	0
A.20.4	Redundant GPS antenna (built in LA) along with around 200 Mtrs antenna cable from antenna to GPS receiver unit and antenna fixing accessories.	Set	2	0
A.20.5	Redundant GPS Receiver/Master Clock-A and Master Clock-B with comparator and out put cards.	Set	1	0
A.20.6	Laying and termination of RG 58 Coaxial Cable FRLS armoured (Clock panel to IRIG B interfacing equipment and Clock panel to various pulses interfacing equipments)	Mtrs	7500	0
A.20.7	Laying and termination of Armoured Power Cable 3Cx2.5 sqmm	Mtrs	6300	0
A.20.8	Laying and termination of Armoured Signal Cable 2Px0.5 sqmm	Mtrs	9000	0
A.20.9	Cable - CAT 5e/CAT6 for NTP / SNTP output	Mtrs	560	0
A.20.10	FO Cable (4F) connecting FO NTP output multimode armoured cable	Mtrs	5000	0
A.20.11	Splicing of Optical Fibre Cable	Nos	10	0
A.20.12	Flexible GI conduit Pipe	Mtrs	500	0
A.20.13	Junction Boxes	Nos	12	0
A.21.0	LARGE VIDEO SCREEN SYSTEMS			
A.21.1	67" - 80" Large Video Screen having resolution 1920X1080 pixels with LED based rear projection along with CPU and other loose supplied items like Video display controller, Border binder, interconnecting power & communication cables, Mounting stand 1200 mm height / arrangement etc. in Unit Control room	Set	8	5
A.21.2	67" - 80" Large Video Screen having resolution 1920X1080 pixels with LED based rear projection along with CPU and other loose supplied items like Video display controller, Border binder, interconnecting power & communication cables, Mounting stand 1200 mm height / arrangement etc. for AHP system.	Set	4	0
A.21.3	67" - 80" Large Video Screen having resolution 1920X1080 pixels with LED based rear projection	Set	4	0

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	along with CPU and other loose supplied items like Video display controller, Border binder, interconnecting power & communication cables, Mounting stand 1200 mm height /arrangement etc. for CHP system.			
A.22.0	HMI & PIS SYSTEM PACKAGE			
A.22.1	HMIPIIS for Unit DDCMIS			
A.22.1.1	Operator WorkStation	Nos	25	10
A.22.1.2	Historical Storage & Retrieval (Information) WorkStation	Nos	2	2
A.22.1.3	Programmer cum documentation station	Nos	2	2
A.22.1.4	LaserJet Colour Printer (A4 size)	Nos	3	3
A.22.1.5	LaserJet B/W Printer (A4 size)	Nos	3	3
A.22.2	HMIPIIS for AHP DDCMIS			
A.22.2.1	Operator WorkStation	Nos	2	0
A.22.2.2	Programmer cum documentation station	Nos	2	0
A.22.2.3	LaserJet Colour Printer (A4 size)	Nos	1	0
A.22.3	HMIPIIS for CHP DDCMIS			
A.22.3.1	Operator WorkStation	Nos	2	0
A.22.3.2	Programmer cum documentation station	Nos	2	0
A.22.3.3	LaserJet Colour Printer (A4 size)	Nos	1	0
A.22.4	HMIPIIS for Mill Reject System			
A.22.4.1	Operator WorkStation	Nos	1	0
A.22.4.2	Programmer cum documentation station	Nos	1	0
A.22.4.3	LaserJet Colour Printer (A4 size)	Nos	1	0
A.22.5	HMIPIIS for CW/ACW SYSTEM			
A.22.5.1	Operator WorkStation	Nos	3	0
A.22.5.2	Programmer cum documentation station	Nos	3	0
A.22.5.3	LaserJet Colour Printer (A4 size)	Nos	3	0
A.22.6	HMIPIIS for Compressed Air System			
A.22.6.1	Operator WorkStation	Nos	1	0
A.22.6.2	Programmer cum documentation station	Nos	1	0
A.22.6.3	LaserJet Colour Printer (A4 size)	Nos	1	0
A.23.0	Performance Analysis Diagnostics and Optimization (PADO) Package			
A.23.1	Computer Table	Nos	3	3
A.23.2	Chairs	Nos	3	3
A.23.3	Printer Table	Nos	1	1
A.24.0	LAB INSTRUMENTS - To be demonstrated and handing over to Customer			
A.24.1	Lab Items-I:			
A.24.1.1	Dead Weight Tester - 2 Nos, Standard Quality Pressure Gauges - 3 Set, Laboratory Type Manometer - 2 Set, Inclined Tube Manometer - 2 Set, Manometer - 2 Set, Pressure and Vaccumm Air Pump - 2 Set, Portable Pressure Comparator - 1 Set, Temperature Calibration Bath - 1 Nos, Temperature Calibrator - 3 Nos, Temperature Calibrator (Table Mounted) - 2 Nos, Hot air Blower - 1 Nos, Barometers - 1 Nos, Surface Pyrometer - 1 Nos, Pneumatic Test Bench - 2 Nos, Portable Flue Gas Analyser - 1 Set, Furnace - 1 Nos,	Set	1	0

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	Mercury Thermometer - 2 Set, Tool Kit Box - 12 Nos, Oil Condition Monitor - 1 Nos, Portable Ultrasonic Flowmeter - 2 Nos, Wet & Dry Bulp Hygrometer - 1 Nos, Flowmeter Calibration - 1 Set, Air Sets - 1 Nos, Welding Machine - 1 Nos, Jewellers Lathe - 1 Nos, Grinding Machine - 1 Set, Feeler Gauge - 1 Nos, Anemometer (Portable) - 1 Nos, Stop Watch - 1 Nos, Vibration Calibrator - 1 Nos, Precision Instrument Radial Drilling Machine - 3 Nos, Portable Drilling Machine - 1 Nos, Universal Digital Thermometer - 1 Nos, Low and Medium Pressure Controller - 1 Set, Portable Pneumatic Hydraulic Calibrator - 1 Set, Bench Vice & Hand Vice - 3 Set, Vacuum Cleaner - 1 Nos, Screw Gauge - 1 Nos, Pitot Tube - 2 Nos, Test Thermocouple - 2 Nos.			
A.24.2	Lab Instruments-II			
A.24.2.1	Portable Multifunction Calibrator (Microprocessor based) - 3 Nos, Decade Resistance Box - 2 Nos, AC Universal Bridge - 1 Nos, Signal Generator - 2 Nos, Hand Tachometer - 2 Nos, Insulation tester of Different range - 1 Nos, DC Regulated Power Supply - 4 Nos, Stop Watch (Digital Type) - 2 Nos, Continuity Tester - 10 Nos, Tong Tester - 3 Nos, High Range Tong Tester - 1 Nos, Stabilised Power Supply - 2 Nos, Stroboscope - 1 Nos, Portable Trend Recorder - 1 Nos, Electronic Test Bench with computerized calibration system - 2 Nos, Digital Oscilloscope - 2 Nos, Decade Resistance Box - 2 Nos, Digital Multimeter - 2 Nos, Function Generator - 2 Nos, Chartless Recorder - 2 Nos, Variable DC Stabilized Power Supply - 2 Nos, Variable AC Stabilized Power Supply (0-260 V, 10A) - 2 Nos, Step Down Transformer (110V, 2A) - 2 Nos, Continuity Tester - 2 Nos, Fixed Power Supply (+/- 48 V DC, 3A, +/- 24V DC, 6A, +/- 12V DC, 10A, +/- 5V DC, 5A) - 2 Nos, Electronically Operated Air Gun - 2 Nos, Digital LCR-Q Bridge - 2 Nos, Card IC Tester - 2 Nos, Soldering Station & Desoldering Station - 2 Nos, Power meter with Harmonic Analysis - 2 Nos, One set of tool box with screw driver set, Spanner, Plier Cutter - 2 Nos, Portable digital multimeter - 10 Nos, Field Transmitter Calibrator - 2 Nos, Soldering Iron with Solder Sucker - 8 Nos, DE Soldering Station - 1 Nos, VARIAC - 1 Nos, Power Pack - 2 Nos, Vibration Analyzer Balancer Instrument - 2 Nos, Portable Meter Calibrator - 2 Nos, Digital Cable Identification System - 6 Nos, Dual Beam Portable Digital Storage Oscilloscope - 2 Nos, Hand Held Thermocouple and PT-100 Ohm Simulator and Indicator - 1 Nos, Insertion and Extraction tools for various Pin Numbers 14,16 and 48 - 2 Nos, Rheostats - 1 Nos, Desktop Digital	Set	1	0

