

VOLUME – IA
Part I & II

TECHNICAL
CONDITIONS OF
CONTRACT
(TCC)

BHARAT HEAVY ELECTRICALS LIMITED



TECHNICAL CONDITION OF CONTRACT (TCC)

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VOLUME - IA PART – I CHAPTER – I

PROJECT INFORMATION

INTRODUCTION

1.1	Project Title	:	Ennore SEZ project of 2 x 660 MW Coal Based Super Critical Thermal Power Project at Ash Dyke of NCTPS
1.2	Plant capacity	:	1320 MW (2 units of 660 MW each)
1.3	Type of project	:	Green field
1.4	Owner	:	Tamil Nadu Generation and Distribution Corporation Limited (TANGEDCO)
1.5	Consultant	:	NA
1.6	Plant site location	:	Ash dyke of North Chennai Thermal Power Station (NCTPS)
1.7	Location co-ordinates	:	80° 18' E to 80 ° 19' E Longitude 13° 17' N to 13 ° 18' N Latitude
1.8	Nearest Village	:	Vayalur
1.9	Nearest Town & City	:	Chennai (35 Km)
1.10	State Capital	:	Chennai (35 Km)
1.11	Nearest Railway Station	:	Athipattu Pudunagar (~ 5 Km) on Chennai – Vijayawada Line
1.12	Nearest Airport	:	Chennai (~ 60 Km)
1.13	Nearest Seaport	:	Ennore (~ 3 Km)
1.14	Nearest Road access	:	All weather road from Pattamandri on the Thiruvottiur – Ponneri highway
2.0	Meteorological Condition		
2.1	Climate	:	Tropical, very dry and hot summer, dry and cold winter and good rain-fall in monsoon accompanied with strong wind
2.2	Site Elevation	:	(+) 10.0 Meter above Mean Sea Level
2.3	Ambient Temperature	:	
a.	Annual Maximum Mean Temperature	:	32 °C

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b.	Annual Minimum Mean Temperature	:	24 °C
c.	Design ambient temperature	:	35 °C
2.4	Relative Humidity		
a.	Maximum	:	100 %
b.	Minimum	:	36 %
c.	Design	:	75 %
2.5	Annual Rainfall		
	Maximum	:	2540 mm
	Average	:	1600 mm
	Minimum	:	1175 mm
2.6	Basic Design Wind Pressure	:	As per IS: 875 (Latest Edition)
2.7	Wind Speed	:	11.8 kmph (Avg), 50 m/s (max)
2.7	Seismic zone	:	Zone: III as defined in IS:1893-2002
2.8	Design ambient temperature for Electrical equipment	:	50 °C

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VOLUME-IA PART-I CHAPTER – II

SCOPE OF WORKS

The Scope of the work will comprise of but not limited to the following:

(All the works mentioned hereunder shall be carried out within the accepted rate unless otherwise specified.)

- 1.2.1 Erection, Testing, Commissioning, Trial Operation of Concrete Volute Type CW Pumps, ACW Pumps & Blowdown Pumps including its associated Auxiliaries work etc. in Cooling Water Pump House (CWPH), including handling of materials at BHEL / Client's Stores / Storage Yard, Transportation to site of erection, supply and application of painting etc. for Unit-1 & Unit-2 of 2X660MW Ennore SEZ Supercritical Thermal Power Project at Ash Dyke of NCTPS, Tamilnadu.
- 1.2.2 **Detailed Scope of work**
- 1.2.2.1 Handling of Materials at BHEL / Client's Stores / Storage Yard, Transportation to site.
- 1.2.2.2 Erection, inspection, preparation of foundation, erection, leveling, centering, alignment, grouting & final alignment of-
- 6 No. Concrete Volute Type CW Pumps (with associated piping/instruments up to BFVs near CW pump house for supply line and Duplex SS piping for Motor & Bearing cooling water),
 - 4 No. ACW Pumps (with associated piping/instruments up to BFVs near CW pump house for supply line),
 - 3 No. Blow down Pumps
 - 1 No. Semi-Gantry Crane (CWPH screens & gates handling).
- 1.2.2.3 Associated surface finish, supply & application of required primer & finish paints / Anti corrosive as applicable and labeling on equipment & piping, pre-commissioning, commissioning, trial operation & handing over of aforementioned equipment's at Unit-1 & Unit 2, are included in contractor scope.
- 1.2.2.4 Receipt of materials from all the BHEL Stores and Transportation to Erection site.
- 1.2.2.5 Lifting, laying, erection, bolt torque tightening of valves, bellows, as applicable, Installation of all valves and other miscellaneous in line / on line items and Erection of discharge piping till BFV & duplex ss pipes for bearing cooling is also included in the contract scope within the quoted rates.
- 1.2.2.6 Fabrication and installation, setting and commissioning of pipe supports, guides, anchors and spring supports as required.
- 1.2.2.7 Execute painting and labelling of all equipment, piping (including small bore piping), and structures like platform, pipe rack.
- 1.2.2.8 Though CW piping will be supplied with Glass Flake Coating, at open ends of each pipe up to 100mm length (on both sides), the Glass Flake Coating will not be done to facilitate while supplying the pipes. Hence the scope of this contract includes surface cleaning, supply and application of Glass Flake coating for the welded portion of the pipes up to the maximum of 100mm length or HAZ on both sides of the joint. Surface cleaning and painting of the internal and external surface of CW

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piping shall be carried out by the contractor as per the painting schedule forming the part of this tender specification.

- 1.2.2.9 Shop coated paint/protection on components pertaining to 3 No. Concrete Volute Pump (CVP) have peeled off & require fresh painting. Same shall be carried out in line with approved painting schedule provided by BHEL, after removing existing paint, within the quoted price. Paint material shall be provided free of cost by BHEL.

Similarly, rubber bearing & pressure reducing bushes shall also be replaced on aforementioned components pertaining to 3 No. Concrete Volute Pump (CVP). Replacement Material shall be provided free of cost by BHEL & work shall be carried out as per BHEL instructions within the quoted price. Necessary T&P and consumables for this activity like drilling machine, adhesives etc. shall be arranged by the contractor within the quoted price.

Apart from above, Contractor shall carryout cleaning and preservation / touch up painting for the materials / equipments under this tender specification right from pre- assembly stage to till the equipment is cleared for final painting. For details refer cl. no. 1.17.2 of TCC.

- 1.2.2.10 Execute all mechanical jobs identified during OWNER / Licensors check list, Technical audits, pre-commissioning and commissioning, including additional supports required to restrain pipe movement avoiding interference with nearby structural / piping.
- 1.2.2.11 Installation of any necessary blind or additional valves to isolate lines to facilitate phased commissioning and start-up.
- 1.2.2.12 Make temporary arrangement viz. A-Frame etc. for taking up blue matching, alignment & erection of 2-3 pumps in parallel (reduce dependability on EOT crane), in order to meet the project schedule as per the instructions of BHEL Engineer, is included in contractor scope within the quoted price.
- 1.2.2.13 Dewatering inside Pump House for facilitating erection of items is in contractor scope.
- 1.2.2.14 Any Operating / Approach platforms, cross over, canopies, ladders etc. for approaching different equipment's as per the site requirement, shall have to be fabricated from raw materials supplied by BHEL at free of cost and are to be erected as per instruction of BHEL, by the contractor within the quoted rate / price.
- 1.2.2.15 Shifting of all materials including ODC consignments (CW Pump Motor) from BHEL/Shed to Site including all manpower assistance for carrying out the aforesaid work will be in contractor scope within the quoted price. The said CW Pump Motor is dispatched to site in assembled condition, dismantling of motor terminal box/Motor cooler may be required for facilitating movement into unloading bay. Dismantling of motor terminal box/ motor cooler, movement into unloading bay and reassembly of the same prior to erection is included in the scope of the bidder within the quoted rates.

FOR FURTHER DETAILED SCOPE OF WORKS REFER RELEVANT CHAPTERS IN THIS BOOK

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Annexure A to VOLUME-IA PART – I CHAPTER – II - SCOPE OF WORKS STATUS OF WORKS

Work	Present Status
CW Pump Embedded parts for suction & discharge	Erected
CW Pump Discharge Piece	Erected
CW Pump Sole Plate	Erected and grouted
CW Pump Discharge Reducer	Pump side Couter-flange fitup completed and welding u/p

Notes:

- i. The items mentioned as erected are removed from BoQ. However, above list and the status is indicative and bidder shall visit the site to ascertain the status of the works under the scope of the tender, to acquaint themselves of site conditions prior to submission of offer.
- ii. Bidder has to execute all the associated works for completion of above list of balance works and handing over as per the scope of work and as per the instructions of BHEL Engineer in charge.
- iii. The bidder shall be responsible for the entire scope of works including the works (which are partly/ fully completed / under execution) and to be continued by the bidder based on 'as-is-where-is condition' for fulfilment of complete scope of works.

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VOLUME IA PART – I CHAPTER – III FACILITIES IN THE SCOPE OF CONTRACTOR / BHEL (SCOPE MATRIX)

Sl.No	Description	Scope to be taken care by		Remarks
		BHEL	Bidder	
1.3.1	PART I			
1.3.1.1	ESTABLISHMENT			
1.3.1.1.1	FOR CONSTRUCTION PURPOSE:			
1.3.1.1.1.1	Open space for office	Yes		Free
1.3.1.1.1.2	Open space for storage	Yes		Free
1.3.1.1.1.3	Construction of bidder 's office, canteen and storage building including supply of materials and other services		Yes	
1.3.1.1.1.4	Bidder 's all office equipments, office / store / canteen consumables		Yes	
1.3.1.1.1.5	Canteen facilities for the bidder 's staff, supervisors and engineers etc		Yes	
1.3.1.1.1.6	Firefighting equipments like buckets, extinguishers		Yes	
1.3.1.1.1.7	Fencing of storage area, office, canteen etc of the bidder		Yes	
1.3.1.1.2	FOR LIVING PURPOSES OF THE BIDDER			
1.3.1.1.2.1	Open space		Yes	
1.3.1.1.2.2	Living accommodation		Yes	
1.3.1.2	ELECTRICITY			
1.3.1.2.1	Electricity For construction purposes			Chargeable Basis.
1.3.1.2.1.1	Single point source	Yes		Refer relevant clause below
1.3.1.2.1.2	Further distribution for the work to be done which include supply of materials and execution		Yes	

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1.3.1.2.2	Electricity for the office, stores, canteen etc of the bidder which include:		Yes	
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Sl.No	Description	Scope to be taken care by		Remarks
		BHEL	Bidder	
1.3.1.2.2.1	Distribution from single point including supply of materials and service		Yes	
1.3.1.2.2.2	Supply, installation and connection of material of energy meter including operation and maintenance		Yes	Calibration certificate to be provided
1.3.1.2.2.3	Duties and deposits including statutory clearances for the above		Yes	
1.3.1.2.2.4	Demobilization of the facilities after completion of works		Yes	
1.3.1.2.3	Electricity for living accommodation of the bidder's staff, engineers, supervisors etc on the above lines.(in case BHEL provides this facility, the scope should be given without ambiguity)		Yes	
1.3.1.3	WATER SUPPLY			
1.3.1.3.1	For construction purposes:			Chargeable Basis
1.3.1.3.1.1	Making the water available at single point	Yes		Refer relevant clause below
1.3.1.3.1.2	Further distribution as per the requirement of work including supply of materials and execution		Yes	
1.3.1.3.2	Water supply for bidder's office, stores, canteen etc			
1.3.1.3.2.1	Making the water available at single point		Yes	
1.3.1.3.2.2	Further distribution as per the requirement of work including supply of materials and execution		Yes	

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1.3.1.4	LIGHTING			
1.3.1.4.1	For construction work (supply of all the necessary materials) At office storage area At the preassembly area At the construction site /area		Yes	
Sl.No	Description	Scope to be taken care by		Remarks
		BHEL	Bidder	
1.3.1.4.2	For construction work (Execution of the lighting work / arrangements) At office storage area At the preassembly area At the construction site /area		Yes	
1.3.1.5	COMMUNICATION FACILITIES for site operations	-		
1.3.1.5.1	Telephone, internet (min 1 No of PC & Printer) – Data entry operator as required with computer knowledge		Yes	
1.3.1.6	COMPRESSED AIR SUPPLY			
1.3.1.6.1	Supply of Compressor and all other equipments required for compressor & compressed air system including pipes, valves, storage systems etc	-	YES	
1.3.1.6.2	Installation of above system and operation & maintenance of the same	-	YES	
1.3.1.6.3	Supply of al the consumables for the above system during the contract period		YES	

Sl.No	Description	Scope to be taken		Remarks
		BHEL	Bidder	
1.3.2	PART II			
1.3.2.1	ERECTION FACILITIES			
1.3.2.1.0	Engineering works for construction			
1.3.2.1.1	Providing the erection drawings for all the equipments covered under this scope	Yes		

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1.3.2.1.2	Drawings for construction methods		Yes	In consultation with BHEL
1.3.2.1.3	As-built drawings – wherever deviations observed and executed and also based on the decisions taken at site- example – routing of small bore pipes		Yes	
1.3.2.1.4	Shipping lists etc for reference and planning the activities	Yes	Yes	In consultation with BHEL
1.3.2.1.5	Preparation of site erection schedules and other input requirements		Yes	
Sl.No	Description	Scope to be taken		Remarks
		BHEL	Bidder	
1.3.2.1.6	Review of performance and revision of site erection schedules in order to achieve the end dates and other commitments		Yes	In consultation with BHEL
1.3.2.1.7	Weekly erection schedules based on SI No 1.3.2.1.5		Yes	
1.3.2.1.8	Daily erection / work plan based on SI No 1.3.2.1.7		Yes	
1.3.2.1.9	Periodic visit of the senior official of the bidder to site to review the progress so that works are completed as per schedule. It is suggested this review by the senior official of the bidder should be done once in every two months.		Yes	
1.3.2.1.10	Preparation of preassembly bay		Yes	
1.3.2.1.11	Laying of racks for gantry crane if provided by BHEL or brought by the contractor/bidder himself			Not applicable

1.3.3 LAND FOR SITE OFFICE AND LABOUR COLONY

- 1.3.3.1 Minimum Open space as made available by customer will be provided at free of charges to the contractor, for construction of temporary office shed, fabrication yard and storage area at the job site, contractor's stores shed(s).
- 1.3.3.2 BHEL shall not provide to the contractor any residential accommodation to any of his staff and the contractor has to make his own arrangements. Contractor has to make his own arrangements for labour colony.
- 1.3.3.3 Location and area requirement for office / storage sheds / fabrication yard shall be discussed and mutually agreed to.

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1.3.4 ELECTRICITY

1.3.4.1 Construction power will be provided to the contractor at one points within plant area by BHEL on chargeable basis at the applicable rate of TANGEDCO under LT tariff VI at the nearest substation. The present LT tariff VI rate of TANGEDCO is

- a) Consumption charges at Rs.13.25 per unit
- b) Fixed MD (Maximum Demand) charges as applicable per month
- c) Electricity Tax on total amount

The TANGEDCO tariff and tax may vary from time to time. The required Energy meter for measuring the consumption shall be provided and installed by the contractor. Any dispute regarding consumption, the BHEL engineer's decision is final. The contractor shall make his own arrangement for further distribution with necessary isolator/LCB etc.

1.3.4.2 Any other charges, duty, deposit involved in getting the Electricity shall be borne by the bidder. As regards to contractor's office shed also, all such expenditure shall be borne by the contractor.

1.3.4.3 Provision of distribution of electrical power from the given points to the required places with proper distribution boards, approved cables and cable laying including supply of all materials like cables, switch boards, pipes etc., observing the safety rules laid down by electrical authority of the State/ BHEL / their customer with appropriate statutory requirements shall be the responsibility of the tenderer / contractor.

1.3.4.4 The required energy meter for measuring power consumption shall be arranged by the contractor and taken care by the contractor.

1.3.4.5 Necessary "Capacitor Banks" to improve the Power factor to a minimum of 0.9 shall be provided by the contractor at his cost. Penalty if any levied by customer on this account will be recovered from contractor's bills.

1.3.4.6 Contractor has to make his own arrangements for his electricity requirement for his labour colony at his cost.

1.3.4.7 BHEL is not responsible for any loss or damage to the contractor's equipment as a result of variations in voltage / frequency or interruptions in power supply.

1.3.4.8 POSSESSION OF GENERATORS

As there are bound to be interruptions in regular power supply, power cut/ load shedding in any construction sites, suitable extension of time, if found necessary only be given and contractor is not entitled for any compensation. It shall be the responsibility of the tenderer / contractor to provide, and maintain the complete installation on the load side of the supply with due regard to safety requirements at site. It shall be responsibility of the contractor to have at least one diesel operated generator sets to get urgent and important work viz. welding, gri to go on without interruptions. The consumables required to operate the generators are to be

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provided by tenderers. This may also be noted while quoting. No separate payment shall be made for this contingency.

1.3.5 CONSTRUCTION WATER

- 1.3.5.1 Water required for construction purposes will be provided at one single point within the plant area on chargeable basis from the nearest storage tank located inside the plant area at the prevailing rates of TANGEDCO / Metro water. The required water meter for measuring the consumption shall be provided and installed by the contractor. The required pumps & accessories, pipes for drawing water from the storage tank and further distribution will be arranged by the contractor at their cost.
- 1.3.5.2 The water charges may vary from time to time as per TANGEDCO / Metro water conditions, however the prevailing water charge is Rs.174.00 per 1000 litres. Any dispute regarding consumption, the BHEL engineer decision will be final.
- 1.3.5.3 Incase non-availability of water, the contractor shall make his own arrangements of water suitable for construction purpose to have uninterrupted work. No separate payment shall be made for any contingency arrangement made by contractor, due to delay / failure for providing water supply. Contractor has to make his own arrangements for his water requirement for his labour colony at his cost.

1.3.6 DRINKING WATER:

Bidder shall provide drinking water at the work spot at their cost.

1.3.7 CONSUMABLES:

- 1.3.7.1 Any special electrodes / consumables supplied by the manufacturing units of BHEL for the respective packages/equipments alone will be issued to the contractor free of charge for erection activities. Other required consumables like electrodes, all gases, and other materials for this scope of work are to be arranged by the contractor at their cost.
- 1.3.7.2 All the required electrodes (in his scope) as approved by BHEL shall be arranged by contractor at his cost. It shall be the responsibility of the contractor to obtain prior approval of BHEL, before procurement regarding, suppliers, type of electrodes etc. On receipt of the electrodes at site, it shall be subject to inspection and approval by BHEL. The contractor shall inform BHEL details regarding type of electrodes, batch number and date of expiry etc.
- 1.3.7.3 The contractor shall provide within finally accepted price / rates, all consumables like welding electrodes (including alloy steel and stainless steel), all gases (inert, welding, and cutting), soldering material, dye penetrants, radiography films. Other erection consumables such as wrap cloth, tapes, jointing compound, grease, lubricants, M-seal, Araldite, petrol, CTC / other cleaning agents, grinding and cutting wheels are to be provided by the contractor. Steel, H&S, packers, shims, wooden planks, scaffolding and pre-assembly materials, hardware items etc required for

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temporary works such as supports, scaffoldings, bed are to be arranged by him. Sealing compounds, gaskets, gland packing, wooden sleepers, for temporary work, required for completion of work except those which are specifically supplied by manufacturing unit are also to be arranged by him.

