



**MAHARASHTRA STATE POWER
GENERATION CO. LTD.**

**PROJECTS & PLANNING
DEPARTMENT**

BID SPECIFICATION NO.: DG/BSL U-6/2011/T-1

ADDENDUM -1

**TECHNICAL SPECIFICATION
FOR
ADDITIONAL SOURCING OF RAW WATER**

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1.0

INTRODUCTION

1.1

This section presents the system description, scope of work, basic design criteria and performance requirements of the additional sourcing of Raw Water for the 1 x 660 MW Bhusawal expansion project.

2.0

SYSTEM DESCRIPTION

2.1

The main source of Raw Water for plant make up is Ozerkheda reservoir belonging to Irrigation Department, located about 20 km from plant site.

2.2

At present, the Line from Ozerkheda reservoir is being built to cater to the requirement of 2 x500 MW units, together with the projected requirement for the 1 x 660 MW unit.

2.3

MAHAGENCO also have their own pump house on Tapi River which is used to serve through a canal, the existing 2x210MW units as well as the 2x500 MW units currently under execution. For the proposed 1x660MW unit also MAHAGENCO intends to use the Tapi River water as an additional source. It has been decided to go for a dedicated pipeline from the existing pump house on Tapi River to the plant site.

2.4

The distance from the existing river water pump house to the 1 x 660 MW unit (Unit # 6) is approximately 3 km. The proposed pipe line from Tapi river water pump house shall join the line coming from Ozerkheda near one day reservoir for 1 x 660 MW. The scope under this addendum covers the two numbers of intake water pumps and connecting pipework from river water pump house to the one day reservoir for 1 x 660 MW. The isolation arrangement shall be near to one day reservoir within plant boundary of 1x660 MW unit.

2.5

Five (5) pumps are presently installed in River Water Pump House out of which one pump is not operational owing to mechanical faults. This non operational pump is to be replaced by one of the new pumps. Further, space for installing one additional pump is also available in the pump house. Thus, two (2) pumps (1W+1S/B) can be accommodated in the pump house for catering to the requirement of 1x660 MW unit. However, this needs to be independently verified by the bidder.

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2.6

This river water will be transported to the power plant site by cross country M.S. pipe line and stored in the raw water reservoir in the plant

2.7

The layout of River water Pump House and the proposed scheme is as per the enclosed sketch (Drg. PE-189-ME-SK-1043).

3.0

SCOPE OF WORK

3.1

The scope of work shall include design, manufacture / fabrication, inspection, testing, packing & forwarding, transportation, delivery, erection, commissioning & performance test at site of raw water system (including carrying out soil investigation, excavation and backfilling of the soil, providing requisite thrust blocks wherever applicable etc) from the existing river water pump house of MAHAGENCO located on Tapi river to the one day reservoir of 1 x 660 MW unit, including all electrical, control and instrumentation.

3.2

The scope inter-alia shall include the dismantling of one of the existing pumps in order to make way for the new pump.

3.3

The layout of the existing pump house as well as the indicative routing of the cross-country piping is shown in the attached sketches ; However, the bidder shall independently carryout the site survey and determine the detailed scope.

3.4

The major scope of work under this specification are Two (2) vertical pump sets (1W+1S/B), One (1) M.S. cross country piping (partly buried and partly above ground), valves and related electrical and instrumentation. The pumps and piping specification is as per Datasheet-A enclosed. However, any item not specifically mentioned but deemed necessary by the Bidder for making the system completely reliable and efficient shall also be included.

3.5

Providing and laying M.S. pipeline of commercial quality Fe-410 grade conforming to IS 3589, aligning proper line and level as per site requirement.

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3.6

PIPING VALVES AND SPECIALTIES

(a)

Motorized butterfly valves at pump discharge with associated actuator.

(b)

Manually operated butterfly valve and non-return valve at the interconnection point near One Day reservoir for 1x660 MW unit

(c)

Rubber expansion joints at pump discharge.

(d)

Double kinetic air valves and accessories at pump discharge.

(e)

Drain arrangement with isolation gate valve at pump discharge. All drains shall be header routed.

(f)

Pressure gauge and pressure switch with isolation globe valves at pump discharge and pressure gauge at common header.

(g)

Pipe supports and associated civil/structural works as required including all temporary frames for transport.

(h)

Electro -Magnetic Flow meter with integrator on pipe line

(i)

Expansion joints to be provided at an interval of 300m for above ground portion of pipe line.

3.7

The raw water intake channel at existing pump house located in the Tapi River shall be provided with level indicators and level switches with protection interlocks for associated pumps. All pumps drawing suction from the raw water intake channel and shall be protected against operation under low suction condition. Annunciation for abnormal conditions levels (low and high) in the raw water pumps shall be annunciated in the control panel. The MCC for pumps providing power supply to the pumps shall be provided in the adjoining room of the raw water intake pump house.

3.8

The raw water intake pump set shall be supplied with the following accessories, as applicable.

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(a) Heavy duty couplings of approved design to connect the pump shaft directly with the motor shaft. (b) Sets of base plates, support plates, grounding pads, thrust blocks, lifting lugs, eye bolts, nuts etc for each pump and motor set. (c) Slip on type drilled steel counter flanges of proper rating to suit the discharge flange of each pump set. All the counter flanges shall be complete with requisite number of bolts, nuts and gaskets etc. (d) Thrust pads, if required, for pump discharge head complete with all necessary fixing and bolting arrangement, fasteners etc. (e) One (1) pressure indicator with isolating cocks at the discharge side of each pump, two (2) additional stubs with isolating root valves for pressure tapings and two (2) thermowells for temperature tappings at the discharge side of each pump for performance testing. Thrust bearing shall be furnished with thermometer, temperature switch for high temperature annunciation and oil level gauge. Thrust bearing temperature indicator shall be hooked-up to the PLC. (f) All internal/integral piping with valves, fittings and instruments for lubrication, cooling and sealing, if applicable, shall preferably be tapped off from respective pump discharge. (g) Pump using 6.6 kV drive shall be equipped with vibration measuring and temperature measuring probes for pump and motor bearing with adequate annunciation / interlock function. The vibration measurement, Start/Stop and necessary interlocks shall be hooked-up to PLC.		
4.0 <u>TERMINAL POINT :</u>		
4.1 River water pipeline shall be connected to tap off line from supply pipe coming from Ozerkheda reservoir within the plant boundary and near the one day reservoir of 1x660 MW plant.		

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5.0 SPECIFIC DESIGN CRITERIA

5.1 In case the pumps/ motors need external cooling, the bidder shall consider the same and include in the proposal.

5.2 The design shall take into account the effect of internal/external pressure, thermal expansion, self weight of piping, support reactions, surge and water hammer, earthquake and wind effects at site, corrosion and erosion etc. and any other effects dictated by good engineering practices.

5.3 Pipelines shall be laid underground or in tunnels as far as possible. Wherever it is not possible, pipelines shall be laid over ground on the R.C.C. saddle supports with M.S. clamping.

5.4 The raw water pipe line and pumping system sizing shall be based on Sixteen (16) hours operation per day for a quantity equivalent to 110 % of the plant make up water requirement arrived at by considering a cycle of concentration of five (5). The capacity of the each pump shall be equivalent to 110% of quantity requirement for plant makeup considering Cycle of concentration (C.O.C) of five (5). The number of pumps shall be Two (2) (1W+1 S/B).

5.5 Bidder shall carry out surge analysis for determining the thickness of the cross country piping with provision of additional 1.5 mm thickness for corrosion allowance.

5.6 Sizes of pipe line shall be selected such that the velocity of fluid in pipes does not exceed the range of 1.5 – 1.7 m/s.

5.7 The pipe network shall be provided with air release valves at high points and drain valves at the lower points. Air valve should be placed at least every 500 meters.

5.8 Pipeline passing under or through equipment foundations or walls of buildings or any other inaccessible structure shall be provided with steel encasing pipes for easy insertion and removal.

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5.9	The over ground piping, wherever required, shall have a minimum vertical clearance of 0.9 metres above finished ground level and 8.5 meters above road level in plant working area.		
5.10	Valves provided on the over-ground pipe network shall be provided with steel structural platforms and access ladders.		
5.11	C/C distance between two supports shall not be more than 6.0 m.		
5.12	All the buried pipelines shall be laid with a nominal slope towards the drain point.		
5.13	In case of the buried pipe lines, the top of the pipeline shall be minimum 1200 mm below the finished ground level.		
5.14	Isolation /control valves, drain valves, air release valve provided on the buried pipe network shall be housed in suitably sized covered valve pit and the valve pits shall be of self draining type. Air release valves shall be provided at the highest points of each sector of the pipeline and drainage valves shall be provided at the lowest points of each sector of the pipeline.		
5.15	Wherever the buried pipelines are crossing the roads and tracks, they shall be suitably encased with mild steel pipes or reinforced concrete casing pipes of NP3 class or as required as per statutory norms, whichever stringent. Permissions for crossing (Road/Railway track etc.) shall be obtained by the bidder from the concerned department.		
5.16	Mechanical cleaning and anticorrosive protection of underground MS pipelines shall conform to IS: 10221 - 1982. The anticorrosive protection of pipelines shall consist of the following activities in sequence: (a) Application of one coat of coal tar primer (b) Application of one coat of coal tar enamel (c) One wrap of fibre glass tissue (d) Application of one coat of coal tar enamel		

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(e) One layer of fibre glass tissue impregnated in coal tar enamel.

(f) Application of the final coat of a water-resistant white wash

5.17 Alternatively, Coal tar based anticorrosion tape as per IS :15337 - 2003 shall be provided for protection of underground mild steel pipelines. The thickness of tapes shall be 3 mm up to pipe diameter DN 300 mm and 4 mm above pipe diameter DN 300 mm.

5.18 INTERNAL PAINTING TO PIPELINE

Food-grade epoxy coating, minimum 250 micron thick, shall be imparted to the internal surface of M.S. pipeline. Surface preparation of internal surface shall be made as per clause no. 5.21.

Resin and hardener shall be mixed in standard proportions and the mix shall be applied as primer to the internal surface within ‘open time’ of the resin hardener mix. When the primer is “touch dry”, two (2) top coats shall be applied to a total thickness of 250 micron.

5.19 LAYING BURIED PIPELINES

5.19.1 All buried pipelines shall be laid with earth cover sufficient to avoid damage from pressure of vibration caused by the surface traffic. Minimum earth covering over the pipe shall be 1200 mm from the finished ground levels. For laying of buried pipelines earth work in excavation, back filling and acceptance of trenches etc. shall be as per IS: 5822-1994, IS: 3114-1994 and IS: 12288-1987.

5.19.2 The trench shall be so dug that the pipe line can be laid to the required alignment and at the required depth, proper levelling of the excavated surfaces is an essential requirement.

5.19.3 The bottom of the trench shall be levelled by sand layer for a minimum thickness of 150 mm.

5.19.4 If the depth of excavation is more, proper protection for side walls shall be provided till the pipe levelling is completed.

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5.19.5 The entire pipe trenches bottom shall be covered with local sand bed of 150 mm thick layer.

5.19.6 After laying the pipelines, 150 mm thick layer of local sand shall be provided all around the pipe.

5.19.7 Precautions shall be taken at all the times to prevent damage to the coating and wrapping in the pipe lines and appurtenances as applicable by workmen or trespassers during laying or at any other time. Pipe handling slung and any blocking used in handling or storing the pipes must be well padded to avoid damage to pipe and its coating.

5.19.8 After laying a pipeline on skids it shall be thoroughly cleaned, inspected for any damage to the protective coating. Satisfactory repair work shall be performed while the pipe is suspended above the trench.

5.19.9 After the pipes are erected and tested, the back filling of the trenches shall be done with loose soil free from stones, bricks and metallic pieces in layers and shall be well rammed and compacted.

5.19.10 The underground pipelines shall be provided with pipe markers at regular interval for proper identification.

5.19.11 The coating system for under ground piping based upon the soil resistivity may be selected on the following basis:

	SOIL RESISTIVITY	CORROSIVITY	COAL TAR COATINGS	WRAPPING TAPES
(a)	≤ 1000 ohm-cm	Extremely corrosive	3 coats and 3 wraps	3 layers of tape
(b)	> 1000 ohm-cm	Corrosive & non-corrosive	2 coats and 2 wraps	2 layers of tape

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5.20

PROTECTION FOR ABOVE GROUND PIPING

5.20.1

The coating shall consist of two coats of synthetic enamel painting over a coat of primer, as per relevant standard and manufacturer’s specification.

5.20.2

The two ends of each length of pipe shall be left bare of primer coating for a distance of 150 mm from the end to facilitate field welding and subsequent field coating.

5.20.3

The supply, application, characteristics of materials and testing requirements shall be strictly as per relevant IS.

5.21

SURFACE PREPARATION

5.21.1

Pipe surfaces to be provided with underground protection shall be cleaned by shot blasting. The cleaning shall be so carried out that the piping surface is free from mill scale, rust, oil, welding scale and other foreign materials. Primer shall be applied immediately after shot blasting to prevent rust forming. Superficial rust formed shall be removed by wire brushing or by the use of emery paper. If the rust formation is heavy, re-blasting may be necessary. Around field joints, the pipe surfaces may be cleaned by wire brushing prior to the application of anti-corrosive protection

5.22

PRIMER COAT

5.22.1

The primer shall be compatible with the grade of enamel used. It shall be thoroughly mixed before using by stirring or by rocking the drum to provide uniformity of material. The primer coat shall be applied over a thoroughly clean and dry surface within three (3) hours of the cleaning operation, and shall be applied preferably immediately with a uniform thickness on the entire surface of the piping using appropriate quantity per unit area of surface as recommended by the manufacturer. The primer coating shall be free of bubbles, globules, drips and runs. Pipes having a longitudinal seam shall be carefully examined to determine that all excess primer has been brushed out of each side of the welding seam. The primer shall be thoroughly dry before the enamel is applied. If

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ready-made tapes are used, then primer, as suggested by the manufacturer, shall be used.

5.22.2 Freshly-primed pipe shall be handled carefully to prevent damage. The damaged area shall be re-primed before applying enamel/wrapping tapes.

6.0 PERFORMANCE REQUIREMENTS

6.1 Performance requirements for all the pump(s) shall be as specified in datasheet-A enclosed.

6.2 Pump(s) shall preferably be designed to have the best efficiency at the specified duty point. Further, the pump(s) shall be suitable for continuous operation at any point within its range of operation as specified in datasheet-A enclosed.

6.3 Pump(s) shall have continuously rising head-capacity characteristics, with maximum head at pump discharge shut-off, to enable parallel operation

6.4 Under all circumstances, the `range of operation' of the pump(s) shall exclude any unstable operating zone of the head-capacity curve.

7.0 ELECTRICAL

7.1 The existing 6.6 kV switch gear & Power and control cables in Tapi River Pump house are 40 years old and they shall be replaced. The entire replacement of 6.6 kV switch gear and cables and all associated work shall be done by the EPC contractor. The scope of above work is generally given below. The EPC contractor is expected to visit the site to make the assessment of the quantum of work as the entire activities are included in the scope of EPC contractor.

7.2 **Broad Scope Shall Be As Follows:**

7.2.1 Disconnection of existing power and control cables, bus section wise connected to 12.5 MVA transformers, 6.6 KV switch gears, motors & control panels etc.

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7.2.2	Removal of these cables from Trays, trenches, underground locations & transport & storing them at suggested location.
7.2.3	Removal of existing switchgear panels bus section wise and transport & storing them at suggested location.
7.2.4	Civil modification such as modifications of frames, trenches etc. as required for installation of new switch gear, cables & control panel etc.
7.2.5	Design, engineering, manufacturing, testing at works, Insurance supply to site, unloading, checking, storage, erecting / installation at site testing & commissioning and putting into successful commercial operation of the following electrical equipments. (a) 6.6 kV, 50 Hz, 3 phase, 1250A, 40KA VCB switch gear #1 & #2 as per key single line diagram no PE-189-EL-SK-5007/P0 attached here with. (b) Two (2) new pumps with squirrel cage motors (c) Two (2) control panels for Two (2) new pumps
7.2.6	11/ 6.35 kV XLPE armoured cables & control cables for :- (a) Connection between 12.5 MVA transformer no. 1 to incomer of 6.6 kV switchgear #1. (b) Connection between 12.5 MVA transformer no. 2 to incomer of 6.6 kV switch gear #2. (c) Connection between 6.6 kV switchgear #1 & 2. (d) Connection to all existing 6.6 kV motors. (e) Connection to two (2) new 6.6 kV motors. (f) Connection to Two (2) 6.6 kV/ 433 V 500 KVA existing transformers. (g) Connection to new control panel.

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(h) Any other as required

7.2.7 Grounding for the entire system

7.2.8 All electrical system studies such as short circuit levels, voltage drops, grounding, relay setting & relay coordination, all sizing calculations etc & preparation & submission of all necessary document and drawings for approvals & then with approved AS BUILT STATUS.

7.2.9 Any other activity required for completion of the project on EPC Basis.

7.3 LOCAL CONTROL PANEL

7.3.1 Degree of protection - IP 54 or better totally enclosed type

7.3.2 Mounting - Floor mounted, Free standing, dead front assemblies.

7.3.3 Base plates - steel channel / Angle with anti vibration mounting & stainless steel kick plates.

7.3.4 Construction - Sheet steel Minimum 2 mm thickness.

7.3.5 Door - Rear Door with concealed Type hinges & Pad locking arrangement. Door shall be grounded by copper braid. All doors & removable covers shall be provided with neoprene rubber gaskets all around and sufficiently strong.

7.3.6 Height - panel height shall match with existing panels. Working height of panels shall be limited between 750 mm & 1800 mm.

7.3.7 Control transformers / space Heater - two (2) (1*100% stand by) per panel.

7.4 All electrical equipments and systems shall comply with the Volume II, Volume IV A, Volume IV B and relevant drawings of Bid specification.

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8.0

CONTROL AND INSTRUMENTATION

A programmable logic control (PLC) shall be considered for the monitoring and control of the proposed raw water pumps. For detailed requirement of Control and Instrumentation system, Volume –V shall be referred to.

9.0

CIVIL

9.1

The bidder shall visit the site to acquaint himself regarding all site features and scope & extent of Civil/Structural works to be carried out for this purpose to amalgamate with the new facilities in consultation with Owner/owner’s consultant.

9.2

Scope includes site survey, soil investigation, site development works, complete design engineering and construction of Civil, Structural works and to obtain necessary various approvals from concern Departments/agencies well in advance including necessary charges.

9.3

For crossing of the pipe lines with nallahs, rivers, canals etc, pipe shall be laid over RCC supports and bottom of pipe shall be kept at 0.5 m above H.F.L.

9.4

Providing and Laying pipe line including their supports and foundations, thrust blocks etc wherever required including earth mat/lightening protection.

9.5

Thrust blocks shall be provided to resist the thrust load from pipelines considering the test pressure in the pipelines at bends/tees etc.

9.6

Backfilling, around foundations and bottom of pipes, thrust blocks etc shall be carried out with approved material in layers not exceeding 30 cm thickness and each layer shall be compacted to 90% standard proctor density for cohesive soil and to 75% of relative density for non- cohesive soils.

9.7

For detailed civil specification, refer volume VI-B.

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10.0

TESTING

10.1

THICKNESS

10.1.1

The thickness of the pipe coating shall be measured either by elcometer or by coating thickness gauge.

10.2

BOND

10.2.1

Bond test shall be carried out by cutting 25 mm square at three locations of the coating on a sample test specimen to qualify the procedure. Coating shall be pulled out by lifting one corner of the square. For a good coating, the section shall not peel off easily.

10.2.2

The coating on the pipe shall be carried out only after satisfactory completion of the qualifying test.

10.2.3

In case of doubt regarding the quality of coating, bond test shall be carried out on any location of the pipe to the satisfaction of the Owner.

10.3

FIELD ADHESION TEST FOR WRAPPING TAPES

10.3.1

Adhesion test shall be made to determine the proper bond between the tape and primed pipe. The temperature of the tape and pipe to be tested shall be between 10 and 27 °C. If the temperature is outside this range, hot or cold water shall be poured over the test area until this temperature range is attained. A test area shall be selected by the inspector where the tape is smooth for 15 cm in the longitudinal direction of the tape. Two knife cuts that are 15 cm long and 5 cm apart shall be made through the tape. A flat blade shall be used to pry up 5 cm of the fabric. This 5 cm flap of fabric shall be grasped firmly in one hand and shall be pulled with a quick motion in the direction of the remaining 10 cm of the 15 cm knife cut.