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	Multimeter - 2 Nos, Phase Sequence Meter - 1 Nos, Frequency Meter - 1 Nos, Mini Scope Meter - 1 Nos, Vibration Meter Sould Level Monitor - 1 Nos, Portable pH Calibrator - 2 Nos, Module Tester - 1 Nos, DC Regulated Power Source - 2 Nos, Auto Transformer - 1 Nos, Nickel Cadmium Cell - 1 Nos, Scanner - 1 Nos, Torximitor - 2 Nos, Laptop - 2 Nos, Portable mA Calibrator - 3 Nos, Table Mounted mA Calibrator - 2 Nos, Portable mV Calibrator - 2 Nos, Test RTD - 2 Nos, Frequency counter/Timer - 1 Nos.			
A.25.0	COMPUTER FURNITURES			
A.25.1	Unit Operator Desk (8 Section) Angular installation dimension 7960mm (W) x 1050mm (D) x 750mm (H) including fixing of power Sockets, MCBs, ethernet switches hardware etc	Set	1	1
A.25.2	Common Operator Desk (8 Section) Straight installation dimension 7600mm (W) x 1050mm (D) x 750mm (H) including fixing of power Sockets, MCBs, ethernet switches hardware etc	Set	1	0
A.25.3	CWPH Operator Desk (3 Section) Straight installation dimension 2850mm (W) x 1050mm (D) x 750mm (H) including fixing of power Sockets, MCBs, ethernet switches hardware etc	Set	1	0
A.25.4	Common & other area Operator Desk (2 Section) Straight installation dimension 1900mm (W) x 1050mm (D) x 750mm (H) including fixing of power Sockets, MCBs, ethernet switches hardware etc	Set	6	0
A.25.5	Computer tables with Shelf for each Unit 1000mm(L)X1650MM(H)X950MM(D)	Set	31	31
A.25.6	Computer tables with Shelf for Common & Other areas 1000mm(L)X1650MM(H)X950MM(D)	Set	5	0
A.25.7	Computer tables with Shelf for common areas 1000mm(L)X1650MM(H)X950MM(D)	Set	12	0
A.25.8	Computer tables with Shelf for MIS Clients 1000mm(L)X1650MM(H)X950MM(D)	Set	40	40
A.25.9	Computer tables without Shelf 1000mm(L)x750mm(H)x1050mm(D)	Set	2	2
A.25.10	PC Rack 1000mm(L)x1900mm(H)x900mm(D) including fixing of power sockets, MCBs, Ethernet Switches hardware, etc	Set	2	2
A.25.11	Printer Tables 735mmx900mmx600mm including fixing of power sockets, MCBs, Ethernet Switches , hardware,etc	Set	13	13
A.25.12	Printer Tables 900mm(L)x735mm(H)x590mm(D) including fixing of power sockets, MCBs, Ethernet Switches , hardware,etc	Set	9	0
A.25.13	Printer Tables for MIS Clients 900mm(L)x735mm(H)x590mm(D) including fixing of	Set	40	40

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	power sockets, MCBs, Ethernet Switches , hardware,etc			
A.25.14	Printer Tables for MIS Servers 900mm(L)x735mm(H)x590mm(D) including fixing of power sockets, MCBs, Ethernet Switches , hardware,etc	Set	2	2
A.25.15	Computer Chair Medium back with cushioned arms	Set	85	55
A.25.16	Computer Chair Medium back with cushioned arms for MIS Clients	Set	40	40
A.25.17	Almira 1780mm x 839mm x 380mm with glass window	Set	1	1
A.25.18	Safety lock key pad 350mm x 250mm x 250mm weight 10 kg, safety rack 1830mm x 410mm x 457mm	Set	1	1
A.25.19	Operator Desk (6 Section) Straight installation dimension 5700mm (W) x 1050mm (D) x 750mm (H) including fixing of power Sockets, MCBs, ethernet switches hardware etc	Set	1	0
A.26.0	TERMINATION OF POWER CABLES			
A.26.1	Termination of cable size UN 0000 - Uninyvin Cable (Equivalent to 1Cx109 Sqmm Copper Cable) from UPS to Battery	Nos	14	14
A.26.2	Termination of cable size UN 0000 - Uninyvin Cable (Equivalent to 1Cx109 Sqmm Copper Cable) UPS to ACDB	Nos	26	26
A.26.3	Termination of cable size UN 4 - Uninyvin Cable (Equivalent to 1Cx21.5 Sqmm Copper Cable) from UPS to Battery	Nos	4	0
A.26.4	Termination of cable size UN 4 - Uninyvin Cable (Equivalent to 1Cx21.5 Sqmm Copper Cable) UPS to ACDB	Nos	2	0
A.27.0	COMMISSIONING OF THE FOLLOWING			
A.27.1	Commissioning of Transducers- Removal and recalibration of Power, Voltage, Current, Frequency out put 4-20 mA	Nos	25	25
A.28.0	STRUCTURAL MATERIALS			
A.28.1	ISM 100, ANGLE 50X50X6 & 2.5MM THICK Plates	MT	15	15
B	BHEL TRICHY SCOPE OF SUPPLY			
B.1.0	FUEL OIL SYSTEM			
B.1.1	PD Type Mass flow meter in HFO,LDO/HSD & HFO return line with mounting flanges, electronics amplifier box, inter connecting cabling, etc.	Set	3	3
B.1.2	Pressure Gauges	Nos	72	45
B.1.3	Temperature Indicator	Nos	12	6
B.1.4	Pressure Switches	Nos	22	22
B.1.5	Level Indicator	Nos	1	1
B.1.6	Temperature Elements	Nos	2	0
B.1.7	FSSS Local Oil Gun Maintenance Switch Box	Nos	18	18
B.1.8	H.E.A Exciter box 240 V AC alongwith retractor assembly 240 V AC solenoid, flexible spark rod 133 inch, spark top, flexible cable assembly 3 mtr long, SS	Set	16	16

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	hose 6.35mmx1000mm, Air Filter Regulator 1/4 inch etc.			
B.1.9	Flame Scanner Head Assembly consisting fibre optic cable L130" lense barrel, flame processor module, Flame module, pigtail cable, pico fuse, card extender module, power supply module, 6 way JB, etc	Set	32	32
B.1.10	Microprocessor based flame scanner amplifier 8 Nos. of 19" racks of size 482x263x134 (WxDxH) to be mounted in flame scanner panel (CJF49/CJF50) supplied by EDN	Set	1	1
B.2.0	ACOUSTIC STEAM LEAK DETECTOR			
B.2.1	ASLD panel assembly and computer with monitor panel size 800mmx2315mmx800mm & App.Wt. 200 kg	Set	1	1
B.2.2	ASLD sensor assembly -30 Nos + Sonic Tube + Field Amplifier box with Module- 32 Set+ Power Supply Units-4 Nos+ JB- 1No, Calibrator-1 No, Sensor Pig tail cable-450 mtr	Set	1	1
B.3.0	FURNACE CCTV SYSTEM			
B.3.1	High Temperature Furnace Camera CCTV head assembly with advance retract mechanism and Local Control Unit panels (800mmx1000mmx300mm) with inter connecting pipes, air filter regulators, ss hose mounted at boiler 45 M elevation. Remote Control Box (600 mm x500 mmx 300 mm) with 24" monitor and accessories at CCR, 40" LED monitor & Multiplexer.	Set	2	2
B.4.0	PNEUMATIC POWER CYLINDERS (REGULATING TYPE) Installation and Commissioning			
B.4.1	Pneumatic Power Cylinders with Position Transmitters controlled from SADC (App.Weight 20 kg each)	Set	132	132
B.4.2	Pneumatic Power Cylinders with SMART Positioners controlled from DDCMIS (App.Weight 20 kg each)	Set	16	16
B.4.3	PA/ID/FD Fans Blade Pitch Control Damper with SMART Positioner controlled from DDCMIS (App.Wt. 90 kg)	Set	6	6
B.4.4	Cold Air Regulating Dampers with SMART positioner alongwith linkage rod (App.Wt. 95 kg)	Set	8	8
B.4.5	Hot Air Regulating Dampers with SMART positioner alongwith linkage rod (App.Wt. 175 kg)	Set	8	8
B.4.6	Dynavane Filter Pressure Control Damper with SMART positioner	Set	1	1
B.5.0	GRAVIMETRIC FEEDER PANEL			
B.5.1	Gravimetric Feeder Remote Power Cabinet Size 1200x2315x600 and Wt.300 kg	Nos	8	8
B.5.2	Feeder Coal flow monitor assembly flange mounted	Nos	8	8
B.5.3	Feeder Electronics including 3 Nos. of Calibration probe with cable and 100 Nos. of Retro-Reflective Tape	Set	1	1
B.6.0	STEAM/WATER/PULVERIZER/AIR/FLUE GAS LINE INSTRUMENTS			