1.3.7.4 All the shims, gaskets and packing, which go finally as part of equipment, shall be supplied by BHEL free of cost.

1.3.7.5 In the event of failure of contractor to bring necessary and sufficient consumables, BHEL shall arrange for the same at the risk and cost of the contractor. The entire cost towards this along with standard BHEL overhead shall be deducted from the contractor's immediate due bills.

1.3.8 MATERIAL SUPPLY:

BHEL will supply the materials/equipments indicated in the weight schedule from their respective manufacturing units which are to be executed/incorporated in the permanent system. In addition, the material such as lube oil, grease required for commissioning the erected equipments and chemicals required for chemical cleaning of equipments will be supplied free of cost by BHEL.

1.3.9 LIGHTING FACILITY:

Adequate lighting facilities such as flood lamps, hand lamps and area lighting shall be arranged by the contractor at the site of construction, pre assembly yard and contractor's material storage area etc. at his cost.

1.3.10 GASES:

1.3.10.1 All the required gases like Oxygen / Acetylene / argon /Nitrogen required for work shall be supplied by the Contractor at his cost. It shall be the responsibility of the contractor to plan the activities and store sufficient quantity of these gases. Non-availability of gases cannot be considered as reason for not attaining the required progress.

1.3.10.2 BHEL reserves the right to reject the use of any gas in case required purity is not maintained.

1.3.10.3 The contractor shall submit weekly / fortnightly / monthly statement report regarding consumption of all consumables for cost analysis purposes.

1.3.10.4 The contractor shall ensure safe keeping of the inflammable cylinder at a separate place away from normal habit with proper security etc.

1.3.11 ELECTRODES SUPPLY AND STORAGE

1.3.11.1 The bidder shall use the BHEL / Customer approved quality welding electrodes only.

1.3.11.2 It shall be the responsibility of the contractor to obtain prior approval of BHEL, before procurement, regarding suppliers, type of electrodes etc. On receipt of the electrodes at site, it shall be subject to inspection and approval by BHEL. The

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contractor shall inform BHEL details regarding type of electrodes, batch number and date of expiry etc. Test certificates for electrodes and other consumables should be submitted to BHEL Engineer as per requirement.

- 1.3.11.3 Shortage of any of the electrodes or the equivalent suggested by BHEL shall not be quoted as reason for deficiency in progress or for additional rate. Contractor shall submit weekly/ fortnightly/ monthly statement/ report regarding consumption and available stock of all types of electrodes for avoiding stoppage of work on consumable scarcity.
- 1.3.11.4 Storage of electrodes shall be done in an air conditioned / controlled humidity room as per requirement, at his own cost by the contractor.
- 1.3.11.5 All low hydrogen electrodes shall be baked / dried in the electrode drying oven (range 375 deg. C - 425 deg. C) to the temperature and period specified by the BHEL Engineer before they are used in erection work and each welder should be provided with one portable electrode drying oven at the work spot. Electrode drying oven and portable drying ovens shall be provided by contractor at his cost.
- 1.3.11.6 In case of improper arrangement of procurement of above electrodes BHEL reserves the right to procure the same from any source and recover the cost from the contractor's first subsequent bills at market value plus departmental charges of BHEL communicated from time to time. Postponement of such recovery is not permitted.
- 1.3.11.7 BHEL reserves the right to reject the use of any electrodes at any stage, if found defective because of bad quality, improper storage, date expiry, unapproved type of electrodes etc. It shall be the responsibility of the contractor to replace at his cost without loss of time.

1.3.12 OTHER FACILITIES

Adequate water less urinals shall be arranged by the contractor within quoted rates, at site of construction at different level and different areas like TG floors at different levels, with proper disposal arrangement. Also refer chapter regarding HSE Plan for Site Operations by Subcontractor in Volume IA Part II.

1.3.13 CONTRACTOR'S OBLIGATION ON COMPLETION

On completion of work, all the temporary buildings, structures, pipe lines, cables etc. shall be dismantled and leveled and debris shall be removed as per instructions of BHEL by the contractor at his cost. In the event of his failure to do so, the expenditure towards clearance of the same will be recovered from the contractor. The decision of BHEL Engineer in this regard is final.

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VOLUME-IA PART-I CHAPTER – IV **T&Ps and MMEs to be deployed by Contractor**

- 1.4.1 All the tools & plants and Measuring Monitoring Equipment (MME) required for this scope of work, except the tools & plants provided by BHEL, are to be arranged by the contractor within the quoted rates.
- 1.4.2 Experienced EOT Crane operators and operator for portal crane in shifts shall be arranged by the bidder separately for each unit within the quoted rate / price
- 1.4.3 For loading, transportation and erection, all necessary T&P such as Trailers, Cranes, Winches, welding generators, slings, jacks, sleepers, rails, M64 Eye bolts for handling pump shaft etc., are to be arranged by the contractor. All the tools & plants required for this scope of work, except the tools & plants provided by BHEL, are to be arranged by the contractor within the quoted rates /prices.
- 1.4.4 All the tools and plants including suitable Jacks / Hydraulic jacks / suitable Pipe Bending machines, required for satisfactory completion of the work has to be arranged by the contractor.
- 1.4.5 Any loss/damage of tools (supplied by BHEL) by the contractor shall have to be replaced by contractor or otherwise cost thereof shall be recovered from the contractor.
- 1.4.10 Deleted
- 1.4.11 Crane operators deployed by the contractor shall be tested by BHEL before he is allowed to operate the cranes.
- 1.4.12 The crane operator(s) deployed by the contractor shall meet the following qualification requirement
 - 1.4.12.1 Must be capable of independently operating Hydraulic / Mechanical Crawler / Tyre mounted Cranes of respective categories.
 - 1.4.12.2 Must have minimum 2 years of experience in operation of Hydraulic / Mechanical Crawler / Tyre mounted Cranes in respective categories & hold valid HMV / TRANS license.
 - 1.4.12.3 Should be able to read and interpret the operation and maintenance manual, boom load chart, boom angle and other indicating devices.
 - 1.4.12.4 Shall have the latest Physician's certification for their physical fitness in vision with / without lenses & adequate hearing with / without hearing aid.
- 1.4.13 Deleted
- 1.4.14 In the event of contractor failing to arrange the required tools, plants, machinery, equipment, material or non-availability of the same owing to breakdown, BHEL will make alternative arrangement at the risk and cost of the contractor.
Case 1: BHEL provides its own Capital T&P
In case the BHEL provides any T&P which is owned by BHEL, hire charges (as per BHEL norms) will be recovered from the contractor as per the prevailing BHEL Corporate hire charges. In case, the T&P is specifically

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listed in “T&Ps to be deployed by Contractor”, “hire charges applicable to outside agencies other than contractors working for BHEL” will apply. If not listed, “hire charges applicable to contractors working for BHEL” will apply. The hire charges of Capital Tools & Plants are exclusive of operating expenses e.g., Operator, fuel & Consumables and the same shall be arranged by the contractor at his cost.

Case 2: In all cases other than that specified in Case 1 above, actual expenses incurred by BHEL along with applicable overheads will be back-charged to the contractor.

The present rates of BHEL’s Corporate Crane hire charge, are enclosed in part II of Technical Conditions of Contract (Volume I Book-I). This may get revised further as per the BHEL corporate guidelines. The prevailing rates as on date of execution shall be applicable.

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VOLUME-IA PART-I CHAPTER - V **T&Ps TO BE DEPLOYED BY BHEL ON SHARING BASIS**

- 1.5.1 The following T&Ps will be provided by BHEL to contractor free of hire charges on sharable basis.

S. No	T&P Description	Qty.
01	EOT crane – 70 T capacity at CW pump house	01
02	Suitable Higher capacity crane (75T Crane and above) for erection of Semi-Gantry Crane , if required.	As per requirement

- 1.5.2 All the above T&Ps shall be issued on free of hire charges on need basis for erection/pre-commissioning activities only and to be shared with other contractors.
- 1.5.3 Allotment of the above T & Ps will be made by BHEL Site Engineer depending on the requirement.
- 1.5.4 All the tools & plants required for this scope of work, except the tools & plants provided by BHEL as mentioned above, are to be arranged by the contractor within the quoted rates /prices.

1.5.5 EOT Crane:

- 1.5.5.1 Since EOT crane is to be handed over to customer, allotment will be made only on need basis. Construction power towards using EOT crane will be provided to the contractor on chargeable basis as per clause 1.3.4 of this TCC. Experienced EOT crane-operators are to be arranged in shifts by the contractor within the quoted rates. Contractor has to plan the activities on item wise where the EOT crane is required to be used and submit to BHEL site for approval. In case the erection can be carried out by using other T&Ps, contractor shall make his own arrangement within the quoted price. The decision of BHEL Site in-charge on this will be final and binding.
- 1.5.5.2 The availability of EOT crane is likely to be hampered from time to time due to routine preventive maintenance or breakdown maintenance. Contractor has to make alternative arrangement or plan / modify / alter his activities to suit the above conditions and the contractor will not be liable for any compensation or extension of time due to this non availability, for maintaining the erection schedule.
- 1.5.5.4 Providing required manpower assistance for moving the trailing cable of EOT Crane is included in the scope of this contract.
- 1.5.5.5 Experienced Crane operator for EOT crane shall be arranged by the bidder within the quoted rate / price. Crane operators deployed by the contractor shall be tested by BHEL before he is allowed to operate the cranes.

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- 1.5.6 Higher capacity crane will be provided for erection of Semi-Gantry Crane, if required.
- 1.5.7 BHEL may provide either BHEL owned cranes or hired cranes at the discretion of BHEL as below:
- 1.5.7.1 In the event of providing BHEL own cranes:
- 1.5.7.1.1 BHEL shall provide crane operator, free of charges. Fuel and lubricants are to be arranged by the contractor within the quoted rate.
- 1.5.7.1.2 Maintenance for the BHEL own cranes shall be carried out by BHEL. However, all the consumables for the maintenance of BHEL own cranes shall be provided by the contractor within the quoted rates. The Tentative List of consumables required to be provided by contractor from the BHEL/OEM recommended supplier is as below:
- Engine Oil
 - Fuel Filters
 - Air Filters
 - Hydraulic Filters
 - Hydraulic Oil
 - Gear Oil
 - Engine Oil Filter
 - Oil Separator Filter
 - Rope
 - Grease
- Maintenance for the BHEL cranes shall be carried out by BHEL. The bidder shall extend support if required for routine maintenance works without any additional cost.
- 1.5.7.2 In the event of providing hired cranes:
- 1.5.7.2.1 Crane Operators for hired cranes will be provided by BHEL, free of charges.
- 1.5.7.2.2 Fuel and lubricants are to be arranged by the contractor within the quoted rate.
- 1.5.8 Cranes provided by BHEL are only for erection purpose and shall not be available for material handling or transportation purpose. Contractor shall make their own arrangements for material transportation to erection site.
- 1.5.9 Besides the T & P mentioned above, which is being made available to the contractor on free of hire charges, any additional crane and other T & P which may be required for successful and timely execution of the work covered within the scope of this tender shall be arranged and provided at site by the contractor at his cost. In case if the contractor fails to provide such equipments, BHEL will arrange for the same and the cost will be recovered from the contractor's bill with BHEL overheads, as applicable from time to time which may vary even during contract period.
- 1.5.10 Any loss / damage to any or part of the BHEL T&Ps by the contractor shall have to be replaced or otherwise cost thereof shall be recovered from the contractor.

TECHNICAL CONDITION OF CONTRACT (TCC)

- 1.5.11 All the distribution boards, connecting cables, hoses etc., and temporary connection work including electrical connections shall have to be arranged by the contractor at his cost.
- 1.5.12 Necessary electrical / water / air connection required for operation of any of the tools & tackles shall be in the Contractor's scope.
- 1.5.13 Apart from the above mentioned tools, any other tools and plants including suitable Jacks / Hydraulics jacks required for satisfactory completion of the work has to be arranged by the contractor.
- 1.5.14 For the cranes, the required consolidation and preparation for placing crane for operation (civil work) is under bidder scope and also necessary plates / sleepers required for marching operation shall be provided by the contractor within quoted rates.
- 1.5.15 For movement of cranes etc., it may become necessary to lay sleeper bed for obtaining leveled safe approach for usage of equipment. It shall be the responsibility of the contractor to lay necessary sleeper's. The sleepers shall be arranged by the contractor at his cost.
- 1.5.16 The contractor at his cost shall arrange for grouting of anchor points of T&Ps issued to him. Necessary grout materials are to be arranged by the contractor at his cost.
- 1.5.17 In case of non-availability of any of these equipment, due to any reason i.e., unavoidable breakdown, major overhaul or any other reason etc., the contractor should make arrangement at his cost to meet the erection targets. No extra claim will be admitted due to non-availability of any of the above equipment. No delay in execution of work shall be accepted on this account.

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VOLUME-IA PART-I CHAPTER - VI

TIME SCHEDULE

1.6.1 TIME SCHEDULE

1.6.1.1 The entire work of Erection, Testing, Commissioning & Trial Operation of Pumps & Auxiliaries work in Cooling Water Pump House (CWPH), shall be completed within Six (6) months from the date of commencement of work at site.

1.6.1.2 During the total period of contract, the contractor has to carry out the activities in a phased manner as required by BHEL to achieve the milestone events as programmed.

1.6.1.3 The erection work shall be commenced within 7 days of issuance of LOI and shall be deemed as completed in all respect only when entire work as per scope is completed. The decision of BHEL in this regard shall be final and binding on the contractor. The scope of work under this contract is deemed to be completed only when so certified by the site Engineer.

1.6.1.4 The contractor is required to refer Form 15 – Monthly performance evaluation of contractors in Volume IA Part II of TCC for all the instructions to be taken immediately after receipt of LOI.

1.6.2 COMMENCEMENT OF CONTRACT PERIOD

The work shall commence within 7 days of issuance of Letter Of Intent (LOI) by BHEL. In case of discrepancy the decision of BHEL engineer is final.

1.6.3 MOBILISATION FOR ERECTION, TESTING, ASSISTANCE FOR COMMISSIONING ETC.,

1.6.3.1 The activities for erection, testing etc shall be started as per directions of Construction Manager of BHEL.

1.6.3.1.1 The contractor has to augment his resources in such a manner that following major milestones of erection & commissioning are achieved on specified schedules mentioned below:

Tentative Milestone schedule

Sl. No.	Milestone Description	Scheduled Completion (from date of commencement)
1.	START OF WORK	1 st Month
2.	Commencement of Discharge Piping Erection	1 st Month
3.	Commencement of Pump Erection	1 st Month
4.	Pump readiness for forebay charging	4 th Month
5.	Pump coupled trial run	5 th Month
6.	Completion of contractual obligation	6 th Month

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In order to meet the schedule in general, and any other intermediate targets set, to meet customer/ project schedule requirements, Contractor shall arrange & augment all necessary resources from time to time on the instructions of BHEL Engineer. Contractor shall plan for round the clock work in order to execute works to match project schedule on the instructions of BHEL Engineer, within the quoted price.

1.6.3.2 In case the project is to be advanced, the erection works in the scope of the contractor is to be advanced to meet the project requirement. No extra payment whatsoever shall be paid on this account.

1.6.3.3. Intermediate Milestones:

M1 and M2 shall be the intermediate milestones for this work.

Sl. No	Description	Completion from the contractual date of start of the work at site	Intermediate Milestone
1	Pump readiness for forebay charging	4 th Month	M1
2	Readiness for Motor Trial Run	5 th Month	M2

Provision of Penalty in case of slippage of Intermediate Milestones:

1.6.3.3.1 In case of slippage of Two Major Intermediate Milestones, mentioned as M1 & M2 above, delay Analysis shall be carried out on achievement of each of these two Intermediate Milestones in reference to F-14.

1.6.3.3.2 In case delay in achieving M1 Milestone is solely attributable to the contractor, 0.5% per week of executable contract value*, limited to maximum 2% of executable contract value, will be withheld.

1.6.3.3.3 In case delay in achieving M2 Milestone is solely attributable to the contractor, 0.5% per week of executable contract value*, limited to maximum 3% of executable contract value, will be withheld.

1.6.3.3.4 Amount already withheld, if any against slippage of M1 milestone, shall be released only if there is no delay attributable to contractor in achievement of M2 Milestone.

1.6.3.3.5 Amount required to be withheld on account of slippage of identified intermediate milestone(s) shall be withheld out of respective milestone payment (corresponding RA Bill) and balance amount (if any) shall be withheld @10% of RA Bill amount from subsequent RA bills.

1.6.3.3.6 Final deduction towards LD (if applicable), on account of delay attributable to contractor shall be based on final delay analysis on completion/ closure of contract. Withheld amount, if any due to slippage of identified intermediate milestone(s) shall be adjusted against LD or released as the case may be.

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1.6.3.3.7 In case of termination of contract due to any reason attributable to contractor before completion of work, the amount already withheld against slippage of intermediate milestones shall not be released and be converted into recovery.

1.6.3.3.8 Contractor shall make all possible efforts to expedite the activities, in case of delay of any intermediate milestone, to maintain overall project completion schedule.

*Executable Contract Value - Value of work for which inputs/ fronts were made available to contractor and were scheduled for execution till the date of achievement of that milestone.

1.6.4 **CONTRACT PERIOD**

The contract period for completion of entire work under scope shall be **Six (6)** months from the "COMMENCEMENT OF CONTRACT PERIOD" as specified earlier for completion of the entire work.

1.6.5 **GUARANTEE PERIOD**

The guarantee period of Twelve (12) months for workmanship for each unit shall commence from Commencement of performance guarantee shall be as per clause no. 2.24 (Performance Guarantee for Workmanship) of General Conditions of Contract. The commencement of guarantee period for the quality of the workmanship shall start from the date of Trial operational acceptance of facilities OR Handing Over to the customer, whichever is earlier.

TECHNICAL CONDITION OF CONTRACT (TCC)

VOLUME-IA PART-I CHAPTER - VII TERMS OF PAYMENT

1.7.1 The break-up of pro-rata payment (90%) and milestone payment (10%) detailed below.

1.7.1.1 The 90% of the total agreed lump sum price for the scope of work shall be paid as Progressive Payment in Prorata against monthly running bills on completion of the each of the activities as per Cl no 1.7.1.1.1 to 1.7.1.1.5 of the following table.