10.3.2

The adhesion is satisfactory if the tape tears at the point of stripping or the fabric strips from the underlying coal tar component, leaving exposed not more than 10% of the primer or metal.

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10.4

HOLIDAY TEST

10.4.1

On completion of coating/wrapping, the quality of the coating shall be tested using efficient high voltage holiday detectors, operating at a voltage high enough to jump an air gap, the length of which is equal to the thickness of the coating/wrapping. All holidays found shall be repaired and the repairs shall be retested with the holiday detector to ensure that adequate repairs have been made.

10.4.2

The suggested test voltage shall be as follows:

V

=

1250 (t) ½ where

V - voltage in volts,

t - coating thickness in mils (1 mil = 0.001 in.)

10.5

CERTIFICATES

The CONTRACTOR shall furnish certificates of all the materials purchased by him and also complete instructions from the manufacturer regarding the storage, preparation and application of the coating materials.

11.0

SPARES AND CONSUMABLES AND LUBRICANTS

Bidder shall consider identical mandatory spares for all mechanical, electrical and instrumentation items in line with Volume- II, Section-9 and include in the scope.

Similarly, all consumables and lubricants till COD of the unit shall be included in the scope.

Further, bidder shall offer recommended spares for Three (3) year operation as specified under Volume- I .

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<u>DATASHEET-A</u> <u>VERTICAL PUMPS</u>			
SR.NO.	DESCRIPTION		
1.0	Service	Raw Water	
2.0	Designation	Raw Water Intake Pump	
3.0	Duty	Continuous	
4.0	Location	Indoor	
5.0	Number of Pumps required	Two (2)	
6.0	Number of Pumps working	One (1)	
7.0	Number of Pumps Standby	One (1)	
8.0	Liquid handled	Raw Water	
9.0	Motor pedestal floor elevation	Bidder to indicate based on specification guidelines	
10.0	Level of bottom of sump		
11.0	Normal water level (M)		
12.0	Minimum water level (M)		
13.0	Maximum water level (M)		
14.0	<u>PUMP PERFORMANCE REQUIREMENTS</u>		
(a)	Performance Standard	IS-1710/equivalent	
(b)	Rated capacity, (m ³ /Hr)	By bidder	
(c)	Speed (RPM)	By Bidder to be determined keeping in view the number of stages, acceptable head-capacity, power and NPSH values. (subject to Owner's review)	

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(d)	Estimated Total dynamic head at rated capacity (MLC)	By Bidder to be determined as follows: Static head: Elevation difference between minimum water level in the raw water sump indicated in the attached sketch (PE-189-ME-SK-1043) plus 3 mWC residual pressure at the destination. Frictional head: 20 % margin on the calculated drop in the line based on Hazen Williams formula with a C factor of 120.	
(e)	Pump shut off head (MLC)	Bidder to indicate	
(f)	Permissible tolerance in rated capacity (%)	± 2.5 percent at the rated head	
(g)	Permissible tolerance in efficiency at rated capacity	No negative tolerance	
15.0	<u>DESIGN AND CONSTRUCTIONAL FEATURES</u>	Please refer to Volume III-E2	
16.0	<u>MATERIAL OF CONSTRUCTION</u>		
17.0	<u>SUPPLY OF ACCESSORIES AND SERVICES</u>		
(a)	Sole plate	Yes	
(b)	Foundation bolts, nuts, sleeves etc	Yes	
(c)	Discharge flanges with nuts, bolts and gaskets	Yes	
(d)	Gland Sealing / cooling and bearing cooling / lubrication	Yes	

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SR.NO.	DESCRIPTION		
	system complete with pipes, valves, fittings and instruments as required		
(e)	Thrust Block	Yes, if applicable	
(f)	Pump motor Coupling and guard	Yes	
(g)	Eye bolts, lifting tackle etc	Yes	
(h)	Discharge pressure gauges with isolating cocks	Yes	
(i)	Instrument connections	Yes	
(j)	Vent with isolating cock	Yes	
(k)	All other accessories and services	Yes	
18.0	<u>INSPECTION AND TESTING</u>		
(a)	Material testing of casing, impeller and shafts	Yes	
(b)	Hydrostatic testing	Yes	
(c)	Dynamic balancing test	Yes	
(d)	Sump model tests	Yes	
(e)	NDT Tests on casing/ shaft	Yes	
(f)	NDT Test on impeller	Yes	
(g)	Vibration and noise measurement	Yes	
(h)	Performance Tests	Yes	
(i)	Performance test to be done on	Proto type at rated speed	
(j)	Performance test required for determining	H Vs. Q curve P Vs. Q curve N Vs. Q curve NPSH Vs. Q curve	

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(k)	Field performance test required	Yes	
(l)	Other tests as per applicable clauses of this specification	Yes	

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	ADDENDUM- I	

DATA SHEET A

1.0 PIPING AND SPECIALITIES

1.1 Please refer volume III - F

DATASHEET A

1.0 BUTTERFLY VALVES

1.1 Please refer volume III - F

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	ADDENDUM- I		
<u>DATASHEET A</u> <u>AIR RELEASE VALVES</u>			
SR. NO.	DESCRIPTION	UNIT	VALUES / REQUIREMENTS
1.0	Quantity	No	BY BIDDER
2.0	Size	mm	BY BIDDER
3.0	Type		Double Kinetic, with double orifice
4.0	Liquid handled		Raw water
5.0	Function		To admit air to prevent vacuum formation in pipeline and release air during filling the pipeline.
6.0	Working pressure	Kg/cm ² (g)	BY BIDDER
7.0	Design pressure	Kg/cm ² (g)	BY BIDDER
8.0	Maximum flow in pipeline	m ³ /hr	BY BIDDER
9.0	Size of main pipeline	mm	BY BIDDER
10.0	Materials of construction		
(a)	Body		IS210 GR. 260
(b)	Top cover		----- DO -----
(c)	Splash cover		----- DO -----
(d)	Floats		HARD RUBBER
(e)	Bolts and nuts		ASTM A193 Gr.B7 and ASTM A194 Gr.2H

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SR. NO.	DESCRIPTION	UNIT	VALUES / REQUIREMENTS	
(f)	Flange		Flat face per ASME B 16.1	
(g)	Seats		IS 318 Gr LTB2 / ASTM B62	
11.0	Flange drilling standard		Flat face per ASME B 16.1	
12.0	Accessories		---	

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	ADDENDUM- I		
HT SWITCHGEAR (6.6 kV) DATA SHEET - A			
SR NO.	ITEM	UNITS	
1.0	SWITCHGEAR		6.6 kV
1.1	GENERAL		
(a)	Type		Metal-clad, draw out
(b)	Service		Indoor
(c)	Enclosure		IP – 4X
1.2	SYSTEM		
(a)	Rated Voltage	kV rms	6.6 ± 10%
(b)	Phase		Three (3)
(c)	Rated Frequency	Hz	50 Hz ± 5%
(d)	System grounding		Non effectively earthed through resistance
1.3	DESIGN AMBIENT TEMPERATURE	°C	50
1.4	Rated Current inside the cubicle and at design ambient temperature of 50°C		
(a)	Bus bar		1250A
(b)	Circuit breaker		1250A

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		ADDENDUM- I		
SR NO.	ITEM	UNITS		
1.5	<u>SHORT CIRCUIT RATING</u>			
(a)	Rated short time withstand current	kA	40 kA	
(b)	Duration		3 Sec	
(c)	Rated peak withstand current	kA	100 kA	
1.6	<u>INSULATION LEVEL</u>			
(a)	Rated lightning impulse withstand voltage	kV	As per IEC	
(b)	Rated one minute power frequency withstand voltage	kV	As per IEC	
1.7	<u>AC/DC POWER SUPPLY</u>			
(a)	Control voltage	V	110 V DC	
(b)	Service voltage	V	240V ± 10%, 1 Ph, 50 Hz ± 5%	
2.0	<u>CIRCUIT BREAKER</u>			
2.1	Duty Cycle		0 - 3' - CO - 3' – CO	
2.2	<u>BREAKING CURRENT</u>			
(a)	A.C. Symmetrical	kA	40 kA	
(b)	A.C. Asymmetrical		As per IEC	
2.3	Making Current	kA	100 kA p	
2.4	<u>OPERATION TIME</u>			
(a)	Opening time (ms)		Not more than 60	

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	ADDENDUM- I		
<u>H.V. POWER CABLE (6.6 kV)</u> <u>DATA SHEET - A</u>			
<u>SR. NO.</u>	<u>ITEM</u>		
1.0	<u>6.6 kV POWER CABLE FOR NON EFFECTIVELY EARTHED SYSTEM</u>		
1.1	11kV /6.35 grade 90° C continuous rating under normal condition and 250° C rating under short circuit condition heavy duty XLPE power cable suitable for use in non-effectively earthed (UE) system conforming to following requirement and in line with IS-7098, IS-8130, IS-5831 & IS-3975, manufactured by Triple Extrusion Dry Cure(CCV) process using pressurized Nitrogen		
1.1.1	Conductor		Stranded and compacted circular aluminium conductor of grade H2 & class 2 for all sizes, generally conforming to IS:8130
1.1.2	Conductor Screen		Extruded semi-conducting compound
1.1.3	Insulation		Extruded cross linked polyethylene (XLPE) conforming to IS7098 (Part-2)
1.1.4	Insulation Screen		Extruded semi-conducting compound in combination with a layer of lapped copper tape of thickness is not less than 0.1mm.
1.1.5	Core Identification		By coloured strips applied on (For three core cables) cores or by numerals.

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	ADDENDUM- I		
SR. NO.	ITEM		
1.1.6	Inner Sheath		Extruded HRPVC/FRLS compound conforming to type ST2 of IS: 5831 for three core cables. Single core cables shall also have inner sheath. Filler material shall also be of type ST2 PVC.
1.1.7	Armour		Galvanised single round steel wire armour for twin and multicore cables
			Non-magnetic hard drawn aluminum single round wire conforming to H4 of IS-8130 latest for single core cables.
1.1.8	Overall Sheath		Extruded FRLSH HRPVC compound conforming to type ST2 of IS: 5831.
1.1.9	Drum		Steel Drum

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	ADDENDUM- I		
<u>CONTROL CABLE</u> <u>DATA SHEET - A</u>			
<u>SR. NO.</u>	<u>ITEM</u>		
1.0	<u>CONTROL CABLES</u>		
1.1	Rating : 1.1 kV grade 85° C continuous rating under normal condition and 160°C under short circuit condition rating HRPVC Control cable (YWY) conforming to following requirement and in line with IS:1554, IS:8130, IS:5831 and IS:3975.		
1.1.1	Conductor		Stranded, non-compacted & circular, high conductivity annealed plain copper, generally conforming to IS: 8130.
1.1.2	Insulation		Extruded HRPVC type-C compound conforming to IS: 5831. The minimum volume resistivity of insulation shall be 3.5 x 10 ¹⁴ ohm-cm at 27°C and 3.5 X 10 ¹¹ OHM-CM at 85°C.
1.1.3	Core Identification		By color coding and numbering at interval of 100mm or less.
1.1.4	Inner Sheath		Extruded HRPVC compound conforming to type ST2 FRLS of IS: 5831 for multicore cables. Single core cables shall have no inner sheath. Filler shall be of same material as of inner sheath i.e. ST2.

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<u>SR. NO.</u>	<u>ITEM</u>	<u>UNIT</u>		
2.9	Maximum noise level	dB		
3.0	<u>DESIGN</u> & <u>CONSTRUCTIONAL FEATURES</u>			
3.1	Pump duty		Continuous / Intermittent	
3.2	Pump Type		Centrifugal/Mixed flow/Axial flow	
3.3	Pump design		Pull out/Non-Pull out/Above floor discharge/Below Floor Discharge	
3.4	Impeller type		Closed/Semi-Open/Open	
3.5	Number of stages			
3.6	Running speed			
3.7	NPSHr			
3.8	Pump specific speed			
3.9	Pump suction specific speed			
3.10	Minimum submergence required at rated capacity	mlc		
3.11	<u>REVERSE ROTATION</u>			
3.11.1	Is the pump suitable for reverse flow condition?		Yes/No	
3.11.2	Runaway speed of the pump due to reverse flow	rpm		
3.11.3	Head at Reverse Flow	m		
3.12	Pump Critical Speed	rpm		

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<u>SR. NO.</u>	<u>ITEM</u>	<u>UNIT</u>	
3.13	<u>MODE OF PUMP STARTING</u>		
3.13.1	Whether the pumps offered can be started with discharge valve closed ?		Yes/No
3.13.2	(a) If the answer is "no" whether the discharge valve should be kept partially open and for what % flow?		Yes/No, ...% flow
	(b) If the answer is "yes" allowable duration for such operation	minutes	
3.13.3	What precautionary measure is required to be taken to avoid hammering action on the valve disc if the pump is started with valve fully closed?		
3.14	Provision for impeller adjustment available.		Yes/No
3.15	Type and make of coupling between pump and drive.		
3.16	Number of column pipes and maximum length of single piece.	mm	
3.17	Number of shaft pieces and maximum length of single piece.	mm	
3.18	Type of shaft coupling		

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<u>SR. NO.</u>	<u>ITEM</u>	<u>UNIT</u>			
3.19	<u>SHAFT BEARINGS</u>		Impeller shaft bearings	Line and head shaft bearings	
3.19.1	Type of bearings and Manufacturer				
3.19.2	Numbers provided				
3.19.3	Type of lubrication & cooling		Self/External	Self/External	
3.19.4	Type of lubricant		Liquid handled / clear water/ oil	Liquid handled /clear water/ oil	
3.20	<u>THRUST BEARING (S)</u>				
3.20.1	Location		On Pump / On Motor		
3.20.2	Numbers provided				
3.20.3	Type				
3.20.4	Manufacturer & Catalogue No				
3.20.5	Design life at pump duty point	Hrs.			
3.20.6	Description of lubrication arrangement and lubricant				
3.20.7	Coolant		Handling fluid/external water		
3.21	<u>SHAFT SEALING ARRANGEMENT</u>				
3.21.1	Type				
3.21.2	Sealing fluid		Handling fluid/External water		
4.0	<u>MATERIAL OF CONSTRUCTION</u> (indicate applicable code/ standard)				

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<u>SR. NO.</u>	<u>ITEM</u>	<u>UNIT</u>		
4.1	Discharge head and discharge casing			
4.2	Column pipe			
4.3	Impeller bowl			
4.4	Suction bell			
4.5	Impeller			
4.6	Impeller shaft, head shaft and line shaft			
4.7	Impeller and casing wear rings			
4.8	Shaft sleeve			
4.9	Shaft coupling			
4.10	<u>STUFFING BOX</u>			
(a)	Submerged			
(b)	Above fluid level			
5.0	<u>CONNECTIONS AND OTHER DIMENSIONAL DETAILS</u>			
5.1	<u>DISCHARGE NOZZLE</u>			
(a)	Diameter	mm		
5.2	Column pipe O/D & thickness	mm		
5.3	Suction bell diameter	mm		
5.4	Impeller shaft diameter	mm		
5.5	Line and head shaft diameter	mm		
5.6	Shaft enclosing tube O/D and thickness	mm & mm		

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SR. NO.	ITEM	UNIT	
5.7	Recommended Sump Dimensions (Bidder to furnish for each individual pump)		
5.7.1	Bottom clearance required from the edge of suction bell	mm	
5.7.2	Back wall clearance from pump centre line	mm	
5.7.3	Side wall clearance from pump centre line	mm	
5.7.4	Minimum water level	m	
5.7.5	Maximum water level	m	
5.7.6	Normal water level	m	
5.8	Approx. centre line elevation of discharge nozzle from floor level.	mm	
5.9	Minimum hook lift required from floor level to handle pump and drive.	mm	
6.0	<u>DRIVE DATA</u>		
6.1	Drive element output at ambient condition	kW	
6.2	Whether drive element rating takes care of the stipulations of the specification ?		Yes/No
6.3	Cooling arrangement for the drive		

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<u>SR. NO.</u>	<u>ITEM</u>	<u>UNIT</u>	
7.0	<u>INSPECTION AND TESTING</u>		
7.1	Material test		Yes/No
7.2	Hydrostatic test pressure and duration	kg/ cm ² (g) and minutes	
7.3	<u>PERFORMANCE TEST</u>		
7.3.1	Testing standard		
7.3.2	Test to be conducted on		Proto- type
7.3.3	Test speed	rpm	
7.4	Cavitation test		Yes/No
7.5	Submergence test		Yes/No
7.6	Dynamic balancing test		Yes/No
8.0	<u>WEIGHT & LOADING DATA</u>		
8.1	Approximate weight of the pump and drive assembly	kg	
8.2	Weight of the largest single piece to be handled for	kg	
(a)	Erection		
(b)	Maintenance		

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DATA SHEET - C

DRAWINGS, DATA, CURVES AND INFORMATION REQUIRED:

1.0 DRAWINGS/DATA

1.1 Drawings/Data

(a) Determination of pump head and capacity as per guidelines of this specification.

(b) General arrangement drawings showing the principal dimensions, weight and location of the suction and discharge connections of the pumps offered. Details of lubrication and sealing arrangement shall be included.

(c) Outline drawings of the pump showing the various dimensions, suction and discharge locations.

1.2 Anticipated performance curves showing the following characteristics:

(a) Capacity Vs Head

(b) Capacity Vs Power & Efficiency

(c) Capacity Vs Submergence

(d) Capacity Vs NPSH requirement

1.3 A write-up describing clearly the procedure for installing the pump with its column pipe - piece by piece and also for overhauling the pump in a like manner. A diagram showing the required pump house crane hook lift above the pump operating floor has also to be furnished.