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B.6.1	Pressure Indicators	Nos	15	15
B.6.2	DP Switches	Nos	1	1
B.6.3	Temperature Indicator	Nos	8	8
B.6.4	K-Type MTM Thermocouple 8MM OD & 8 M DUPLEX	Nos	8	8
B.6.5	K-Type MTM Thermocouple 8MM OD & 10 M DUPLEX	Nos	33	33
B.6.6	K-Type MTM Thermocouple 8MM OD & 12 M DUPLEX	Nos	38	38
B.6.7	K-Type MTM Thermocouple 8MM OD & 14 M DUPLEX	Nos	41	41
B.6.8	K-Type MTM Thermocouple 8MM OD & 16 M DUPLEX	Nos	37	37
B.6.9	K-Type MTM Thermocouple 8MM OD & 18 M DUPLEX	Nos	40	40
B.6.10	K-Type MTM Thermocouple 8MM OD & 20 M DUPLEX	Nos	63	63
B.6.11	K-Type MTM Thermocouple 8MM OD & 22 M DUPLEX	Nos	57	57
B.6.12	K-Type MTM Thermocouple 8MM OD & 24 M DUPLEX	Nos	47	47
B.6.13	K-Type MTM Thermocouple 8MM OD & 26 M DUPLEX	Nos	57	57
B.6.14	K-Type MTM Thermocouple 8MM OD & 28 M DUPLEX	Nos	16	16
B.6.15	K-Type MTM Thermocouple 8MM OD & 30 M DUPLEX	Nos	12	12
B.6.16	DP Switches	Nos	2	2
B.6.17	Level Switches High/Low	Nos	20	20
B.6.18	DP Switches High/Low	Nos	17	17
B.6.19	ERV Controller with Pressure Switch App.Dimension(mm): 400x350x190; App.Wt: 10 kg	Set	4	4
B.7.0	LAYING AND TERMINATION OF CABLES (PVC,FRLS,ARMOURED CABLES FOR SCANNER, MILL FEEDER, AC CONTROLS AND INSTRUMENTATION)			
B.7.1	FLAME SCANNER CABLE-P/O SHIELDED	Mtrs	8280	8280
B.7.2	2P X 0.5 SQMM O/A SHIELDED INST.CABLE	Mtrs	1500	1500
B.7.3	4P X 0.5 SQMM O/A SHIELDED INST.CABLE	Mtrs	4950	4950
B.7.4	8P X 0.5 SQMM O/A SHIELDED INST.CABLE	Mtrs	32400	32400
B.7.5	12P X 0.5 SQMM O/A SHIELDED INST.CABLE	Mtrs	5850	5850
B.7.6	2P X 1.5 SQMM P/O SHIELDED INST.CABLE	Mtrs	9900	9900
B.7.7	2P X 0.5 SQMM P/O SHIELDED INST.CABLE	Mtrs	3150	3150
B.7.8	4P X 0.5 SQMM P/O SHIELDED INST.CABLE	Mtrs	8820	8820
B.7.9	8P X 0.5 SQMM P/O SHIELDED INST.CABLE	Mtrs	7200	7200
B.7.10	12P X 0.5 SQMM P/O SHIELDED INST.CABLE	Mtrs	4320	4320
B.7.11	3C X 2.5 SQ.MM. ARM. CONTROL CABLE	Mtrs	500	500
B.7.12	5C X 2.5 SQ.MM. ARM. CONTROL CABLE	Mtrs	500	500
B.7.13	7C X 2.5 SQ.MM. ARM. CONTROL CABLE	Mtrs	1000	1000
B.7.14	9CX 2.5 SQ.MM. ARM. CONTROL CABLE	Mtrs	1000	1000
B.7.15	12CX 2.5 SQ.MM. ARM. CONTROL CABLE	Mtrs	1000	1000

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B.7.16	12P X 1.31 SQ. MM. EXTN. CABLE - KX	Mtrs	2700	2700
B.7.17	2P X 0.5 SQ.MM PTFE INST. CABLE - G	Mtrs	2700	2700
B.7.18	4P X 0.5 SQ.MM PTFE INST. CABLE - G	Mtrs	2880	2880
B.7.19	8P X 0.5 SQ.MM PTFE INST. CABLE - G	Mtrs	2000	2000
B.7.20	4P X 0.5 SQ.MM PTFE INST. CABLE - F	Mtrs	750	750
B.7.21	3C X 2.5 SQ.MM PTFE CONTROL CABLE	Mtrs	550	550
B.7.22	5C X 2.5 SQ.MM PTFE CONTROL CABLE	Mtrs	2000	2000
B.7.23	2P X 0.5 SQ.MM PTFE INST. CABLE - F	Mtrs	2600	2600
B.7.24	2P X 1.31 SQ.MM PTFE EXTENSION CABLE	Mtrs	3600	3600
B.8.0	CABLE TRAY			
B.8.1	CABLE TRAY-50 MM WIDTH	Mtrs	1750	1750
B.8.2	CABLE TRAY-100 MM WIDTH	Mtrs	5875	5875
B.8.3	CABLE TRAY-150 MM WIDTH	Mtrs	3750	3750
B.9.0	JUNCTION BOXES			
B.9.1	24 WAY FRP JUNCTION BOX WITH CANOPY	Nos	80	80
B.9.2	48 WAY FRP JUNCTION BOX WITH CANOPY	Nos	65	65
B.9.3	72 WAY FRP JUNCTION BOX WITH CANOPY	Nos	60	60
B.9.4	24 WAY MTM FRP JUNCTION BOX WITH CANOPY	Nos	5	5
B.9.5	48 WAY MTM FRP JUNCTION BOX WITH CANOPY	Nos	35	35
B.9.6	72 WAY MTM FRP JUNCTION BOX WITH CANOPY	Nos	10	10
B.10.0	MISCELLENEOUS RACKS/PANELS			
B.10.1	Local Instrument Enclosures/Racks with Junction Boxes, App. Size: 1650x2150x800 (mm) and App.Wt: 500 kg	Set	15	15
B.10.2	Pulveriser Dynamic Classifier - VFD Cabinet App. Size: 900x2100x700 (mm) and App.Wt: 100 kg	Nos	8	8
B.10.3	HWL-1&2 and MEF Controller JB App. Size: 600x600x250 (mm) and App.Wt: 50 kg	Nos	3	3
B.11.0	HARDWARES FOR TUBING			
B.11.1	1/4" Air Filter Regulators (for mill system)	Nos	8	8
B.11.2	1" Air Filter Regulators (for SADC System)	Nos	8	8
B.11.3	Purge Meter cum DP Regulator	Nos	16	16
B.11.4	1" OD SS TUBE	Mtrs	40	40
B.11.5	1/4" OD SS TUBE	Mtrs	4800	4800
B.11.6	3/4" OD SS TUBE	Mtrs	20	20
B.11.7	3/8" OD SS TUBE	Mtrs	55	55
B.11.8	1/4" TEFLON HOSE- 2 METER PER PIECE	Nos	135	135
B.11.9	1" TEFLON HOSE- 3 METER PER PIECE	Nos	5	5
B.11.10	1/2" TEFLON HOSE- 1 METER PER PIECE	Nos	18	18
B.12.0	MISCELLENEOUS ITEMS			
B.12.1	Structural Steel for fabrication of Supports consisting of angles, channels (ISA ISMC 100x50x6 wt 1250 kg, ISA 50x50x6 Wt. 800 kg,etc)	MT	2	2
B.12.2	1/2" GI Pipe	Mtrs	1215	1215
B.13.0	Commissioning of the following (including cabling, tubing, fixing AFR, Speed Regulators as applicable, checking and commissioning)			
B.13.1	Heavy Duty Limit Switches for Burner Tilt Shear Pin Failure Indication Purpose	Nos	32	32