BILLING BREAK UP

Sl. No.	Activity / Work Description	%
1.7.1.1.0	PRO RATA PAYMENTS (90%)	
1.7.1.1.1	Erection, testing & commissioning of 6 No. Concrete Volute CW Pumps (40%)	
1.7.1.1.1.1	Placement	12.00%
1.7.1.1.1.2	Levelling & Alignment	16.00%
1.7.1.1.1.3	Torque tightening/ welding/ grouting incl. testing & commissioning	12.00%
1.7.1.1.2	Erection, Alignment, grouting testing & commissioning of 4 No. ACW Pumps (12%)	
1.7.1.1.2.1	Placement	3.60%
1.7.1.1.2.2	Levelling & Alignment	4.80%
1.7.1.1.2.3	Torque tightening/ welding/ grouting incl. testing & commissioning	3.60%
1.7.1.1.3	Erection, Alignment, grouting testing & commissioning of 3 No. Blowdown Pumps (8%)	
1.7.1.1.3.1	Placement	2.40%
1.7.1.1.3.2	Levelling & Alignment	3.20%
1.7.1.1.3.3	Torque tightening/ welding/ grouting incl. testing & commissioning	2.40%
1.7.1.1.4	Erection, testing & commissioning of Semi-Gantry Crane (CWPH screens & gates handling) (5%)	5.00%
1.7.1.1.5	Piping (25%)	
1.7.1.1.5.1	On Pre-assembly wherever applicable (if not applicable, this portion shall be clubbed with placement in position)	3.75%

TECHNICAL CONDITION OF CONTRACT (TCC)

1.7.1.1.5.2	Placement in position	5.00%
1.7.1.1.5.3	Alignment	7.50%
1.7.1.1.5.4	Welding/Bolting/Fixing/Torque Tightening	6.25%
1.7.1.1.5.5	Completion of Non Destructive Examination & Stress Relieving/ Heat Treatment (if not applicable, then this portion to be paid along with welding)	2.50%
	Total for pro rata payments (90%)	90%

1.7.2 Further, 10 % payment on pro-rata basis shall be released on achievement of the following stage / milestones events (as per Cl no 1.7.1.2.1 to 1.7.1.2.6 of the following table) for the tonnage erected.

SL. NO.	Activity / Work Description	%
1.7.1.2.0	Stage / milestone payments (10%)	%
1.7.1.2.1	Pumps readiness for forebay charging	2.00%
1.7.1.2.2	Pumps coupled trial run	3.00%
1.7.1.2.3	PG test of Pumps	2.00%
1.7.1.2.4	Painting (including arrow marking, nomenclature, etc), Area cleaning, temporary structures cutting / removal and return of scrap	1.00%
1.7.1.2.5	Material Reconciliation, Punch List points / pending points liquidation	1.00%
1.7.1.2.6	Final Bill & completion of contractual obligation	1.00%
	Total for Milestone / Stage payments (10%)	10.00%

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VOLUME-IA PART-I CHAPTER VIII

TAXES AND OTHER DUTIES

1.8.1 Goods and service Tax (GST) & Cess

1.8.1.1 The successful bidder shall furnish proof of GST registration with GSTN Portal in the State in which the Project is being executed, covering the services under this contract. Registration should also bear endorsement for the premises from where the billing shall be done by the successful bidder on BHEL for this project/ work.

1.8.1.2 Contractor's price/rates shall be exclusive of GST & Cess (if applicable) (herein after termed as GST). Contractor shall submit to BHEL the GST compliant tax invoice/debit note/revised tax invoice on the basis of which BHEL will claim the input tax credit in its return. Since this is a works contract, the applicable rate shall be @ 18% GST, as applicable presently

1.8.1.3 Bidder shall note that the GST Tax Invoice complying with GST Invoice Rules wherein the 'Bill To' details will as below:

BHEL GSTN- 33AAACB4146P2ZL

NAME - BHARAT HEAVY ELECTRICALS LIMITED

ADDRESS - 2 X 660 MW ENNORE SEZ STPP, VAYALUR BR PO MINJUR PO, TAMILNADU - 601203

1.8.1.4 GST charged in the tax invoice/debit note/revised tax invoice by the contractor shall be released separately to the contractor only after contractor files the outward supply details in GSTR-1 on GSTN portal and input tax credit of such invoice is matched with corresponding details of outward supply of the contractor and has paid the GST at the time of filing the monthly return.

1.8.1.5 In case BHEL has to incur any liability (like interest / penalty etc.) due to denial/reversal/ delay of input tax credit in respect of the invoice submitted by the contractor, for the reasons attributable to the contractor, the same shall be recovered from the contractor.

1.8.1.6 Further, in case BHEL is deprived of the Input tax credit due to any reason attributable to contractor, the same shall not be paid or Recovered if already paid to the contractor.

1.8.1.7 Tax invoice/debit Note/revised tax invoice shall contain all such particulars as prescribed in GST law and comply to the timelines for issue of the same. Invoices shall be submitted on time to the concerned BHEL Engineer In Charge.

1.8.1.8 TDS under GST (if/ as & when applicable) shall be deducted at prevailing rates on gross invoice value from the running bills.

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1.8.1.9 E-way bills // Transit passes / Road Permits, if required for materials / T&P etc., bought into the project site is to be arranged by the Contractor only

1.8.1.10 BHEL shall not reimburse any amounts towards any interest / penalty etc., incurred by contractor Any additional claim at a later date due to issues such as wrong rates / wrong classification by contractor shall not be paid by BHEL

1.8.2 All taxes and duty other than GST & Cess

The contractor shall pay all (except the specific exclusion viz GST & Cess) taxes, fees, license charges, deposits, duties, tools, royalty, commissions, Stamp Duties, or other charges / levies, which may be levied on the input goods & services consumed and output goods & services delivered in course of his operations in executing the contract and the same shall not be reimbursed by BHEL. In case BHEL is forced to pay any of such taxes, BHEL shall have the right to recover the same from his bills or otherwise as deemed fit.

1.8.3 Statutory Variations

Statutory variations are applicable under the GST Acts, against production of proof. The changes implemented by the Central / State Government during the tenure of the contract viz. increase / decrease in the rate of taxes, applicability, etc. and its impact on upward revision / downward revision are to be suitably paid/ adjusted from the date of respective variation. The bidder shall give the benefit of downward revision in favour of BHEL. No other variations shall be allowed during the tenure of the contract.

1.8.4 New Taxes/Levies

In case Government imposes any new levy / tax after submission of bid during the tenure of the contract, BHEL shall reimburse the same at actual on submission of documentary proof of payment subject to the satisfaction of BHEL that such new levy / tax is applicable to this contract.

1.8.5 Direct Tax

BHEL shall not be liable towards Income Tax of whatever nature including variations thereof arising out of this contract as well as tax liability of the bidder and their personnel. Deduction of tax at source at the prevailing rates shall be effected by BHEL before release of payment as a statutory obligation, unless exemption certificate is produced by the bidder. TDS certificate will be issued by BHEL as per the provisions of Income Tax Act.

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VOLUME-IA PART-I CHAPTER IX BILL OF QUANTITY

1.9.1 WEIGHT SCHEDULE - SUMMARY		
Sl. No.	EQUIPMENT / PACKAGE	APPROX WT (In KG) for UNIT-1 & 2
1	CONCRETE VOLUTE TYPE COOLING WATER PUMP ASSEMBLY	4,52,975.76
2	MISCELLANEOUS PUMPS ASSEMBLY	94,150.00
3	PUMP DISCHARGE PIPING, RE JOINTS, BF VALVES, NRV, ETC. (Unit-1 & 2)	1,31,333.29
4	SEMI GANTRY CRANE	7,900.00
	APPROX. TOTAL WEIGHT (in KG)	6,86,359.05
	APPROX. TOTAL WEIGHT (in MT)	686.36

CONCRETE VOLUTE TYPE COOLING WATER PUMP ASSEMBLY (UNIT-1 & UNIT-2)						
Sl. no.	Item	Approx Weight per Unit Item (kg)	Qty. per CVP	UOM	Approx weight per CVP (kg)	Remarks / Dimensions in meter (L x B x H)
A	<u>Pullout unit- CVP</u>					
A.1	Rotor	8950	1	EA	8950	2.1 x 2.1 x 4.6
A.2	Casing cvr assly	5184	1	EA	5184	2.8 x 2.8 x 1.8
A.3	Th. Brg assly	4364	1	EA	4364	2.3 x 2.3 x 1.6
A.4	Stfg box	591	1	EA	591	0.98 x 0.98 x 0.6
A.5	Gland& gland pkg	45	1	EA	45	0.55 x 0.55 x 0.19
B	<u>Loose Items</u>					
B.1	Counter flange	1500	1	EA	1500	2.6 x 2.6 x 0.2
B.2	Drain Pump	200	1	EA	200	0.2 x 0.2 x 0.3
C	<u>Motor</u>	53000	1	EA	53000	3.4 x 3.4 x 3.75

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CONCRETE VOLUTE TYPE COOLING WATER PUMP ASSEMBLY (UNIT-1 & UNIT-2)						
Sl. no.	Item	Approx Weight per Unit Item (kg)	Qty. per CVP	UOM	Approx weight per CVP (kg)	Remarks / Dimensions in meter (L x B x H)
D	<u>Piping Items</u>					
D.1	SORF FLANGE 2 1/2" (65A), CL150	3.2	24	EA	76.8	
D.2	ELBOW LR 90DEG 3/4" SCH 40S BW ENDS	0.2	2	EA	0.4	
D.3	ELBOW LR 90DEG 1 1/2" SCH 40S BW ENDS	0.77	6	EA	4.62	
D.4	GATE VLV 3" CL150 FLNGD RF	41	1	EA	41	
D.5	GLOBE VALVE,3",CL 150,FLANGED-RF	22	1	EA	22	
D.6	FLOW GLA INDICATOR 3"	9.5	1	EA	9.5	
D.7	GASKET NON-ASBESTOS,1/2",1.6THK,VAR.01	0.002	8	EA	0.016	
D.8	GASKET NON-ASBESTOS,3/4",1.6THK,VAR.02	0.003	4	EA	0.012	
D.9	GASKET NON-ASBESTOS,1",1.6THK,VAR.03	0.004	6	EA	0.024	
D.10	GASKET NON-ASBESTOS,1-1/2",1.6TH,VAR.05	0.008	6	EA	0.048	
D.11	GASKET NON-ASBESTOS,2-1/2",1.6TH,VAR.07	0.015	12	EA	0.18	
D.12	GASKET NON-ASBESTOS,3",1.6THK,VAR.08	0.021	18	EA	0.378	
D.13	TEE,RDCNG,2-1/2"X2-1/2"X1",80S,BW	1.68	2	EA	3.36	
D.14	TEE,RDCNG,3"X3"X1-1/2"80S, BW	2.66	3	EA	7.98	
D.15	TEE,RDCNG,2-1/2"X2-1/2"X1-1/2"40S, BW	1.3	2	EA	2.6	
D.16	REDUCER CONC 1 1/2"X 1" SCH 40, BW,	0.26	3	EA	0.78	
D.17	REDUCER CONC 1 1/2"X3/4" SCH 40, BW,	0.26	2	EA	0.52	
D.18	REDUCER CONC 2-1/2"X1-1/2" SCH40,BW,	0.68	2	EA	1.36	
D.19	TEE,STRAIGHT,2 1/2",40S,SEAMLE BW	1.66	6	EA	9.96	
D.20	DUPLEX STRAINER FOR CV PUMPS	150	1	EA	150	

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CONCRETE VOLUTE TYPE COOLING WATER PUMP ASSEMBLY (UNIT-1 & UNIT-2)						
Sl. no.	Item	Approx Weight per Unit Item (kg)	Qty. per CVP	UOM	Approx weight per CVP (kg)	Remarks / Dimensions in meter (L x B x H)
D.21	HEX.BOLT M12X75,VAR.12	0.08	100	EA	8	
D.22	HEX.BOLT M16X75,VAR.20	1.2	116	EA	139.2	
D.23	HEX.NUT M12X1.75,VAR.05	0.017	96	EA	1.632	
D.24	HEX.NUT M16X2.0,VAR.06	0.02	116	EA	2.32	
D.25	PIPE 21.3 X 2.8	1.302	25	M	32.55	
D.26	PIPE 26.7 X 2.9	1.735	10	M	17.35	
D.27	PIPE 33.4 X 3.4	2.564	10	M	25.64	
D.28	PIPE 48.3 X 3.7	4.147	25	M	103.675	
D.29	PIPE 73.16 X 5.2	8.882	20	M	177.64	
D.30	PIPE(SMLS) 88.9X7.62 S	15.529	35	M	543.515	
D.31	ELBOW LR 90DEG 2 1/2"SCH 40S BW ENDS	2.5	7	EA	17.5	
D.32	RDCR CONC CS 3"X2 1/2" SCH 40X40 BW ENDS	1.2	2	EA	2.4	
D.33	ELBOW SR 90DEG 1" SCH 40S BW ENDS	0.15	4	EA	0.6	
D.34	ELBOW 90DEG SR NB2 1/2" BW SCH 40S	3.5	8	EA	28	
D.35	ELBOW SR 90DEG 3" SCH 40S BW ENDS	4	10	EA	40	
D.36	FLANGE SOW 1/2" CL 150 RAISED FACE	0.8	16	EA	12.8	
D.37	FLANGE SOW 3/4" CL 150 RAISED FACE	0.8	8	EA	6.4	
D.38	FLANGE SOW 1" CL 150 RAISED FACE	1.3	12	EA	15.6	
D.39	FLANGE SOW 1 1/2" CL 150 RAISED FACE	1.4	14	EA	19.6	
D.40	FLANGE SOW 3" CL 150 RAISED FACE	4	34	EA	136	
	Total Weight (in Kg) per Concrete Volute Pump				75,495.96	
	Total Weight (in Kg) for 6 No. Concrete Volute Pumps				4,52,975.76	
	Total Weight (in Mt) for 6 No. Concrete Volute Pumps				452.97	

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MISCELLANEOUS PUMPS ASSEMBLY				
SL. NO.	DESCRIPTION	QTY FOR BOTH UNITS	UOM	WEIGHT (KG)
2.1	ACW PUMPS (V)	4	NO	34800.000
2.2	CW BLOWDOWN PUMPS (V)	3	NO	24000.000
2.3	ACW PUMPS MOTOR (AIR COOLED)	4	NO	22400.00
2.4	CW BLOWDOWN PUMPS MOTOR (AIR COOLED)	3	NO	12450.00
2.5	DUPLEX SS PIPES FOR BEARING COOLING, MISCELLANEOUS FITTINGS LIKE PIPES, FLANGES, ELBOWS, FASTENERS, GASKETS ETC. (APPROX.)	LOT	LOT	500.00
	WEIGHT SUB-TOTAL (KG)			94150

PUMP DISCHARGE PIPING, RE JOINTS, BF VALVES, NRV, ETC. (UNIT-1 & 2)				
SL. NO.	DESCRIPTION	QTY FOR BOTH UNITS	UOM	WEIGHT (KG)
3.1	<u>CW DISCHARGE</u>			
3.1.1	PF.PIPE OD2540X20 WITH STUBS	6	NO.	15822.864
3.1.2	PIPE OD2540 WITH REDOD2540/2124 GF OG	6	NO.	5955.468
3.1.3	BUTTERFLY VALVE ASSEMBLY 2500NB (MOTORISED)	6	NO.	70680.00
3.1.4	R.E.JOINT ASSEMBLY FOR CW PUMP DISCHARGE (ORDINARY TYPE 2500NB)	6	NO.	15600.00
3.1.5	ARV & MISCELLANEOUS FITTINGS	LOT	LOT	1000.00
3.2	<u>ACW DISCHARGE</u>			
3.2.1	PF.PIPE OD813X10 WITH STUBS	4	NO.	2,165.832
3.2.2	PF.PIPE OD813X10 WITH STUBS	4	NO.	2,196.668
3.2.3	RED. OD813X762 WITH GF COAT (OG)	4	NO.	764.460

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3.2.4	R.E.JOINT ASSEMBLY FOR ACW PUMP DISCHARGE (800NB CON. TYPE)	4	NO.	2200.00
3.2.5	BUTTERFLY VALVE ASSEMBLY 800NB (MOTORISED)	4	NO.	5648.00
3.2.6	NON RETURN VALVE ASSEMBLY 800NB	4	NO.	8800.00
3.2.7	ARV & MISCELLANEOUS FITTINGS	LOT	LOT	500.00
	WEIGHT SUB-TOTAL (KG)			131333.29

	SEMI GANTRY CRANE				
SL. NO.	DESCRIPTION	CAPACITY	QTY	UOM	WEIGHT (KG)
4.1	CWPH SCREENS & GATES HANDLING (SEMI-GANTRY CRANE) (ELECTRICALLY OPERATED)	10T	1	NO	7900.000
WEIGHT SUB-TOTAL (KG)					7900.000

NOTE:

1. The weight indicated above is approximate and there may be a variation in weight of equipments.
2. A lump sum price is to be quoted in the price bid for Erection, Testing, Commissioning & Trial Operation of Pumps & Auxiliaries work in Cooling Water Pump House (CWPH) consisting of all equipments detailed under Clause no 1.9.1 (Weight Schedule - Summary) of this chapter, as applicable.
3. The Lump sum quoted value for Erection Works shall include the Variation of +/-15% (Fifteen percent) in total indicated weight of Unit-1 & 2 together. In case of variation in weight +15%, the quantity exceeding +15% of the tendered quantity will be paid at the average tonnage rate arrived at by dividing the lump sum quoted/accepted value by 115% of total indicated weight.
4. The list is tentative and is given to enable the contractor to study the nature of work. The approximate weight and dimensions of the various sub-assemblies of pumps, etc. is indicated above. The weights & Dimensions given are only approximate and for general guidance and they are subject to variation as per design consideration.
5. The information furnished is only a description regarding the items to be erected by the contractor. BHEL reserves the right to add or exclude any components / items / system according to the site requirements / customer requirements to complete various systems in all respects.

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6. Details regarding components, sub-assemblies, and auxiliaries etc. to be erected, tested and commissioned under the scope of this tender are given in this tender. The schedule of weights given are only approximate and meant for giving a general idea to the tenderer, about the magnitude of the work involved. This should not be taken for billing or any other claims. All weights for such purposes will have to be taken from design documents only (Shipping list).
7. Refer Chapter - Welding, Heat Treatment & Radiography and Non-Destructive Testing in Volume IA Part I and Volume-IA Part-II (Field Welding Schedule) of Technical Conditions of Contract (Volume-I Book-I) for welding & NDT requirements.

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VOLUME-IA PART-I CHAPTER -X

GENERAL

The scope of the work will comprise of but not limited to the following:

(All the works mentioned hereunder shall be carried out within the accepted rate unless otherwise specified.)

- 1.10.1 Successful Bidder is requested to furnish the following at PSSR-HQ Chennai immediately after release of Letter of Intent (LOI)
- i) Security Deposit
 - ii) Unqualified Acceptance for Detailed LOI / Work Order.
 - iii) Rs.100/- Stamp Paper for preparation of Contract Agreement.
- 1.10.2 Successful Bidder are requested to furnish the proof of documents for the following at the respective PSSR- Site
- i) PF Regn No.
 - ii) Labour License No.
 - iii) Workmen Insurance Policy No.
- 1.10.3 **In addition to the clause 2.8 of General Conditions of Contract (Volume1C of Book-II) the contractor shall comply with the following.**
- 1.10.3.1 BOCW Act & BOCW Welfare Cess Act**
- 1.10.3.1.1 The Contractor should Register their Establishment under BOCW Act 1996 read with rules 1998 by submitting Form I (Application for Registration of Establishment) and Form IV (Notice Of Commencement / Completion of Building other Construction Work) to the respective Labour Authorities i.e.,
- a) Assistant Labour Commissioner (Central) in respect of the project premises which is under the purview of Central Govt.-NTPC, NTPL etc.
 - b) Appropriate State authorities in respect of the project premises which is under the purview of State Govt.
- 1.10.3.1.2 The Contractor should comply with the provisions of BOCW Welfare Cess Act 1996 in respect of the work awarded to them by BHEL.
- 1.10.3.1.3 The contractor should ensure compliance regarding Registration of Building Workers as Beneficiaries, Hours of work, welfare measures and other conditions of service with particular reference to Safety and Health measures like Safety Officers, safety committee, issue of Personal protective equipments, canteen, rest room, drinking water, Toilets, ambulance, first aid centre etc.
- 1.10.3.1.4 The contractor irrespective of their nature of work and manpower (Civil, Mechanical, Electrical works etc) should register their establishment under BOCW Act 1996 and comply with BOCW Welfare Cess Act 1996.