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<u>SR. NO</u>	<u>ITEM</u>	<u>UNIT</u>		
(d)	Material of construction (indicate code/standard)			
(e)	Type of joints			
	(i) For size 65 NB & above			
	(ii) For size 50 NB & below			
1.1.5	Fittings			
(a)	Manufacturer			
(b)	Material			
(c)	Type of Construction			
(d)	Standard			
(e)	End details			
	(i) For size 65 NB & above			
	(ii) For size 50 NB & below			
1.1.6	Flanges			
(a)	Manufacturer			
(b)	Type			
(c)	Standard			
(d)	Material Standard			
(e)	Gasket			
1.1.7	(a) Welding Process			
	(b) Type and make of welding rods to be used			

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1.1.8	Hydrostatic Test Pressure	ata		
1.1.9	All equipment and temporary piping for hydro testing furnished?		Yes/No	
1.1.10	Type of rust inhibitor given before shipment			
1.1.11	Procedure for galvanization of pipes and fittings (mention standard)			
1.1.12	Outside protection for Buried Pipes			
(a)	Type and make of primer			
(b)	Type and make of paint			
(c)	Number of coats of primer			
(d)	Number of coats of paints			
(e)	Total dry thickness of the paint applied			
(f)	Type of wrapping			
(g)	Number of layer of wrapping			
(h)	Surface preparation before painting			
1.1.13	Outside Painting for Overground/ Trench Pipes			
(a)	Type and make of primer			

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<u>SR. NO</u>	<u>ITEM</u>	<u>UNIT</u>	
(b)	Type and make of paint		
(c)	Type of surface preparation before use of paint		
2.0	The following data is to be furnished for each category (different materials, type and size of valves for different services)		
2.1	<u>TYPE AND CLASS OF VALVE</u>		
2.1.1	Manufacturer		
2.1.2	Service/Location		
2.1.3	Design Standard/Code		
2.1.4	Pressure class		
2.1.5	Material of construction for valve components (Indicate also applicable codes/standards and grades)		
(a)	Body and Bonnet		
(b)	Trim/Wedge		
(c)	Seating surfaces/Seat rings		
(d)	Yoke		
(e)	Stem		
(f)	Flanges		
(g)	Bolts		
(h)	Nuts		
2.1.6	Gear operator provided		Yes/No

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<u>SR. NO</u>	<u>ITEM</u>	<u>UNIT</u>		
(a)	If so, for what size of valve			
(b)	Type			
(c)	Make			
2.1.7	Integral bypass valve provided		Yes/No	
(a)	If so, for what size of valve			
2.1.8	End preparation			
2.1.9	Valves are outside screw and rising spindle type?		Yes/No	
2.1.10	Type of valve position indicator for the valves			
2.1.11	(a) Hand-wheel included with all valves?		Yes/No	
	(b) Are the valves provided with service tag discs at the hand- wheel?		Yes/No	
2.1.12	All the valves under this Group as desired for safe and reliable operation offered?		Yes/No	
2.1.13	Flange standard			
2.1.14	Standard for Bolts and nuts for counter flanges		Yes/No	
2.1.15	Enclosed with proposal, manufacturer's descriptive and illustrative literature/drawings on the valves		Yes/No	

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<u>SR. NO</u>	<u>ITEM</u>	<u>UNIT</u>		
2.1.16	Testing Standard			
3.0	<u>BUTTERFLY VALVE</u>			
3.1	<u>GENERAL</u>			
3.1.1	Manufacturer			
3.1.2	Whether double flanged		Yes / No	
3.1.3	Size of the valve	mm		
3.1.4	Number offered			
3.1.5	Installation		Horizontal / Vertical Shaft	
3.1.6	Type and Make			
3.2	<u>EQUIPMENT PROCEDURE</u>			
3.2.1	Maximum disc differential pressure	Kg/cm ² (g)		
3.2.2	Maximum differential back pressure allowable for valve operation	Kg/cm ² (g)		
3.2.3	Maximum allowable flow	m ³ /hr		
3.2.4	Maximum allowable fluid velocity through valve	m/sec		
3.2.5	Pressure drop across the valve at design flow when valve is fully open	Kg/cm ² (g)		
3.2.6	Angle of travel from wide open to shut-off condition in degrees (applicable for Butterfly Valves only			

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<u>SR. NO</u>	<u>ITEM</u>	<u>UNIT</u>		
3.2.7	Design pressure	Kg/cm ² (g)		
3.2.8	Design temperature	°C		
3.3	<u>DESIGN AND CONSTRUCTION</u>			
3.3.1	Valve design standard			
3.3.2	Design pressure class			
3.3.3	Maximum torque required at the disc shaft for operation (Including seating and unseating)	Kg. m		
3.4	<u>VALVE BODY & DISC</u>			
3.4.1	Body construction		Cast /Fabricated	
3.4.2	Pressure class			
3.4.3	Thickness of disc.			
3.4.4	Disc. Construction		Cast / Fabricated	
3.4.5	Flange drilling standard for flanged valve			
3.5	<u>VALVE SEAT</u>			
3.5.1	Material			
3.5.2	Location			
3.5.3	Seat thickness (mm) and radial width	mm	On body /on disc	
3.5.4	Whether of replaceable design		Yes/No	

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<u>SR. NO</u>	<u>ITEM</u>	<u>UNIT</u>		
3.5.5	Whether reinforcement provided (applicable for resilient material)		Yes/No	
3.5.6	Number of retaining ring segments			
3.6	<u>VALVE SHAFT</u>			
3.6.1	Shaft attachment piece		Stubbed/Single	
3.6.2	Shaft diameter	mm		
3.7	<u>SHAFT BEARING</u>			
3.7.1	Type and make			
3.7.2	Location			
3.7.3	Number's provided			
3.7.4	Catalogue No.			
3.7.5	Design life at normal operating conditions	Hrs		
3.7.6	Whether self lubricating		Yes / No	
3.8	<u>THRUST BEARING</u>			
3.8.1	Type and make			
3.8.2	Catalogue No.			
3.8.3	Location			
3.8.4	Numbers provided			
3.8.5	Design axial thrust	Kgf		

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		ADDENDUM- I		
<u>SR. NO</u>	<u>ITEM</u>	<u>UNIT</u>		
3.8.6	Design life at normal operating conditions	Hrs		
3.9	<u>SHAFT SEAL</u>			
3.9.1	Type			
3.9.2	Location			
3.9.3	Seal replacement possible without dismantling the valve			
3.10	<u>MATERIAL</u> <u>OF</u> <u>CONSTRUCTION</u>			
3.10.1	Valve body			
3.10.2	Valve disc			
3.10.3	Valve seat ring			
3.10.4	Valve shaft			
3.10.5	Shaft bearings			
3.10.6	Thrust bearings			
3.10.7	Shaft seals/stuffing box packing			
3.10.8	Gears			
3.10.9	Extension spindle, if any			
3.10.10	Clamping rings			
3.10.11	Hand wheel/Chain wheel			
3.10.12	Internal fasteners (pins, screws, etc.)			

CONSULTANT : PROCON ENGINEERS

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		BID SPECIFICATION NO.: DG/BSL U-6/2011/T-1		
		ADDENDUM- I		
<u>SR. NO</u>	<u>ITEM</u>	<u>UNIT</u>		
3.10.13	External fasteners			
3.10.14	Floor stand, if any			
3.10.15	Seal			
3.10.16	Gear casing			
3.11	<u>INSPECTION AND TESTING</u>			
3.11.1	Material test			
3.11.2	Hydrostatic Test			
3.11.2.1	Pressure	kg/cm ² (g)		
3.11.2.2	Duration	minutes		
3.11.3	Disc Strength Tests			
3.11.3.1	Disc strength test pressure	Kg/cm ² (g)		
3.11.3.2	Duration	minutes		
3.11.4	Air Leakage Test			
3.11.4.1	Pressure	kg/cm ² (g)		
3.11.4.2	Duration	minutes		
3.11.5	Seat Test			
3.11.5.1	Pressure	kg/cm ² (g)		
3.11.5.2	Duration	minutes		
3.12	<u>VALVE SEAL</u>			
3.12.1	Whether seal is mounted on disc or body?			

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		ADDENDUM- I		
<u>SR. NO</u>	<u>ITEM</u>	<u>UNIT</u>		
3.12.2	Thickness and radial width of seal	mm		
3.12.3	Type of reinforcement or inserts provided in rubber seal			
3.12.4	Replaceable design			
3.13	Class & Retaining Rings etc., for Rubber Seal			
3.13.1	Type			
3.13.2	Type of construction			
3.13.3	Replaceable design			
3.14	<u>WEIGHT DATA</u>			
3.14.1	Weight of the valve assembly complete with gearing, motor etc.	kg		
3.14.2	Weight of the largest piece to be handled	kg		
4.0	<u>DOUBLE KINETIC AIR VALVE</u>			
4.1	<u>GENERAL</u>			
4.1.1	Manufacturer			
4.1.2	Size of the valve	mm		
4.1.3	Number offered			
4.1.4	Installation		Horizontal / Vertical Shaft	

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		ADDENDUM- I		
<u>SR. NO</u>	<u>ITEM</u>	<u>UNIT</u>		
4.1.5	Type and Make			
4.1.6	Working pressure	Kg/cm ² (g)		
4.1.7	Design pressure	Kg/cm ² (g)		
4.1.8	Maximum allowable flow	m ³ /hr		
4.1.9	Pressure drop across the valve at design flow when valve is fully open	Kg/cm ² (g)		
4.1.10	Design pressure	Kg/cm ² (g)		
4.1.11	Design temperature	°C		
4.2	<u>DESIGN AND CONSTRUCTION</u>			
4.2.1	Valve design standard			
4.2.2	Design pressure class			
4.2.3	Maximum torque required at the disc shaft for operation (Including seating and unseating)	Kg. m		
4.2.4	Body construction			
4.2.5	Top Cover			
4.2.6	Splash cover			
4.2.7	Floats			
4.2.8	Bolts and nuts			
4.2.9	Flange			

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	ADDENDUM- I	

DATA SHEET – C

DRAWINGS, DATA, INFORMATION & MANUALS REQUIRED:

1.0

Final versions of all the documents, furnished during the bid.

2.0

A complete list of all piping systems and corresponding materials included in the scope of work.

3.0

A complete list of all valves with their quantities and ratings.

4.0

Detailed layout of the cross- country piping from Tapi river water pump house upto the interconnection point.

5.0

Manufacturer’s catalogue indicating complete range of available size and rating of pipes, fittings, valves and specialties.

6.0

General Arrangement and Sectional drawings with data on weight and material of construction for each category of Expansion Joints with control rod assemblies.

7.0

Outline drawings and Cross Sectional drawings indicating principal dimensions and weights of equipment, size and location of various nozzles, connections, nozzle sizes and foundation arrangement.

8.0

Detail drawings including fabrication drawings of all shop fabricated piping system indicating design parameters and complete bill of material (Relevant Standards and grades to be indicated) and information/data pertaining to the hydrostatic and non-destructive test requirements to be submitted progressively.

9.0

Detail dimensioned drawing of each valve, specialties, indicating tag no., pressure rating, manufacturing standard, the bill of materials and hydrostatic test pressures. The drawing shall include the end preparation details and shall indicate the position of the hand wheel/operator. Technical particulars of motor operators wherever applicable shall also be indicated.

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	BID SPECIFICATION NO.: DG/BSL U-6/2011/T-1	
	ADDENDUM- I	
10.0	General arrangement drawing for each hanger/support/anchor etc. indicating identification number, auxiliary supporting structural details, other details & information as required in the specification.	
11.0	Wiring diagram for all limit switches of motor operated valves.	

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**MAHARASHTRA STATE POWER
GENERATION CO. LTD.**

**PROJECTS & PLANNING
DEPARTMENT**

BID SPECIFICATION NO.: DG/BSL U-6/2011/T-1

CORRIGENDUM - III

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	CORRIGENDUM - III	

CORRIGENDUM TO BID SPECIFICATION

VOLUME-I

COMMERCIAL AND GENERAL CONDITIONS OF

CONTRACT

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		BID SPECIFICATION NO.:DG/BSL U-6/2011/T-1		
		CORRIGENDUM - III		
Sr. No.	Section/Page No./ Cl. No.	Existing Particulars	To be read as	
1.	Section 1,Page 38/ Cl. No.18.2	The date of ----- in number of days from the date of award of contract----- period offered by him.	The date of ----- in number of days from the zero date ----- period offered by him.	
2.	Section 1, Page 40/ Cl No. 19.1, Table item Sr No. 2.	Loading for evaluation of shortfall in performance	Loading for evaluation of shortfall in performance	
		Heat Rate: Increase in turbine cycle heat rate (considering lowest quoted Heat Rate as base) in kCal/kWh under rated steam conditions at 76mm of Hg(back pressure) with zero make up at 100% unit load at generator terminals.	Heat Rate: Increase in weighted average turbine cycle Heat rate in KCal/Kwh (refer clause No. 1.2.3, Section 8, Vol-II) as compared to the lowest quoted in weighted average Heat rate received against this bid.	
		INR 40,000,000/- (INR Forty Million only) per kCal/kWh	INR 40,000,000/- (INR Forty Million only) per kCal/kW	
3.	Section 1, Page 50/ Cl No. 29.1,	After opening of Part-I i.e. Techno-commercial bid in both electronic as well as physical form -----	After opening of Part-I i.e. Techno-commercial bid in physical form -----	
4.	Section 1, Page 51/ Cl No. 29.4,	By obtaining clarifications/ confirmations in respect of each of the techno-commercial bids, all the bids will be brought at par as far as technical requirements and commercial terms & conditions are concerned.	By obtaining clarifications/ confirmations in respect of each of the techno-commercial bids, all the bids will be brought at par as far as functional technical requirements and commercial terms & conditions are concerned.	
			The deviations indicated in the deviation schedules may be acceptable to the owner provided- i) The deviation indicated is due to superiority of offered system/equipment compared to the specified requirements and/or ii) The deviation is due to	

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		BID SPECIFICATION NO.:DG/BSL U-6/2011/T-1		
		CORRIGENDUM - III		
Sr. No.	Section/Page No./ Cl. No.	Existing Particulars	To be read as	
			intrinsic design features pertaining to the Steam Turbine Generator set & Steam Generator set and its associated control system, without compromising the specified functional & performance requirements. In deciding the superiority of the offered system/ equipment or intrinsic design feature, the decision of the owner will be final and binding on the bidder. In such circumstances, the cost of withdrawal indicated in Schedule-10 & Schedule-11 shall not be considered for evaluation	
5.	Section 1, Page 58/ Cl No. 35.7,	The contract shall be signed in One Original and One Copy.The Original shall be retained by the owner and the copy shall be handed over to the contractor.- - - - -	The contract shall be signed in One Original and Two Copies. The Original and One Copy shall be retained by the owner and the copy shall be handed over to the contractor.- - - - -	
6.	Section 1, Page 59/ Cl No. 37.2	Three Years O&M Spares (Recommended Spares):the Bidder shall - - - - - . The price of these spare parts shall be firm on price basis and shall have extended validity not less than 18 (eighteen) months after the placement of order for Main Plant Package. The Prices - - - - -.	Three Years O&M Spares (Recommended Spares):the Bidder shall - - - - - . The price of these spare parts shall be firm on price basis and shall have extended validity not less than 12(twelve) months after the placement of order. The Prices - - - - -	
7.	Section 1, Page 118/	Cross-fall-Breach clause: Breach of any of the terms and	Cross-fall Breach Clause : Breach of any of the terms and	

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		BID SPECIFICATION NO.:DG/BSL U-6/2011/T-1		
		CORRIGENDUM - III		
Sr. No.	Section/Page No./ Cl. No.	Existing Particulars	To be read as	
	Annexure-XII, Cl No. 4.0,	conditions of this contract shall be deem breach of	conditions of this contract shall be deem breach of other contracts which will automatically be construed as breach of other contracts which confer right on the owner to terminate the other contract(s) also at the risk & cost of the contractor.	
8.	Section 1, Page 128/ Schedule-3, Cl No. 1.4.2	Wpo= Value of "Wholesale Price Index" as declared by Office of the Economic Advisor, GoI, New Delhi as on base date. Wp1=Value of Index "Wholesale Price Index" "as declared by Office of the Economic Advisor, GoI, New Delhi as on applicable as on the 1st day of the month in which the shipment is effected.	Wpo= Value of Index "All commodities" as declared by Office of the Economic Advisor, GoI, New Delhi as on base date. Wp1= Value of Index "All commodities" as declared by Office of the Economic Advisor, GoI, New Delhi as on the 1st day of the month in which the shipment is effected.	
9.	Section 1, Page 128/ Schedule-3, Cl No. 1.5	In the event of the shipment beyond Scheduled date of supply completion of the respective equipment/spare/material as the case may be, the price adjustment shall be worked out based on i) the scheduled date of supply completion of respective equipment/spare/material and ii) the actual date of completion of the same and whichever is beneficial to the owner shall be payable	In the event of the shipment beyond Scheduled date of supply completion of the respective equipment/spare/material as the case may be for the reasons not attributable to the contractor, the price adjustment shall be worked out based on i) the scheduled date of supply completion of respective equipment/spare/material and ii) the actual date of completion of the same and whichever is beneficial to the owner shall be payable	
10.	Section 1, Page 129/ Schedule-3,	E0 = Basic Price less advance paid for Erection, Testing & Commissioning charges	E0 = Basic Price (Without Taxes and duties payable against the contract, transport, Insurance	

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		CORRIGENDUM - III		
Sr. No.	Section/Page No./ Cl. No.	Existing Particulars	To be read as	
	Cl No. 2.1	completed during the month. E1 = Adjusted Price less advance paid for Erection, Testing & Commissioning charges completed during the month.	etc.) less advance paid for Erection, Testing & Commissioning charges completed during the month. E1 = Adjusted Price (Without Taxes and duties, transport, Insurance etc.) less advance paid for Erection, Testing & Commissioning charges completed during the month.	
11.	Section 1, Page 129/ Schedule-3, Cl No. 3.1	C0 = Basic Price less advance paid for Civil, Structural & Architectural Works completed during the month. C1 = Adjusted Price less advance paid for Civil, Structural & Architectural Works completed during the month.	C0 = Basic Price (Without Taxes and duties, transport, Insurance etc.) less advance paid for Civil, Structural & Architectural Works completed during the month. C1 = Adjusted Price (Without Taxes and duties, transport, Insurance etc.) less advance paid for Civil, Structural & Architectural Works completed during the month.	
12.	Section 1, Cl No.3.2 page 130	In the event of the work performed beyond Scheduled date of completion of the respective activity, the price adjustment shall be worked out based on i) the scheduled date of completion of respective activity and ii) the actual date of completion of the activity and whichever is beneficial to the owner shall be payable	In the event of the work performed beyond Scheduled date of completion of the respective activity for the reasons not attributable to the contractor, the price adjustment shall be worked out based on i) the scheduled date of completion of respective activity and ii) the actual date of completion of the activity and whichever is beneficial to the owner shall be payable	

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		BID SPECIFICATION NO.:DG/BSL U-6/2011/T-1		
		CORRIGENDUM - III		
Sr. No.	Section/Page No./ Cl. No.	Existing Particulars	To be read as	
13.	Section 2, Page 170/ Cl No. 3.1 xxxvi	“Zero Date” shall mean the date of commencement of work which shall be either the date of issuance of the Letter of Award OR the date of issuance of Notice to proceed if the LOA issued does not stipulate the Zero date.	“Zero Date” shall mean the date of commencement of work which shall be either the date of issuance of the Letter of Award OR the date of issuance of Notice to proceed if the LOA issued does not stipulate the Zero date. In case of delay in first advance payment beyond the contractual period, the zero date shall be extended by the period equal to the delay in making the payment of first instalment of the advance to the contractor.	
14.	Section 2, Page 189/ Cl No. 28.5	The charges levied by the Directorate of Insurance or Lead Insurer proposed by them together with taxes and duties applicable thereon, if any, shall be reimbursed to the contractor at actual.	The charges levied by the Directorate of Insurance or Lead Insurer proposed by them together with taxes and duties applicable thereon, if any, shall be reimbursed to the contractor at actual within 30 days from the date of submission of invoice alongwith all the relevant documents including money receipt.	
15.	Section 2, Page 194/ Cl No. 36.3	In the event, the Owner for any reason does not consider it necessary to avail of the training facilities; he shall be entitled for rebate on this account.	In the event, the Owner for any reason does not consider it necessary to avail of the training facilities; he shall be entitled for rebate on this account at the rate mutually agreed upon.	
16.	Section 2, Page 203/ Cl No. 44.1.3	All spares shall be properly protected and packed for long storage at site under prevailing conditions.	All spares shall be properly protected and packed for long storage at site under prevailing conditions, upto expiry of guarantee period of the spares as per the provisions of clause	

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		BID SPECIFICATION NO.:DG/BSL U-6/2011/T-1		
		CORRIGENDUM - III		
Sr. No.	Section/Page No./ Cl. No.	Existing Particulars	To be read as	
			No. 44.1.4, Section 2.	
17.	Section 2, Page 203/ Cl No. 44.2.1	It shall be the responsibility of the contractor to maintain adequate items in sufficient number, as erection & commissioning spares to ensure that erection commissioning works and operation up to end of guarantee period do not hamper -----.	It shall be the responsibility of the contractor to maintain adequate items in sufficient number, as erection & commissioning spares to ensure that erection commissioning works and operation up to end of Performance Guarantee Test do not hamper -----.	
18.	Section 2, Page 203/ Cl No. 45.1	The Contractor shall ensure the long term availability of spares to the owner for the full life of the equipment covered under the contract. The contractor shall also ensure that before going out of production of spare part of the equipment covered under the contract,-----	The Contractor shall ensure the long term availability of spares to the owner for the full life of the equipment (i.e. 25 Years from the date of commencement of guarantee period) covered under the contract. The contractor shall also ensure that before going out of production of spare part of the equipment covered under the contract,-----	
19.	Section 2, Page 212/ Cl No. 61.1.6	If the sum payable to the contractor as per Clause 61.1.5 and the costs incurred by the owner are execution of the balance works by pursuant to this clause exceed the contract price, the contractor shall be liable for such excess.	If the sum payable to the contractor as per Clause 61.1.5 and the costs incurred by the owner in execution of the balance works by pursuant to this clause exceed the contract price, the contractor shall be liable for such excess.	
20.	Section 2A, Page 225/ Cl No. 2.1	Critical/Vital Equipment / Materials :	Critical/Vital/Major Equipment or Materials :	
21.	Section 2A, Page 225/ Cl No. 2.1.1	----- before the Pre-despatch inspection of such equipment.	----- before the Pre-despatch inspection of such equipment or material.	