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B.13.2	HWL 1 & 2 & MEFCV Motor Starter Panel	Set	1	1
B.13.3	Motor Operated Valves (MOV) Actuators (On/Off) in Various Applications	Nos	78	78
B.13.4	Motor Operated Valves Actuators (MOV) (inching) in Various Applications	Nos	35	35
B.13.5	Electric Actuators for Various Dampers (Open/Close)	Nos	16	16
B.13.6	Pneumatic Actuators for Various Dampers(Open/Close)	Nos	17	17
B.13.7	Limit Switches (Cabling and Checking) for manually operated dampers	Nos	44	44
B.13.8	Solenoids (different ratings) of Pneumatic Valves of Various applications - tubing, Cabling & Commissioning	Nos	213	213
B.13.9	Burner Tilt Shear Pin failure indication junction box App.Dimension: 280(H)x600(L)x200(D): weight 12 kg each	Nos	16	16
B.13.10	Calibration/Commissioning of Gravimetric Feeder Comprising of Feeder C&I Equipment like motion monitor sensor, micro switches, etc. along with Feeder Integral Cabinet of App.Size 600x750x350 and Wt.75 kg , LT Motors, etc.	Set	8	8
B.14	SCR PACKAGE			
B.14.1	INSTRUMENTS			
B.14.1.1	Pressure Indicators	Nos	14	3
B.14.1.2	Level Switches H/HH	Nos	10	6
B.14.1.3	Level Transmitters	Nos	12	6
B.14.1.4	Differential Pressure Transmitters	Nos	10	8
B.14.1.5	Pressure Transmitters	Nos	51	25
B.14.1.6	Temperature Elements	Nos	44	28
B.14.1.7	Temperature Indicator	Nos	6	3
B.14.1.8	Ammonia Leak Detector	Nos	10	4
B.14.1.9	Density Analyzer	Nos	2	2
B.14.1.10	pH Analyzer	Nos	1	1
B.14.1.11	Oxygen Analyzer: Consisting of insitu,flange mounted probe and electronics-1 cabinet, Verification gas cylinder and analyser accessories such as Ref.air+Verification gas kit cabinet, signal and power cables (10m), SS tubings and fittings, Junction box, Glands for Electronics and JB, mounting flanges. App.weight of analyser is 22 Kg	Set	4	4
B.14.1.12	NoX Analyzer: Consisting of insitu,flange mounted probe and electronics-1 cabinet, Verification gas cylinder and analyser accessories such as Ref.air+Verification gas kit cabinet, signal and power cables (10m), SS tubings and fittings, Junction box, Glands for Electronics and JB, mounting flanges. App.weight of analyser is 22 Kg	Set	6	6
B.14.1.13	SoX Analyzer:Consisting of insitu,flange mounted probe and electronics-1 cabinet, Verification gas	Set	4	4

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	cylinder and analyser accessories such as Ref.air+Verification gas kit cabinet, signal and power cables (10m), SS tubings and fittings, Junction box, Glands for Electronics and JB, mounting flanges. App.weight of analyser is 22 Kg			
B.14.1.14	NH3 Analyzer:Consisting of insitu,flange mounted probe and electronics-1 cabinet, Verification gas cylinder and analyser accessories such as Ref.air+Verification gas kit cabinet, signal and power cables (10m), SS tubings and fittings, Junction box, Glands for Electronics and JB, mounting flanges. App.weight of analyser is 22 Kg	Set	2	2
B.14.1.15	Flow Elements	Nos	14	14
B.14.1.16	Flow Transmitters	Nos	20	20
B.14.2	CABLES			
B.14.2.1	4P X 0.5 SQ.MM. O/A SHIELDED INST. CABLE	Mtrs	7200	7200
B.14.2.2	8P X 0.5 SQ.MM. O/A SHIELDED INST. CABLE	Mtrs	5400	5400
B.14.2.3	12P X 0.5 SQ.MM O/A SHIELDED INST. CABLE	Mtrs	900	900
B.14.2.4	2P X 0.5 SQ.MM. P/O SHIELDED INST. CABLE	Mtrs	2200	2200
B.14.2.5	4P X 0.5 SQ.MM. P/O SHIELDED INST. CABLE	Mtrs	7200	7200
B.14.2.6	8P X 0.5 SQ.MM. P/O SHIELDED INST. CABLE	Mtrs	5760	5760
B.14.2.7	3C X 2.5 MM ² ARMoured CONTROL CABLE	Mtrs	2430	2430
B.14.2.8	5C X 2.5 MM ² ARMoured CONTROL CABLE	Mtrs	8100	8100
B.14.2.9	9C X 2.5 MM ² ARMoured CONTROL CABLE	Mtrs	1500	1500
B.14.2.10	12C X 2.5 MM ² ARMoured CONTROL CABLE	Mtrs	5400	5400
B.14.2.11	2P X 1.31 MM ² EXTENSION CABLE - KX	Mtrs	100	100
B.14.2.12	4P X 1.31 MM ² EXTENSION CABLE - KX	Mtrs	800	800
B.14.3	JUNCTION BOXES			
B.14.3.1	24 WAY JUNCTION BOX	Nos	12	12
B.14.3.2	48 WAY JUNCTION BOX	Nos	17	17
B.14.3.3	24 WAY JUNCTION BOX-FLAME PROOF	Nos	10	10
B.14.3.4	48 WAY JUNCTION BOX-FLAME PROOF	Nos	10	10
B.14.3.5	72 WAY JUNCTION BOX-FLAME PROOF	Nos	6	6
B.14.4	PUSHBUTTON STATIONS			
B.14.4.1	E-STOP PUSH BUTTON STATION	Nos	10	10
B.14.4.2	FOGGING PUSH BUTTON STATION	Nos	5	5
B.14.5	CABLE TRAYS			
B.14.5.1	Cable Trays - 50mm Perforated with accessories	Mtrs	250	250
B.14.5.2	Cable Trays - 100mm Perforated with accessories	Mtrs	125	125
B.14.6	MISCELLANEOUS RACKS/PANELS			
B.14.6.1	Local Instrument Enclosures/Racks with Junction Boxes, App. Size: 1650x2150x800 (mm) and App.Wt: 1000 kg	Set	7	7
B.14.7	SUPPORTING MATERIALS			
B.14.7.1	ANGLE (50X50X6)/CHANNEL(100X50)	MT	3	3
B.14.8	EARTHING MATERIALS			
B.14.8.1	Earth Flat (50x6)	Mtrs	125	125
B.14.8.2	Earth Wire 1.219 mm GI	Mtrs	350	350

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B.14.9	IMPULSE TUBE OD 6.35X1.6X9500-SA213TP304H with accessories	Mtrs	320	320
B.14.10	Commissioning of the following (including cabling, tubing, fixing AFR, Speed Regulators as applicable, checking and commissioning)			
B.14.10.1	Motor Operated Valve (MOV) Actuators (On/Off) in various locations	Nos	8	8
B.14.10.2	Motor Operated Valves Actuators (MOV) (Regulating) in Various Locations	Nos	1	1
B.14.10.3	Unit Directional Drives	Nos	19	19
B.14.10.4	Pneumatic Operated On/Off/Control Valves with accessories	Set	30	11
C	BHEL-PIPING CENTRE SCOPE OF SUPPLY			
C.1.0	Local Instruments			
C.1.1	Pressure Gauges	Nos	40	40
C.1.2	Temperature Gauges	Nos	104	104
C.1.3	Thermowells (Screwed and Welded)	Nos	197	197
C.1.4	Level Gauges	Nos	5	5
C.1.5	Sight Flow Glasses	Nos	56	56
C.1.6	Averaging Pitot Tube	Set	3	3
C.2.0	Commissioning of the following (including cabling, tubing, fixing AFR, Speed Regulators as applicable, checking and commissioning)			
C.2.1	Control Valves - for LP Start Up Systems & SCAPH Sysyems - including Air Filter Regulators, Positioners, Testing upto DCS	Set	5	5
C.2.2	MOV Actuators for SCAPH, CW Aux Steam,etc	Nos	16	16
C.2.3	LT Drives: Condensate Drain Pumps, Emergency Fill Pumps	Nos	5	5
D	BHEL RANIPET SCOPE OF SUPPLY			
D.1	OPACITY MONITOR			
D.1.1	Opacity Monitoring System consisting of Sender/Receiver/Ref/Control Unit 1 No. each, 5 Metre Slave wire cable-1 No., Purge Air Blower with filter-1 No., Power JB-1 No., Weather Hood Cover for Purge Air Blower JB-1 No., Fully auto. Electric Operated Fail Safe Shutter-2 Nos., Differential Pressure Switch-2 Nos., Mounting Flange With Pipe - 2 Nos., Weather Hood Cover for Sender/Receiver Units - 2 Nos., Weather Hood Cover for Power JB-2 Nos. & Purge Air Hose	Set	4	4
D.2.0	AUTOMATIC LEAKAGE CONTROL SYSTEM-Air Pre Heater			
D.2.1	ALCS DCS panel 750x750x2067 mm. App. Wt.90 kg	Nos	1	1
D.2.2	ALCS Drive Control Panel 680x400x1053 mm App.Wt.50 kg	Nos	6	6
D.2.3	ALCS Controller with panel 370x210x520 mm App. Wt. 5 kg	Nos	6	6
D.2.4	Sensor Electronic with Enclosure 140x100x70 mm	Nos	6	6
D.2.5	Interfacing Box 140x100x70 mm App.Wt.5 kg.	Nos	6	6
D.2.6	Shielded Teflon Cable for ALCS	Mtrs	30	30
D.3.0	Instruments of APH/Fans/Gates & Dampers			