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1.10.3.1.5 Contractor shall make remittance of the BOCW cess as per the Act in consultation with BHEL as per the rates in force (presently 1%) BHEL shall reimburse the same upon production of documentary evidence. However, BHEL shall not reimburse the Fee paid towards the registration of establishment, fees paid towards registration of Beneficiaries and Contribution of Beneficiaries remitted.

1.10.3.1.6 Non-compliance to Provisions of the BOCW Act & BOCW Welfare Cess Act is not acceptable. In case of any non-compliance, BHEL reserves the right to withhold any sum as it deems fit. Only upon total compliance to the BOCW Act and also discharge of total payment of Cess under the BOCW Cess Act by the Contractor, BHEL shall consider refund of the Amounts

1.10.3.2 PROVIDENT FUND

1.10.3.2.1 The contractor is required to extend the benefit of Provident Fund to the labour employed by you in connection with this contract as per the Employees Provident Fund and Miscellaneous Provisions Act 1952. For due implementation of the same, you are hereby required to get yourself registered with the Provident Fund authorities for the purpose of reconciliation of PF dues and furnish to us the code number allotted to you by the Provident Fund authorities within one month from the date of issue of the letter of intent. In case you are exempted from such remittance an attested copy of authority for such exemption is to be furnished. Please note that in the event of your failure to comply with the provisions of said Act, if recoveries therefore are enforced from payments due to us by the customer or paid to statutory authorities by us, such amount will be recovered from payments due to you.

1.10.3.2.2 The final bill amount would be released only on production of clearance certificate from PF / ESI and labour authorities as applicable.

1.10.3.3 OTHER STATUTORY REQUIREMENTS

1.10.3.3.1 The Contractor shall submit a copy of Labour License obtained from the Licensing Officer (Form VI) u/r25 read with u/s 12 of Contract Labour (R&A) Act 1970 & rules and Valid WC Insurance copy or ESI Code (if applicable) and PF code no. along with the first running bill.

1.10.3.3.2 The contractor shall submit monthly running bills along with the copies of monthly wages (of the preceding month) u/r78(1)(a)(1) of Contract Labour Rules, copies of monthly return of PF contribution with remittance Challans under Employees Provident Fund Act 1952 and copy of renewed WC Insurance policy or copies of monthly return of ESI contribution with Challans under ESI Act 1948 (if applicable) in respect of the workmen engaged by them.

1.10.3.3.3 The Contractor should ensure compliance of Sec 21 of Contract Labour R&A) Act 1970 regarding responsibility for payment of Wages. In case of "Non-compliance of Sec 21 or non-payment of wages" to the workmen before the expiry of wage period by the contractor, BHEL will reserve its right to pay the

TECHNICAL CONDITION OF CONTRACT (TCC)

workmen under the orders of Appropriate authority at the risk and cost of the Contractor.

1.10.3.3.4 The Contractor shall submit copies of Final Settlement statement of disbursal of retrenchment benefits on retrenchment of each workmen under I D Act 1948, copies of Form 6-A (Annual Return of PF Contribution) along with copies of PF Contribution Card of each member under PF Act and copies of monthly return on ESI Contribution – Form 6 under ESI Act 1948 (if applicable) to BHEL along with the Final Bill.

1.10.3.3.5 In case of any dispute pending before the appropriate authority under ID Act 1948, WC Act 1923 or ESI Act 1948 and PF Act 1952, BHEL reserve the right to hold such amounts from the final bills of the Contractor which will be released on submission of proof of settlement of issues from the appropriate authority under the act.

1.10.3.3.6 In case of any dispute prolonged / pending before the authority for the reasons not attributable to the contractor, BHEL reserves the right to release the final bill of the contractor on submission of Indemnity bond by the contractor indemnifying BHEL against any claims that may arise at a later date without prejudice to the rights of BHEL.

1.10.3.3.7 DEPLOYMENT OF SKILLED / SEMI-SKILLED TRADESMEN

The following clause is applicable in case the contract value / contract price is Rs. Five crores and above.

The contractor shall, at all stages of work deploy skilled / semi-skilled tradesmen who are qualified and possess certificate in particular trade from CPWD Training Institute / Industrial Training Institute / National Institute of Construction Management and Research (NICMAR), National Academy of Construction, CIDC or any similar reputed and recognized Institute managed / certified by State / Central Government. The number of such qualified tradesmen shall not be less than 20% of total skilled / semi-skilled workers required in each trade at any stage of work. The contractor shall submit number of man days required in respect of each trade, its scheduling and the list of qualified tradesmen along with requisite certificate from recognized Institute to Engineer-in-Charge for approval. Notwithstanding such approval, if the tradesmen are found to have inadequate skill to execute the work of respective trade, the contractor shall substitute such tradesmen within two days of written notice from Engineer-in-Charge. Failure on the part of contractor to obtain approval of Engineer-in-Charge or failure to deploy qualified tradesmen will attract a compensation to be paid by contractor at the rate of Rs. 100 per such tradesman per day. Decision of Engineer-in-Charge as to whether particular tradesman possesses requisite skill and amount of compensation in case of default shall be final and binding.

TECHNICAL CONDITION OF CONTRACT (TCC)

1.10.3.4 *Site Visit by the Bidder*

1.10.3.4.1 The bidder shall, prior to submitting his tender for the work, visit, examine and acquire full knowledge & information and necessary conditions prevailing at the site and its surroundings of the plant premises together with all statutory, obligatory, mandatory requirements of various authorities about the site of works at his own expense, and obtain and ascertain for himself on his own responsibility that may be for preparing his tender and entering into a contract, and take the same into account in the quoted contract price for the work.

1.10.3.4.2 The bidder shall satisfy themselves about the following factors:

- i) Site conditions including access to the site, existing and required roads and other means of transport/communication for use by him in connection with the work including diverting and re-routing of services.
- ii) Requirement and availability of land and other facilities of his enabling works, establishment of his nursery, office, stores etc.
- iii) Ground conditions including those bearing upon transportation, disposal, handling and storage of materials required for the work or obtained therefrom.
- iv) Source and extent of availability of suitable materials, including water etc., and labour (skilled and unskilled) required for work, and laws and regulations governing their use and employment.
- v) Geological, meteorological, topographical and other general features of the site and its surroundings as are pertaining to and needed for the performance of the work.
- vi) The limit and extent of surface and subsurface water to be encountered during the performance of the work, and the requirement of drainage and pumping.
- vii) The type of equipment and facilities needed, for and in the performance of the work;
- viii) The extent of lead and lift required for the work in complete form over the entire duration of the contract, and
- ix) All other information pertaining to and needed for the work including information as to the risks, contingencies and other circumstances which may influence or affect the work or the cost thereof under this contract.

1.10.3.4.3 The bidder should note that information, if any, in regard to the local conditions, as contained in these tender documents, has been given to tenderer merely for guidance and is not warranted to be complete.

1.10.3.4.4 A bidder shall be deemed to have full knowledge of the site, whether he inspects it or not, and no extra charges consequent on any misunderstanding or otherwise shall be allowed.

TECHNICAL CONDITION OF CONTRACT (TCC)

- 1.10.3.4.5 The bidder and any of his personnel or agents will be granted permission by the Site-In-Charge or his authorized nominee, on receipt of formal application in respect thereof a week in advance of the proposed date of inspection of site, to enter upon his premises and lands for purpose of such inspection, but only on the express condition that the tenderer (and his personnel and agents) will relieve and indemnify the Employer (and his personnel and agents) from and against all liability in respect thereof and will be responsible for personal injury (whether fatal or otherwise), loss of or damage to property and any other loss, damage, costs and expenses however caused which, but for the exercise of such permission, would not have arisen.
- 1.10.3.5 Scope of work covered under this specification requires quality workmanship, engineering and green belt management along with the supply of all consumables, tools and tackles and testing instruments. The contractor shall ensure timely completion of work. The contractor shall have adequate tools, measuring instruments etc. in his possession. He shall also have adequate trained, qualified and experienced engineers, supervisory staff and skilled personnel. The manpower deployment identified by contractor shall match with above scope of works.
- 1.10.3.6 It is not the intent to specify herein all details of all material. Any item related this work not covered by this but necessary to complete the system will be deemed to have been included in the scope of the work.
- 1.10.3.7 All the necessary certificates and licenses required to carry out this scope of work are to be arranged by the contractor then and there at no extra cost.
- 1.10.3.8 Site testing wherever required shall be carried out for all items / materials installed by the contractor to ensure proper installation and functioning in accordance with drawings, specifications and manufacturer's recommendations.
- 1.10.3.9 The contractor shall carryout additional tests if any, which the Engineer feels necessary because of site conditions and also to meet system specification.
- 1.10.3.10 All the work shall be carried out as per instructions of BHEL engineer. BHEL engineer's decision regarding the correctness of the work and method of working shall be final and binding on the contractor.
- 1.10.3.11 Wherever work sequences are furnished by BHEL, the contractor shall follow the same sequence.
- 1.10.3.12 Contractor shall execute the supply and works as per sequence prescribed by BHEL at site engineer. No claims for extra payment from the contractor will be entertained on the grounds of deviation from the methods of execution of similar job in any other site or for any reasons whatsoever.
- 1.10.3.13 If required by BHEL, the contractor shall change the sequence of his operation so that work on priority sectors can be completed within the projects schedule. The contractor shall afford maximum assistance to BHEL in this connection without causing delay to agreed completion date.

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- 1.10.3.14 Contractor shall, transport all materials to site and unload at site / working area for inspection and checking. All material handling equipment required shall be arranged by the contractor.
- 1.10.3.15 Contractor shall retain all T&P / Testing instrument / Material handling equipments etc at site as per advice of BHEL engineer and same shall be taken out from site only after getting the clearances from engineer in charge.
- 1.10.3.16 The contractor at his cost shall arrange necessary security measures for adequate protection of his machinery, equipment, tools, materials etc. BHEL shall not be responsible for any loss or damage to the contractor's construction equipment and materials. The contractor may consult the Engineer-in-Charge on the arrangements made for general site security for protection of his machinery equipment tools etc.
- 1.10.3.17 The Contractor may have to execute work in such a place and condition where other agencies also will be under such circumstances. However completion time for work agreed will be subject to the condition that contractor's work is not hampered by the agencies.
- 1.10.3.18 Contractor has to work in close co-ordination with other work agency at site. BHEL engineer will co-ordinate area clearance. In a project of such magnitude, it is possible that the area clearance may be less / more at a particular given time. Activities and work program have to be planned in such a way that the milestones are achieved as per schedule/ plans. Contractor shall arrange & augment the resources accordingly.
- 1.10.3.19 The contractor must obtain the signature and permission of the security personnel of the customer for bringing any of their materials inside the site premises. Without the Entry Gate Pass these materials will not be allowed to be taken outside.
- 1.10.3.20 Contractor shall remove all scrap materials periodically generated from his working area and collect the same at one place earmarked for the same. Load of scraps is to be shifted to a place earmarked by BHEL. Failure to collect the scrap is likely to lead to accidents and as such BHEL reserves the right to collect and remove the scrap at contractor's risk and cost if there is any failure on the part of contractor in this respect.
- 1.10.3.21 The contractor shall ensure that his premises are always kept clean and tidy to the extent possible. Any untidiness noted on the part of the contractor shall be brought to the attention of the contractor's site representative who shall take immediate action to clean the surroundings to the satisfaction of the Engineer-in-Charge.
- 1.10.3.22 The contractor is strictly prohibited from using BHEL's regular components like angles, channels, beams, plates, pipe / tubes, and handrails etc for any temporary supporting or scaffolding works. Contractor shall arrange himself all such materials. In case of such misuse of BHEL materials, a sum as determined by BHEL engineer will be recovered from the contractor's bill. The decision of BHEL engineer is final and binding on the contractor.

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- 1.10.3.23 No member of the already erected structure / buildings, other component and auxiliaries should be removed / modified without specific approval of BHEL engineer.
- 1.10.3.24 Contractors shall ensure that all their Staff / Employees are exposed to periodical training programme conducted by qualified agencies/ personnel on ISO 9001 – 2008 Standards.
- 1.10.3.25 The terminal points decided by BHEL are final and binding on the contractor for deciding the scope of work and effecting the payment for the work done up to the terminals.
- 1.10.3.26 Crane operators deployed by the contractor shall be tested by BHEL before he is allowed to operate the cranes.
- 1.10.3.27 On Completion of work, all the temporary buildings, structures, pipe lines, cable etc. shall be dismantled and leveled and debris shall be removed as per instruction of BHEL by the contractor at his cost. In the event of his failure to do so, the expenditure towards clearance of the same will be recovered from the contractor. The decision of BHEL Engineer in this regard is final.
- 1.10.3.28 It is the responsibility of the contractor to do the checking, testing etc. if necessary, repeatedly to satisfy BHEL Engineer with all the necessary tools and tackles, manpower etc. without any extra cost. The testing will be completed only when jointly certified so, by the BHEL Engineer.
- 1.10.3.29 If any item or equipment not covered but requires being executed, same shall be carried out by the contractor. Equivalent or proportional unit rate shall be considered wherever possible from the BOQ. The rates quoted by the contractor shall be uniform as far as possible for similar items appearing in rate schedule.
- 1.10.3.30 The contractor's work shall not hinder other work, either underground or over ground, such as electrical, phone lines, water or sewage lines, etc. In areas of overlap, the contractor shall work in coordination with other related contractors. Any damage by the landscape contractor's team to such utilities will be penalized and contractor shall be responsible for cost for such damages.
- 1.10.3.31 SITE INSPECTION**
- BHEL or his authorized agents may inspect various stages of work during the currency of the contract awarded to him. The contractor shall make necessary arrangements for such inspection and carry out the rectification pointed out by the owner / employer without any extra cost to the owner / employer. No cost whatsoever such duplication of inspection of work be entertained.
- BHEL will have full power and authority to inspect the works at any time, either on the site or at the contractor's premises. The contractor shall arrange every facility and assistance to carry out such inspection. On no account will the contractor be allowed to proceed with work of any type unless such work

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has been inspected and entries are made in the site inspection register by BHEL.

Wherever the performance of work by the contractor is not satisfactory in respect of workmanship, deployment of sufficient labour or equipment, leading to delay in execution of work or any other matter, BHEL shall have the right to engage labour at normal ruling rates and get the work executed through other agency and debit the cost to the contractor and the contractor shall have no right to claim compensation thereof. In such a case, BHEL shall have the right to utilize the materials and tools brought by the contractors for the same work.

1.10.3.32 DOCUMENTATION

1.10.3.32.1 The following information shall be furnished by the bidder within two weeks of award of contract for purchaser's approval:

- a) Bar chart covering planned activities at site
- b) Detailed organization chart
- c) Details of T&P available with contractors with documents proofs.

1.10.3.32.2 The following information shall be furnished by the bidder after testing and inspection:

Test certificates of various tests conducted at site. All inspection and test certificates shall be signed by BHEL representative also.

1.10.3.33 RECORDS TO BE MAINTAINED AT SITE:

1.10.3.33.1 Record of Quantity of FREE/Chargeable items issued by BHEL must be maintained during contract execution. Also reconciliation statement to be prepared at regular intervals.

1.10.3.33.2 The under mentioned Records/ Log-books/ Registers applicable to be maintained.

- a. Hindrance Register.
- b. Site Order Book.
- c. Test Check of measurements.
- d. Supply and Consumption Daily Register of Cement and Steel
- e. Records of Test reports of Field tests.
- f. Records of manufacture's test certificates.
- g. Records of disposal of scraps generated during and after the work completion.

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VOLUME-IA PART-I CHAPTER - XI

PROGRESS OF WORK

(All the works mentioned hereunder shall be carried out within the accepted rate unless otherwise specified.)

- 1.11.1 Refer forms F -14 to F-18 of volume I D of volume -I book-II (Revised Form F 14 and F 15 in Vol IA Part II). Plan and review will be done as per the formats. These should be submitted on monthly basis with duly signed by BHEL and Contractor.
- 1.11.2 Contractor is required to draw mutually agreed monthly erection programs in consultation with BHEL well in advance. Contractor shall ensure achievement of agreed program and shall also timely arrange additional resources considered necessary at no extra cost to BHEL.
- 1.11.3 Progress review meetings will be held at site during which actual progress during the week vis-a-vis scheduled program shall be discussed for actions to be taken for achieving targets. Contractor shall also present the program for subsequent week. The contractor shall constantly update / revise his work program to meet the overall requirement. All quality problems shall also be discussed during above review meetings. Necessary preventive and corrective action shall be discussed and decided upon in such review meetings and shall be implemented by the contractor in time bound manner so as to eliminate the cause of nonconformities.
- 1.11.4 Tenderers have to furnish a list of Tools and Plants including cranes, Tractor / Trailers etc., which they propose to deploy for this work.
- 1.11.5 The contractor shall submit daily, weekly and monthly progress reports, manpower reports, materials reports, consumables (gases / electrodes) report, cranes availability report and other reports as per Performa considered necessary by the Engineer. The periodicity of the reports will be decided by BHEL Engineer at site.
- 1.11.6 The contractor shall submit weekly / fortnightly / monthly statement report regarding consumption of all consumables for cost analysis purposes.
- 1.11.7 The contractor shall submit a report of any damage, shortage, discrepancy etc., every week detailing in this regard.
- 1.11.8 The manpower reports shall clearly indicate the manpower deployed, category wise specifying also the activities in which they are engaged.
- 1.11.9 The monthly report as a booklet shall be submitted at the end of every month and shall contain the following details: -
 - a. Progress photographs in colour.
 - b. Erection progress in terms of tonnage, welding joints, radiography, stress relieving, etc., completed as relevant to the respective work areas against planned.

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- c. Site Organization chart of engineers & supervisors as on the last day of the month with further mobilization plan.
- d. Category- wise man hours engaged during the previous month under the categories of fitters, welders, riggers, khalasis, grindermen, gas-cutters, electricians, crane operators and helpers.
- e. Consumables report giving consumption of all types of gases and electrodes during the previous month.
- f. Availability report of cranes.
- g. Safety implementation report in the format.
- h. Pending material and any other inputs required from BHEL for activities planned during the subsequent month.