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		BID SPECIFICATION NO.:DG/BSL U-6/2011/T-1		
		CORRIGENDUM - III		
Sr. No.	Section/Page No./ Cl. No.	Existing Particulars	To be read as	
22.	Section 2A, Page 226/ Cl No. 2.2.1	All the equipment not enlisted as Critical/ Vital Equipment/ Material shall deem to be classified as Non-Critical/Non-Vital Equipment/Materials.	All the equipment/ materials not classified as Critical/ Vital/ Major as mentioned in Clause no. 2.1 above, shall deem to be classified as Non-Critical/Non-Vital Equipment/Materials.	
23.	Section 2A, Page 229/ Cl No. 4.1	On completion of tests of equipment at manufacturer's works, the Contractor shall furnish 4 copies of test certificate(s) as required as per the approved quality plan -----	On completion of tests of equipment/ material enlisted in the list as mentioned under Clause No. 2.1 above, at manufacturer's works, the Contractor shall furnish 4 copies of test certificate(s) as required as per the approved quality plan-----	
24.	Section 2A, Page 229/ Cl No. 4.3	Only on approval of these test results by the controller of Quality and the despatch clearance thereafter by the Project Manager, -----	Only on approval of these test results by the controller of Quality and the despatch clearance thereafter by the Controller of Quality, -----	
25.	Section 2A, Page 229/ Cl No. 4.4	New Clause	For non-critical/ non- vital/ minor items, the despatch clearance shall not be required. However, the test certificates/ inspection report of the pre-despatch inspection/ tests carried out by the contractor/ sub-vendor shall invariably accompany the consignment.	
26.	Section 2A, Page 233/ Cl No. 8.8	No tax other than stipulated under this clause shall be payable/ reimbursable to the contractor against the supply of goods against this contract. Further, no CST/ MAVT, as the case be, shall be payable on the transactions which can be	No tax other than stipulated under this clause shall be payable/ reimbursable to the contractor against the supply of goods against this contract. Further, the contractor shall cover all the imports under the provision of Section 5 (2) sale in	

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		CORRIGENDUM - III		
Sr. No.	Section/Page No./ Cl. No.	Existing Particulars	To be read as	
		covered under the provisions of Section 5(2), Sale in Course of Import and Section 6 (2), Sale in Transit of Central Sales Tax Act 1956. The contractor shall be responsible for all the documentation, procedures to be adopted for the purpose of claiming the admissible exemptions of CST/MAVT.	course of import (Sale occasioning the import) of Central Sales Tax Act 1956 and no CST/MVAT shall be payable on these transactions. In case of sale in course of Transit as per Section 6(2) of Central Sales Tax Act 1956, except for the reimbursement of CST as mentioned under Clause No. 8.3.2, no CST/MVAT shall be payable to the contractor. The contractor shall be responsible for all the documentation, procedures to be adopted for the purpose of claiming the admissible exemptions of CST/MAVT as the case may be, as above.	
27.	Section 2A, Page 237/ Cl No. 12.1.4	The payments shall be released by the Project Manager or the financing institute(s) with whom the owner has tied up the funding for this project.	The payments shall be released by the Project Manager or the financing institute(s) with whom the owner has tied up the funding for this project through Crossed Cheque/NEFT/RTGS.	
28.	Section 2A, Page 237/ Cl No. 12.1.5	New Clause	The owner, as per guidelines and conditions specified herein, shall arrange the payment to the contractor only for the performance of the works under the contract. All payments during the currency of the contract shall be “on account” payments only. The payments shall be made in Indian Rupees and or in foreign currency as per the contract.	

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		BID SPECIFICATION NO.:DG/BSL U-6/2011/T-1		
		CORRIGENDUM - III		
Sr. No.	Section/Page No./ Cl. No.	Existing Particulars	To be read as	
29.	Section 2B, Page 255/ Cl No. 4.5.1	The owner will allow the contractor to use the railway siding facilities and shunting locomotive, (when construction in the vicinity of the owner’s existing Power Station) for unloading of material and equipment despatched against the contract as and when available without any charge.----- -----	The owner will allow the contractor to use the railway siding facilities and shunting locomotive, which shall be operated by the owner's operator (when construction in the vicinity of the owner’s existing Power Station) for unloading of material and equipment despatched against the contract as and when available without any charge.--- ---	
30.	Section 2B, Page 283/ Cl No. 37.4	Unless all material are removed and clear space is handed over back to the owner, the final bill payment as well as release of contract performance security shall not be considered by the owner.	Unless all material are removed and clear space is handed over back to the owner, release of contract performance security shall not be considered by the owner.	
31.	Section 2C, Page 300/ Cl No. 20.6	The contractor shall submit reconciliation statement of steel/cement/ other materials used by him and incorporated in the work once in every three (3) months (quarter)	Deleted	
32.	Section 3, Page 309/ Cl No. 2.1.1	Steam Generator shall ----- ----- water wall tubing for which he is qualified.	Steam Generator shall ----- ----- water wall tubing for which he is qualified. Steam Generator shall be in successful operation for at least one year from date of commissioning till the date of bid opening.	
33.	Section 3, Page 318/ Cl No. 2.6.2.1, ii)	In case the vendor is - - - - - - - - - - AND Collaborate(s)/ Associate(s) with party (ies) who meet(s) the requirement under clause 5.2.1	In case the vendor is - - - - - - - - - - AND Collaborate(s)/ Associate(s) with party (ies) who meet(s) the requirement under clause	

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		CORRIGENDUM - III				
Sr. No.	Section/Page No./ Cl. No.	Existing Particulars		To be read as		
		above which the contractor/subcontractor himself is not able to meet.		2.6.2.1 above which the contractor/subcontractor himself is not able to meet.		
34.	Section 3, Page 323/ Cl No. 4.5	Any change in the ----- --- during contractual work completion period and extended contractual work completion period for the reasons attributable to the owner, if any, shall be to the owners' account. However,-----shall only be payable.		Any change in the ----- ---- during contractual work completion period and extended contractual work completion period for the reasons not attributable to the contractor, if any, shall be to the owners' account. However,-----shall only be payable.		
35.	Section 3, Page 326/ Cl No. 6.3, Table Sr No. 1	Auxiliary	Multiplication Factor	Auxiliary	Multiplication Factor	
		Boiler Feed Pumps	1.00	Deleted	Deleted	
36.	Section 3, Page 324/ Cl No. 6.3, Table Sr No. 1	Variation factor	Rate of Liquidated Damages	Variation factor	Rate of Liquidated Damages	
		Heat Rate: Increase in gross turbine cycle heat rate----- ----.	INR 60,000,000/- (INR Sixty Millions only) per Kcal/Kwh	Heat Rate: Increase in weighted average turbine cycle heat rate (refer clause no. 1.2.3 of Sec.8, Vol-II) -----.	INR 60,000,000/- (INR Sixty Millions only) per Kcal/Kwh	
37.	Section 3, Page 325/ Cl No. 6.3, Table Sr No. 5	Shortfall in Capacity of Steam Generator(Main Steam): Drop of -----Steam Generator as compared to 2000 TPH	INR 60,000,000/- (INR Sixty Millions only)	Shortfall in Capacity of Steam Generator(Main Steam): Drop of --- ----- Steam Generator as compared to bidders guaranteed value.	INR 60,000,000/- (INR Sixty Millions only)	
38.	Section 1, Annexure VII A Page 108	Proforma for Commercial Deviations without Price Implication: We confirm that all the Commercial Deviations.....with price implication shown.....		Proforma for Commercial Deviations without Price Implication: We confirm that all the Commercial Deviations.....without price implication shown.....		

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		BID SPECIFICATION NO.:DG/BSL U-6/2011/T-1		
		CORRIGENDUM - III		
Sr. No.	Section/Page No./ Cl. No.	Existing Particulars	To be read as	
39.	Section 2B, Page 273 Clause 27.5.1	70% payment towards the Price Adjustment on supply of equipment/mandatory spares along with taxes	70% payment towards the Price Adjustment on services rendered along with taxes	
40.	Section 2A Page 240 Clause no.12.3.3	30% payment shall be retained and out of which 20% payment shall be released on achievement of important milestones in the project completion as stipulated below.	30% payment of invoice value shall be retained and out of which 20% payment of invoice value shall be released on achievement of important milestones in the project completion as stipulated below.	
41.	Section 2B Page 272 Clause no.27.3.2	30% payment shall be retained and out of which 20% payment shall be released on achievement of important milestones in the project completion as stipulated below.	30% payment of invoice value shall be retained and out of which 20% payment of invoice value shall be released on achievement of important milestones in the project completion as stipulated below.	
42.	Section 2A Page 244 Clause no.15.1	ii) all consumables like, grease, lubricating oils, chemicals, ink & graphs for recorders etc. up to satisfactory completion of trial operation. The Contractor shall also arrange any additional quantities required specifically for the Performance Guarantee Test.	ii) all consumables like, grease, lubricating oils, chemicals, ink & graphs for recorders etc. up to taking over the unit by owner as stipulated in Cl. 41.0, Section 2. The Contractor shall also arrange any additional quantities required specifically for the Performance Guarantee Test.	

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	BID SPECIFICATION NO.:DG/BSL U-6/2011/T-1		
	CORRIGENDUM - III		
Corrigendum for Words "Contract Value" and "Contract Price" in Clauses Volume -1 of Bid Specification.			
Sr. No.	Section/Page No./ Cl. No.	Existing Particulars	To be read as
1.	Section IFB,Page 13/ Cl. No.4.3	The bidder/consortium ----- -----or 0.05% of the contract value whichever is higher, valid beyond 90 days from the scheduled date of completion of guarantee period.	The bidder/consortium ----- -----or 0.05% of the contract price whichever is higher, valid beyond 90 days from the scheduled date of completion of guarantee period.
2.	Section 1, Page 27/ Cl No. 4.3,	The bidder/consortium ----- -----or 0.05% of the contract value whichever is higher, valid beyond 90 days from the scheduled date of completion of guarantee period.	The bidder/consortium ----- -----or 0.05% of the contract price whichever is higher, valid beyond 90 days from the scheduled date of completion of guarantee period.
3.	Section 1, Page 30/ Cl No. 8.2,	Agent's commission, if any, ----- ----- with the payments towards base contract price .	Agent's commission, if any, ----- ----- with the payments towards base contract value .
4.	Section 1, Page 50/ Cl No. 28.4, Sr No. 5)	Billing Break-up of Contract Value (Clause 26.0, Scetion-2B)	Billing Break-up of Contract Price (Clause 26.0, Scetion-2B)
5.	Section 1, Schedule-3, Page 125/ Cl No. 1.1.2	EC0=Ex-works / FOB supply price-component (without taxes and duties, transport, Insurance etc.) less advance paid of the contract price for equipment, shipment-wise.	EC0=Ex-works / FOB supply price-component (without taxes and duties, transport, Insurance etc.) less advance paid of the contract value for equipment, shipment-wise.
6.	Section 1, Schedule-3, Page 126/ Cl No. 1.2.1	The Ex-Works price of Steel for Civil, Structural and Architectural Works shall be subject to price adjustment limited to ± 20% of the contract price of steel.	The Ex-Works price of Steel for Civil, Structural and Architectural Works shall be subject to price adjustment limited to ± 20% of the contract value of steel.
7.	Section 1, Schedule-3, Page 127/ Cl	S0 =Ex-works price-component (without taxes and duties, transport, Insurance etc.) less	S0 =Ex-works price-component (without taxes and duties, transport, Insurance etc.) less

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		CORRIGENDUM - III		
Sr. No.	Section/Page No./ Cl. No.	Existing Particulars	To be read as	
	No. 1.2.2	advance paid of the contract price for steel, shipment-wise.	advance paid of the contract value for steel, shipment-wise.	
8.	Section 1, Schedule-3, Page 127/ Cl No. 1.3.1	The Ex-Works price of Cement for Civil, Structural and Architectural Works shall be subject to price adjustment limited to $\pm 20\%$ of the contract price of Cement.	The Ex-Works price of Cement for Civil, Structural and Architectural Works shall be subject to price adjustment limited to $\pm 20\%$ of the contract value of Cement.	
9.	Section 1, Schedule-3, Page 128/ Cl No. 1.3.3	In any case, the price adjustment shall not exceed $\pm 20\%$ of the contract price of Cement.	In any case, the price adjustment shall not exceed $\pm 20\%$ of the contract value of Cement.	
10.	Section 1, Schedule-3, Page 128/ Cl No. 1.4.1	The basic price of Aggregates (other than Steel & Cement) for Civil, Structural & Architectural Works shall be subject to price adjustment limited to $\pm 20\%$ of the contract price for the same.	The basic price of Aggregates (other than Steel & Cement) for Civil, Structural & Architectural Works shall be subject to price adjustment limited to $\pm 20\%$ of the contract value for the same.	
11.	Section 1, Schedule-3, Page 128/ Cl No. 1.4.2	A0 =Ex-works price-component (without taxes and duties, transport, Insurance etc.) less advance paid of the contract price for Supply of other Aggregates for Civil, structural & Architectural Works.	A0 =Ex-works price-component (without taxes and duties, transport, Insurance etc.) less advance paid of the contract value for Supply of other Aggregates for Civil, structural & Architectural Works.	
12.	Section 1, Schedule-3, Page 128/ Cl No. 1.4.3	The price adjustment shall be limited to $\pm 20\%$ of the contract price of other aggregates.	The price adjustment shall be limited to $\pm 20\%$ of the contract value of other aggregates.	
13.	Schedule - 8(B)/Page 148/Foot Note No.3	Insert amount equivalent to 0.5% of the contract value in words and figures in all currencies of the contract.	Insert amount equivalent to 0.5% of the contract price in words and figures in all currencies of the contract.	
14.	Schedule - 8(C)/Page 151/Foot	Insert amount equivalent to 0.5% of the contract value in words and figures in all currencies of	Insert amount equivalent to 0.5% of the contract price in words and figures in all	

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Sr. No.	Section/Page No./ Cl. No.	Existing Particulars	To be read as	
	Note No.1	the contract.	currencies of the contract.	
15.	Section 2, Page 192/ Cl No. 30.2.2	Notwithstanding anything contained hereinabove; the total liability of the contractor against this clause No. 30.2 shall not exceed 10% of the contract value .	Notwithstanding anything contained hereinabove; the total liability of the contractor against this clause No. 30.2 shall not exceed 10% of the contract price .	
16.	Section 2, Page 192/ Cl No. 30.4	Notwithstanding anything ----- ----- exceed 25% of the contract value . -----	Notwithstanding anything ----- ----- exceed 25% of the contract price . -----	
17.	Section 2B, Page 250, Table of Contents, Sr No. 26.0	Billing Break-up of Contract Value	Billing Break-up of Contract Price	
18.	Section 2B, Page 270, Clause No. 26.0	Billing Break-up of Contract Value	Billing Break-up of Contract Price	

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Table under Clause No.24.2 , Page No. 45, Section-I, Volume-I, is revised as under:

Section of the Bid	Contents
Bid Proposal Part – 1	Bid Proposal in format as per Annexure – 1 (A). Key Particulars of the bid in format as per annexure - III Documents of incorporation of bidder/ consortium members. Power of Attorney in favour of person(s) signing the bid, Deed of Joint Undertaking (DJU) and consortium agreement (if applicable). Consent of Proposed Assignee¹, if any, as per the format given in Annexure – XI
Enclosure – 1	Bid Security as per Clause No. 6.0, Section – 1, Volume – I of the Bid Specification.
Enclosure – 2	Summary of Qualification of the bidder/ consortium members (Annexure – IV) Documents establishing the qualification of the bidder as stipulated in Annexure – IV Deed(s) of Joint undertaking in the formats as per Annexure – V (A) or V (B) as may be applicable.
Enclosure – 3	Copy of the bid specification (Volume – I to Volume - VIII) including all clarifications, corrigenda, addenda, errata, amendments thereto issued by the owner duly sealed and signed (without filling in any data).
Enclosure – 4	<u>Deleted</u>
Enclosure – 5	Schedule of Deviations against Volume – I (commercial part) of the bid specification in the format as per Annexure – VII (A) and VII (B). Any other information called in Volume – I

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¹Insert only if applicable

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	Section of the Bid	Contents	
	Enclosure – 6	Bid Data Sheets and drawings as required under Volumes – II to VIII duly filled in and enclosures thereto if called for/required.	
	Enclosure – 7	Schedules of Deviations against Volume – II to VIII (Technical part) of the bid specification in the format as per Annexure – VIII (A) and VIII (B)	
	Enclosure – 8	List of proposed vendors/subcontractors as per format in Schedule - 9 List of the Mandatory Spares proposed by the bidder in the format as per Annexure - IX. List of 3 Years O&M spares proposed by the bidder in the format as per Annexure - X.	

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The Tables under Clause No. 24.3.1, Page 47 and Clause No. 2.0 of Annexure-I(B), Page No. 71, Section 1, Volume I shall be replaced by following table :

Section of the bid	Contents
Price Bid Form	Covering Letter as per Annexure – I (B).
Enclosure – 1	Break-up of Quoted Price in the format as per Schedule - 1.
Enclosure - 2	Break-up of prices of Mandatory Spares as per Schedule - 2
Enclosure - 3	Details of Price Adjustment Schedule - 3
Enclosure – 4	Details of Imports proposed (Schedule – 4)
Enclosure – 5	Schedule of Unit Prices of items for the Purpose of Addition/ Deletion (Schedule – 5)
Enclosure – 6	Guaranteed Completion Period and details of the inputs required from owner as per schedule-6 of the specification and Guaranteed Technical Particulars as per Schedule-7
Enclosure – 7	Schedule of Commercial Deviations indicating costs of withdrawal (Schedule – 10)
Enclosure – 8	Schedule of Technical Deviations indicating cost of withdrawal (Schedule - 11)
Enclosure – 9	Schedule of 3 Year's O&M (Recommended) Spares (Schedule – 12)

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Following Table shall be added at Sr No. 7) under Clause No. 1.0 of Annexure-XII, Page 117

7) Various sections of Volume-I shall be attached to the contracts as under :

i) In case the bidder is an Indian Entity

Section	Description	To be incorporated in		
		First Contract	Second Contract	Third Contract
2	General Conditions of the Contract	Yes	Yes	Yes
2A	Terms & Conditions of the Contract - Supply	Yes	No	No
2B	Terms & Conditions of the Contract - Site Services	No	Yes	Yes
2C	Additional Conditions of the Contract - Civil	No	No	Yes
3	Special Terms & Conditions of the Contract	Yes	Yes	Yes

ii) In case the bidder is a Foreign Entity

Section	Description	To be incorporated in		
		First Contract	Second Contract	Third Contract
2	General Conditions of the Contract	Yes	Yes	Yes
2A	Terms & Conditions of the Contract - Supply	Yes	Yes	Yes
2B	Terms & Conditions of the Contract - Site Services	No	No	Yes
2C	Additional Conditions of the Contract - Civil	No	No	Yes
3	Special Terms & Conditions of the Contract	Yes	Yes	Yes

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Schedule-1, Volume-I, Section 1 at Page No. 121 is revised as under :

Schedule – 1

Proforma for Break-up of Prices

(to be in electronic form on line)

Sr. No.	Particulars	Price			Applicable Taxes	
		INR	FC1	FC2	Tax	Rate
1.	Supply of Equipment, Mandatory Spares and Materials					
1.1	Supply of Indigenous Equipment & Materials				Excise Duty	
					CST	
					M VAT	
1.2	Supply of Indigenous Mandatory Spares				Excise Duty	
					CST	
					M VAT	
1.3	Supply of Imported Equipment, and materials to be directly delivered to the site on CFR basis				Total Customs Duty	
1.4	Supply of Imported Mandatory Spares to be directly delivered to the site on CFR basis				Total Customs Duty	
1.5	Supply of Steel, Cement and other aggregates for Civil, Structural and Architectural Works		NA	NA	Excise Duty	
					CST	
					M VAT	

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		CORRIGENDUM - III					
Sr. No.	Particulars		Price			Applicable Taxes	
			INR	FC1	FC2	Tax	Rate
	1.6	Inland Freight for FOR Site Delivery of 1.1 to 1.5 above including taxes thereon, if any		NA	NA	---	---
	Total					---	---
2.	Erection, Testing & Commissioning						
2.1	Equipment Related Design & Engineering (except for Civil Design & Engineering				Service Tax		
2.2	Erection, Testing & Commissioning		NA	NA	Service Tax		
Total					---	---	
3.	Civil Construction, Structural and Architectural Works						
3.1	Civil Works related Design Engineering		NA	NA	Service Tax		
3.2	Civil Construction, Structural and Architectural Works		NA	NA	Service Tax		
Total			NA	NA	----	----	
Grand Total (1+2+3)							

NA = Not Applicable i.e. Foreign Currency bid price and payment not acceptable for the respective element of the bid price. FC1, FC2 = Foreign Currencies of bidders option.