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D.3.1	Pressure Switches	Nos	4	4
D.3.2	Pressure Indicators	Nos	24	24
D.3.3	RTD With Thermowell	Nos	8	8
D.3.4	Temperature Indicator	Nos	10	10
D.3.5	Flow Indicating Switch	Nos	4	4
D.3.6	Go Switch	Nos	2	2
D.3.7	Dial Thermometer	Nos	2	2
D.3.8	Temperature Elements	Nos	12	12
D.3.9	Thermocouple with Thermowell	Nos	56	56
D.3.10	On/Off Switch Box including light assembly and interconnecting heat resistant cable	Set	2	2
D.3.11	Temperature Indicators-Fans	Nos	24	24
D.3.12	RTDs with Thermowell-Fans	Nos	64	64
D.3.13	Pressure Gauges-Fans	Nos	2	2
D.3.14	Pressure Transmitters-Fans	Nos	2	2
D.3.15	Angular Position Transmitters-For FD/ID/PA Fans	Nos	6	6
D.3.16	Pressure Switches-GAD	Nos	10	10
D.4.0	Commissioning of the following (including cabling, tubing, fixing AFR, Speed Regulators as applicable, checking and commissioning)			
D.4.1	Electric Actuators for Various Dampers (Open/Close)	Nos	76	76
D.4.2	Pneumatic Actuators for Various Dampers (Open/Close)	Nos	27	27
D.4.3	Solenoid Valves for APH	Nos	2	2
D.4.4	Lub Oil Skids for Air Preheater: The scope of work includes removal of instruments, calibration, refixing, checking cable connection from JB to instruments etc. The app. Quantity of instruments for each skids given below: Pressure Gauges-2 Nos. Temperature Gauges-2 Nos., Flow Switches-2 Nos.	Set	4	4
D.4.5	Fan Motor Bearing Temperature Indicators for all fans (Removal, Calibration and refixing only)	Nos	24	24
D.4.6	Fan Motor Bearing/Winding RTDs (Checking of healthiness only)	Nos	64	64
D.4.7	Lub Oil Skids for FD Fans: The scope of work includes removal of instruments calibration, refixing, checking cable connection from JB to instruments etc. The approximate total quantityof instruments for the skid put together is given below: Tank instrumentation Level transmitters (contact type guided wave)-3 Nos. Temperature Sensing Elements: -3 Nos, Temp. Gauge - 2 Nos, DP Transmitter - 1 No., DP Indicator-01 No., Pr. Gauge-3 Nos, Pr. Transmitters-2 Nos, Flow Indicator with flow transmitters - 02 No.	Set	2	2
D.4.8	Lub Oil Skids for ID Fans: The scope of work includes removal of instruments for calibration, refixing, checking cable connection from JB to instruments etc. The approximate total quantityof instruments for the skid put together is given below: Tank instrumentation Level transmitters (contact type guided wave)-3 Nos.	Set	2	2

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	Temperature Elements - 3 Nos, Temp. Gauge - 2 Nos, DP Transmitter - 1 No., DP Indicator-1No., Pr. Gauge- 6 Nos, Pr. Transmitters-2 Nos, Flow Indicator with flow transmitters - 05 Nos.			
D.4.9	Lub Oil Skids for PA Fans: The scope of work includes removal of instruments calibration, refixing, checking cable connection from JB to instruments etc. The approximate total quantity of instruments for the skid put together is given below: Tank instrumentation Level transmitters (contact type guided wave)-3 Nos. Temperature Elements- 3 Nos, Temp. Gauge - 2 Nos, DP Transmitter - 1 No., DP Indicator-1 No., Pr. Gauge- 6 Nos, Pr. Transmitters-2 Nos, Flow Indicator with flow transmitters - 05 Nos.	Set	2	2
E	BHEL-HYDERABAD SCOPE OF SUPPLY			
E.1.0	TG INSTRUMENTS			
E.1.1	Pressure Gauges	Nos	46	46
E.1.2	Differential Pressure Gauges	Nos	4	4
E.1.3	Pressure Transmitters	Nos	46	46
E.1.4	Pressure Switches	Nos	3	3
E.1.5	RTDs with Thermowell	Nos	18	18
E.1.6	Chromel alumel Type Thermocouple	Nos	15	15
E.1.7	Level Gauges (Reflex Type)	Nos	1	1
E.1.8	Level Transmitters (Guide Wave Radar Type, top mounted)	Nos	2	2
E.1.9	Speed Measuring Loop with probe	Nos	3	3
E.1.10	Proximeter Units, Local Field Cable etc. for Governing Sytem	Set	18	18
E.1.11	E/P Transducers	Nos	4	4
E.2.0	DRIP PUMP/CWP/TDBFP/CEP INSTRUMENTS			
E.2.1	Temperature Gauge	Nos	2	2
E.2.2	Pressuer Gauges	Nos	10	10
E.2.3	Pressure Switch	Nos	5	5
E.2.4	Flow Transmitters	Nos	5	5
E.2.5	Reverse Rotation Indicators	Nos	2	2
E.2.6	Flow Glass Indicators	Nos	5	5
E.2.7	Level Glass Indicators	Nos	5	5
E.2.8	Temperature Elements (RTDs)	Nos	81	81
E.2.9	Thermowells	Nos	6	6
E.3.0	HEAT EXCHANGERS (LP & HP Heaters) &DEAERATORS			
E.3.1	Pressure Gauges	Nos	12	12
E.3.2	Level Gauges	Nos	14	14
E.3.3	Level Switches	Nos	3	3
E.3.4	Thermowell	Nos	8	8
E.3.5	Bimetallic Temperature Gauges	Nos	6	6
E.4.0	PANEL/FIELD MOUNTED INSTRUMENTS			
E.4.1	TSI System for BFP Drive Turbine and gear box consisting of the following: Configuration of Laptop with software-1 No., Monitor Rack with Modules (to be	Set	2	2