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VOLUME-IA PART-I CHAPTER -XII FOUNDATIONS, GROUTING AND CIVIL WORKS

The scope of the work will comprise of but not limited to the following:

(All the works mentioned hereunder shall be carried out within the accepted rate unless otherwise specified.)

- 1.12.1 Foundation for the equipments to be erected shall be provided by BHEL/ clients of BHEL. The dimension of the foundation and anchor bolt pits shall be checked by the contractor for their correctness as per drawings. Further, top elevation of foundations shall be checked with respect to bench mark etc. Contractor should log before taking over the foundations for erection. All adjustments of foundations surfaces, enlarging the pockets in foundations etc. as may be required for the erection of equipments, plants shall be carried out by the contractor within the quoted rate.
- 1.12.2 Cleaning of foundation surfaces, pocket holes and anchor bolt pits etc., de-watering, making them free of oil, grease, sand and other foreign materials by soda wash, water wash, compressed air or any other approved methods etc., form / shuttering work are within the scope this work.
- 1.12.3 It shall be contractor's responsibility to check the various equipment foundations for their correctness with respect to level, orientation, dimensions etc., and ascertained dimensions shall be measured and submitted to BHEL for approval before erection. Also minor chipping, dressing of foundations up to 25 mm for obtaining proper face / elevation for packer plates/shims, and may be required for the erection of the equipment/plants shall have to be carried out as per BHEL Engineers instructions by the contractor within the quoted rate.
- 1.12.4 Preparation of foundation: Providing necessary skilled and other labour to BHEL / Customer for checking of dimensional accuracy, axis, elevation, levels etc., with reference to bench marks of foundations and anchor bolts pits shall be in the scope of the work. Contractor should log before taking over the foundations for erection.
- 1.12.5 The concrete foundation, surfaces shall be properly prepared by chipping, dressing of foundations up to 25 mm as required to bring the top of such foundation to the required level to provide the necessary roughness for bondage and to ensure enough bearing strength. All laitance and surface film shall be removed and cleaned and the packers placed with suitable mortar prior to erection of the equipment.
- 1.12.6 The surface of foundations shall be dressed to bring the surface of the foundations to the required level and smoothness prior to placement of equipments. All minor adjustments up to 25 mm of foundation level,

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- dressing, chipping of foundation surface enlarging the pockets in foundations and grouting of equipments etc. as may be required for the erection of equipments / plants shall be carried out by the Contractor.
- 1.12.7 Foundation pockets are to be cleaned thoroughly before placing the columns / equipments. Verticality of foundation bolts to be checked along with correctness of the threads and freeness of the nuts movement. If required cleaning of the threads to be done with proper dies.
- 1.12.8 The concrete foundation, surfaces shall be properly prepared by chipping, as required to bring the top of such foundation to the required level to provide the necessary roughness for bondage and to ensure enough bearing strength. All laitance and surface film shall be removed and cleaned and the packers placed with suitable mortar prior to erection of the equipment.
- 1.12.9 Packer plates should not only be blue matched with foundation but also with foundation frame, inter-packer contact surfaces between the packers and foundation frame etc. Blue matching shall be by Prussian blue match checks and required percentage contact shall be achieved by chipping and scrapping as per BHEL Engineers instructions.
- 1.12.10 The contractor shall ensure perfect matching of packer plates with foundation by dressing the foundation and between the packer plates and the base plate of structural column / equipment to the satisfaction of BHEL Engineer. Matching of packer shall be carried out by the Contractor at his cost.
- 1.12.11 Contractor shall carry out scrapping and blue matching of embedment plates / packers of rotating equipments so as to achieve prescribed percentage of contact. Chipping and bedding of concrete surfaces, finely dressing up to the extent required to obtain contact between packer and concrete, is also covered in the scope of the work. The fine dressing of concrete shall be with blue matching checks.
- 1.12.12 Shims and packer plates required for temporary use are to be arranged by the contractor within the quoted rate.
- 1.12.13 BHEL will provide only shims and packer plates (either machined or plain), which will go as permanent parts of the equipment at free of cost.
- 1.12.14 Certain packer plates and shims over and above the quantity received as part of supplies from manufacturing units of BHEL will have to be cut out from steel plates / sheets at site by the contractor to meet site requirement. Contractor shall cut and prepare packers and shims by gas cutting or chiseling, grinding and filing for de-burring the packers at his own cost. Raw materials required for the above will be arranged by BHEL free of cost.

TECHNICAL CONDITION OF CONTRACT (TCC)

- 1.12.15 Works such as minor rectification of foundation bolts, reaming of holes, drilling of dowels, matching of bolts and nuts, making new dowel pin etc. are covered in the scope of work.
- 1.12.16 The contractor shall arrange for grouting of foundation bolt holes of equipment and final grouting of equipment as per the drawings / specification as advised by the Engineer or BHEL after preparing the foundation surface for grouting. The contractor has to arrange, a representative from the supplier of special cement for witnessing the grouting and other works at their cost including any miscellaneous expenditure for this activity. BHEL will not pay any service and incidental charges for arranging the supplier representative. The contractor to take note of this aspect and quote accordingly.
- 1.12.17 Grouting of equipments is included in the scope of contractor. All the materials required for grouting including special cements like PAGEL, CONBEXTRA- GP2, SHRINKOMB or its equivalent grade free flow cement as approved by BHEL/Customer and other materials like Portland cement, sand, gravel etc., are to be arranged by the contractor within the quoted rate. It shall be the responsibility of the contractor to obtain prior approval of BHEL, regarding suppliers, type of grouting cements before procurement of grouting cements.
- 1.12.18 Contractor shall arrange the required nos. of mixing machines and vibrators at their cost for carrying out the grouting operation. All the materials like cement and cleaning consumables shall also be arranged by the contractor at his cost.
- 1.12.19 The certificates of the grout is to be submitted BHEL. If necessary, test cubes are to be made and tested at site to ensure the quality of the grout as per relevant IS standards. In case grouting with Portland cement is approved, necessary cement, sand etc. to be arranged by the contractor including the fine aggregates.
- The approximate Quantity of grouting cement required per UNIT is 30T.
- Any additional quantity of grouting materials required for above and also for all other equipments to be arranged by the bidder within the quoted cost.
- 1.12.20 **PROCEDURE FOR GROUTING:**
- Contractor has to carry out the grouting as per the work instructions for grouting available at site or the grouting is to be carried out as per supplier's recommendation / IS standard. Copy of these recommendations to be submitted to BHEL for records.

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VOLUME-IA PART-I CHAPTER -XIII MATERIAL HANDLING, TRANSPORTATION AND SITE STORAGE

The scope of the work will comprise of but not limited to the following:

(All the works mentioned hereunder shall be carried out within the accepted rate unless otherwise specified.)

- 1.13.1 Loading at BHEL / Customer stores and storage yard, transport to site, unloading at site / working area of equipment placement on respective foundation / location, fabrication yard, pre-assembly bay or at working area are in the scope of work. The scope includes taking materials / Equipment from customer stores / storage yard also. Contractors Quoted / Accepted rate shall be inclusive of the same. Required cranes, tractors, trailer or trucks / slings / tools and tackles / labour including operators Fuel lubricants etc for loading & unloading of materials will be in the scope of contractor.
- 1.13.2 The storage yard is located in more than one location within the Main Plant Boundary.
- 1.13.3 ODC consignments will be unloaded near to erection site (Power House). Some other materials may also be unloaded near to erection site, as per space availability. All other materials have to be transported from storage yard to construction area by the contractor at his own cost within the quoted price.
- 1.13.4 Contractor shall plan and transport equipments, components from storage yard to erection site and erect them in such a manner and sequence that material accumulation at site does not lead to congestion at site of work.
- 1.13.5 The equipments / materials from the storage yard shall be moved in sequence to the actual site of erection / location at the appropriate time as per the direction of BHEL Engineer so as to avoid damage / loss of such equipment at site.
- 1.13.6 Contractor shall take delivery of the components and equipment's from the storage area after getting approval of BHEL Engineer on standard indent forms to be specified by BHEL (Though BHEL's online SCMS system). Complete and detailed account of the equipment's erected as well as progress shall be submitted to the engineer as directed.
- 1.13.7 Sometimes it may become necessary for the contractor to handle certain unrequired components in order to take out the required materials. The contractor has to take this contingency also into account. No extra payment is payable for such contingencies.

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- 1.13.8 Materials shall be stacked neatly, preserved and stored in the contractor's shed / work area in an orderly manner. In case it is necessary to shift and re-stack the materials kept at work area / site to enable other agencies to carry out their work, same shall be done by the contractor at no extra cost.
- 1.13.9 Open ends of piping valves, pipes and tubes shall be covered with plastic caps or will be closed with wooden plugs as the case may be., as provided by BHEL Manufacturing units
- 1.13.10 The contractor shall provide any fixtures, concrete blocks & wooden sleepers, which are required for temporary supporting of the components at site.
- 1.13.11 The contractor shall take all such measures as may be reasonably necessary to ensure that its arrangements and those of its subcontractors with respect to the transport of Goods, Materials and Labour to the site do not interfere with local traffic in the vicinity of the site and where such interference is unavoidable shall make such special arrangements as may be reasonably required to minimize the effect of such interference.

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VOLUME-IA PART-I CHAPTER- XIV ERECTION

- 1.14.1 The scope of work shall comprise but not limited to the following: -**
(All the works mentioned hereunder shall be carried out within the accepted rate unless otherwise specified.)
- 1.14.1.1 Handling of Materials at BHEL / Client's Stores / Storage Yard, Transportation to site of erection, inspection, preparation of foundation, erection, leveling, centering, alignment, grouting & final alignment of 6 No. Concrete Volute Type CW Pumps (with associated piping/instruments up to BFVs near CW pump house for supply line and piping for bearing cooling water), 4 No. ACW Pumps (with associated piping/instruments up to BFVs near CW pump house for supply line), 3 No. Blow down Pumps, 1 No. Semi-Gantry Crane (CWPH screens & gates handling& associated surface finish, supply & application of required primer & finish paints / Anti corrosive / Steam wash paints/ Glass flake coating as applicable and labeling on equipment & piping, pre-commissioning, commissioning, trial operation & handing over of CW pumps and aux of 2x660MW Ennore SEZ Supercritical Thermal Power Project. Also refer Chapter II – Scope of work of this TCC for detailed scope.
- 1.14.1.2 Brief list of equipments / sub-assemblies to be erected by the contractor & approximate weight and size of individual heavy components are given under the chapter-IX (Bill of quantity) and is meant for giving general idea to the tenderer only about magnitude of the work involved. The components are sent in parts for convenient transportation. They are to

be cleaned, assembled in stage by stage, fastened / welded, erected and aligned as per the drawing dimensions / tolerance and instructions of BHEL Engineers.
- 1.14.1.3 The terminal points decided by BHEL are final and binding on the contractor for deciding the scope of work and effecting the payment for the work done up to the terminals.
- 1.14.1.4 All the works such as cleaning, leveling, aligning, trial assembly, dismantling of certain components for checking and cleaning, surface preparation, fabrication of sheets, tubes and pipes as per general engineering practice and as per BHEL Engineer's instructions at site, cutting, weld depositing, grinding, straightening, chamfering, filing, chipping, drilling, reaming, scrapping, lapping, fitting-up etc., as may be applicable in such erection works and are necessary to complete the work satisfactorily, shall be carried out by the contractor as part of the work within the quoted rate.
- 1.14.1.5 Contractor shall erect all the equipments as per the sequence prescribed by BHEL at site. The sequence of erection and methodology will be decided by the BHEL Engineers depending upon the availability of materials, fronts and

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other inputs etc., No claim for extra payment from contractor will be entertained on the grounds of deviation from the methods of erection adopted in erection of similar CW pumps set in other places.

- 1.14.1.6 All normal erection and assembly techniques necessary for completion of works under this specification and magnitude have to be carried out. It is not possible to specifically list out all of them. Absence of any specific reference will not absolve the contractor of his responsibility for the particular operation. These would include
- Scaffolding and rigging operations
 - Flame / electric cutting, grinding, welding, radiography and stress relieving.
 - Fitting, fettling, filing, straightening, chamfering chipping, scrapping, reaming, cleaning, checking, leveling, blue matching, aligning and assembly.
 - Surface grinding, drilling, doweling, shaping
 - Temporary erections for alignment, dismantling of certain equipment for checking, cleaning, servicing and site fabrication
- 1.14.1.7 All the weld seams shall be properly ground and subjected to examination. If any paint or rust noted, these are to be removed either by sand / shot / Grit blasting or buffing method.
- 1.14.1.8 All the weld seams shall be properly ground and subjected to radiographic examination as per manufacturer's recommendation. If any paint or rust noted, are to be removed either by Sand Grit / shot blasting or buffing method.
- 1.14.1.9 Erection of all the piping systems supplied along with pumps and other auxiliaries covered in this contract, is to be erected by the contractor within the quoted rate.
- 1.14.1.10 Wherever pipes / bends / equipments are supplied in pre-fabricated / assembled packages, there may be necessity to make minor changes, including strengthening by additional welds. This shall be treated as part of the contractor's scope.
- 1.14.1.11 All the lubricant oil for bearings for flushing and during trial run of the equipment including first fill up, will be arranged by BHEL at free of cost. Required manpower shall be provided by the contractor for handling, filling, emptying and re-filling etc., as part of the work without any extra cost, till the unit is handed over. Transportation of all the above shall be arranged by the contractor from BHEL store / yard to work site and returning of the

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empty barrels / drums to stores at their cost. Care should be taken to avoid any spillage / wastage.

- 1.14.1.12 Normally weld neck valves will have prepared edges for welding. But, if it becomes necessary, the contractor shall prepare new edges, re-prepare the edges by grinding or chamfering to suit site conditions, which shall be done by the contractor at no extra cost
- 1.14.1.13 All fittings like elbows, tees, reducers, weld neck flanges, inserts etc., shall be matched with pipes for welding which may require re-edge preparation, grinding etc., No extra cost shall be paid for this.
- 1.14.1.14 The valves will have to be cleaned, checked, lapped or overhauled in full or in parts before erection, after chemical cleaning, during commissioning. Any special tools required for lapping only will be arranged by BHEL.
- 1.14.1.15 All piping items below size 2", including pipes, valves, bends, tees, elbow, mitre bends, reducers, flanges, fittings, thruster blocks etc. shall be supplied as loose items as available commercially. Hence Fit-ups, edge preparation including welding of stubs, shall be included in the contractor's scope within the quoted rate.
- 1.14.1.16 For pipes nominal size 2" and below routing shall not be shown in piping layouts or in isometrics and the same to be routed / connected as shown in schematics. For the above size if the routing is shown in layouts it is only for guidance and the same shall be routed and supported as per site requirement / convenience as per site engineer's advice.
- 1.14.1.17 Contractor should fabricate bends of $\leq 2''$ diameter size from running meters of pipe. Wherever elbows of 45° deg or any other angle are required, the same shall be cut from 90° deg. elbow supplied and used. No extra cost shall be paid.
- 1.14.1.18 All the drain lines should have sufficient slope towards drain. Slope of 1 : 500 shall be maintained towards drain point unless otherwise specified. Expansion loops shall be provided in all the vents and drains as per the drawings.
- 1.14.1.19 Carrying out erection of piping as per the specification between equipments constituting terminal points, whether the terminal equipments fall within the scope of work/specification or not , contractor shall carry out the terminal joints at either end. Also where the piping connection to the terminal points involve flanged joints, matching of flanges, welding, fixing gaskets, bolting and tightening as per BHEL Engineers instructions is in the scope of work. In case piping connected to equipment, matching of flanges for achieving the parallelism and alignment at the equipment end by suitably resorting to heat correction or other method as instructed by BHEL Engineer, with in the quoted rate.
- 1.14.1.20 Adjustment like removal of ovalities in pipes and opening or closing of the fabricated bends by process of heat correction or any other method approved by BHEL Engineer to suit the layout, with specified NDT, heat

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- treatment procedure shall be carried out by the contractor within the quoted rate.
- 1.14.1.21 Certain adjustments in length may be necessary while erecting pipelines / steel members. Removing / adding extra lengths to suit the final layout, preparing edges afresh and adopting specified NDT, heat treatment procedure are in the scope of work.
- 1.14.1.22 All the tubes and pipes shall be cleaned and blown with compressed air and shown to the Engineer before lifting. Pipes above 2" diameter have to be cleaned by means of wire brush as per the instruction of BHEL Engineer and subsequently flushed with air before lifting them into position. Pipes below 2" diameter, shall be sponge cleaned with air flushing. After cleaning is over, the end caps shall be put back in tube openings till such time they are welded to other tubes. Required compressors shall be arranged by the contractor at his cost.
- 1.14.1.23 Contractor shall use only bolted clamps for achieving alignment of piping. Wherever "L" shaped stoppers and wedges are to be used for aligning piping and equipments, the same shall be subject to the approval of BHEL Engineer. Contractor shall remove the bridge, stopper etc., by gouging/ grinding and not by hammering. Any burrs left on the equipments / piping, after welding, shall be ground off or any scar or cavity made good by welding and grinding. NDT tests shall be carried out if necessary to detect surface and sub-surface cracks in these ground areas.
- 1.14.1.24 All the weld joints on equipments and piping shall be ground or filed on completion of welding and before radiography as per instructions of BHEL Engineer so as to achieve smooth surface to avoid of ripples, undulations etc.,
- 1.14.1.25 Pipelines shall be cleaned off welding slag and burrs by hand files, wire brushes and flexible grinders wherever required and using cloth.
- 1.14.1.26 Flame cutting of piping or any other equipments shall be strictly done as per BHEL Engineer's instructions and clearance only.
- 1.14.1.27 The work on piping systems (air, water, oil, steam, gas etc.,) will include laying, edge preparation, fixing and welding of the elbows / fittings / valves etc., welded on the lines, fixing and adjustment of supports / hangers / shock absorbers and carrying out all other activities / works to complete the erection and also carrying out all pre-commissioning / commissioning operations mentioned in the specification as per BHEL Engineer's instructions and / or as per approved drawings / documents.
- 1.14.1.28 The instrumentations other than an assembled part of the equipments / items are not included in the scope of this works and shall be carried out by other contractors.
- 1.14.1.29 Certain instruments like pressure switches, gauges, air filters, regulators, filters, junction boxes, power cylinders, dial gauges, thermometers, flow meters, valve actuators, flow indicators etc., are received in assembled conditions as integral part of equipments. Contractor shall dismantle such instruments and re-erect whenever required prior to commissioning.