- We confirm that the taxes at the rates mentioned above are applicable as on record date considering the prevailing Project Import Regulations. However, the above mentioned Taxes and Duties shall be payable at the rates prevailing considering 1) Deemed Export

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Benefits and 2) Mega Power Project benefits (including benefits for Expansion Unit of Mega Power Project benefits) shall only be payable to us. 2. We confirm that subject to grant of the Mega Power Project/Expansion Unit of Mega Power Project status by the Ministry of Power for the Project (Bhusawal TPS 1x660 MW Unit- 6), we shall avail all the benefits of taxes and duties so available to the project as per the prevailing rules and pass on all such benefits on this account to the owner. 3. We confirm that in view of International Competitive Bidding, Deemed Export Benefits as per the current Foreign Trade Policy (FTP) 2009-2014 are available to the project. Note : Total Foreign currency component indicated in schedule-1, shall not exceed the foreign currency component indicated in Schedule-4 of the bid specification		

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	CORRIGENDUM - III						
Schedule-4, Volume-I, Section 1 at Page No. 131 is revised as under :							
Schedule - 4 DETAILS OF IMPORT CONTENT OF BID (to be submitted in electronic form on line by uploading the *.pdf file)							

Sr. No.	Item Description	Unit of Measure	Quantity		Rate/Unit		
					INR	FC 1	FC 2
1.	Goods imported and Directly Despatched to the site quoted on CFR Basis						
				FOB			
				CFR			
				FOB			
				CFR			
Total				FOB			
				CFR			
2.	Input Material included in Supply Price						
				FOB			
				CFR			
				FOB			
				CFR			
Total				FOB			
				CFR			
Total Foreign currency component of import content of bid (CFR)					INR	FC 1	FC 2

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Schedule-5, Volume-I, Section 1 at Page No. 132 is revised as under :

Schedule - 5

Price Schedule for Unit Price for Addition/Deletion

(to be submitted in electronic form by uploading a *.pdf file. Giving unit prices of every item is mandatory)

PRICE SCHEDULE FOR UNIT PRICE FOR ADDITION/DELETION (Refer Clause No ____, Section - __)

The item wise unit price including insurance, port handling, loading/unloading, receiving, storage etc. and all the taxes and duties but taxes and duties as stipulated under Clause No. 8, Section - 2A, Volume - I are as under. We confirm that in the event of the any addition or deletion of any item(s), the Inland Transportation Charges shall be revised in proportion with the contract price for supply. The taxes and duties shall be payable as per the provisions of Clause No. 8, Section - 2A, Volume - I.

Sr. No.	Description	Unit of Measure (UoM)	Currency	Price Per Unit
(1)	(2)	(3)	(4)	(5)
	Item Sr. No. A 1 to 8, B 1 to 15, C 1 to 22, D 1 to 9 and E 1 to 19 stand deleted			
C 23	Complete Breaker Cubicle with			
	i)	Incomer		
	ii)	Tie Feeder		
	iii)	Motor Feeder		
	iv)	Transformer Feeder		
	v)	Bus Coupler		
	vi)	PT Cubicle		
	vii)	Feeder Protection Relay		
	viii)	Motor protection Relay		
	ix)	Dummy Panel		

~~Note: The bidder may add other items as per his experience.~~

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Schedule-6, Volume-I, Section 1 at Page No. 141 is revised as under :

Schedule – 6

Details of Work Completion Schedule and Inputs Required from the Owner

(to be submitted on the letterhead of the bidder/lead member of consortium)

WORK COMPLETION SCHEDULE

We are herewith submitting our Work Completion Schedule comprising of major milestones as under:

Sr. No.	Milestone	Duration from the date of LOA/Notice to Proceed
1	Commencement of excavation for Boiler foundation	
2	Site development and grading	
3	Completion of Boiler foundation	
4	Commencement of Boiler Erection	
5	Hydraulic Test	
6.	Commissioning of DM Plant	
7	Boiler Light up	
8	Commencement of excavation for TG building	
9	Casting of TG raft	
10	Casting of TG Deck	
11	Commencement of Condenser Erection	
12	Commencement of TG Erection	

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13	Stator lifting		
14	Boxing up of Turbine and Generator		
15	Rolling of Turbine		
16	Commissioning of Cooling Tower and CW System		
17	Commissioning of WTP and STP		
18	Synchronisation of the Unit		
19	Commissioning of CHP and AHP		
20	Coal Firing of unit on achieving commissioning of CHP and AHP		
21	Completion of successful Trial Operation		
22	Completion of Performance Guarantee Test and Handover of the unit to the owner		

In order to complete the project as per above mentioned schedule, following inputs shall be required from the owner on or before the days from the date of Letter of Award as mentioned against those inputs:

Sr. No.	Input Required	Due date in terms of No. of days from the zero date of the contract

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1. We confirm that the probable date of the availability of above mentioned inputs shall be discussed during pre award stage and the due dates shall be modified accordingly.

Signature: _____

Name: _____

Designation: _____

Seal of the Company: _____

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Schedule-7, Volume-I, Section 1 at Page No. 143 is revised as under :

Schedule – 7

GUARANTEED TECHNICAL PARAMETERS

(to be submitted on letter head of the bidder/lead member of the consortium)

GUARANTEED TECHNICAL PARAMETERS

For the purpose of evaluation of price bid in terms of Clause No. 19 read with Clause No. 31, Section – 1, Volume - 1 and for the purpose of Clause No. 6.3, Section - 3, Volume – 1, we are herewith submitting guaranteed technical particulars which shall be demonstrated by us during Performance Guarantee Test:

Sr. No.	Guaranteed Particulars	Unit of Measure	Value Guaranteed
1.	Maximum Weighted Average Turbine Heat Rate (Clause no. 1.2.3 of Sec.8, Vol-II)	kCal/kWh	
2.	Minimum Efficiency of Steam Generator	%	
3.	Maximum Auxiliary Power Consumption	kW	
4.	Suspended Particulate Matter (SPM) Level (maximum acceptable 50 mg/Nm ³)	mg/Nm ³	

Signature: _____

Name: _____

Designation: _____

Seal of the Company: _____

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Annexure -I(A), Section-1, Volume-I, page No. 63 is revised as under :
Annexure - I(A)
Bid Proposal
(to be submitted on the official letterhead of the bidder/consortium leader)

Bid Proposal No. _____ Date: _____

To
The Chief Engineer (P&P)
Maharashtra State Power Generation Co. Ltd.
3rd Floor, 'Prakashgad', Prof. Anant Kanekar Marg,
Bandra (East), Mumbai - 400 051

Subject: Bid Proposal for Design, engineering, manufacture, inspection, testing at Manufacturer's work, supply, forwarding to site, Civil, Structural & Architectural Works, Marine-cum-Erection insurance, transportation, delivery, unloading, receipt at site, storage at site, erection, testing and commissioning of Bhusawal Thermal Power Station 1x660 MW Unit - 6project complete with all auxiliaries, accessories including supply of mandatory spares, specified tools & tackles and 3 years O&M spares as prescribed in the bid specification No. DG/BSL U-6/2011/T-1as a fully integrated package.

Reference: Invitation For Bids (IFB) No. DG/BSL U-6/2011/T-1/_____ issued on _____.

Dear Sir,

We the undersigned bidder, having read and examined in detail all the contents of the bid specification No. DG/BSL U-6/2011/T-1 pertaining to the works as stated above for your Bhusawal T.P.S. Unit - 6: 1X660 MW Project and addenda/corrigenda/amendments/errata to the same bearing Nos. _____, do hereby propose to perform the works as a fully coordinated package as set forth in your specification and documents and do hereby submit our bid for the same.

1.0 Bid validity:We confirm that all the terms, conditions and price of this proposal are valid for acceptance up to and inclusive of the last date of the calendar

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month in which 180 days from the date of opening of Bid Cover No. One expires i.e. up to _____¹.

2.0 Status of the Bidder:

²We are submitting this bid in our sole capacity as Qualified Manufacturer of Supercritical Steam Generator (SG), Supercritical Steam Turbine (ST) and Generating Set (GS) as stipulated in the bid Specification

OR

We are qualified Manufacturer as stipulated in bid specification of super Critical Stem Generator (SG) and or Super Critical Turbine and Generating set/EPC contractor and are submitting this bid in consortium with:

i) M/s. _____ a qualified Manufacturer as stipulated in bid specification of Super Critical Steam Generator (SG) and /or Super Critical Steam Turbine (ST) and Generating Set (GS) /Qualified EPC contractor as stipulated in bid specification.

ii) M/s. _____ a Qualified Manufacturer as stipulated in bid specification of Super Critical Turbine (ST) and Generating Set (GS).

iii) M/s. _____ a Qualified Manufacturer as stipulated in bid specification of Generating Set (GS)

3.0 Contents of the Bid:

3.1 Techno-commercial Bid (Part - 1 Bid):

3.1.1 As required in the bid specification, we have attached herewith below mentioned documents:

Section of the Bid	Contents	Page No. of the Bid

31313142_____

¹ Insert the date of validity of the bid.

² Strikeout whichever is not applicable.

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	Section of the Bid	Contents	Page No. of the Bid
	Bid Proposal Part - 1	Bid Proposal in format as per Annexure -I (A). Key Particulars of the bid in format as per Annexure - III Documents of incorporation of bidder/ consortium members. Power of Attorney in favour of person(s) signing the bid and consortium agreement (if applicable). Consent of Proposed Assignee ³ if any as per the format given in Annexure - XI	
	Enclosure - 1	Bid Security as per Clause No.6.0, Section - 1, Volume - I of the Bid Specification.	
	Enclosure - 2	Summary of Qualification of the bidder/ consortium members (Annexure - IV) Documents establishing the qualification of the bidder as enlisted in Annexure - IV Deed(s) of Joint undertaking in the formats as per Annexure - V (A) or V (B) as may be applicable.	
	Enclosure - 3	Copy of the bid specification (Volume - I to Volume - VIII) duly sealed and signed.	Yes
	Enclosure - 4	Deleted	
	Enclosure - 5	Schedule of Deviations against Volume - I (Commercial part) of the bid specification in the format as per Annexure - VII(A) and VII (B) and any other information called in Volume - I	

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³insert only if applicable



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Section of the Bid	Contents	Page No. of the Bid
Enclosure – 6	Bid Data Sheets and drawings as required under Volumes – II to VIII duly filled in and enclosures thereto if called for/required.	
Enclosure- 7	Schedules of Deviations against Volume – II to VIII (Technical part) of the bid specification in the format as per Annexure – VIII (A) and VIII (B)	
Enclosure – 8	List of proposed vendors/subcontractors as per format in Schedule - 9 List of the mandatory spares proposed by the bidder in the format as per Annexure - IX. List of O&M spares proposed by the bidder in the format as per Annexure - X.	

3.2 Price Bid (Part – 2 Bid): As required under the bid specification the price bid and the enclosures thereto as under have been submitted on line on micro website <https://mbspcl.abcpocure.com>.

Section of the bid	Contents
Price Bid Form	Covering Letter as per Annexure -I (B).
Enclosure – 1	Break of Quoted Price in the format as per Schedule - 1.
Enclosure - 2	Breakup of prices of Mandatory Spares as per Schedule - 2
Enclosure – 3	Details of Price Adjustment as per Schedule - 3
Enclosure – 4	Details of Imports proposed (Schedule – 4)

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	Section of the bid	Contents
	Enclosure – 5	Schedule of Unit Prices of items for the Purpose of Addition/ Deletion (Schedule – 5)
	Enclosure – 6	Guaranteed Completion Period and details of the inputs required from owner as per schedule-6 of the specification and Guaranteed Technical Particulars as per Schedule-7
	Enclosure – 7	Schedule of Commercial deviations indicating costs of withdrawal (Schedule – 10)
	Enclosure – 8	Schedule of Technical deviations indicating cost of withdrawal (Schedule - 11)
	Enclosure – 9	Schedule of 3 Year's O&M (Recommended) Spares (Schedule – 12)

4.0 Construction of the Contract:

4.1 ⁴We are a foreign national firm having been incorporated by virtue and under the Laws of _____⁵ and do hereby confirm that:

- We have studied all the extent laws in India in connection with execution of Engineering and Construction contracts, employment of labour, taxation including the Income Tax Act etc. and shall abide with the same and other laws which may come into force during the performance of the contract.
- We have studied the Clause 35.3, Section – 1, Volume – I and have noted that in the event of acceptance of our bid, you shall award three contracts as stipulated therein. We also accept that all these three contracts shall have cross-fall-breach clause to the effect that breach of any contract shall be considered as breach of remaining contracts.
- ⁶We propose M/s. _____ as our assignee for execution of Second and/or Third Contract (strike out whichever is

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⁴ Applicable for Offshore bidders only, Indian Bidders to strike out this portion till marked @@.

⁵ Insert the name of the country where the bidder is registered.

⁶ Insert only if applicable

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not applicable) and enclose their unequivocal consent to work as your independent contractor on the terms and conditions offered/accepted by us. We also confirm that the proposed assignee has capacity and experience to perform the contract to your entire satisfaction. However, if the proposed assignee is not acceptable to you, we shall propose alternate assignee or perform the contract(s) proposed to be assigned by ourselves. We also confirm that the assigned contracts shall also contain cross-fall-breach clause to the effect that any breach of the contract(s) by assignee may be considered as the breach of the remaining contracts including the first contract and vice-a-versa.@@ ⁷ We are Indian Bidder and do hereby confirm that: i) We have studied all the extent laws in connection with execution of Engineering and Construction contracts, employment of labour, taxation including the Income Tax Act etc. and shall abide with the same and other laws which may come into force during the performance of the contract. ii) We have studied the Clause 35.2, Section – 1, Volume – I and have noted that in the event of acceptance of our bid, you shall award three contracts as stipulated therein. We also accept that all these three contracts shall have cross-fall-breach clause to the effect that breach of any contract shall be considered as breach of remaining contracts.§§ 5.0 We have understood that deviation in essential terms and conditions as mentioned under Clause 28.4, Section -1, Volume – I of the bid specification shall render our bid to be non-responsive. We confirm that we have not taken any deviation, directly or indirectly, explicitly or implicitly to these terms and conditions. If any such deviation is observed in the bid, the same shall deem to be unconditionally withdrawn by us without any financial implication to the owner. 6.0 We confirm and accept that you are not bound to accept the Lowest evaluated Bid or the Lowest Price Bid or any other bid you may receive. 7.0 The work completion period offered by us and the inputs required from the owner for the same are submitted as Schedule – 6 and Guaranteed Technical Particulars as Schedule – 7. We also accept your right to the bid offering lowest completion period on time preference basis. We also confirm that if our bid is 35353542_____ ⁷ Applicable for Indian bidders. Offshore bidders to strike out this provision till §§		

	MAHARASHTRA STATE POWER GENERATION CO. LTD.	Page 36 of 42
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	CORRIGENDUM - III	

accepted on such criterion and if we fail to achieve the completion of the project, the difference in our evaluated price and lowest evaluated price shall be recovered by you from amounts payable to us.

8.0 If our bid is accepted, we undertake to provide an Advance Payment Security, Contract Performance Securities, performance Security for Phased Manufacturing Programme and Securities for Deed(s) of Joint Undertaking (as applicable) in the form and amounts and within the times specified in the Bid Specification.

9.0 We confirm that upon notification of the contract (issuance of LOA) as stipulated in the bid specification, the contract shall get concluded and our acceptance of the notification of award shall not be required for this purpose. Our contractual obligations shall commence from the notification of award of the contract.

10.0 We undertake, if our bid is accepted, to commence work on the facilities immediately upon your Notification of Award/Notice to Proceed whichever stipulates the date of commencement of contract to us and to achieve Completion of project and Conduct Guarantee Tests within the time offered by us in the Bid.

11.0 Any clarification required about any part of our bid shall be complied promptly.

Thanking you, we remain,

Yours' truly,

For M/s. _____

Signature: _____

Name: _____

Designation: _____

Seal of the Company: _____

	MAHARASHTRA STATE POWER GENERATION CO. LTD.	Page 37 of 42
	BID SPECIFICATION NO.:DG/BSL U-6/2011/T-1	
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Annexure-II, Section 1, Volume -I, Page No. 73 is revised as under :

Annexure - II

Proforma for bank Guarantee against Bid Security

(to be submitted on the stamp paper of requisite money value purchased in the name of the guarantor bank)

BANK GUARANTEE

In accordance with Invitation for Bids (IFB) issued by Maharashtra State PowerGeneration Co. Ltd. (MAHAGENCO) against Bid Specification No. DG/BSL U-6/2011/T-1forDesign, engineering, manufacture, In accordance with Invitation for Bids (IFB) issued by Maharashtra State Power Generation Co. Ltd. (MAHAGENCO inspection, testing at Manufacturer's work, supply, forwarding to site, Civil, Structural & Architectural Works, Marine-cum-Erection insurance, transportation, delivery, unloading, receipt at site, storage at site, erection, testing and commissioning of Bhusawal Thermal Power Station 1x660 MW Unit - 6 project complete with all auxiliaries, accessories including supply of mandatory spares, specified tools & tackles and 3 years O&M spares as prescribed in the bid specification as a fully integrated package.

And Whereas M/s._____ having its registered office at _____ wish/wishes to participate in the said bid.

As per the aforementioned Bid Specification, the bidder is required to furnish Bid Security (EMD) Rs. _____ (In words Rs._____) and the same is acceptable in the form of Bank Guarantee valid for a minimum period of 30 days (in words _____ days) days from the date of expiry of the validity of the bid which, in terms of the bid specification should be last day of calendar month in which 180 days from the date of opening of the bid expire is required to be submitted by the Bidder. We, (name of the bank) , hereby unconditionally and irrevocably guarantee and undertake that during the period commencing from the date of issuance of this guarantee till the last date of validity of this guarantee, to immediately pay on written demand(in the form of post/fax/telegram) served by Maharashtra State Power Generation Co. Ltd. (Mahagenco), Prakashgad, Bandra (East) Mumbai, India the amount of _____ (In words _____ only) to the said Company without any reservation or protest. This guarantee would remain valid up to_____816.00 hrs. IST and if any further extension to this is required, the same will be extended on receiving instructions from M/s. _____ on whose behalf this guarantee has been issued.

37373742_____

⁸ Insert the date 30 days beyond the validity of the bid.

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	CORRIGENDUM - III	

We confirm that appropriate stamp duty against issuance of this bank guarantee has been paid in terms of the statute in force in the state of _____⁹.

In witness whereof, we _____ Bank Limited have executed this on this the _____ day of _____.

Signed and delivered by (name of the bank) by the hand of Shri./Smt. _____ its (designation) and authorized official.

Notwithstanding anything contained hereinabove:

1. Our liability under this Guarantee is restricted to _____
2. It shall remain in force upto and including _____ with further claim period of six months thereafter.
3. The guarantor is liable to pay the guaranteed amount or any part thereof under this bank guarantee only and only if the owner serves upon us a written claim or demand on or before _____.

For -----(Name of the Bank) ---

[Authorised Signatory(ies)]

38383842_____

⁹ Insert the name of the state where the issuing branch of the bank resides.