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	mounted on CWW panel) app. Wt. 40 kg per rack-1 Set, relative shaft vibration sensor probes 8mm reverse mounted Turbine and gear box-8 Nos, Axial Displacement Probes-3 Nos., Eccentricity Probe-1 No., Zero Speed Probe - 1 No., Key phasor-1 No., Bearing housing vibration Probes-4 Nos., Differential Expn. Probe -1 No., Casing Expansion-1 No., with probe extension cables-18 Nos., Probe drivers for VIBR-17 Nos., Driver Housing -12 No., JB - 3 Nos., Flexible conduits-150 Mtr., Cable seal, Cable connectors, Mounting brackets for vibration/differential exp/brg housings, RS485 cable with connector for DCS 35 Mtr long etc and calibration kit.			
E.4.2	Fabrication of Local Instrument Racks, each of size 1500x1700mm with the following materials Channel (100x50mm), Angle (50x50x6mm), 4mm Thick Sheet (400x120mm) and 10mm Thick Plate (375x770mm).	MT	2	2
E.4.3	Temperature Indicators of BFP, CEP (Removal, Calibration & Refixing only)	Nos	8	8
E.4.4	Erection and Commissioning of Oil Purification Control Panel of Size 550 (W)x250(D)x1315(H) of App. Wt. 100 kg	Nos	1	1
E.5.0	LOCAL GAUGE BOARD (LGB) / LOCAL INSTRUMENT RACK (LIR) (including removal, calibration and re-fixing of LGB mounted instruments)/JB			
E.5.1	LGB (LGB -1)Assembly for Feed Water Service for TDBFP/MD BFP including instruments, tubing, valves, fittings, junction boxes and wiring from switches to JB's. Approximate Size 1100 x900 x 2200 mm ; Weight = 600 kg each.Quantity of instruments per set is Pressure Gauge: 4 Nos.DP Gauges: 2 Nos.Temperature Gauges: 2 Nos.	Set	3	3
E.5.2	LGB (LGB-2) Assembly for SW & Cooling Water Service of TD/MD Booster Pump & BFP including instruments, tubing, valves, fittings, junction boxes and wiring from switches to JB's. Approximate Size 1100 x 900 x 2200 mm ; Weight = 600 kg each.Quantity of instruments per set is Temperature Gauges: 8 Nos. Pressure Gauge - 1 Nos. DP Gauges - 3	Set	3	3
E.5.3	LGB (LGB-2) Assembly for Lub oil service of TD / MD Booster Pump & BFP including instruments, tubing, valves, fittings, junction boxes and wiring from switches to JB's.Approximate Size 1100 x 900 x 2200 mm ; Weight = 600 kg each.Quantity of instruments per set is Temperature Gauges: 4 Nos. Pressure Gauge - 4 Nos.	Set	3	3
E.5.4	LGB (LGB-1) Assembly for 3 Nos. CEP instruments, tubing, valves, fittings, junction boxes and wiring from switches to JB's.Quantity of instruments per set is Pressure Gauges: 6 Nos..Diff. pressure Gauges: 3	Set	1	1

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	Nos.temp. gauge qty 3 nos Approximate Size 1100 x 900 x 2200 mm; Weight = 600 kg each			
E.5.5	Local instrument rack (LIR) assembly for TDBFP/MDBFP Transmitters. This LIR includes PT & DPTs,tubing , fittings, JBs, Main-fold valves and wiring from JBs to transmitters. Approximate Size 2000 x 650 x 2150 mm; Weight = 350 kg. Quantity of instruments per set is DP transmitters: 05 Nos.Pressure transmitter : 05 Nos.	Set	3	3
E.5.6	Local Instrument Rack (LIR) assembly for CEP-A,B&C pumps to mount Pr. Transmitters. This LIR includes Transmitters, tubing, fittings, JBs, Manifolds Valves Approximate Size: 2000 x 600 x 2150 mm;and wiring from JBs to transmitters Weight = 300 kg Quantity of instruments per set is Pressure transmitters: 9 Nos, DP transmitters : qty 3 nos	Set	1	1
E.5.7	24 Terminals JB for Thrust Bearing RTDs	Nos	6	6
E.6.0	SUPPORT MATERIALS			
E.6.1	Structural steel (ISMC 100 x 50 mm qty 20 mtrs, Angle 45 x 45 x 5 mm-qty 24 mtrs etc.)	MT	0.5	0.5
E.6.2	Impulse Tube Dia 16X2.6 (CS) for BFP/CEPs	Mtrs	1900	1900
E.6.3	SS tube 12.7x2.1	Mtrs	750	750
E.6.4	SS tube 6x1.5	Mtrs	35	35
E.7.0	Cables/Cable Trays for BFP/CEPs			
E.7.1	4 Pair x 0.5 sqmm cable	Mtrs	500	500
E.7.2	Perforated Cable Tray 50 mm Wide	Mtrs	80	80
E.7.3	Perforated Cable Tray 150 mm Wide	Mtrs	45	45
E.8.0	Commissioning of the following (including cabling, tubing, fixing AFR, Speed Regulators as applicable, checking and commissioning)			
E.8.1	Mill Motor Temperature Indicators (Removal, Calibration & Fixing)	Nos	16	16
E.8.2	Mills Lub Oil System: - Removal, Calibration and re-fixing of following instruments, Checking of Wiring from skid Junction Box to Equipment in Lub Oil skid. Equipment per Set: Level Transmitter-03 Nos., Temperature Elements-09 Nos., Temp.Gauges-02 Nos., DP Transmitters- 01 No., DP Indicator-01 No., Pressure Gauge-3 Nos., Pressure Transmitters- 03 Nos. and Flow Transmitter-06 Nos.	Set	8	8
E.8.3	LT Drives of Lub Oil Skid of Mills	Nos	16	16
E.8.4	Turbine Lub Oil Purification Skid: - Removal, Calibration and re-fixing of following instruments, Checking of Wiring from skid Junction Box to Equipment in Lub Oil skid. Equipment per Set: Level Switch-02 Nos., Temperature Elements-02 Nos., Temp.Gauges-03 Nos., DPI with Switch- 01 No., Pressure Gauge-04 Nos.	Set	2	2
E.8.5	LT Drives of Oil Purification Skid of Turbine	Nos	2	2

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E.8.6	Control Valves with Smart Positioner, AFR, Limit Switches, inbuilt Position Transmitters, Junction Box, etc	Set	8	8
E.8.7	TDBFP Lub Oil System: - Removal, Calibration and re-fixing of following instruments, Checking of Wiring from skid Junction Box to Equipment in Lub Oil skid. Equipment per Set: Level Transmitter-02 Nos., Temperature Elements-09 Nos., Temp. Gauges-15 Nos., DP Transmitters- 02 No., DP Indicator-02 No., Pressure Gauge-17 Nos., Pressure Transmitters- 08 Nos. and Pressure Switch-02 Nos.	Set	2	2
E.8.8	LT Drives of TDBFP System	Nos	18	18
E.8.9	MOV Actuators for TDBFP System	Nos	26	26
E.8.10	MDBFP Lub Oil System: - Removal, Calibration and re-fixing of following instruments, Checking of Wiring from skid Junction Box to Equipment in Lub Oil skid and commissioning of the system. Equipment per Set: Level Transmitter-01 Nos., Temperature Elements-33 Nos., Temp. Gauges-18 Nos., DP Transmitters- 01 No., DP Indicator-01 No., Pressure Gauge-08 Nos. and Pressure Transmitters- 02 Nos.	Set	1	1
E.8.11	LT Drives of MDBFP System	Nos	9	9
E.8.12	Hydraulic Coupling of MDBFP: The scope of work covers a) Removal, calibration & re-fixing of following instruments. Pressure Indicators: 2 Nos. DP Indicator: 1 No. Temperature Indicators: 14 Nos. Pressure Transmitters: 6 Nos. Level transmitter: 1 No. DP transmitter: 1 No. RTDs (Checking only): 18 Nos. B) Fixing of I/P Convertors, Air filter, Copper tubing & feedback transmitter, adjustment and calibration of scoop mechanism etc. C) Commissioning of Speed Indicators etc.	Set	1	1
E.8.13	Governing Console Board: The scope includes removal, calibration and re-fixing of Instruments, wiring etc. Size of panel 1200 x 1650 x 450 mm The approximate quantity of instruments is Pressure Gauges: 10 Nos. Pressure Switches: 24 Nos.	Set	1	1
F	VOID			
G	BHEL-HARIDWAR SCOPE OF SUPPLY			
G.1.0	GENERATOR AUXILIARY CONTROL CABINETS-INSTALLATION AND COMMISSIONING			
G.1.1	Moisture Measurement System for Generator, including indicator cum controller placed in control room 144 x 72 and sampling system in field 760 x 600 x 210 . Weight : 100 Kg	Set	2	2
G.1.2	Gen end vibration monitoring cabinet (CXW01E) dimension 800mm(W) x 600mm (D) x 2200mm (H) Including preamplifier units, special cables	Set	1	1