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- Sometime this may have to be handed over to store or instrumentation contractor.
- 1.14.1.30 The dampers, actuators etc. will have to be cleaned, checked and overhauled in full or in part before erection, after acid cleaning, steam blowing and during commissioning as maybe necessary.
- 1.14.1.31 Erection of flow switches, steam traps, filters, flow meters, other metering elements, flow orifices, flow indicators, control valves supplied either by BHEL or customer forming part of the system is in the scope of work. This will include collecting from BHEL / Customer stores, transport to site, suitably cutting the erected piping, cleaning, erection, welding, radiography and stress relieving and commissioning.
- 1.14.1.32 Erection of all the piping systems supplied along with equipments, pumps and other auxiliaries covered in this contract is to be erected by the
- 1.14.1.33 contractor within the quoted rate. All piping works including integral piping shall be completed up to & including erection / welding of root valves for further connection of impulse tubing.
- 1.14.1.34 All piping will be supplied in running metres, contractor has to cut and edge prepare as per the standards / drawings and as per the instruction of BHEL Engineer within the quoted rate.
- 1.14.1.35 Contractor shall also weld small length of piping with root valve to the pressure, temperature, flow and level tapping points on piping or flow nozzles / orifices / metering elements fixed on piping as per the instructions of BHEL Engineer.
- 1.14.1.36 Plate / Pipe shoes for piping supports shall be fabricated at site by the contractor at no extra cost. Other supports namely Hangers, U-clamps etc., shall be supplied by BHEL duly bent and threaded. Assembly and necessary cutting work etc., shall be carried out at site by contractor within the quoted rate.
- 1.14.1.37 Tubes or pipes wherever deemed to be convenient will be sent in standard length and will be cut to suit the site conditions and the layouts. Bends less than or equal to NB 65 mm will have to be fabricated at site adopting specified NDT, heat treatment procedures, wherever required at no extra cost.
- 1.14.1.38 All site-fabricated pipes will be issued in running meters as straight. These are to be cut and edge prepared at site to required length to suit layout as given in the erection drawing.
- 1.14.1.39 For all the site routed piping, as built drawings are to be submitted by the contractor immediately after erection.
- 1.14.1.40 Fine fittings, oil system and other small bore piping have to be routed according to site conditions and hence shall be done only in position as per the site requirement. Necessary sketch for routing these lines should be got approved from BHEL by the contractor. In case any minor modifications are required in these pipelines after completion to meet the system requirements, the same shall be carried out by the contractor within the quoted rate.

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- 1.14.1.41 The contractor shall fabricate piping, install lub oil systems and carry out the acid cleaning of fabricated piping. The contractor shall also service the lub oil system, carry out the hydraulic test of oil coolers. etc.,
- 1.14.1.42 All the attachments like lugs, stoppers, cleats etc., will be supplied as loose items and to be cut and welded to the pipes at site as per erection drawing. Necessary drilling of holes on main pipe for welding stubs shall also be done at site by the contractor.
- 1.14.1.43 In case of piping connected to equipment, matching of flanges for achieving the parallelism and alignment at equipment end by suitably resorting to heat correction or other method as instructed by BHEL Engineer is within scope of work.
- 1.14.1.44 For any mismatch while matching the joints in tubes, the cutting, preparing edges afresh, re-welding, addition of spool pieces, adopting specified NDT, heat treatment procedure should be done by the contractor to match site conditions without any extra payment.
- 1.14.1.45 The surface of the pipes to be joined shall be suitably prepared as per instructions of BHEL Engineers. Edge preparation shall be done by chamfering machine, whenever required and all welding surfaces must be cleaned thoroughly.
- 1.14.1.46 Instrumentation drains, stubs which are sent in loose from manufacturing units are to be welded at site as per BHEL Engineer's instructions.
- 1.14.1.47 Before erecting the valves and other mountings, check for the tag for correct rating with valve schedule. Ensure correct flow direction. Ensure easy accessibility for operation and maintenance of valves.
- 1.14.1.48 Contractor has to fabricate and erect temporary spool pieces wherever required due to non-receipt of valves in time and after receipt of valves the spool pieces are to be replaced with regular valves at no extra charges to BHEL. For spool pieces materials will be supplied free of cost by BHEL.
- 1.14.1.49 All the valve packing with asbestos base to be lubricated once in 6 months till handing over. Necessary gland packing will be supplied by BHEL.
- 1.14.1.50 Contractor has to carryout fabrication works such as welding of stubs / nipples, attachments etc., preparation of surface for rust preventive coating and application of rust preventive within the quoted / accepted rate / price.
- 1.14.1.51 In the case of structural members / pipes, plates etc, in certain cases, or in small bore piping for integral cooling water or lubrication system, etc., the raw material will be supplied in random lengths and the contractor will have to make up the length/prepare the edges to suit the matching profiles, weld/bolt connect the joints at no extra cost.
- 1.14.1.52 Any Operating / Approach platforms, cross over, canopies, ladders etc. for approaching different equipment's as per the site requirement, shall have to be fabricated from raw materials supplied by BHEL at free of cost and are to be erected as per instruction of BHEL, by the contractor within the quoted rate / price.
- 1.14.1.53 Attachment, welding of necessary instrumentation tapping points, thermocouple pads, root valves, condensing vessels, flow nozzles and

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- control valves etc., to be provided on the components/ equipments/ pipelines erected by the contractor shall be carried out by the contractor, as per the instructions of BHEL Engineer. The erection and welding of all above items will be contractor's responsibility even if, the items are supplied by an agency other than BHEL if they are integral to the scope envisaged under this package.
- 1.14.1.54 All the dampers, valves, lifting equipments, actuators / power cylinders, etc., shall be serviced and lubricated to the satisfaction of BHEL engineer before erecting the same and also during pre-commissioning.
- 1.14.1.55 All Rotating machineries and equipment shall be cleaned, lubricated, checked for their smooth rotation, if necessary dismantling and refitting before erection by the contractor. If in the opinion of BHEL Engineer, the equipment is to be checked for clearance, tolerance at any stage of work or during commissioning period, all such works are to be carried out by contractor within the quoted rate.
- 1.14.1.56 All the shafts of rotating equipment shall have to be properly aligned to those of matching equipment to perfection, accuracy as required and the equipment shall be free from excessive vibration so as to avoid overheating of bearings or other conditions which may tend to shorten the life of the equipment.
- 1.14.1.57 All the equipments / material to be taken inside the plant building shall be cleaned thoroughly before taking them inside for erection.
- 1.14.1.58 The contractor shall clean, wherever necessary and paint inside surfaces of the equipments like coolers, oil tanks, Rubber expansion joints assembly and other components as per instruction of BHEL Engineer during erection.
- 1.14.1.59 All the bearings, Gearboxes etc., of the equipment and electrical motors to be erected are provided with protective greases only. Contractor shall arrange as and when required by the engineer for cleaning the bearing / gear boxes etc., with kerosene or some other agent if necessary by dismantling some of the parts of the equipment during erection and shall arrange for re-greasing / lubricating them with recommended lubricants and assembling back. Lubricants will however be supplied by BHEL at free of cost.
- 1.14.1.60 All the motors / pumps shall be stripped opened, thoroughly serviced with proper care and re-assembled properly before erection by the contractor, if required. During servicing, pre-commissioning & commissioning, if any deficiency is observed the same should be taken up with BHEL Engineer at site and rectified at site without any delay.
- 1.14.1.61 Assistance for calibrating / testing the power cylinders/ actuators / valves, gauges, instruments, etc. and setting to actuators / gauges/ instruments shall be provided by contractor within the quoted rates.
- 1.14.1.62 Fixing / fitting / welding of thermo wells, stubs, hoses, tapping points, root valves and instruments etc., on different lines / equipments (which will be supplied by BHEL) is within the scope of work. Fixing of Pick-Ups, Probes & Accessories for vibration monitoring system is the scope of this specification.

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- 1.14.1.63 The contractor shall also weld all thermo wells, small length of pipes to all pressure, flow and level tapping points, isolating valves and root valves on all equipment under scope of erection of this contract. All embedded temperature measuring elements provided in the bearings will have to be terminated at the junction box by the contractor. Thermo wells tapping point connections incorporated shall be plugged during the pressure testing and steam blow out of piping systems. Upon completion of blow out operation all thermo wells and flow elements with branch pipes be installed and welded.
- 1.14.1.64 Wherever hanger and support materials of piping are not received from manufacturing unit in time, to suit the erection schedule contractor shall erect the piping system on temporary supports to ensure the progress of work. The required structural steel materials will be issued on free of charges by BHEL, either from scrap / spare materials. The same shall be removed and returned to BHEL store after erection of permanent supports. The above work is within the scope of this contract.
- 1.14.1.65 Suspension for pressure parts, piping etc., will be supplied in running lengths and shall be cut to suitable sizes and adjusted as required.
- 1.14.1.66 Hangers' components which are being supplied in loose shall be assembled at site and erected as part of the work.
- 1.14.1.67 Spring suspensions / constant load hangers have to be preassembled and adjusted for the required loading and erected as per instructions, of BHEL Engineer. Any adjustments, removal of temporary arrestors / lockers, etc., have to be carried out as and when required.
- 1.14.1.68 1.14.1.98 All hangers, supports and anchors (including concreting or welding) shall be installed as per drawing to obtain are reliable and complete installation as per instructions of BHEL Engineer. Normally supports are issued in running meters. Any additional supports as called for by BHEL Engineer shall be fabricated by the contractor and provided at no extra cost. However, the raw material required for fabrication of such supports shall be supplied by BHEL free of cost. Any machining or threading involved will be done by the contractor within his quoted rated.
- 1.14.1.69 For hangers and supports the instruction given in the drawings and documents must be followed for handling, erection and setting of cold / hot values and locking etc.
- 1.14.1.70 Normally, the machine profile will be cut for the structural members but the contractor will have to carry out suitable alterations / adjustments at site, without any extra payment, in case it becomes necessary. Also, it may sometimes be necessary to remove some of the erected members to facilitate erection of bigger pre-assembled equipments. In such case, the removal and re-erection of such members which are essential and if so agreed by the BHEL Engineer will have to be done by the contractor without any extra payment.
- 1.14.1.71 Certain extra lengths of portions / parts of various site fabricated components / parts / bellows / piping etc. are provided as erection

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- allowance and they shall have to be cut to suit site conditions and layout. Certain small length of portions / components / bellows / piping casing etc., may have to be added to suit conditions and layouts. Preparing edges afresh and adopting specified heat treatment procedure, are in the scope of work. No extra payment will be admitted for such works.
- 1.14.1.72 All instrumentation impulse lines from equipment / component / pipings upto root valves shall also be erected and welded by TIG welding only by
- 1.14.1.73 the contractor within their quoted value. The required piping and root valves will be supplied by BHEL free of cost.
- 1.14.1.74 The HT motor bearings shall be blue matched at site and checked for bearing clearance. Scrapping of bearing housing, if required to any extent shall be carried out by the contractor. No extra claim for blue matching of any two surfaces will be entertained. The HT motors will also be checked for air gap and adjustment stator / rotor to magnetic center shall be carried out as part of erection within the quoted rates.
- 1.14.1.75 The contractor shall take necessary measures to see that all the machined surfaces are preserved and covered.
- 1.14.1.76 HSFG Bolts are to be tightened by turn of nut method / Torque Wrench, as per the instruction of BHEL Engineer. The bolted joints shall be jointly checked by BHEL / Customer personnel for the required tightness and retightened wherever necessary. The tightened bolts shall be identified by color paints. Facility for random checking with calibrated Torque Wrench shall also be provided by contractor.
- 1.14.1.77 The temporary structures / items welded to permanent members / pipes, temporary lugs / structures meant for transportation are to be cut and removed without any damage. In case of any damage, the same has to be made good by the contractor at his cost.
- 1.14.1.78 Contractor has to arrange required fire retardant covering material at their cost to protect the machined components / assembled parts drawn from BHEL before and after erection.
- 1.14.1.79 The contractor shall provide any fixtures, concrete blocks / wooden sleepers, steel structures etc., which are required for temporary supporting for checking / welding / lifting / handling / preassembly of the components at site.
- 1.14.1.80 Prior to erection of any components inspection to be done for any foreign materials and damages and they are to be attended as per directions of BHEL engineer.
- 1.14.1.81 Before lifting the heavy components, soft materials like gunny bags to be used while lashing the rope to avoid dents, rubbing marks etc. The capacity, number of sheave pulleys, size of the rope, guide pulley locations are to be decided at site with respect to the capacity and positioning of the winch.
- 1.14.1.82 The end caps provided at shop for various stubs are to be removed during final fit up only.
- 1.14.1.83 For other agencies, such as boiler, Power Cycle Piping, cabling, instrumentation, insulation, civil works etc., to commence their work from

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- 1.14.1.84 / on the equipments coming under this scope, Contractor has to clear the front, expeditiously and promptly as instructed by BHEL Engineer. Some time it may be required to re-schedule the activities to enable other agencies to commence / continue the work so as to keep the overall project schedule.
- 1.14.1.85 The contractor shall conduct non-destructive tests like Radiography, Ultrasonic, Dye penetrant, Magnetic particle tests, etc. on welds, castings, valve bodies & other equipments etc. and Ultrasonic test for finding thickness of materials as per BHEL Engineer's instructions within the quoted rate.
- 1.14.1.86 The contractor has to fabricate stainless steel orifice plate within the quoted rate. No extra payment will be made for fabrication of above orifice plates. The required stainless steel plate will be supplied by BHEL.
- 1.14.1.87 All welded joints should be painted with anti-corrosive paint, once radiography and stress relieving works are over.
- 1.14.1.88 It is the responsibility of the contractor to do the alignment, checking, etc. if necessary, repeatedly to satisfy BHEL Engineer / Customer Engineers with all the necessary tools and tackles, manpower etc. without any extra cost. The alignment will be completed only when jointly certified so, by the BHEL Engineer & Customer. Also the contractor should ensure that the alignment is not disturbed afterwards.
- 1.14.1.89 Some of the packages may be sent in parts to suit the site condition / transportation, the same is to be assembled at site without any extra cost. Likewise, the package may be assembled together and sent as a single assembly. Contractor may have to dismantle and erect (or) erect as single assembly as per the instruction of BHEL Engineers within the quoted rates / prices.
- 1.14.1.90 BRIEF LIST OF EQUIPMENTS / COMPONENTS TO BE ERECTED FOR EACH UNIT IS MENTIONED BELOW:

Note :

1. The Information furnished above is only a description regarding the item to be erected by the contractor. BHEL reserves the right of adding or excluding any components/ items / systems according to the site requirements/ customer requirements to complete various systems in all respects.
2. Any other systems / components which are integral to equipment supplied by the manufacturing units shall also be erected and commissioned by the contractor within the quoted /accepted rate.

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VOLUME-IA PART-I CHAPTER - XV

WELDING, HEAT TREATMENT & RADIOGRAPHY AND NON-DESTRUCTIVE TESTING

The scope of the work will comprise of but not limited to the following:

(All the works mentioned hereunder shall be carried out within the accepted rate unless otherwise specified.)

- 1.15.1 The equipments and piping shall be erected in conformity with the standard / Indian Boiler Regulations / and as may be directed as per any other standard / specification in practice in BHEL. The method of welding (viz) MMAW(SMAW), TIG or other methods as indicated in the detailed drawing or as instructed by BHEL Engineer shall be followed. BHEL Engineer will have the option to change the method to suit site conditions. All the prepared / patched edges will have to be suitably protected to prevent rusting or foreign material ingress.
- 1.15.2 The technical particulars, specifications and other general details of work shall be in accordance with DIN / Haridwar Plant Standard / ASME / IBR / BHEL welding, Heat treatment and NDE manuals or equivalent as decided by BHEL Engineer.
- 1.15.3 The contractor shall conduct nondestructive tests like radiography ultrasonic test for weld defects etc., ultrasonic test for finding thickness, dye penetrant tests, magnetic particle test etc., on weld joints, castings, valve bodies and other equipments etc., as per BHEL Engineer's instructions.
- 1.15.4 Welding of pressure parts, piping & fittings (under IBR code) shall be done by certified IBR welders who possess valid certificate of CIB of the State in which the equipment is erected as per provision of IBR. The H.P. welder who possesses necessary certificate shall ensure re-validation as per relevant provisions of IBR and keep the certificate valid till the completion of work. The services of such welders, the validity of whose certificates have expired shall not be utilized for high pressure works.
- 1.15.5 Welding of high tensile structural steel shall be done by certified structural welders who possess valid certificate and who are approved by BHEL Engineer.
- 1.15.6 All welders including tack welders, structural and high pressure welder shall be tested and approved by BHEL Engineer before they are actually engaged on work even though they may possess a valid certificate. BHEL reserves the right to reject any welder if the welder's performance is not found to be satisfactory. The contractor shall maintain the records of qualification AND performance of welders. BHEL Engineer will issue all the welders qualified for the work, an identity card. The welder will keep the

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same with him at work place at all times. He may be stopped from work if he is not found in possession of the same.

- 1.15.7 All charges towards testing of welders for destructive and non-destructive testing and approval of welders for engaging in the erection work shall be borne by the contractor.
- 1.15.8 All expenses for testing of contractor's welders (pre-production test) including destructive and Non- destructive tests conducted by BHEL or by the inspecting authority at site or at laboratory shall have to be borne by the contractor only. Limited quantity of structural plates, tube and pipe material required for making test pieces will be supplied by BHEL free of cost and all testing facility shall be made available by the contractor.
- 1.15.9 BHEL Engineer is entitled to stop any welder from the work if his performance is unsatisfactory for any technical reason or if there is a high percentage of rejection in the joints welded by him. The welders having passed qualification tests does not absolve the contractor of contractual obligation to continuously check the welder's performance.
- 1.15.10 The contractor shall carry out the root run welding of all LP piping, valves by TIG welding method as specified in the Drawing / EWS. The contractor shall have to carry out full TIG welding of butt weld joints of tubes / pipes of lesser thickness if required. During the root runs of stainless steel joints, the contractor shall carry out purging the pipes with inert gas before and during welding.
- 1.15.12 The regulators used on welding machines shall be calibrated before putting these into use for work. The Contractor at his cost shall also arrange periodic calibration for the same.
- 1.15.13 The thermostat and thermometer of electrode drying oven shall be also calibrated. All welders shall have electrodes drying portable oven at the work spot.
- 1.15.14 Pre -heating, radiography and all other NDT tests like KLT/MPT/UT/LPT/Hardness testing etc, post heating and stress relieving after welding of tubes, pipes, including attachment welding wherever necessary are part of erection work and shall be carried out by the contractor in accordance with the instructions of the Engineer and as specified in Erection Welding Schedule, Welding, Heat Treatment & NDT manuals and Field Quality Plan. Contractor at his cost shall arrange all equipment and consumables & NDT quantified personnel essential for carrying out the above process.
- 1.15.15 Preheating, post weld heating and stress relieving after welding are under the scope of the contract and shall be performed by the contractor in accordance with the instructions of BHEL Engineer.