	MAHARASHTRA STATE POWER GENERATION CO. LTD.		Page 39 of 42																				
	BID SPECIFICATION NO.:DG/BSL U-6/2011/T-1																						
	CORRIGENDUM - III																						
Annexure – IV Summary of Qualification (to be submitted on the letter head of the bidder)																							
SUMMARY OF QUALIFICATION (Refer Clause No. 4.0, Section – 1, Volume – I)																							
Clause No.	Particulars	Details																					
4.1	Details of the EPC orders executed by the Engineering, Procurement & Construction(EPC) Company. (Certificate issued by the owner should indicate details of order, value, date commissioning of the project/contract and date of completion of defect liability period etc.)	Indicate page nos. where the evidencing documents along with summery as per table below are attached: <table border="1" style="margin-top: 10px;"> <tr> <th>Sr. No.</th> <th>Owner</th> <th>Order details</th> <th>Value</th> <th>Certificate encl. (page no. of bid)</th> </tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td></tr> </table>		Sr. No.	Owner	Order details	Value	Certificate encl. (page no. of bid)															
Sr. No.	Owner	Order details	Value	Certificate encl. (page no. of bid)																			
4.2.1/4.2.2/4.2.3	Name of the Parent manufacturer																						
	Equipment	Supercritical Steam Generator (SG)/Supercritical Steam Turbine (ST)/Generating Set (GS)																					
	Name of the Project with unit capacity																						
	Name of the Owner																						
	Date of commissioning of the unit																						
	Certificate issued by the owner	(indicate page nos. of the bid)																					
	Name of the Indian Subsidiary/JV Company for the Equipment																						
	Name(s) of other promoters holding 25% or more equity in the Subsidiary/JV																						
	Certificate of Registration/Incorporation/ Commencement of business etc,	(indicate page nos. of the bid)																					
	Paid up share capital of the company																						

	MAHARASHTRA STATE POWER GENERATION CO. LTD.		Page 40 of 42			
	BID SPECIFICATION NO.:DG/BSL U-6/2011/T-1					
	CORRIGENDUM - III					
Clause No.	Particulars	Details				
	Pattern of Equity holding	Entity	Amount of Equity (INR)	% of paid-up capital		
		Parent Mfr.				
		Total		100%		
	Technology Transfer agreement	(Indicate page nos. of bid)				
	Details of land held by Subsidiary/JV Company for setting up manufacturing facility of Supercritical equipment [refer Clause 4.2.1 (vii)]	(Give details of the place with detail address, telephone nos. etc. and attach documents statutory showing ownership. Indicate page nos. of bids where this information is enclosed.)				
	Deed of Joint Undertaking	(Indicate page nos. of bid)				
4.2.3	Details of the EPC orders executed by the Indian Promoter holding 51% or more equity in the JV company incorporated for manufacturing of the supercritical equipment. (Certificate issued by the owner should indicate details of order, value, date commissioning of the project/contract and date of completion of defect liability period etc.)	Indicate page nos. where the evidencing documents along with summery as per table below are attached:				
		Sr. No.	Owner	Order details	Value	Certificate encl. (page no. of bid)
4.2.4	Name of the Indian Sub-critical equipment manufacturer					
	Details of the Equipment	Supercritical Steam Generator (SG)/Supercritical Steam Turbine (ST)/Generating Set (GS)				
	Name of the Project with Unit capacity					
	Name of the Owner					
	Date of commissioning of the unit					
	Certificate issued by the owner	(indicate page nos. of the bid)				
	Name of the Collaborator					

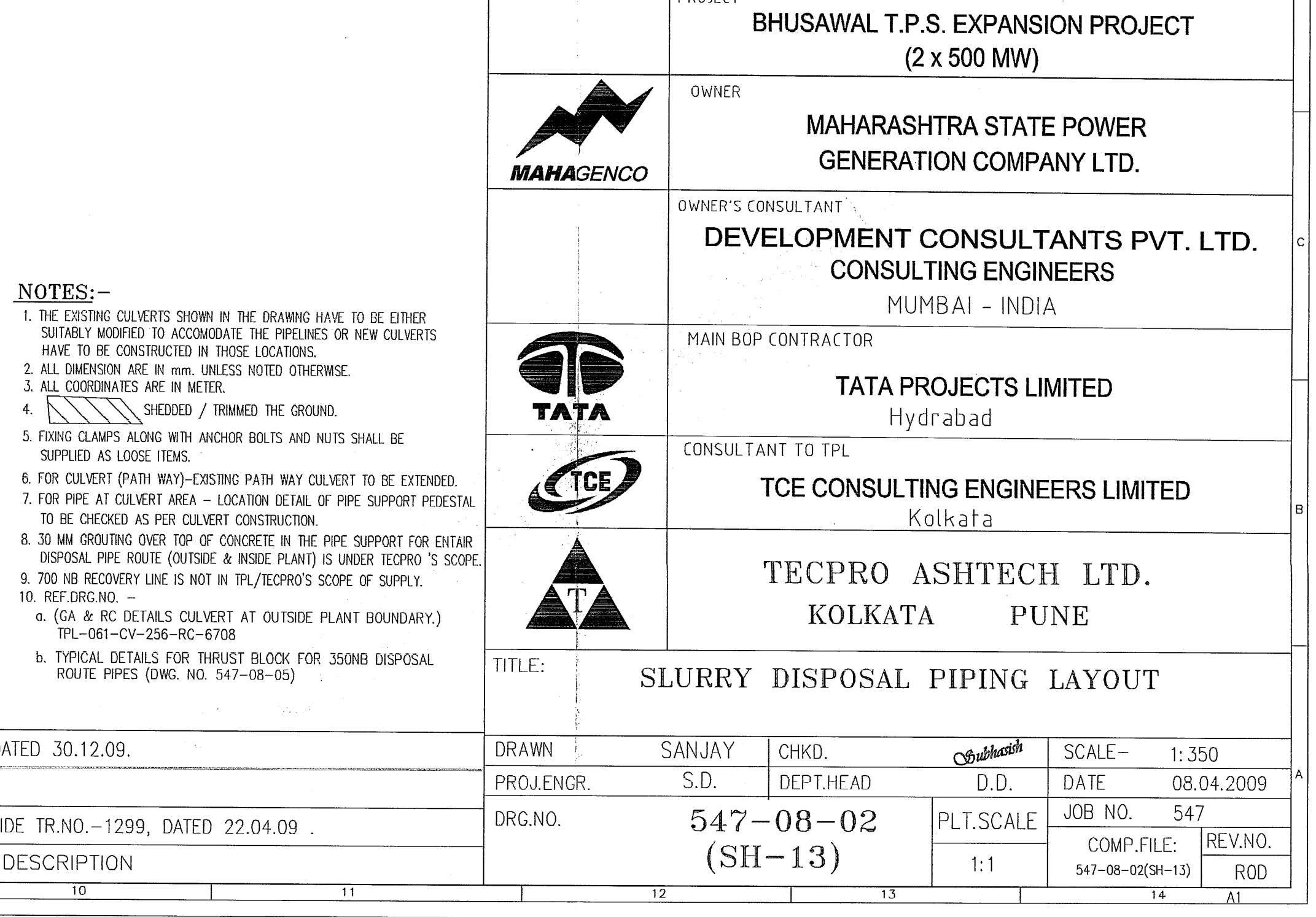
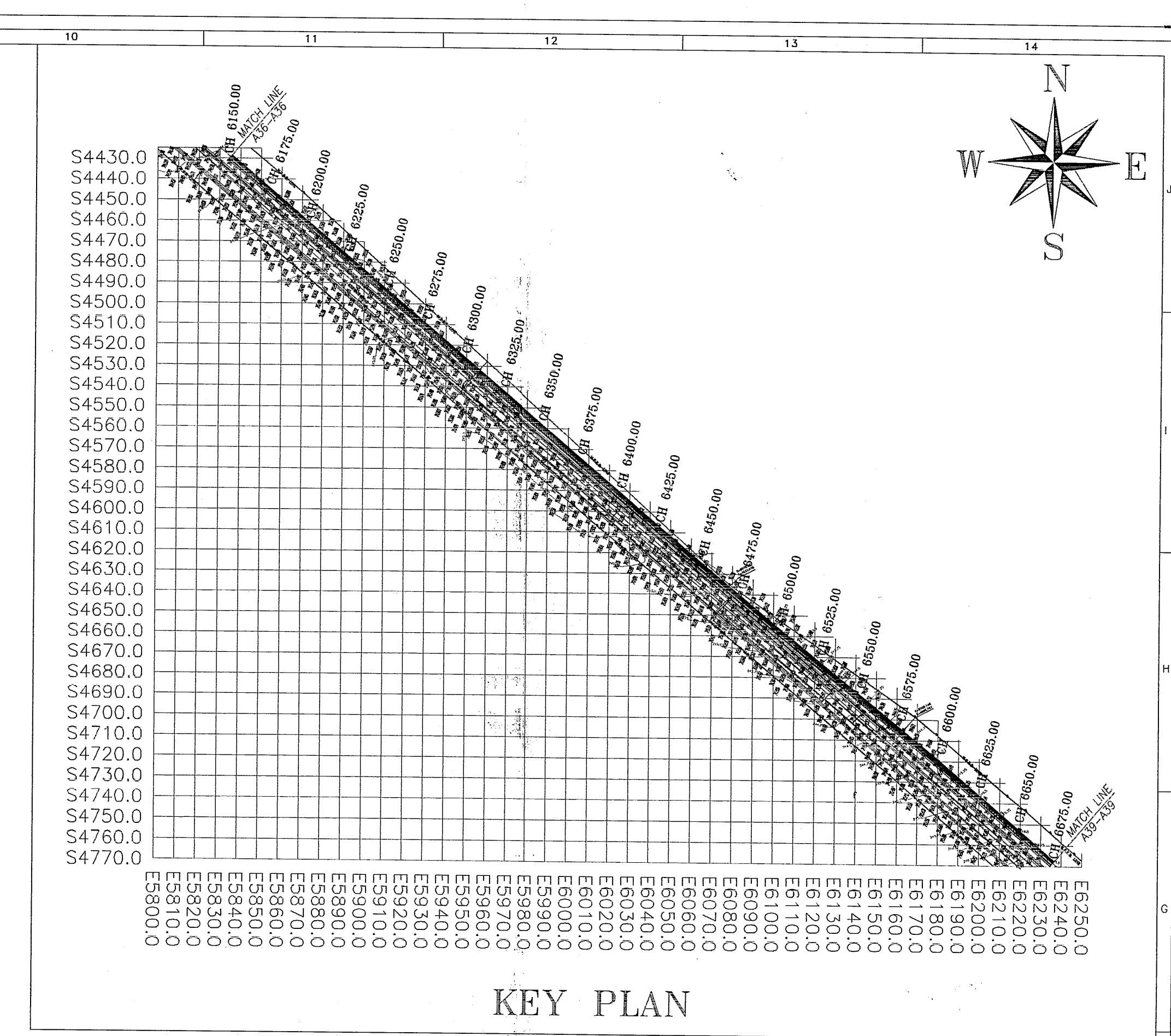
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	CORRIGENDUM - III		

Clause No.	Particulars	Details																				
	Details of the Equipment	Supercritical Steam Generator (SG)/Supercritical Steam Turbine (ST)/Generating Set (GS)																				
	Name of the Project with Unit capacity																					
	Name of the Owner																					
	Date of commissioning of the Unit																					
	Certificate issued by the owner	(indicate page nos. of the bid)																				
	Technology Transfer Agreement	(Indicate page Nos. of the bid)																				
	Deed of Joint Undertaking in Original	(Indicate page Nos. of the bid)																				
4.3	Name of the entity responsible for engineering																					
	Name of the Project(s) with Unit capacity																					
	Name(s) of the Owner																					
	Date(s) of commissioning of the project(s)																					
	Certificate issued by the owner(s)	(indicate page nos. of the bid)																				
4.4	Average Annual Turnover of the bidder/Leader of Consortium	<table border="1"> <thead> <tr> <th>Sr. No.</th> <th>Year</th> <th>Turnover INR Millions)</th> <th>P/L attached at (page No.)</th> </tr> </thead> <tbody> <tr><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td></tr> </tbody> </table>	Sr. No.	Year	Turnover INR Millions)	P/L attached at (page No.)																
Sr. No.	Year	Turnover INR Millions)	P/L attached at (page No.)																			
4.5	Net worth as on end of preceding financial year	INR _____ Million as on _____ Audited Balance Sheet attached at (indicate page Nos. of the bid)																				

Signature: _____
 Name: _____
 Designation: _____
 Seal of the Company: _____

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	CORRIGENDUM - I	

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REVNO	DATE	DRN.	CHKD.	DESCRIPTION
R0D	09.03.10	SANJAY	<i>Subhash</i>	REVISED AS PER DCPL COMMENTS DATED 30.12.09
R0C	23.09.09	P.D	<i>Subhash</i>	REVISED AS PER DCPL COMMENTS
R0B	04.05.09	<i>Asif</i>	<i>Subhash</i>	REVISED AS PER DCPL COMMENTS VIDE TR.NO.-129



**MAHARASHTRA STATE POWER
GENERATION CO. LTD.**

**PROJECTS & PLANNING
DEPARTMENT**

BID SPECIFICATION NO.: DG/BSL U-6/2011/T-1

CORRIGENDUM - X

 MAHAGENCO Maharashtra State Power Generation Co. Ltd.	MAHARASHTRA STATE POWER GENERATION CO. LTD.			Page 2 of 60
	BID SPECIFICATION NO.:DG/BSL U-6/2011/T-1			
	CORRIGENDUM - X			
<u>CONTENTS</u>				
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 MAHAGENCO Maharashtra State Power Generation Co. Ltd.		MAHARASHTRA STATE POWER GENERATION CO. LTD.			Page 4 of 60		
		BID SPECIFICATION NO.:DG/BSL U-6/2011/T-1					
		CORRIGENDUM - X					
Following Clauses of the Bid Specification are amended as under:							
Sr No	Section /Page No/Cl No.	Existing Particulars of Bid Stipulation including amendment/corrigendum thereof			To be read as		
1	Section 1,Page 35/ Cl. No.15.1 .1	The ~~bidder at his option can offer the bid price in three currencies out of which one~~ shall be <u>in</u> Indian Rupee (INR) <u>only</u> . ~~and remaining two can be out of US Dollar (USD), Sterling Pound (GBP), Euro (EUR), and Japanese Yen (JPY).~~			The bidder, at his option, can offer the bid price in three currencies out of which one shall be Indian Rupee (INR) and remaining two can be out of US Dollar (USD), Sterling Pound (GBP), Euro (EUR) and Japanese Yen (JPY).		
2	Section 1,Page 36/ Cl. No.15.2 .1	i) Price for Supply Equipment/ materials manufactured in India (shall also include the ~~foreign~~ currency portion towards imported raw material, if any) ii) Price for Supply of Mandatory Spares manufactured in India (shall also include the ~~foreign~~ currency portion towards imported raw material, if any)			i) Price for Supply Equipment/ materials manufactured in India (shall also include the foreign currency portion towards imported raw material, if any) ii) Price for Supply of Mandatory Spares manufactured in India (shall also include the foreign currency portion towards imported raw material, if any)		
3	Section 1,Page 40/ Cl. No. 19.1	Sr No	Variation Factor	Loading for evaluation of shortfall in performance	Sr No	Variation Factor	Loading for evaluation of shortfall in performance
		1.	Duration offered (considering the lowest as base) for completion of the Project as envisaged under Clause No. 30.1, Section-2 of the Bid Specification	INR 3,600,000/- (INR Three Million Sixty Thousand Only)	1.	Duration offered (considering the lowest as base) for completion of the Project as envisaged under Clause No. 30.1, Section-2 of the Bid Specification	INR 3,600,000/- (INR Three Million Six Hundred Thousand Only)
4	Section 1, Page 53/Cl. 31.5	For the purpose of evaluation of the bids the prices shall be converted to INR. The exchange rate applicable for this purpose shall be the Bills Selling Rate declared by State Bank of India (SBI) as on the record date (or next working day if the record date is a holiday for SBI			For the purpose of evaluation of the bids the prices shall be converted to Indian Rupees. The foreign currency component quoted by the bidder in the cash flow statement as per Schedule-1A shall be converted in Indian Rupee as per the rate of Indian Rupee in Future contract rates quoted by SBI on Record Date for the 1 st day of the particular month of		

CONSULTANT : PROCON ENGINEERS

 MAHAGENCO Maharashtra State Power Generation Co. Ltd.		MAHARASHTRA STATE POWER GENERATION CO. LTD.		Page 5 of 60
		BID SPECIFICATION NO.:DG/BSL U-6/2011/T-1		
		CORRIGENDUM - X		
Sr No	Section /Page No/Cl No.	Existing Particulars of Bid Stipulation including amendment/corrigendum thereof	To be read as	
			Cash FLOW. For the purpose of this clause, the next day of scheduled expiry of validity of the bids shall be considered as the 'Zero Date'.	
5	Section 1,Page 60/Cl. No. 37.3	Commissioning Spares: To cater for any exigency arising during initial trial and initial operation stages upto the satisfactory completion of Trial Operation due to infant mortality of items / components / consumable hardware, the bidder at his own cost shall arrange and maintain an inventory of such items so as not to have any major interruptions during the period from initial trial to Trial Operation.	Commissioning Spares: To cater for any exigency arising during initial trial and initial operation stages upto the satisfactory completion of ~~Trial-Operation~~ <u>Performance Guarantee Test</u> due to infant mortality of items / components / consumable hardware, the bidder at his own cost shall arrange and maintain an inventory of such items so as not to have any major interruptions during the period from initial trial to ~~Trial-Operation~~ <u>end of Performance Guarantee Test</u> .	
6	Section 1,Page 70/Annexure I(B)/ Cl. No.1.0	Bid Price: In continuation with our Bid Proposal No. _____ dated _____, we hereby offer to perform the subject work as offered by us vide our bid proposal which for the sum (bid Price) of: INR _____ (in words INR) And ~~_____ ¹Foreign Currency 1 (in _____ words)~~ And ~~_____ ¹Foreign Currency 2 (in _____ words)~~ or such sums which may be determined in terms of the contract, if awarded. The detailed breakup of our	Bid Price: In continuation with our Bid Proposal No. _____ dated _____, we hereby offer to perform the subject work as offered by us vide our bid proposal which for the sum (bid Price) of: INR _____ (in words INR) And ~~_____ ²Foreign Currency 1 (in words _____)~~ And ~~_____ ¹Foreign Currency 2 (in words _____)~~ or such sums which may be determined in terms of the contract, if awarded. The detailed breakup of our bid price is enclosed as Schedule - 1 attached hereto- - - - -	
55560_____				
¹ Please name the foreign currencies				
² Please name the foreign currencies				

CONSULTANT : PROCON ENGINEERS

 MAHAGENCO Maharashtra State Power Generation Co. Ltd.		MAHARASHTRA STATE POWER GENERATION CO. LTD.		Page 6 of 60
		BID SPECIFICATION NO.:DG/BSL U-6/2011/T-1		
		CORRIGENDUM - X		
Sr No	Section /Page No/CI No.	Existing Particulars of Bid Stipulation including amendment/corrigendum thereof	To be read as	
		bid price is enclosed as Schedule - 1 attached hereto- - -		
7	Section-I, Page 88-89, Annexure-V(A),	10. Any dispute that may arise between the Owner and the Indian executants in connection with this Deed of Joint Undertaking shall be finally settled as per the arbitration procedure / rules mentioned in the Contract documents. Any dispute that may arise between the Owner and the Parent Manufacturer, *the parent manufacturer - GS in connection with this Deed of Joint Undertaking shall be finally settled by reference to arbitration in accordance with the United Nations Commission Trade Law (UNCITRAL) Arbitration Rules of 1976. The Arbitral Tribunal shall consist of three members and shall be appointed in accordance with the said Rules. The appointing authority for the Third Arbitrator shall be the President, International Chamber of Commerce, Paris. The language to be used in arbitral proceedings shall be English. The place of arbitration shall be Singapore. The award made in such arbitration shall be final and binding and shall be enforceable in any court of competent jurisdictions.	10. Any dispute that may arise between the Owner and the Indian executants in connection with this Deed of Joint Undertaking shall be finally settled as per the arbitration procedure / rules mentioned in the Contract documents. Any dispute that may arise between the Owner and the Parent Manufacturer, *the parent manufacturer - GS in connection with this Deed of Joint Undertaking shall be finally settled by reference to arbitration in accordance with the United Nations Commission Trade Law (UNCITRAL) Arbitration Rules of 1976. The Arbitral Tribunal shall consist of three members and shall be appointed in accordance with the said Rules. The appointing authority for the Third Arbitrator shall be the President, International Chamber of Commerce, Paris. The language to be used in arbitral proceedings shall be English. The ~~place~~ <u>venue</u> of arbitration shall be Singapore. The award made in such arbitration shall be final and binding and shall be enforceable in any court of competent jurisdictions.	
8	Section 1, Schedule-8(B) Page 148	____We the Guarantor_____. The Bank undertakes not to revoke this Guarantee during its currency without previous consent of the Owner and further agrees that the Guarantee herein contained shall be enforceable till ninety six months after expiry of its validity. _____	____We the Guarantor_____. The Bank undertakes not to revoke this Guarantee during its currency without previous consent of the Owner and further agrees that the Guarantee herein contained shall be enforceable till ~~ninety~~ six months after expiry of its validity. _____	