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	interconnecting, PC based monitor and printer computer table etc.aprox weight 150 kg			
G.1.3	Grounding Brush Monitor (Wall mounted) Approx. size & weight : 235 x 235 x 285 mm; 100 Kg.	Set	1	1
G.2.0	INSTALLATION AND COMMISSIONING OF GENERATOR INSTRUMENTS:			
G.2.1	Pressure Gauges	Nos	33	33
G.2.2	Temperature Gauges	Nos	15	15
G.2.3	Pressure Transmitters	Nos	29	29
G.2.4	Differential Pressure Transmitters	Nos	1	1
G.2.5	Differential Pressure Indicators	Nos	2	2
G.2.6	Differential Pressure Switch	Nos	6	6
G.2.7	Flow Meters	Nos	8	8
G.2.8	Flow Switches	Nos	2	2
G.2.9	Level Indicator	Nos	1	1
G.2.10	Level Transmitter	Nos	1	1
G.2.11	Position Transmitters	Nos	2	2
G.2.12	Level Switches (capacitance type)	Nos	19	19
G.2.13	RTDs	Nos	165	165
G.2.14	Pressure Switches	Nos	2	2
G.2.15	Thermocouples (NiCrNi) (Generator Bearing Temp: 4 Nos.& Exciter Bearing Temp: 2 Nos.)	Nos	18	18
G.2.16	Conductivity Sensor with Transmitter	Nos	4	4
G.2.17	Limit Switches	Nos	8	8
G.3.0	REMOVAL, CALIBRATION & REFIXING OF GENERATOR INSTRUMENTS			
G.3.1	Pressure Gauges	Nos	13	13
G.3.2	DP Gauges	Nos	2	2
G.3.3	Temperature Gauges	Nos	8	8
G.3.4	Pressure Transmitter	Nos	5	5
G.3.5	DP Transmitter	Nos	5	5
G.3.6	Pressure Switches	Nos	8	8
G.3.7	Level Switches	Nos	6	6
G.3.8	Flow Meters	Nos	8	8
G.3.9	Conductivity Cells	Nos	3	3
G.3.10	PW Conductivity Indicator	Nos	1	1
G.3.11	Checking the healthiness of the RTDs/Thermocouples	Nos	180	180
G.4.0	LAYING AND TERMINATION OF POWER CABLES FOR 24 V SOLENOIDS			
G.4.1	4Cx2.5 Sqmm	Mtrs	12960	12960
G.5.0	LOOSE SUPPLIED INSTRUMENTS TO BE INSTALLED AND COMMISSIONED ON GENERATOR PIPINGS			
G.5.1	Vacuum Switches	Nos	2	2
G.5.2	Pressure Gauges	Nos	7	7
G.5.3	Pressure Switches	Nos	1	1
G.5.4	PT RTD, Duplex Type	Nos	2	2
G.5.5	Dial Thermometer	Nos	5	5
G.6.0	LOOSE SUPPLIED INSTRUMENTS TO BE INSTALLED AND COMMISSIONED ON H2 COOLER PIPINGS			
G.6.1	Pressure Gauges	Nos	8	8

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G.6.2	Pressure Switches	Nos	1	1
G.6.3	PT RTD, Duplex Type	Nos	17	17
G.6.4	Moisture Sensor Probe	Nos	2	2
G.6.5	Dial Thermometer	Nos	6	6
G.7.0	LOOSE ITEMS TO BE INSTALLED AND COMMISSIONED ON UCB			
G.7.1	Analog/Digital Indicators	Nos	10	10
G.7.2	Bar Graph Indicators	Nos	5	5
G.7.3	Pressure Indicators (Moving Coil Type)	Nos	2	2
G.7.4	Temperature Indicator (Moving Coil Type)	Nos	2	2
G.7.5	Vibration Indicator along with Selector Switch	Nos	4	4
G.8.0	TURBINE INSTRUMENTATION GAUGES AND SENSORS			
G.8.1	RTDs	Nos	13	13
G.8.2	Thermocouples (for MAV,LBA,LBB,LBG,PGB,MAW,MAA,MAB,MAN etc	Nos	138	138
G.8.3	Thermocouples routed alongwith innercasing as per drawing only installation and healthiness checking for TSE, IPC exhaust, LPC outer, LPC-2 outer etc	Nos	9	9
G.8.4	Temperature Gauges	Nos	19	19
G.8.5	Pressure Transmitters / Absolute Pressure Transmitters	Nos	70	70
G.8.6	Differential Pressure Transmitter	Nos	6	6
G.8.7	Pressure Switches	Nos	13	13
G.8.8	Temperature Switch (Main oil Tank)	Nos	2	2
G.8.9	Differenital Pressure Switches	Nos	6	6
G.8.10	Pressure Gauges	Nos	47	47
G.8.11	Level Transmitters with amplifire, bar probe	Nos	6	6
G.8.12	Level Switches	Nos	18	18
G.8.13	Limit Switches	Nos	11	11
G.8.14	Positon Transmitters	Nos	36	36
G.8.15	Speed Sensors	Nos	9	9
G.8.16	Level Indicator	Nos	6	6
G.8.17	Emergency Push Button at CCR, Turbine Hall, LPBP	Nos	12	12
G.9.0	PRESSURE INSTRUMENTS RACKS			
G.9.1	Instrument rack TYPE A 2150mm(W) x 700mm(D) x 2150mm(H)	Set	6	6
G.9.2	Instrument rack TYPE B 1250mm(W) x 700mm(D) x 880mm(H)	Set	4	4
G.10.0	IMPULSE PIPES - TURBINE			
G.10.1	SEAMLESS C.S.TUBE 21.3X2.3 ST-BQ-A1-CDS-TUBE	Mtrs	200	200
G.10.2	CARBON STEEL TUBE 88.9x4 ST-B-HFSPIPES (RACK OF COND.INST.)	Mtrs	80	80
G.10.3	SEAMLESS C.S. TUBE 21.3X2.3 ST-BQ-A1-CDS-TUBE (RACK OF EXT & GLAND SEAL INS)	Mtrs	150	150
G.10.4	SEAMLESS C.S.TUBE 21.3x2.3 ST-BQ-A1-CDS-TUBE (RACK OF WATER INJECTION INST.)	Mtrs	120	120
G.10.5	SEAMLESS A.S. TUBE D=13.5X2.6 ST-2.25 CR-1MO-TUBE (TEMP. & PR. CONNECTION)	Mtrs	20	20

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G.10.6	S.L TUBES (GR.T22)21.3X2.77 ST-2.25 CR-1MO-TUBE (RACK OF EXT & GLAND SEAL INS)	Mtrs	60	60
G.10.7	GR:T91 (13.5X2.6) HTS -ALY- ST-TUBE (TEMP. &PR. CONNECTION)	Mtrs	10	10
G.10.8	SEAMLESS TUBE GR.T91 21.3x7.47 HTS -ALY-ST-TUBE (RACK OF MS PR.INSTRUMENTS)	Mtrs	350	350
G.10.9	SEAMLESS A.S. TUBE 21.3X2.77 HTS -ALY- ST-TUBE (RACK OF HRH/MS PR.INSTRUMENTS)	Mtrs	200	200
G.11.0	JUNCTION BOXES-TO BE INSTALLED AND COMMISSIONED			
G.11.1	Junction Box (to be mounted as per hardwar drg)	Nos	16	16
G.11.2	JB for thermocouple HPT, IPT, LPT1&2, TSE, IPC exhaust, LPC outer etc	Nos	12	12
G.11.3	Push button for TG and lube oil room	Nos	12	12
G.11.4	STRUCTURAL STEEL (for both turbine and generator instruments) 50x50x6 angle	MT	1	1
G.12.0	INSTRUMENTS FOR HEAT EXCHANGERS (CONDENSER, GSC, LP HEATER-1, TOC, CFC)			
G.12.1	Level Switches (Float type)	Nos	12	12
G.12.2	Temperature Gauges	Nos	16	16
G.12.3	Pressure Gauges	Nos	4	4
G.12.4	Level Gauges	Nos	8	8
G.12.5	MIS type Thermometer	Nos	12	12
G.12.6	Thermowell (125/175/325)	Nos	52	52
G.13.0	VOID			
G.14.0	VOID			
G.15.0	Commissioning of the following (including cabling, tubing, fixing AFR, Speed Regulators as applicable, checking and commissioning)			
G.15.1	Condenser Vacuum Pump Removal, calibration and commissioning of CVP skid mounted instruments including CVP PLC and motor mounted on the skid. The approximate quantity of skid mounted instruments shall be Pressure Transmitters - 02 Nos., Pressure Indicators – 04 Nos., Temperature Transmitters - 03 Nos., Temperature Indicators - 04 Nos., Flow Indicator cum Switch – 01 No., Level Indicator-1 No., Rotameter-01 No., Level Switches – 02 Nos., DP Switch – 1 , Diff. Pr.Indicator-01 No., Junction Box-1 No. & Temperature Element-02 Nos., Pneumatic Butterfly Valve-01 No.,	Set	2	2
G.15.2	LT drives for Vaccum pump, Recirculation pump,	Nos	4	4
G.15.3	Oil Centrifuge Unit - Removal, calibration and refixing of all instruments mounted on centrifugal unit, checking and commissioning of the system.	Set	2	2
G.15.4	NRV Valves, Stop Valves, Control Valves, HP/LP Bypass Valves with accessories	Set	40	40
G.15.5	Position Transmitters (Removal, calibration and re-fixing)	Nos	19	19
G.15.6	Limit Switch (checking only)	Nos	76	76