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- 1.15.16 Oxy-acetylene flame heating or exo-thermic chemical heating for stress relieving is not permitted. Heating shall be by means of Electric Induction coil or Electric resistance coil. Potentiometric type recorders shall only be used for temperature recording purposes.
- 1.15.17 Contractor shall arrange all necessary heating and stress relieving equipment with automatic recording devices. The contractor shall arrange for labour, heating elements, thermocouples, compensating cables, thermo-chalks, temperature recorders, thermocouple attachment units, graph sheets, insulating materials like wools, asbestos cloth, ceramic beads, asbestos ropes etc. required for heat treatment/ stress-relieving operations. The contractor should take a note of the following,
- Temperature shall be measured by thermocouple and recorded on a continuous printing type recorder. All the recorded graphs for heat treatment works shall be the property of BHEL.
 - All stress relieving equipment will be used after due calibration and submission of test certificate to BHEL. Periodic calibration from Govt. Approved / accredited Test Houses traceable to National / International standards will also be arranged by the contractor for such equipment at his cost.
 - The contractor shall obtain the signature of Engineer or his representative on the strip chart of the recorder prior to the starting of Stress Relieving operations.
- 1.15.18 The contractor shall also be equipped for carrying out other NDT like LPI / MPI / Hardness test etc. as required as per welding schedules / drawings within the finally accepted price / rates. Ultrasonic testing, wherever required also has to be arranged by the contractor within the quoted rate.
- 1.15.19 All arrangements for carrying out radiography work including radiography source & equipments and consumables, dark room and air conditioner and other accessories shall be provided by contractor within the space allotted for office at his cost. As an alternative the contractor may deploy an agency having all above facilities and who are duly approved / accredited by BARC and / or other Regulatory authorities. Detailed particulars of such agencies shall be submitted to BHEL Engineer and
- approval obtained before the actual deployment of agency for radiography work.
- 1.15.20 Contractor shall note that 100% radiography will be done at the initial stages on the piping welding joints. Subsequently radiographic inspection will be done on the basis of quality of welding. However minimum percentage of joints to be radiographed shall not be less than the requirement of BHEL welding schedule / specifications / drawings / Customer's requirements. The

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percentage may be increased depending upon the quality of joints and at the discretion of BHEL. For LP Piping, as per site engineer's instructions, NDT method and other tests to be carried out.

- 1.15.21 Heat treatment and radiography may be required to be carried out at any time (day and night) to ensure the continuity of the progress. The contractor shall make all necessary arrangements including safety, labour, supervisors/ Engineer required for the work as per directions of BHEL.
- 1.15.22 The Contractor shall carryout Radiography as per welding Manual booklet applicable as per IBR. However percentage radiography shown in the respective drawings shall be final and binding on the contractors.
- 1.15.23 Low speed high contrast fine grain films (D7 or equivalent) in 10 cm width only should be used for weld joint radiography. Film density shall be between 1.5. to 2.00
- 1.15.24 Penetrameter as per ASME / ISO shall be used for all exposures.
- 1.15.25 All radiographs shall be free from mechanical / chemical process marks to the extent that they shall not confuse the radiographic image and defect finding penetrameter as per ASME / SI shall be used for all exposures.
- 1.15.26 Lead numbers and letters (generally of 6mm size) are to be used for identification of radiographs. Contract No., joints identification, sources used, welders identification, SFD used are to be noted down in the paper cover of radiography. Lead intensifying screens for front and back of the film shall be used as per the instructions of BHEL Engineer.
- 1.15.27 The weld joint is to be marked with permanent mark A, B, C, etc. to identify the segments. For this a low stress stamp shall be used to stamp the pipe on the downstream side of the weld. For multiple exposures on pipes, an overlap of about 25 mm of film shall be provided.
- 1.15.28 The contractor shall be fully equipped with radiography equipments, films, chemicals and other dark room facilities. There must be a number of radiographic personnel with sufficient experience and certified by BARC for field radiographic inspection. Further, the contractor must follow

strictly the safety rules laid down by BARC, from time to time, contractor's radiographers shall also be registered with BARC for film badge service.
- 1.15.29 Contractor shall provide all skilled, unskilled work men required for the job, which will include Engineers, supervisors, operators, as required for timely and satisfactory execution of radiography work and other NDTworks.
- 1.15.30 If the contractor does not carry out radiography work in time due to nonavailability of film, chemicals etc. BHEL shall get the work done through some other agency at the risk and cost of the contractor.

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- 1.15.31 All the radiographic films of joints radiographed at site in connection with work of this tender shall be properly preserved in air-conditioned rooms and shall become the property of BHEL. They are to be reconciled with the work done, joints radiographed and submitted to BHEL/customer.
- 1.15.32 Radiography of joints shall be so planned after welding that the same is done either on the same day or next day of the welding to assess the performance of high pressure welders. If the performance of the welder is unsatisfactory, he shall be replaced immediately.
- 1.15.33 The defects as pointed out by the Engineer shall be rectified immediately to the satisfaction of Engineer and Re-radiographed. The decision of Engineer regarding acceptance or otherwise of the joint shall be final and binding on the contractor.
- 1.15.34 Wherever radiographs are not accepted on account of poor exposure, joints shall be re-radiographed and new film submitted for evaluation. Radiographs shall be taken again on joints after carrying out repairs. However, if the defect persists after first repair as per radiograph, carrying out radiography shall be repeated till the joint is made acceptable. In case the joint is not repairable, the same shall be cut, re-welded and reradiographed at contractor's cost. In case of repair joints, at the discretion of BHEL engineer, additional weld joints to be NDT tested as per the instruction of BHEL engineer.
- 1.15.35 Radiography work of the welds connected with this contract shall be arranged by the contractor including provisions of services of technicians and necessary equipment and consumables like Isotope camera, X-Ray / RTfilms, chemicals and other dark room facilities etc. Also contractor has to provide necessary labour required such as Riggers, Helpers etc. to assist the technicians for carrying the above radiography work and making other arrangements such as providing scaffolding, approaches, platform lighting arrangements at his cost as per the instructions of BHEL. It may please be noted that invariably the radiography will be carried out after the normal working hours only.
- 1.15.36 Radiography inspection of welds shall be performed in accordance with the requirements and recommendation of BHEL Engineer. The Minimum extent of radiographic inspection shall be as per BHEL Drawings / provision of IBR Regulations. They may however be increased depending upon the performance of the individual welder at the discretion of BHEL Engineer / Boiler inspection authority.
- 1.15.37 Contractor has to make his own arrangements for air conditioned dark room to process the radiographs.
- 1.15.38 BHEL Engineer reserves the right to alter the quantum of radiography of joints without any additional cost. The decision of the BHEL Engineer in this

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- regard is fixed and final and binding on the contractor. Any defects as pointed out by BHEL Engineer shall have to be rectified by the contractor at his cost.
- 1.15.39 It may also become necessary to adopt inter layer Radiography / MPT/ UT depending upon the site / technical / requirement necessitating interruptions in continuity of the work and making necessary arrangements for carrying out the above work. The tenderers shall take all this into account and quote the price inclusive of all such work and radiography.
- 1.15.40 All field joints shall be subjected to dye penetrant examination as specified in the respective drawings and shall have to be accepted by BHEL Engineer. Any rectifications required shall have to be done by the contractor at his cost.
- 1.15.41 For carrying out ultrasonic testing of welded joints of large size tubes and pipes, it will be necessary to prepare the surface by grinding to a smooth finish and contour as desired by BHEL Engineer. The contractor's scope of work include such preparation and no extra charges are payable for this.
- 1.15.42 The welded surface irrespective of place of welding shall be cleaned of slag and painted with primer paint to prevent corrosion at no extra cost.
- 1.15.43 The contractor shall have to do root run by TIG process, wherever required as per the instruction of BHEL Engineer.
- 1.15.44 All welds shall be painted with primer as specified in the painting schedule, once radiography and stress relieving works are over.
- 1.15.45 Erection of equipment involves good quality of Welding, Heat treatment and Non-Destructive Testing. Wherever required, 100% dye penetration tests have to be carried out as per instructions of BHEL Engineer. Contractor's Engineers, Supervisors, Technicians and workers engaged should have adequate knowledge on the above works with NDT level 2 certificate.
- 1.15.46 The contractor shall maintain a record in the format as prescribed by BHEL of all operations carried out on each weld and maintain a record indicating the number of welds, the names of welders who welded the same, date and time of start and completion, preheat temperature, radiographic results, rejection if any, percentage of rejection etc. and submit copies of the same to the BHEL Engineer as required. Interpretation of the BHEL Engineer regarding acceptability or otherwise of the welds shall be final.
- 1.15.47 Approval Given by Customer / BHEL for welding, results tests etc. shall also be recorded in the log book.
- 1.15.48 All site welded joints shall be subjected to acceptance by BHEL / Customer Engineer.

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- 1.15.49 All the data such as heating temperatures, heating rate, soaking time, maximum temperature reached during heat treatment shall be properly recorded and documented by contractor, which will be property of BHEL.
- 1.15.50 Faulty welds caused by the poor workmanship shall be cut and re-welded at the contractor's expense. Prior to any repair approval shall be obtained from BHEL Engineer for the procedure for the repair of defective welds. After the repair has been carried out, the compliance document shall be submitted to the quality engineer.
- 1.15.51 The contractor shall carry out the edge preparation of weld joints at site in accordance with details acceptable to BHEL Engineer. Wherever possible machining or automatic flame cutting will be allowed only for edge preparation.
- 1.15.52 All the prepared / patched edges will have to be suitably protected to prevent rusting or foreign material ingress.
- 1.15.53 All necessary preheating, post heating of welds and stress relieving operation of welds are part of the erection work and shall be performed by the contractor in accordance with the relevant regulations and standards of BHEL practice and to the satisfaction of BHEL Engineer and in accordance with the drawings and specifications.
- 1.15.54 Welding of Hangers, supports, stubs and impulse piping to be carried out by the contractor as per drawing specification and as per BHEL Engineer's instructions. According to drawing specifications and as per BHEL Engineer's instructions preheating post-heating stress relieving etc. have to be carried out by the contractor wherever necessary.

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VOLUME-IA PART-I CHAPTER- XVI

TESTING AND COMMISSIONING

The scope of the work will comprise of but not limited to the following:

1.16 TESTING, PRE – COMMISSIONING & COMMISSIONING AND POST COMMISSIONING

(All the works mentioned hereunder shall be carried out within the accepted rate unless otherwise specified.)

- 1.16.1 The Contactor shall carry out all the required tests and precommissioning and commissioning activities required for their successful and reliable operation as per BHEL / Customer / customers' consultant specification.
- 1.16.2 The contractor shall carryout kerosene test of all the bearing housing of pumps & other equipments and do the repair work if any. The contractor at his cost shall also arrange kerosene.
- 1.16.3 All shaft journals and bearings of all the equipments under the scope of this tender shall be periodically inspected and preservation shall be done as per BHEL Engineer's instructions / BHEL quality instruction manuals.
- 1.16.4 All bearings, shaft journals, shafts, and other rotating parts shall be thoroughly cleaned and lubricated as per the recommendations of BHEL Engineers before commissioning / starting.
- 1.16.5 The contractor shall carry out the trial run of motors including checking the direction of rotation in the uncoupled condition checking aligning and coupling the motor to the respective driven equipment. Before starting the motor, IR values of insulation shall be recorded and if found necessary the contractor shall dry out to improve the IR value at no extra cost.
- 1.16.6 The HT motors will also be checked for magnetic center of stator / rotor as part of erection.
- 1.16.7 It is the responsibility of the contractor to provide electricians round the clock during pre-commissioning and post-commissioning activities. Further removal and reconnection of power for HT and LT motors are to be carried out as part of commissioning activities. Contractor's quoted rate shall include all these contingencies.
- 1.16.8 Commissioning of the set involves trial runs of all the equipment erected, blowing of steam lines, flushing of all the lines by air, oil or steam as the case may be, servicing of all equipment like dampers, actuators valves etc and any other works incidental to commissioning. Contractor shall provide required workers along with supervisors with all the requisite tools round the clock for all these works which shall form part of the work to be done.
- 1.16.9 All thermo well points are to be seal welded, with plug in position. All Temperature Element points are to be provided with blanks and welded. Necessary blanks will be provided by BHEL.

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- 1.16.10 Transportation of oil / lubricant drums from customer's / BHEL's stores for bearings, filling of lubricants and filling of oil for flushing and first filling and subsequent topping up during commissioning and post commissioning is included in the scope of this contract. The contractor shall have to return all the empty drums to the customer/BHEL stores..
- 1.16.11 Assistance for calibrating / testing the power cylinders / valves, gauges, instruments, etc. and setting to actuators coming under various groups shall be provided by contractor within the quoted rates.
- 1.16.12 Contractor to provide necessary commissioning assistance from precommissioning stage onwards and up to continuous operation of the unit & handing over to customer. The category of personnel shall be as per site requirement and to meet the various pre-commissioning and commissioning programmes made to achieve the schedule agreed with customer.
- 1.16.13 It shall be the responsibility of the contractor to provide various categories of workers in sufficient numbers along with Supervisors during precommissioning, commissioning and post commissioning of equipment and attending any problem in the equipment erected by the contractor till handing over. The contractor will provide necessary consumables, T&Ps, IMTEs etc., and any other assistance required during this period. Association of BHEL's / Client's staff during above period will not absolve contractor from above responsibilities.
- 1.16.14 It shall be the responsibility of the contractor to provide following category of workers in sufficient numbers along with supervisors including necessary equipment, consumables, hand tools, etc. for commissioning activities till handing over of the Unit to customer. The rate quoted shall include all these contingencies also.
- a) Fitters, Millwright Fitters & Pipe fitters
 - b) HP & Structural Welders
 - c) Riggers
 - d) Gas cutters & Grinders
 - e) Unskilled workers
 - f) Electricians
 - g) Any other category of workers as may be required.
 - h) Supervisors
- Further in addition to the above, contractor has to arrange the following manpower (indicative only) exclusively for each unit for assisting BHEL commissioning engineers during commissioning, stabilization and trial operation period. This manpower will be directly reporting to BHEL commissioning engineers only.

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- a) 1 No of Engineer per shift for three shifts
- b) 2 No of Supervisor per shift for three shifts
- c) 2 Nos of Fitter per shift for three shifts
- d) 6 Nos of Helpers per shift for three shifts
- e) 1 Nos of Electrician per shift for three shifts

The log sheets for above manpower has to be maintained by contractor duly signed by BHEL Commissioning engineers and is required to submit along with RA Bills towards release of payment for commissioning activities/milestones.

- 1.16.15 It shall be specifically noted that the contractor and employees of the contractor may have to work round the clock during the precommissioning, commissioning and post-commissioning period along with BHEL Engineers / customer officials. Hence contractor's quoted rate shall take into consideration of all expenses that will be incurred for such arrangement of personnel including engineers / supervisors.
- 1.16.16 It is the responsibility of the contractor to provide necessary manpower, tools, tackles and consumable till the completion of work under these specifications including for trial operation, even if commissioning of Unit and the other equipments is delayed due to reasons not attributable to the contractor.
- 1.16.17 Contractor to provide necessary commissioning assistance from precommissioning state onwards and up to continuous operation of the unit & handing over to customer. The category of personnel to be as per site requirement and to meet the various pre-commissioning and commissioning programmes made to achieve the schedule agreed with customer.
- 1.16.18 If any equipment / part are required to be inspected during precommissioning and commissioning, the contractor will dismantle / open up the equipment / part and reassemble / redo the work without any extra claim. In case, any rework is required because of contractor's faulty erection, which is noticed during pre-commissioning and commissioning, the same has to be rectified by the contractor at his cost.
- 1.16.19 During commissioning opening / closing of valves, changing of gaskets, attending to leakages, minor modification / rectification works may arise. The contractor has to carry out these works at his cost by providing required manpower and T & Ps in all the three shifts. In case any rework is required because of contractor's faulty erection and which is noticed during commissioning the same has to be rectified by the contractor at his cost.
- 1.16.20 During the initial stages of work, trenches for draining water may not be available after Leak test, Hydro test, alkali Flushing or mass flushing. For discharging / emptying the equipment, system and piping, necessary low point drains and temporary piping up to safe location are to be erected by the contractor at his cost. The piping materials will be provided by BHEL at free of charges.

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- 1.16.21 The dampers, actuators etc. will have to be cleaned, checked and overhauled in full or in part before erection, after acid cleaning, steam blowing and during commissioning as maybe necessary.
- 1.16.22 The valves will have to be cleaned, checked, lapped or overhauled in full or in parts before erection, after chemical cleaning, during commissioning. Any special tools required for lapping only will be arranged by BHEL.
- 1.16.23 The contractor shall carry out cleaning and servicing of valves and valve actuators, if required, prior to pre-commissioning tests and / or trial operations of the plant. A system for recording of such servicing operations shall be developed and maintained in a manner acceptable to BHEL Engineer to ensure that no valves and valve actuators are left unserviced. Wherever necessary as required by BHEL Engineer, the contractor shall arrange to lap / grind valve seats.
- 1.16.24 Overhauling, Cleaning, Servicing of tanks, pumps, equipments, barring gear, valves, governing system during erection and commissioning stages are in the scope of work. Gaskets, packing for replacement will be provided by BHEL free of cost.
- 1.16.25 Replacing / changing mechanical / other seals, removal and cleaning / replacing of filters etc. during pre-commissioning / commissioning stage is within the scope of work.
- 1.16.26 Replacing / Cleaning and servicing of all the filters / strainers of the erected equipments during pre-commissioning / commissioning stage, in the system shall be done by the contractor within the accepted price. Frequent cleaning of the Suction Strainers / Basket filters / Bucket filters and other strainers may be required during various commissioning / percommissioning period, for which sufficient manpower for round the clock to be arranged by the contractor within the quoted rate.
- 1.16.27 Contractor may have to replace old / damaged gaskets / packing etc. in the equipments / components and the same shall be carried out by contractor as per requirement. Gaskets / packing required for replacement will be provided free of cost by BHEL.
- 1.16.28 All required tests (Mechanical and electrical) indicated by BHEL and their clients for successful commissioning are included in the scope of these specifications. These tests / activities may not have been listed in these specifications. Specialized test equipment, if any, shall be provided by BHEL/ its client free of hire charges. However, contractor has to take proper care of the equipment issued to him.
- 1.16.29 The contractor shall carryout any other test not listed in the tender but as desired by BHEL Engineer on erected equipment covered under the scope of this contract during testing, pre-commissioning, commissioning, and operation, to demonstrate the completion of any part or whole work performed by the contractor.
- 1.16.30 In case any erection defect is detected during various tests / operations trial runs such as loose components undue noises or vibration strain on connected equipment steam or oil or water leakage etc. the contractor shall

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immediately attend these defects and take necessary corrective measures. If any readjustment and realignments are necessary, the same shall be done as per BHEL Engineer's instructions. If any part needs repairs rectification and replacement the same shall be done by the contractor at no extra cost. The parts to be replaced shall be provided by BHEL free of cost. If insulation is to be removed to attend any of the defects the cost of removal and reapplication of insulation should be borne by the contractor.

- 1.16.31 During commissioning, opening / closing of valves, changing of gaskets, packings, re-erection, Re-alignment of rotating and other equipment, attending to leakage, filling of oil to the meters / equipment and adjustments of erected equipment may arise. The finally accepted price / rates shall also include all such work.
- 1.16.32 During the stages of pre-commissioning / commissioning / post commissioning, if any of the equipment erected need, repair / rectification / rework / replacement, the same shall be done expeditiously and promptly by the contractor.
- 1.16.33 Necessary scaffolding and approaches for carrying out / conducting all the tests / commissioning activities shall also be within the scope of the contract.
- 1.16.34 After synchronization, the commissioning activities will continue. It shall be the responsibility of the contractor to provide manpower including necessary consumables, hand tools and supervision as part of commissioning assistance till handing over of sets to customer.