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 MAHARASHTRA STATE POWER GENERATION CO. LTD. BID SPECIFICATION NO.:DG/BSL U-6/2011/T-1 CORRIGENDUM - X		Page 7 of 60	
Sr No	Section /Page No/CI No.	Existing Particulars of Bid Stipulation including amendment/corrigendum thereof	To be read as
9	Section-1, Schedule-8(B), Page 149	— — — The bank also agrees that the validity of the Bank Guarantee shall be extended by further period of six months one month before its prevailing date of its validity upon receipt of the demand from the owner to do so without referring the matter to the Parent Manufacturer/the Indian Promoter of Indian Subsidiary Company/JV Company/Collaborator/Indian Subcritical Equipment Manufacturer. The bank further agrees that bank's inability to extend the validity of the bank guarantee as above shall be sufficient ground for encashment of the same by the owner.	— — — The bank also agrees that the validity of the Bank Guarantee shall be extended by further period of six months one month before its prevailing date of its validity upon receipt of the demand from the owner to do so ~~without referring the matter to the Parent Manufacturer/the Indian Promoter of Indian Subsidiary Company/JV Company/Collaborator/Indian Subcritical Equipment Manufacturer.~~ The bank further agrees that bank's inability to extend the validity of the bank guarantee as above shall be sufficient ground for encashment of the same by the Owner.
10	Section 2, Page 181/ Cl. No. 18.2	All costs, damages or expenses that the owner may have incurred, for which under the contract the contractor is liable, shall be recovered by the owner as and when they are incurred from the contractor's bills becoming due under this contract or any other contract. Such recoveries shall be supported by appropriate documents or explanations, to enable the contractor to properly identify such claims. These amounts may be recovered by actions of law or otherwise, if the contractor fails to satisfy the owner of such claims.	All costs, damages or expenses that the owner may have incurred, for which under the contract the contractor is liable, shall be recovered by the owner as and when they are incurred from the contractor's bills becoming due under this contract or any other contract <u>awarded by the Owner to the Contractor.</u> Such recoveries shall be supported by appropriate documents or explanations, to enable the contractor to properly identify such claims. These amounts may be recovered by actions of law or otherwise, if the contractor fails to satisfy the owner of such claims.
11	Section 2, Page 192/ Cl. No. 30.4	Notwithstanding anything contained hereinabove, the aggregate liability of the contractor towards payment of Liquidated Damages stipulated under Clause Nos. 30.1 and 30.2 above shall not exceed 25% of the contract price. For the purpose of this clause No. 30.0, the contract price shall mean the total	Notwithstanding anything contained hereinabove, the aggregate liability of the contractor towards payment of Liquidated Damages stipulated under Clause Nos. 30.1 and 30.2 above shall not exceed 15% and 10% of the contract price respectively. For the purpose of this clause No. 30.0, the contract price shall mean the total contract price as per

CONSULTANT : PROCON ENGINEERS

 MAHARASHTRA STATE POWER GENERATION CO. LTD. BID SPECIFICATION NO.:DG/BSL U-6/2011/T-1 CORRIGENDUM - X		Page 8 of 60	
Sr No	Section /Page No/Cl No.	Existing Particulars of Bid Stipulation including amendment/corrigendum thereof	To be read as
		contract price as per Price Schedule (Schedule - 1) of this contract (excluding price of mandatory spares) along with applicable price variation excluding the amount of taxes & duties.	Price Schedule (Schedule - 1) of this contract (excluding price of mandatory spares) along with applicable price variation excluding the amount of taxes & duties.
12	Section 2,Page 196/ Cl. No. 37.4	The fuel (Coal & Fuel Oil i.e. HFO, LDO), for test/commissioning and PG Test shall be provided by the Owner. Moreover, for the Purpose of commissioning and Guarantee Tests, the Owner shall provide operating personnel for operation of the equipment. Such personnel provided by the Owner shall work under the supervision of the Contractor till the Plant is taken over by the Owner as per Clause No. 41.0 hereunder.	The fuel (Coal & Fuel Oil i.e. HFO, LDO), Electricity and Auxiliary Steam for initial & trial operation, test/commissioning and PG Test shall be provided by the Owner. Moreover, for the Purpose of commissioning and Guarantee Tests, the Owner shall provide operating personnel for operation of the equipment. Such personnel provided by the Owner shall work under the supervision of the Contractor till the Plant is taken over by the Owner as per Clause No. 41.0 hereunder.
13	Section 2,Page 203/ Cl. No.44.1 .4	Provisions of Clause No. 42.0, Defect Liability Period shall be applicable for all the spares covered under this contract except for the Three Years O&M (Recommended) Spares and Commissioning Spares. Three Years O&M (Recommended) Spares, if covered under this contract shall have guarantee of 12 months from the date of putting in use or 18 months from the date of receipt at site whichever is earlier.	Provisions of Clause No. 42.0, Defect Liability Period shall be applicable for all the spares covered under this contract except for the Three Years O&M (Recommended) Spares and Commissioning Spares. Three Years O&M (Recommended) Spares, if covered under this contract shall have guarantee of 12 months from the date of putting in use or 18 months from the date of receipt at site whichever is earlier. <u>However, If any spares (except for 3years O&M Spares) are delivered at site beyond the date of completion of PG Test/Taking over of the unit, the Defect Liability Period for such spares shall be 12 months from the date of putting in use or 18 months from the date of receipt at site, whichever is earlier.</u>
14	Section 2A,Page 227/ Cl.	In the event the inspection is not be carried out on the date confirmed as per Clause No. 3.2.3 above and inspection call is required to be	In the event the inspection is not be carried out on the date confirmed as per Clause No. 3.2.3 above and inspection call is required to be cancelled <u>for the reasons attributable to the</u>

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 MAHAGENCO Maharashtra State Power Generation Co. Ltd.		MAHARASHTRA STATE POWER GENERATION CO. LTD.		Page 9 of 60
		BID SPECIFICATION NO.:DG/BSL U-6/2011/T-1		
		CORRIGENDUM - X		
Sr No	Section /Page No/Cl No.	Existing Particulars of Bid Stipulation including amendment/corrigendum thereof	To be read as	
	No. 3.2.5	cancelled, all the costs of deputing owner's representative /IIA shall be recovered from the contractor's invoices.	<u>Contractor/his Sub-contractor/Vendor</u> , all the costs of deputing owner's representative /IIA shall be recovered from the contractor's invoices.	
15	Section 2A,Page 229/Cl. No. 4.3	Only on approval of these test results by the Controller of Quality and the despatch clearance thereafter by the Project Manager, the material shall be despatched to site. The despatch clearance shall be notified by way of e-mail/fax/letters as may be mutually agreed during execution of the contract.	<u>The approval of Test Reports shall be generally granted within 10 working days from the date of receipt of documents complete in all respects by Controller of the Quality.</u> Only on approval of these test results by the Controller of Quality and the despatch clearance thereafter by the Project Manager, the material shall be despatched to site. The despatch clearance shall be notified by way of e-mail/fax/letters as may be mutually agreed during execution of the contract.	
16	Section 2A,Page 232/Cl. No. 8.3.3	The owner shall issue 'C' form in accordance with the statutory provisions in this regard.	The owner shall issue 'C' form for all the interstate supplies (including cement & steel) made against the contract in accordance with the statutory provisions in this regard.	
17	Section 2A,Page 232/Cl. No. 8.4.2	The owner shall issue form/certificate for concessional rate of tax, as may be applicable as per the prevailing rules in this regard and contractor shall charge the tax accordingly	The owner shall issue form/certificate for concessional rate of tax, as may be applicable as per the prevailing rules in this regard and contractor shall charge the tax accordingly. <u>Currently, MVAT applicable on supplies to the Owner is @5%. The Contractor shall charge the MVAT accordingly.</u>	
18	Section 2A,Page 234/Cl. No. 9.1	If the rates of taxes & duties as stipulated under Clause No. 8.1 to 8.5 above are increased by the respective statutory authorities OR If any tax(es) or duty(ies) are introduced by the Indian Central or State Govt. or Local body with effect from the next day of record date, such changes shall amount to statutory variation. If the contractor/Sub-Contractor, as the case may be, is required to pay any amount	If the rates of taxes & duties as stipulated under Clause No. 8.1 to 8.5 above are increased by the respective statutory authorities <u>OR the concession available as on Record Date are withdrawn by the respective statutory authority</u> OR If any tax(es) or duty(ies) are introduced by the Indian Central or State Govt. or Local body with effect from the next day of record date, such changes shall amount to statutory variation. If the contractor/Sub-Contractor, as the case may	

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		towards such statutory variation against the supplies made against this contract and if CENVAT Credit/set off, as the case may be towards the payment of the same is not available to the contractor, the owner shall reimburse the contractor payments of such statutory variation against documentary evidence. However, statutory variation as above shall be paid/reimbursed against the supplies made during the contractual completion period only. The contractor shall have to bear payments against such statutory variation on supplies beyond contractual completion period.	be, is required to pay any amount towards such statutory variation against the supplies made against this contract and if CENVAT Credit/set off, as the case may be towards the payment of the same is not available to the contractor, the owner shall reimburse the contractor payments of such statutory variation against documentary evidence. However, statutory variation as above shall be paid/reimbursed against the supplies made during the contractual completion period only. The contractor shall have to bear payments against such statutory variation on supplies beyond contractual completion period.
19	Section 2A,Page 239/Cl. No. 12.2.5	The advance paid as above shall be interest free up to the scheduled date of completion of trial operation of the unit as per the approved project schedule. The advance shall be adjusted against the supplies made by the contractor on prorata basis and shall be determined by the value goods delivered by the contractor in against the contract irrespective of the fact whether payment against such supplies are made by the owner or otherwise. However, the contractor may seek accelerated/ one time adjustment of the advance before the scheduled date of completion of trial operation of the unit as per the approved project schedule.	The advance paid as above shall be interest free up to the <u>Scheduled date of Taking over of the Unit</u> ~~scheduled date of completion of trial operation of the unit~~ as per the approved project schedule. The advance shall be adjusted against the supplies made by the contractor on prorata basis and shall be determined by the value goods delivered by the contractor in against the contract irrespective of the fact whether payment against such supplies are made by the Owner or otherwise. However, the contractor may seek accelerated/ one time adjustment of the advance on or before the <u>Scheduled date of Taking over of the Unit</u> ~~scheduled date of completion of trial operation of the unit~~ as per the approved project schedule.
20	Section 2A,Page 239/Cl. No. 12.2.6	For the unrecovered advance, if any, beyond the scheduled date of completion of trial operation of the unit as per the approved project schedule, interest at the rate of whichever is higher of i) one percent higher than the rate of borrowing by	For the unrecovered advance, if any, beyond <u>Scheduled date of Taking over of the Unit</u> ~~the scheduled date of completion of trial operation of the unit~~ as per the approved project schedule, interest at the rate of whichever is higher of i) one percent higher than the rate of borrowing by the owner for

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		the owner for this project or ii) the prevailing Retail Prime Lending Rate (RPLR) of State Bank of India shall be levied.	this project or ii) the prevailing Retail Prime Lending Rate (RPLR) of State Bank of India shall be levied.	
21	Section 2A, Page 242, Cl. No. 12.10	In case of payments in foreign currency, if the supply of the goods is delayed with respect to the scheduled date of work completion as per the project schedule, then the currency amount claimed by the contractor for the delayed supplies shall be restricted to the equivalent Indian Rupees prevailing as on the scheduled date of work completion as per the project schedule or actual date of supply of the equipments whichever is less and shall be paid in currency equivalent to the Indian Rupees worked out as above. For this purpose the Bill Selling Exchange rate by State Bank of India prevailing as on Supply cut off date and actual date of supply of the equipment shall be considered.	In case of payments in foreign currency, if the supply of the goods is delayed with respect to the scheduled date of work completion as per the project schedule, then the foreign currency amount claimed by the contractor for the delayed supplies shall be restricted to the equivalent Indian Rupees prevailing as on the scheduled date of work completion as per the project schedule or actual date of supply of the equipment whichever is less and shall be paid in foreign currency equivalent to the Indian Rupees worked out as above. For this purpose the Bill Selling Exchange rate by State Bank of India prevailing as on scheduled date of Supply and actual date of supply of the equipment shall be considered.	
22	Section 2A, Page 242, Cl. No. 12.11.3	New Clause	As per the provisions of Building & Other Construction Workers Act-1996, BOCW cess @1% of contract price shall be deducted from the invoices of the contractor and deposited to the concerned authorities. Any increase or decrease in the rate from the next day to the Record Date shall accrue to the Owner.	
23	Section 2A, /Cl. No. 12.12	New Clause	In case the Contract is awarded to the Consortium, the payments shall be made as provided in the Consortium Agreement appended to the contract.	
24	Section 2B,Page 268/Cl.	The filed activities of the contractors working at site will be coordinated by the Engineer and the Engineer's	The filed field activities of the contractors working at site will be coordinated by the Engineer and the Engineer's decision shall be	

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	No. 22.1	decision shall be final in resolving any disputes or conflicts between the Contractor and other contractors and tradesmen of the Owner regarding scheduling and co-ordination of work. Such decision by the Engineer shall not be a cause for extra compensation or extension of time for the Contractor.	final in resolving any disputes or conflicts between the Contractor and other contractors and tradesmen of the Owner regarding scheduling and co-ordination of work. Such decision by the Engineer shall not be a cause for extra compensation ~~or extension of time~~ for the Contractor.	
25	Section 2B,Page 271/Cl. No. 27.2.3	The advance paid as above shall be interest free up to the scheduled date of completion of trial operation of the unit as per the approved project schedule. The advance shall be adjusted against the supplies made by the contractor on prorata basis and shall be determined by the value goods delivered by the contractor in against the contract irrespective of the fact whether payment against such supplies are made by the owner or otherwise. However, the contractor may seek accelerated/onetime adjustment of the advance before the scheduled date of completion of trial operation of the unit as per the approved project schedule.	The advance paid as above shall be interest free up to the <u>Scheduled date of Taking over of the Unit</u> ~~scheduled date of completion of trial operation of the unit~~ as per the approved project schedule. The advance shall be adjusted against the supplies made by the contractor on prorata basis and shall be determined by the value goods delivered by the contractor in against the contract irrespective of the fact whether payment against such supplies are made by the owner or otherwise. However, the contractor may seek accelerated/onetime adjustment of the advance <u>on or before Scheduled date of Taking over of the Unit</u> ~~the scheduled date of completion of trial operation of the unit~~ as per the approved project schedule.	
26	Section 2B, Page 273, Cl. No. 27.7	In case of payments in foreign currency, if any, if the activity is delayed with respect to the scheduled date of work completion as per the project schedule, then the currency amount claimed by the contractor for the delayed supplies shall be restricted to the equivalent Indian Rupees prevailing as on the scheduled date of work completion as per the project schedule or actual date of activity completion whichever is less and shall be paid in currency equivalent to the Indian Rupees worked out as above.	In case of payments in foreign currency, if any, if the activity is delayed with respect to the scheduled date of work completion as per the project schedule, then the ~~foreign~~ currency amount claimed by the contractor for the delayed ~~works~~ shall be restricted to the equivalent Indian Rupees prevailing as on the scheduled date of work completion as per the project schedule or actual date of activity completion whichever is less and shall be paid in ~~foreign~~ currency equivalent to the Indian Rupees worked out as above. For this purpose the Bill Selling Exchange rate by State Bank of India prevailing as on <u>scheduled completion</u>	

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		For this purpose the Bill Selling Exchange rate by State Bank of India prevailing as on Supply cut off date and actual date of supply of the equipment shall be considered.	~~date of activity~~ ~~Supply cut off date~~ and actual date of ~~supply~~ <u>work completion of</u> the equipment shall be considered.	
27	Section 2B, Page 274, Cl. No. 27.8.3	New Clause	As per the provisions of Building & Other Construction Workers Act-1996, BOCW cess @1% of contract price shall be deducted from the invoices of the contractor and deposited to the concerned authorities. Any increase or decrease in the rate from the next day to the Record Date shall accrue to the Owner.	
28	Section 2B, Cl. No.27.9	New Clause	In case the Contract is awarded to the Consortium, the payments shall be made as provided in the Consortium Agreement appended to the contract.	
29	Section 2C,Page 296, 297/Cl. No. 17.0	Power to Order Variation: 17.1 The Owner’s Engineer shall make any variation of the form, quality and/or quantity of the works or any part thereof that may in his opinion be necessary and for that purpose or if for any other reason it shall in his opinion be desirable shall have power to order the contractor to do and the contractor shall do any of such variations/alteration/ modification and no such variation shall in any way vitiate or invalidate the contract but the value (if any) of all such variations shall be taken into account in ascertaining the amount of the contract price at the time of completion.	<u>Deleted</u>	

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30	Section 2C,Page 297, 297/Cl. No. 18.0	Variation to be Carried Out on Written Order: 18.1 No variation shall be made by the contractor without an order in writing by the Officer not below the rank of Executive Engineer (Civil) as per approved execution drawings.	<u>Deleted</u>
31	Section 2C,Page 298/Cl. No. 19.0 (F)	Suspension of Works: a. The Owner reserves the right to suspend and reinstate execution of the whole or any part of the works without invalidating the provisions of the contract. Orders for suspension or reinstatement of the works shall be issued by the Engineer to the Contractor in writing. The time for completion of the works shall be extended for a period equal to duration of the suspension. b. Any necessary and demonstrable costs incurred by the Contractor as a result of such suspension of the works shall be paid by the Owner, provided such costs are substantiated to the satisfaction of the Engineer. c. The Owner, however, shall not be responsible for any liabilities if suspension or delay is due to some default on the part of the contractor or his subcontractor or any agencies outside the control of the Owner.	<u>Deleted</u>

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32	Section 2C,Page 304/Cl. No. 33.0	Rates of Extra Item: 33.1 Rates for Extra Item of Works: i) The rates for any items of works required to be executed under this contract and considered essential for completion of the work but not included in the contract shall be derived from prevailing Schedule of Rates of PWD. For the items, which are not available in the PWD Schedule of Rates, the rates for such items shall be derived as under and shall include. a) Cost of materials procured by contractor to the extent actually incorporated in the works including permissible wastage if any, subject however to maximum of 5% of the quantities actually incorporated in the works and including all actual expenses towards handling , transport, taxes and Octroi up to site of work. b) Actual cost of labour excluding any type of supervision. c) 15% of (a) and 25% of (b) above to cover tools and plants, supervision, overheads contingencies and profit. ii) If any equipment is specifically required to be hired for	<u>Deleted</u>	

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		execution of work under extra item, the hire charges (inclusive of fuel cost or exclusive as the case may be) would be considered for the purpose of assessment of extra item. Similarly the transport charges as involved in the extra item of work would also be considered. iii) <u>The contractor shall be bound to execute all extra items of work which are interpreted by the Dy. Chief Engineer / Superintending Engineer</u> - in charge of work as contingent to the works included under the scope of the contract. In case of any dispute regarding interpretation, rates etc., the decision of the Chief Engineer would be final and binding on the contractor. However, the total cost of extra items may not exceed 20% of the contract value.					
33	Section 3,Page 324/Cl. No. 6.3	1.	Heat Rate: increase in gross turbine cycle heat rate in kCal/kWh under rated steam condition at 76 mm of Hg (back pressure) with zero makeup at 100% unit load at generator terminals with respect to guaranteed heat rate at per Schedule 7.	INR 60,000,000/- (INR Sixty Millions only) per kCal/kWh	1	Heat rate : Increase in weighted average turbine Heat rate in kCal/kWh (refer clause no. 1.2.3 , section 8 , Volume 2) as compared to the guaranteed weighted average Heat Rate	INR 60,000,000/- (INR Sixty Millions only) per kCal/kWh

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34	Section 3,Page 325/Cl. No. 6.3	3.	Auxiliary Power Consumption: Total auxiliary power consumption of all auxiliaries (as listed below) at 660 MW load with Zero make up, 76mm of Hg back pressure and 100% unit load with respect to the guaranteed Auxiliary Consumption as per Schedule – 7.	INR 450,000/- (INR Four Hundred Fifty Thousand Only) per kWh	3.	Auxiliary Power Consumption: Total auxiliary power consumption of all auxiliaries (as listed below) at 660 MW load with Zero make up, 76mm of Hg(a) or lower guaranteed/design condenser back pressure and 100% unit load with respect to the guaranteed Auxiliary Consumption as per Schedule – 7.