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G.15.7	Solenoid Valves (checking only) (steam turbine ext.valves & condenser)	Nos	61	61
G.15.8	Motorized temperature control valve with accessories for cold gas	Nos	1	1
G.15.9	Motorized temperature control valve with accessories for primary water	Nos	1	1
G.15.10	Turbine speed monitor consisting of switch amplifier, measuring converter diode clamp Hydraulic Speed Control Equipment Rack (LR1)	Set	1	1
G.15.11	Governing System Control rack : Removal, calibration and refixing of rack mounted instruments, checking solenoid valves, drives, including wiring on the rack etc. The approximate quantity of instruments is as below: Pressure Gauges : 9 Nos. Pressure Switches : 4 Nos.	Set	2	2
G.15.12	LP Bypass Control Rack/Skid: Removal, calibration and refixing of rack mounted instruments, checking solenoid valves, drives, including wiring on the rack etc. The approximate quantity of instruments is as below Transmitters(Pressure, Temp &Level)-7 Nos. Switches(Pressure, DP& Flow)-6 Nos. Pressure gauges:5 Nos	Set	1	1
G.15.13	Supply Unit Racks for HP Valve-1, HP Valve-2, IP Valves (SU1, SU2 & SU3) Removal, calibration and refixing of rack mounted instruments, checking solenoid valves, drives, including wiring on the rack etc. Total quantity of instruments for all 3 racks is as below: Pressure Gauges : 8 Nos. Pressure Switches: 5 Nos DP Switches : 2 Nos. Pressure transmitters :3 Limit switch:3	Set	1	1
G.15.14	Seal Oil Rack	Set	1	1
G.15.15	Stator Water Rack	Set	1	1
G.15.16	Seal Oil Level / PrTxx Instrument Rack	Set	1	1
G.15.17	Stator Water DP Instrument Rack	Set	1	1
G.15.18	H2 Dryer Unit	Set	1	1
G.16.0	LAYING AND TERMINATION OF INSTRUMENTATION CABLES			
G.16.1	Overall Shielded Cable			
G.16.1.1	2P x 0.5 sqmm	Mtrs	13500	13500
G.16.1.2	4P x 0.5 sqmm	Mtrs	9450	9450
G.16.1.3	8P x 0.5 sqmm	Mtrs	3150	3150
G.16.1.4	12P x 0.5 sqmm	Mtrs	1350	1350
G.16.1.5	2P x 0.5 sqmm (Cu braided)	Mtrs	5850	5850
G.16.1.6	4P x 0.5 sqmm (Fire Survival)	Mtrs	3150	3150
G.16.2	Individual & Overall Shielded Cable			
G.16.2.1	4P x 0.5 sqmm	Mtrs	6300	6300
G.16.2.2	8P x 0.5 sqmm	Mtrs	11700	11700
H	BHEL-BHOPAL SCOPE OF SUPPLY			
H.1.0	Commissioning of the following (including cabling, tubing, fixing AFR, Speed Regulators as applicable, checking and commissioning)			

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H.1.1	PT 100 Simplex/Duplex - 3 Wire/4 Wire RTD Sensors for winding/bearings of MDBFP/Drip Pump/CEP/CWP/Mill/DMCW/ACW,etc Motors	Nos	789	717
H.1.2	Electric Actuators for various sizes of Valves	Nos	51	39
H.1.3	11 kV HT Drives ID/FD/PA/MDBFP - Each 2 Nos., CW Pump- 5 Nos	Nos	7	7
H.1.4	3.3 kV HT Drives DMCW(TG)/CEP/ACW - 3 Nos each., Mills-8 Nos, BCW-1 No., Drip Motor 2 Nos.	Nos	22	22
H.1.5	3.3 kV HT Drives of other applications (Stage wise)	Nos	16	0
I	VOID			
J	BHEL-PEM SCOPE OF SUPPLY			
J.1.0	Instruments			
J.1.1	Ultrasonic Flow Transmitter with Controller (Raw Water/Ash Water/CW & ACW)	Nos	14	0
J.2.0	Laying and Termination of I/O Shielded, Screened, Twisted Pair, Type F Armoured Instrumentation Cables			
J.2.1	4 Pair x 0.5 sqmm	Mtrs	59400	59400
J.2.2	8 Pair x 0.5 sqmm	Mtrs	40500	40500
J.2.3	12 Pair x 0.5 sqmm	Mtrs	8640	8640
J.2.4	20 Pair x 0.5 sqmm	Mtrs	8640	8640
J.3.0	Laying and Termination of Overall Shielded, Screened, Twisted Pair, Type G Armoured Instrumentation Cables			
J.3.1	2 Pair x 0.5 sqmm	Mtrs	50580	50580
J.3.2	4 Pair x 0.5 sqmm	Mtrs	40680	40680
J.3.3	8 Pair x 0.5 sqmm	Mtrs	102960	102960
J.3.4	12 Pair x 0.5 sqmm	Mtrs	20700	20700
J.4.0	Commissioning of the following (including cabling, tubing, fixing AFR, Speed Regulators as applicable, checking and commissioning)			
J.4.1	Control Valves with Smart Positioner, AFR, Air Lock Valve etc., LO TCV, Gland Steam inlet and dump	Set	29	29
J.4.2	Electric Actuators for Butterfly Valves	Nos	2	2
J.4.3	Oxygen Dosing Skid for CPU/Dearator O/L - Approximate qty of instruments per skid is Pressure Gauges: 03 Nos., Mass flow controllers- 02 Nos., Pressure Safety Valve - 2 nos. Pressure Transmitter: 6 Nos., Solenoid Valves : 5 No. Junction boxes: 2 Nos, oxygen cylinders - 8 Nos + 11 loose cylinders	Set	2	2
J.4.4	Ammonia Dosing Skid - Approximate qty of instruments per skid is Pressure Gauges: 08 Nos., Level Gauge- 04 Nos, Pressure Transmitter: 04 Nos, level Transmitter: 06 Nos Differential Pressure indicating Transmitter - 02 Nos & Solenoid Operated Gate Valves - 06 Nos.	Set	1	1
J.4.5	NaOH Dosing Skid - Approximate qty of instruments per skid is., Pressure Gauges-03 Nos., Level Gauge- 01 Nos, Level Transmitters: 02 Nos. Pressure transmitter-02 Nos. & Solenoid Operated Gate Valves - 02 Nos.	Set	1	1

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J.4.6	Hydrazine dosing system Approximate qty of instruments per skid is Pressure Gauges: 08 Nos., Level Gauge- 04 Nos, Pressure Transmitter: 04 Nos, level Transmitter: 06 Nos Differential Pressure Transmitter-02 Nos. & Solenoid Operated Gate Valves - 06 Nos.	Set	1	1
J.5.0	Citric Acid Cleaning for Boiler - Installation and Removal			
J.5.1	Temp. Gauges	Nos	2	2
J.5.2	Pressuer Gauges	Nos	2	2
J.5.3	Thermocouple Stem type and MTM	Nos	8	8
J.5.4	Junction Boxes	Nos	3	3

NOTE:

1. The BOQ Ref. no given above may be linked with the BOQ Ref no in Price bid.
2. The Price bid contains the consolidated list of BOQ with brief description of items.
3. Rates are to be filled only in the Price bid.
4. Before filling the Rates in the Price bid, the bidder shall go through the detailed specification of all items of BOQ as well as Scope of Work as specified in relevant Clause of this document.
5. The quantity indicated in the BOQ / Price bid is approximate only and is liable for variation. Payment will be as per actual quantity erected / commissioned as certified by BHEL Engineer.