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VOLUME-IA PART- I CHAPTER-XVII

PAINTING

The scope of the work will comprise of but not limited to the following:

1.17.1 FINAL PAINTING

- 1.17.1.1 The scope of work shall also include supply and application of final painting of all the erected equipments as required and specified in the BHEL / Customer / Customer Consultant's painting specification.
- 1.17.1.2 Though CW piping will be supplied with Glass Flake Coating, at open ends of each pipe up to 100mm length (on both sides), the Glass Flake Coating will not be done to facilitate while supplying the pipes. Hence the scope of this contract includes surface cleaning, supply and application of Glass Flake coating for the welded portion of the pipes up to the maximum of 100mm length or HAZ on both sides of the joint. Surface cleaning and painting of the internal and external surface of CW piping shall be carried out by the contractor as per the painting schedule forming the part of this tender specification.
- 1.17.1.3 In the case of steel fabricated items for platforms, raw steel after fabrication may have to be cleaned by Sand / Grit / shot blasting and subsequent painting to be carried out. Sand / Grit / shot blasting equipment with all accessories and consumables as required has to be carried out by the contractor as per BHEL instructions and within the Quoted rates.
- 1.17.1.4 All the exposed metal parts of the equipments including piping, structures, hangers etc., wherever applicable after installation unless otherwise specified the surface protected, are to be first painted with at least one coat of suitable primer and required number of finish coats as indicated in the Painting Specification which matches the shop primer paint used, after thoroughly cleaning the dust, rust, scales, grease oil, and other foreign materials by wire brushing scrapping and chemical cleaning and the same being inspected and approved by BHEL engineers for painting. Afterwards the above parts shall be finished with as per the instructions of BHEL / Customer official.
- 1.17.1.5 Normally Paint shall be applied by brushing as per the instruction of BHEL Engineer. It shall be ensured that brush marks are minimum. If needed and insisted either by BHEL / Customer in certain cases, spray painting has to be carried out within the Quoted rates. Spray painting gun and compressed air arrangement has to be made by the contractor himself within the Quoted rates.
- 1.17.1.6 Paint used shall be stirred frequently to keep the pigment in suspension. Paint shall be of the ready mix type in original sealed containers as packed by the paint manufacturer. Paint manufacturer's instructions shall be followed in method of application, handling, drying time etc.,
- 1.18.1.7 The scope of painting includes application of colour bands, lettering the names of the systems, equipments, tag Nos of valves, marking the directions of flow and other data required by BHEL within the quoted rate.

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- 1.17.1.7 All surfaces shall be thoroughly cleaned, free from scales, dirt and other foreign matter. Each coat shall be applied in an even & uniform film free from lumps, streaks, runs, sags and uncoated spots. Each coat (Primer, intermediate, finish) shall have a minimum thickness of dry film thickness (DFT) in microns and the DFT of finish paint shall not be less than the specified value. Necessary instrument for measuring the thickness of paint applied is to be arranged by the contractor.
- 1.17.1.8 Finish coat paint, no of coats and DFT shall be as indicated in the painting specification enclosed in this tender / relevant BHEL document / customer's specifications. The painting specification forming part of this tender shall be used as guidelines to be followed. Painting to be done as per the procedure / approved painting schedule given by BHEL Engineer / Manufacturing unit.
- 1.17.1.9 The actual colour to be applied shall be approved by BHEL / customer before starting of actual painting work.
- 1.17.1.10 Primer & finish paint shall be of reputed paint supplier approved by BHEL / Customer. Contractor has to procure paints from the BHEL / Customer approved agencies only, and the paints should be as per the customer painting specification. The quality of the finish paint shall be as per the standards of IS or equivalent as approved by BHEL / Customer. Before procurement of paint the contractor has to obtain the clearance from BHEL authorities. The batch certificates of paints to be submitted to BHEL Engineer before using the same.
- 1.17.1.11 No paint shall be applied when the surface temp is above 55 deg. Centigrade or below 10 deg. Centigrade, and when the humidity is greater than 90% to cause condensation on the surface or frost / foggy weather.
- 1.17.1.12 Before commencement of final painting, contractor has to obtain written clearance from BHEL / Customer for effective completion of surface preparation. It is the responsibility of agency to get Final protocol for painting completion signed by Customer after which payment under milestone achievement for said works will be released.
- 1.17.1.13 Before applying the subsequent coats, the thickness of each coat shall be measured and recorded with BHEL / Customer.
- 1.17.2 PRESERVATION / TOUCH UP PAINTING
- 1.17.2.1 Contractor shall carryout cleaning and preservation / touch up painting for the materials / equipments under this tender specification right from pre- assembly stage to till the equipment is cleared for final painting.
- 1.17.2.2 The contractor shall clean, wherever necessary and paint inside surfaces of the equipments like coolers, oil tanks and other components as per instruction of BHEL Engineer during erection at the quoted rate. The Contractor has to arrange necessary paints within the quoted price.

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- 1.17.2.3 Any equipment which has been given the shop coat of primer shall be carefully examined after its erection in the field and shall be treated with touch up coat of same primer wherever the shop coat has been abraded, removed or damaged during transit / erection, or defaced during welding.
- 1.17.2.4 Mostly the equipment / items / components will be supplied with one coat of primer paint and one coat of finish paint. However, during storage and handling, the same may get peeled off / deteriorate. All such surfaces are to be thoroughly cleaned and to be touch up painted with suitable approved primer and finish paint matching with shop paint / approved final colour.
- 1.17.2.5 All welded joints should be painted with anti-corrosive paint, once radiography and stress relieving works are over.
- 1.17.2.6 Due to atmospheric conditions erected materials are likely to get rusted more frequently. It is the responsibility of the contractor to preserve the erection materials drawn from stores for erection till these are commissioned and handed over to customer. The required consumables for this purpose like paint, thinner, rust converter compound (Ruskill or Ferropro) or any other equivalent shall be arranged by contractor. However, the contractor should also arrange other consumables like wire brushes, emery paper, cotton waste, cloth etc. at their cost. The contractor should ensure that the materials are not rusted on any account till they are handed over to customer. The decision of the BHEL Engineer is final with regard to frequency of application of paint and rust converter compound.

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VOLUME-IA PART-II CHAPTER-1 **CORRECTIONS / REVISIONS IN SPECIAL CONDITIONS OF** **CONTRACT, GENERAL CONDITIONS OF CONTRACT** **AND FORMS & PROCEDURES**

Sl. No.: 01

Following Clauses in General Conditions of Contract (GCC) are modified/ revised/ added:

S. No	GCC Clause Reference	/ Revision / Addition in GCC Clause
1.	GCC Clause 1.9.1, Sl. No (ii)	The following mode of deposit, Sl. No. (e) is added: e) Insurance Surety Bonds
2.	GCC Clause 1.10.3, Sl. No. (vi)	The following Clause, Sl. No. (vi) is deleted: Security deposit can also be recovered at the rate of 10% of the gross amount progressively from each of the running bills of the contractor till the total amount of the required security deposit is collected. However, in such cases at least 50% of the required Security Deposit, including the EMD, should be deposited in any form as prescribed before start of the work and the balance 50% may be recovered from the running bills as described above
3.	GCC Clause 1.10.3, Sl. No (vii)	The following mode of deposit, Sl. No. (vii) is added: e) Insurance Surety Bonds
4.	Note mentioned under the GCC Clause 1.10.3	Note mentioned under GCC Clause 1.10.3 is revised as below: Note: (1) BHEL will not be liable or responsible in any manner for the collection of interest or renewal of the documents or in any other matter connected therewith. (2) In case of delay in submission of security deposit, enhanced security deposit which would include interest (Repo rate +4%) for the delayed period, shall be submitted by the bidder.

TECHNICAL CONDITION OF CONTRACT (TCC)

S. No	GCC Clause Reference	/ Revision / Addition in GCC Clause
5.	GCC Clause 1.10.8	GCC Clause 1.10.8 is revised as below: Bidder agrees to submit security deposit required for execution of the contract within the time period mentioned. In case of delay in submission of security deposit, enhanced security deposit which would include interest (Repo rate+4%) for the delayed period, shall be submitted by the bidder. Further, if security deposit is not submitted till such time the first bill becomes due, the amount of security deposit due shall be recovered as per terms defined in NIT / contract, from the bills along with due interest
6.	GCC Clause 2.22.1	GCC Clause 2.22.1 is revised as: Retention Amount shall be 5% of the Contract Value and shall be furnished through BG in line with clause 1.12 of GCC before payment of first RA Bill. The validity of the said BG shall be initially for the contract period & shall be extended, if so required, up to acceptance of final bill. In case of increase in
		contract value, additional BG for 5% of differential amount shall be submitted by Contractor before payment of next RA Bill due. Retention Amount can also be recovered at the rate of 10% of the gross amount progressively from each of the running bills of the contractor till the total amount of the required retention amount is collected. In case, contractor opts cash deduction from RA bills in the beginning & subsequently offers to submit BG later on, then refund of deducted retention amount may be permitted against submission of BG for 5% of the Contract Value.

TECHNICAL CONDITION OF CONTRACT (TCC)

S. No	GCC Clause Reference	/ Revision / Addition in GCC Clause
7.	New Clause for "Breach of Contract, Remedies and Termination" is added in place of existing clause of Risk & Cost (i.e. 2.7.2.1 to 2.7.3)	1. Clause 2.7.2 and 2.7.3 are revised as: 2.7.2 <u>Breach of Contract, Remedies and Termination</u> 2.7.2.1 BHEL shall terminate the contract after due notice of a period of 14 days in any of the following cases, which if not rectified/ improved within the time period mentioned in the notice, then, 'Breach of Contract' will be considered to have been established: - i). Contractor's poor progress of the work vis-à-vis execution timeline as stipulated in the Contract, backlog attributable to contractor including unexecuted portion of work does not appear to be executable within balance available period considering its performance of execution. - ii). Withdrawal from or abandonment of the work by contractor before completion of the work as per contract. - iii). Non-completion of work by the Contractor within scheduled completion period as per Contract or as extended from time to time, for the reasons attributable to the contractor. - iv). Repeated failure of contractor in deploying the required resources, to comply the statutory requirements etc. even after given by BHEL in writing. - v). Strike or Lockout declared is not settled within a period of one month. vi) Termination of Contract on account of any other reason (s) attributable to Contractor. - vii). Assignment, transfer, subletting of Contract without BHEL's written permission. - viii). Non-compliance to any contractual condition or any other default attributable to Contractor.

TECHNICAL CONDITION OF CONTRACT (TCC)

S. No	GCC Clause Reference	/ Revision / Addition in GCC Clause
		<u>2.7.2.2 Remedies in case of Breach of Contract is established</u> In case 'Breach of Contract' is established, Security Deposit and Retention Amount shall be encashed/ forfeited. This is without prejudice to BHEL's right to levy of liquidated damages, debarment etc. which shall be applied as per the provisions of the contract. Sequence of recovery to be made in case of breach of contract is established, is as below: In case the value of Security Deposit & Retention Amount, available for the Contract, is less than 10% of the Contract Value, the balance amount shall be recovered from dues available in the form of Bills payable to contractor, BGs against the same contract etc. Demand notice for deposit of balance recovery amount shall be sent to contractor, if funds are insufficient to effect complete recovery against dues indicated in (a) above. If contractor fails to deposit the balance amount to be recovered within the period as prescribed in demand notice, following action shall be taken for balance recovery: i) Dues payable to contractor against other contracts in the same Region shall be considered for recovery. ii) If recovery cannot be made out of dues payable to the contractor as above, balance amount to be recovered, shall be informed to other Regions/Units for making recovery from the Unpaid Bills/Running Bills/SD/BGs/Final Bills of contractor. iii) In-case recoveries are not possible with any of the above available options, Legal action shall be initiated for recovery against contractor. Note: In addition to above, levy of liquidated damages, debarment, termination, short-closure etc. shall be applied as per provisions of the contract. If tendering is done for the balance work, the defaulted contractor (including all the members/partners in case of

TECHNICAL CONDITION OF CONTRACT (TCC)

S. No	GCC Clause Reference	/ Revision / Addition in GCC Clause
		JV/ partnership firm) shall not be eligible for either executing the balance work or to participate in the tender(s) for executing the balance work. 2.7.3 In case Contractor fails to deploy the resources as per requirement informed by BHEL in writing to expedite the work, BHEL can deploy own/hired/otherwise arranged resources and recover the expenses incurred from the dues payable to contractor. Recoveries shall be actual expenses incurred plus 5% overheads or as defined in TCC.
8.	GCC Clause 2.7.7	GCC Clause 2.7.7 is revised as: 1. BHEL may permit or direct contractor to demobilize and remobilize at a future date as intimated by BHEL in case of following situations for reasons other than Force majeure conditions and not attributable to contractor: suspension of work(s) at a Project either by BHEL or Customer, or where work comes to a complete halt or reaches a stage wherein worthwhile works cannot be executed and there is no possibility of commencement of work for a period of not less than three months 2. In such cases, charges towards demobilization and remobilization shall be as decided by BHEL after successful remobilization by contractor at site, and decision of BHEL shall be final and binding on the contractor. After remobilization, all conditions as per contract shall become applicable. In case Contractor does not remobilize with adequate resources or does not start the work within the period as intimated, then BHEL reserves the right to terminate the contract and effect remedies under Clause 2.7.2.2. Duration of the contract/time extension shall be revised suitably. In case of

TECHNICAL CONDITION OF CONTRACT (TCC)

S. No	GCC Clause Reference	/ Revision / Addition in GCC Clause
		any conflict, BHEL decision in this regard shall be final and binding on the contractor.
9.	GCC Clause 2.11.3	GCC Clause 2.11.3 is revised as: However, if any 'Time extension' is granted to the contractor to facilitate continuation of work and completion of contract, due to backlog attributable to the contractor alone, then it shall be without prejudice to the rights of BHEL to impose penalty/LD for the delays attributable to the contractor, in addition to any other actions BHEL may wish to take under clause 2.7.2 of GCC i.e. "Breach of Contract, Remedies and Termination".
10.	GCC Clause 2.19.1	GCC Clause 2.19.1 is revised as: The contractor will be fully responsible for all disputes and other issues connected with his labour. In the event of the contractor's labour resorting to strike or the Contractor resorting to lockout and if the strike or lockout declared is not settled within a period of one month, it may be considered as 'Breach of Contract' under Clause 2.7 and the remedies under Clause 2.7.2.2 may be executed, at the discretion of BHEL.
11.	GCC Clause 2.24.1	GCC Clause 2.24.1 is revised as: Even though the work will be carried out under the supervision of BHEL Engineers the Contractor will be responsible for the quality of the workmanship and shall guarantee the work done for a period of Twelve months from the date of commencement of guarantee period as defined in Technical Conditions of Contract, for good workmanship and shall rectify free of cost all defects due to faulty erection detected during the guarantee period. In the event of the Contractor failing to repair the defective works within the time specified by the Engineer, BHEL may proceed to undertake the repairs of such defective works, by itself, without prejudice to any other rights and recover

TECHNICAL CONDITION OF CONTRACT (TCC)

S. No	GCC Clause Reference	/ Revision / Addition in GCC Clause
		the cost incurred for the same along with 5% overheads from the Security Deposit.

Sl. No.: 02

In addition to The EARNEST MONEY DEPOSIT (EMD) clause 1.9 and The SECURITY DEPOSIT (SD) clause 1.10 published in General Conditions of Contract (Volume I Book II) following is added for FDR

1. FDR should be Lien marked in favour of M/s BHEL.
2. Bank issuing FDR should agree to the following conditions and submit duly signed letter addressed to BHEL, confirming the following points:
 - a) There is no Lock in Period for Encashment of the Said FDR
 - b) The amount under the Said FDR would be paid to BHEL-PSSR on Demand, at any point of Time before, or upon Maturity, without any reference to the (Contactor Name).
 - c) Encashment whether premature or otherwise would not require any clearance from any other authority /Person.
 - d) FDR will be auto renewed for such period/s initially mentioned in the FDR and the intimation of Such renewal shall be sent to BHEL, PSSR and (Contractor), immediately after the renewal.
 - e) FDR will not be closed, Encashed, Changed or Discharged without the Written permission/Confirmation from M/s BHEL PSSR.
 - f) Bank to acknowledge and agree that the Lien created on the FDR shall be in Force until M/s BHEL PSSR, gives a Discharge Letter in this regard.

SL. No.3

Detailed Instruction for EMD / Security deposits through SBI e-collect:

Step 1: Vendors may visit SBI collect website, the URL of which is <https://www.onlinesbi.sbi/sbicollect> where they get the home page with various categories of institutions.

Step 2: Select PSU - Public Sector Undertakings – leading to a page with list of PSUs
Step 3: Type BHEL and search, they get to see all BHEL divisions wherein they shall select BHEL PSSR Chennai. The screen shot of the same is given below.

TECHNICAL CONDITION OF CONTRACT (TCC)

The screenshot displays the SBI SB Collect web interface. At the top, the 'Payment Progress' section shows a five-step flow: Select Payee (active), Enter Payment Details, Verify Payment Details, Complete Payment, and Print Receipt. Below this, the 'Select Payee' screen is shown. It includes a search bar with 'bhel' entered, a 'Filter by State' dropdown, and a table of results. The table has two columns: 'Name of PSU-Public Sector Undertaking' and 'State'. Two entries are listed, both from Tamil Nadu. A 'Back' button is at the bottom of the form area. The footer shows '© State Bank of India' and links for 'Privacy Statement', 'Disclosures', and 'Terms of Use'. The Windows taskbar at the bottom indicates the date is 29-06-2023.

Payment Progress

Select Payee

Category: PSU-Public Sector Undertaking

bhel

Filter by State: -- Select --

Name of PSU-Public Sector Undertaking	State
BHEL BAP RANIPET	Tamil Nadu
BHEL PSSR CHENNAI	Tamil Nadu

Showing 1 to 2 of 2 entries (filtered from 113 total entries)

Back

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Step 4: Select EMD receipts. Having selected the Payee in the Payment Progress, it will lead to the payment details – a drop down list of values. From that list, vendors shall select EMD receipts. Upon clicking the entry EMD receipts, a form will open asking for the remitters details and the details of the tender.

Step 5: Confirm details and pay

Fill in all the details correctly, verify the details, and complete the payment as it is leading to the payment gateway.

Step 6: Take a printout on completing the payment and enclose the copy of the same along with the bid submission. Store the copy of receipt for future reference.

SI. No.: 04

GCC Clause 2.12 Over Run Compensation (ORC) - NOT APPLICABLE

SI. No 05

GCC Clause 2.17 Price Variation Compensation (PVC) - NOT APPLICABLE

TECHNICAL CONDITION OF CONTRACT (TCC)

VOLUME-IA PART-II
CHAPTER - 2 to CHAPTER – 5
In the next 184 pages as below:

Chapter No.	Description	No. of pages
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3	T&P Hire Charges	12
4	Welding Schedule	08
5	Painting Scheme	21
6	Drawings (For information & Tendering purpose only) - 0-80-468-07245; Cooling Water Supply Line Near Pump House - 1-80-468-22107; ACW Piping Inside Pump House - ACW Pumps General Arrangement Drawing - Blowdown Pumps General Arrangement Drawing - Concrete Volute Type CW Pumps General Arrangement Drawing	12