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Following Annexure shall be added to the Bid Specification, which shall be applicable to the Collaborator – SG and Indian Manufacturer - SG

Annexure – V (B) 1

Form for Deed of Joint Undertaking

[To be executed by the collaborator of the Equipment and the Indian Manufacturer of the equipment on Non-Judicial Stamp Paper of INR 200/- [(refer Clause No. 4.2.4, Section – I, Volume – I of the bid specification)]

DEED OF JOINT UNDERTAKING

The DEED OF JOINT UNDERTAKING executed this _____day of _____Two thousand _____ by:

M/s. _____, a company incorporated under the provisions of _____ act of _____(country)_____ having its Registered Office at _____ (hereinafter referred to and called as the “the Collaborator SG”, which expression shall include its successors, administrators, executors and permitted assigns).

And

M/s. _____, a company incorporated under the provisions of Indian Company’s Act 1956 having its registered office at _____ (hereinafter referred to and called as “the Indian Manufacturer SG”, which expression shall include its successors, administrators, executors and permitted assigns) or “the Contractor”.

in favour of Maharashtra State Power Generation Company Ltd., a Government of Maharashtra Enterprise incorporated under the Provisions of Indian Companies Act, 1956, having its Registered Office at 2nd Floor, Prakashgad, Prof. Anant Kanekar Marg, Bandra (East), Mumbai - 400 051, INDIA (hereinafter referred to as either “MAHAGENCO” or “ the Owner” which expression include its successors, administrators, executors and assigns).

WHEREAS, the owner has invited Bids for design, engineering, manufacture, supply, transportation to site, installation, testing, commissioning and conductance of guarantee tests for the Power Plant comprising of Supercritical Steam Generator including its all Auxiliaries (SG), Supercritical Steam Turbine including its all Auxiliaries (ST) & Generator Set including its all Auxiliaries (GS), Balance of the Plant Equipment and Civil Works for its Bhusawal Thermal Power Station 1x660 MW Unit - 6 Project (hereinafter referred to as “Plant”) against its Bid Specification No. : DG/BSL U-6/2011/T-1 vide its Invitation of Bids No. _____ dated _____.

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AND WHEREAS Clause 4.2.4, Section – 1, Volume – I of the bid specification stipulates that the Indian manufacturer of sub-critical equipment who meets the experience criteria stipulated therein can be considered as the Qualified Manufacturer of Supercritical Steam Generator including its all Auxiliaries (SG) provided he has a valid ongoing collaboration and technology transfer agreement including license to manufacture and supply of Supercritical Steam Generator including its all Auxiliaries (SG) covering the type, size and rating specified with a manufacturer of the respective equipment (the collaborator SG) who satisfies the experience criterion stipulated under Clause No. 4.2.1 and furnishes a Deed of Joint Undertaking executed by the Indian Manufacturer SG and the collaborator SG.

AND WHEREAS against Owner's aforesaid Invitation for Bids (IFB), M/s. _____ (the bidder) has submitted the bid proposal in consortium with M/s. _____ and M/s. _____ which includes supply of Supercritical Steam Generator including its all Auxiliaries (SG) covering the type, size and rating specified manufactured at the works of the Collaborator SG, the Indian Manufacturer SG and their sub-vendors as per the drawings, specifications, Quality plans etc. approved by the collaborator SG.

AND WHEREAS the Indian Manufacturer SG satisfies the experience criterion stipulated under Clause No. 4.2.4 Section – I, volume – I of the bid specification for Steam Generator and has a valid ongoing collaboration and technology transfer agreement including license to manufacture and supply supercritical Steam Generator covering the type, size and rating specified with the Collaborator SG who satisfies the experience criterion stipulated under Clause 4.2.1, Section – I, volume – I of the bid specification

AND WHEREAS the Indian Manufacturer SG and the Collaborator SG are required to jointly execute and furnish along with the bid an irrevocable Deed of Joint Undertaking and be jointly and severally responsible and bound unto the Owner for the successful performance of the equipment fully meeting the stipulated technical requirements, and Guaranteed parameters and characteristics as per bid specification, in the event, the Bid is accepted by the Owner resulting into a Contract/Contracts.

AND FURTHER WHEREAS the Indian Manufacturer SG and the Collaborator SG are required to jointly execute and furnish along with the bid an irrevocable Deed of Joint Undertaking and be jointly and severally responsible and bound unto the Owner for the successful performance of the Contract with regard to implementation of the Phased Manufacturing Program and transfer of technology in accordance with the bid specification, in the event, the Bid is accepted by the Owner resulting into a Contract/Contracts.

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NOW THEREFORE, THIS DEED WITNESSETH AS UNDER:

1. That in consideration of the award of the Contract(s) by the Owner to the Contractor, we the Collaborator SG and the Indian Manufacturer SG do hereby declare and undertake that we shall be jointly and severally responsible to the Owner for the execution and successful performance of the equipment and achievements of all guaranteed parameters as specified under the said Contract(s) to the satisfaction for the Owner.
2. In case of any breach of the Contract(s) committed by the Contractor, we the ~~Indian Manufacturer SG and~~ Collaborator SG do hereby undertake, declare and confirm that we shall be fully responsible for the successful performance of complete equipment, including its satisfactory performance and achievement of all guaranteed parameters as specified in the Contract and undertake to carry out all obligations and responsibilities under this Deed of Joint Undertaking including the technical guarantees for the complete equipment in order to discharge the Contractor's obligations and responsibilities stipulated in the Contract. Further, if the Owner sustains any loss or damage on account of any breach of the Contract(s) related to the equipment, we the Indian Manufacturer SG and the Collaborator SG jointly and severally undertake to promptly indemnify and pay such losses/ damages caused to the Owner on its written demand without any demur, reservation, contest or protest in any manner whatsoever. Determination of losses/ damages shall be in line with provisions on Limitation of Liability of the said Contract(s).

The liability of the Collaborator SG hereunder shall, however, be limited to an amount calculated at the rate of 221 Million for each number of equipment to be supplied by the Contractor. This is without prejudice to any right of Owner against the Contractor under the Contract and all guarantees.

Without prejudice to the joint and several obligations of the Contractor and the Collaborator SG hereunder, the analysis/ investigations of the non-performance of the equipment manufactured by the Contractor may initially be carried out by the Contractor within a period of 15 days from the date of reference of the problem by the Owner, before the Owner approaches the Collaborator SG for any such analysis/ investigation. It shall not be necessary or obligatory for the Owner to first proceed against the Contractor before proceeding against the Collaborator SG (with respect to obligations and responsibilities of the collaborator covered under this Deed of Joint Undertaking). Nor any extension of time or any relaxation given by the Owner to the contractor shall prejudice any

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right of Owner under this Deed of Joint Undertaking to proceed against Indian Manufacturer SG and the Collaborator SG and the Contractor.

3 Without prejudice to the generality of the undertaking in para '1' above. The manner of achieving the objectives set forth in para '1' above shall be as follows:

a) We, the Collaborator SG shall be specifically responsible for complete engineering, preparation of all designs, design calculations, design documents / drawings and manufacturing drawings for all the equipment; selection of their auxiliaries and interfacing / integration of all equipment with their auxiliaries so as to ensure satisfactory, reliable, safe and trouble free performance of all equipment as well as the performance meeting all stipulated technical requirements as well as all guaranteed parameters specified in the Contract (s).

b) We, the Collaborator SG shall extend our quality surveillance / supervision / quality control to the Contractor during manufacture, erection, commissioning and performance testing, both at Contractor's works and / or at Owner's project site. Without prejudice to the overall responsibilities of the Collaborator SG for successful commissioning and performance of the equipment, the Collaborator SG shall depute their technical experts from time to time to the works of the Indian Manufacturer SG / Owner's project site, as mutually agreed upon between the owner and the Contractor in accordance with the stipulations of the Contract(s).

c) We, the Collaborator SG will supply equipment / components manufactured at our works or at our vendor's works as per requirements / schedule specified in the Contracts.

d) We, the Collaborator SG will be fully responsible for the quality of manufacture of all equipment / main assemblies / components for incorporation in the equipment. For the items to be manufactured by the Indian Manufacturer SG at his / or his vendor's works as per design of the Collaborator SG, the Collaborator SG shall ensure completeness and correctness of the design, data, document and information in every detail provided to the Indian Manufacturer SG which would result in the same quality of equipment as if manufactured at the works of the Collaborator SG and shall meet approval / acceptance of the Collaborator SG.

e) The Indian Manufacturer SG shall be responsible to manufacture portion of the equipment which are to be manufactured at its works or its vendor's works as per the design of the Collaborator SG and to the quality acceptance

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level of the Collaborator SG (to be finalized before Notification of Award). Further, the Indian Manufacturer SG shall erect, commission and carry out the guarantee tests of all the equipment in accordance with the advice, procedure and guidance of the Collaborator SG. In case, there is any need to modify the design / drawings / procedure in certain areas, the Indian Manufacturer SG shall seek specific approval of the Collaborator SG before proceeding further.

f) In the event any problem is encountered during design, manufacture, erection, testing and commissioning or if the Indian Manufacturer SG fails to demonstrate during the guarantee tests that the equipment meet the guaranteed parameters and demonstration parameters as specified in the contract, the Collaborator SG shall promptly provide all technical assistance / services / support to analyze and suggest corrective measures / modifications to the equipments / systems of all the equipment under the Contract(s) directly to the Owner and the Contractor/ Indian Manufacturer SG and the Collaborator SG shall promptly carry out all corrective measures and modifications (as suggested by the Collaborator SG and agreed by the Owner) for each of their respective equipment / systems supplied by them at their own expense. Thereafter, the Contractor/ Indian Manufacturer SG and the Collaborator SG shall demonstrate the successful performance of the equipment meeting the guaranteed parameters as stipulated under the contract.

4. We the Indian Manufacturer SG and the Collaborator SG do hereby declare and undertake that we shall be jointly and severally responsible to the Owner for the successful implementation of the Phased Manufacturing Program as specified in the said Contract(s).

5. We, the Indian Manufacturer SG and the Collaborator SG do jointly herby undertake, declare and confirm that we shall be fully responsible for indigenizing the manufacturing of supercritical Steam Generator sets in India in a phased manner in accordance with the Phased Manufacturing Program specified in the said Contract(s).

6. We, the Indian Manufacturer SG and the Collaborator SG do jointly hereby undertake, declare and confirm that we shall be fully responsible for ensuring that transfer of the technological know – how for equipment (of the type, size and rating specified in the Contract (s) in the form of complete transfer of design dossier, design software’s, drawings and documentation and quality system manuals is transferred to the Indian Manufacturer as per the Contract(s).

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7. We, the Indian Manufacturer SG and the Collaborator SG do further undertake, declare and confirm that we shall be fully responsible for imparting relevant training to the personnel of the Indian Manufacturer SG as part of the technology transfer agreement between the Indian Manufacturer and the Collaborator SG.

8. We, the Indian Manufacturer SG and the Collaborator SG do hereby undertake and confirm that this Deed of Joint Undertaking shall be initially valid till ninety (90) days beyond the schedule date of completion of the defect liability period of the all the equipment or completion of the Phased Manufacturing Program under the Contract (s), whichever occurs later. In case of delay in completion of the defect liability period under the contract(s) or delay in the completion of the Phased Manufacturing Program beyond the aforesaid period, the validity of this Deed of Joint Undertaking shall be extended by such period of delay. However, this Deed of Joint Undertaking shall terminate at the latest 27 months from the scheduled end of defect liability period of the unit of 660MW under the contract. We, the Indian Manufacturer SG and the Collaborator SG do further undertake and confirm that this Deed of Joint Undertaking shall be irrevocable and shall not be revoked till its validity. We further agree that this Deed of Joint Undertaking shall be without any prejudice to the various liabilities of the Contractor including contract performance security as well as other obligations of the Contractor in terms of the Contract(s).

9. In case of award, in addition to the Contract Performance Securities to be furnished by the Contractor, the Indian Manufacturer and the Collaborator SG shall furnish as security on demand Performance Bank Guarantee(s) in favour of the Owner as per provision of the bid specification for each of the contract(s) awarded to the Bidder/Contractor. The value of each such Bank Guarantee shall be equal to one-half percent (0.5%) of the total Contract Price of the Contract(s) (an equivalent absolute amount to be specified at the time of award of Contract) and it shall be guarantee towards the faithful performance/compliance of this Deed of Joint Undertaking in accordance with the terms and conditions specified herein. The bank guarantee shall be unconditional, irrevocable and initially valid till ninety (90) days beyond the scheduled date of completion of the defect liability period of the equipment / component covered under the Contract(s) or completion of the Phased Manufacturing Program under the Contract(s) whichever occurs later. In case of completion of the defect liability period under the Contract(s) or delay in the completion of the Phased Manufacturing Program beyond the aforesaid period, the validity of this Deed of Joint Undertaking shall be extended by such period of delay. However, this bank guarantee shall terminate at the latest 27 months from the scheduled end of defect liability

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period of the equipment. The guarantee amount shall be promptly paid to the Owner on demand without any demur, reservation, protest or contest.

10. Any dispute that may arise between the Owner and the Contractor in connection with this Deed of Joint Undertaking shall be finally settled as per the arbitration procedure/rules mentioned in the Contract Documents. Any dispute that may arise between the Owner and the Collaborator SG in connection with this Deed of Joint Undertaking shall be finally settled by reference to Arbitration in accordance with the United Nations Commission on International Trade Law (UNCITRAL) Arbitration Rules of 1976. The Arbitral Tribunal shall consist of three members and shall be appointed in accordance with the said Rules. The appointing authority for the Third Arbitrator shall be the President, International Chamber of Commerce, Paris. The language to be used in arbitral proceedings shall be English. The venue of arbitration shall be Singapore. The award made in such arbitration shall be final and binding and shall be enforceable in any court of competent jurisdiction.

11. This deed of undertaking shall be construed and interpreted in accordance with the Laws of India.

12. That this Deed of joint undertaking shall be operative from the effective date of the Contract.

IN WITNESS WHEREOF, the Collaborator SG and the Indian Manufacturer through their authorized representatives have executed these presents and affixed common seal of their respective companies on the day, month and year first mentioned above.

Witness: Signature: _____ Name: _____ Office Address: _____	For M/s. <u> (the collaborator) </u> (Authorised Signatory) Name: _____ Designation: _____
Witness: Signature: _____ Name: _____ Office address: _____	For M/s. <u> (Indian Subcritical Equipment mfr.) </u> (Authorised Signatory) Name: _____ Designation: _____

‡ Insert only if the Indian Manufacturer -SG

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Note : Power of Attorney issued in favour of the persons signing this deed by their respective employers shall be attached along with this deed.			

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Following Annexure is added to the Bid Specification, which shall be applicable to the Collaborator - ST & GS and Indian Manufacturer - ST & GS

Annexure - V (B) 2

Form for Deed of Joint Undertaking

[To be executed by the collaborator and the Indian Manufacturer for Steam Turbine & Generator on **Non-Judicial Stamp Paper of INR 200/-** [(refer Clause No. 4.2.4, Section - I, Volume - I of the bid specification)]

--

DEED OF JOINT UNDERTAKING

The DEED OF JOINT UNDERTAKING executed this _____ day of _____ Two Thousand _____ by:

M/s. _____, a company incorporated under the provisions of _____ act of (country) having its Registered Office at _____ (hereinafter referred to and called as the "the Collaborator ST & GS" which expression shall include its successors, administrators, executors and permitted assigns).

And

M/s. _____, a company incorporated under the provisions of Indian Company's Act 1956 having its registered office at _____ (hereinafter referred to and called as "the Indian Manufacturer ST & GS" or "Contractor", which expression shall include its successors, administrators, executors and permitted assigns).

in favour of Maharashtra State Power Generation Company Ltd., a Government of Maharashtra Enterprise incorporated under the Provisions of Indian Companies Act, 1956, having its Registered Office at 2nd Floor, Prakashgad, Prof. Anant Kanekar Marg, Bandra (East), Mumbai - 400 051, INDIA (hereinafter referred to as either "MAHAGENCO" or "the Owner" which expression include its successors, administrators, executors and assigns).

WHEREAS, the Owner has invited Bids for design, engineering, manufacture, supply, transportation to site, installation, testing, commissioning and conductance of guarantee tests for the Power Plant comprising of Supercritical Steam Generator including its all Auxiliaries (SG), Supercritical Steam Turbine including its all

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Auxiliaries (ST) & Generator Set including its all Auxiliaries (GS), Balance of the Plant Equipment and Civil Works for its Bhusawal Thermal Power Station 1x660 MW Unit - 6 Project (hereinafter referred to as “Plant”) against its Bid Specification No. : DG/BSL U-6/2011/T-1 vide its Invitation of Bids No. _____ dated_____.

AND WHEREAS Clause 4.2.4, Section - 1, Volume - I of the bid specification stipulates that the Indian manufacturer of sub-critical equipment who meets the experience criteria stipulated therein can be considered as the Qualified Manufacturer of Supercritical Steam Turbine including its all Auxiliaries (ST) & Generating Set including its Auxiliaries (GS) provided he has a valid ongoing collaboration and technology transfer agreement including license to manufacture and supply of Supercritical Steam Turbine including its all Auxiliaries (ST) & Generating Set including its Auxiliaries (GS) covering the type, size and rating specified with a manufacturer of the respective equipment (the collaborator ST & GS) who satisfies the experience criterion stipulated under Clause No. 4.2.1 and furnishes a Deed of Joint Undertaking executed by the Indian Manufacturer ST & GS and the Collaborator ST & GS.

AND WHEREAS against owner’s aforesaid Invitation for Bids (IFB), M/s. _____ (the bidder) has submitted the bid proposal which includes supply of Supercritical Steam Turbine including its all Auxiliaries (ST) covering the type, size and rating specified manufactured at the works of the Collaborator ST, the Indian Manufacturer ST & GS and their sub-vendors as per the drawings, specifications, Quality plans etc. approved by the collaborator ST & GS.

AND WHEREAS the Indian Manufacturer ST & GS satisfies the experience criterion stipulated under Clause No. 4.2.4 Section - I, volume - I of the bid specification for Steam Turbine & Generating Set and has a valid ongoing collaboration and technology transfer agreement including license to manufacture and supply supercritical Steam Turbine & Generator Set covering the type, size and rating specified with the Collaborator ST & GS who satisfies the experience criterion stipulated under Clause 4.2.1, Section - I, volume - I of the bid specification

AND WHEREAS the Collaborator ST & GS shall indemnify the Indian Manufacturer ST & GS with respect to patent infringement claims pertaining to the Steam Turbine and Generator Set of Type, size and rating specified and offered, as per the provisions of the said collaboration and technology transfer agreement.

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AND WHEREAS the Indian Manufacturer ST & GS and the Collaborator ST & GS are required to jointly execute and furnish along with the bid an irrevocable Deed of Joint Undertaking and be jointly and severally responsible and bound unto the Owner for the successful performance of the Steam Turbine Generator Set including the auxiliaries specified in Annexure-I (hereinafter referred to as "Equipment") fully meeting the stipulated technical requirements, and Guaranteed parameters and characteristics as per Contract documents, in the event, the Bid is accepted by the Owner resulting into Contracts.

AND FURTHER WHEREAS the Indian Manufacturer ST & GS and the Collaborator ST & GS are required to jointly execute and furnish along with the bid an irrevocable Deed of Joint Undertaking and bound unto the Owner for the successful performance of the Contract with regard to transfer of technology in accordance with the Clause No. 6 hereunder and the Indian Manufacturer ST & GS is responsible for implementation of Phased Manufacturing Program in accordance with the bid specification , in the event, the Bid is accepted by the Owner resulting into a Contract/Contracts.

NOW THEREFORE, THIS DEED WITNESSETH AS UNDER:

1. That in consideration of the award of the Contract(s) by the Owner to the Contractor, we the Indian Manufacturer ST & GS and Collaborator ST & GS do hereby declare and undertake that we shall be jointly and severally responsible to the Owner for the execution and successful performance of the Equipment and achievements of all guaranteed parameters as specified under the said Contract(s).
2. In case of any breach of the Contract(s) committed by the Contractor, we the ~~Indian Manufacturer ST & GS and~~ Collaborator ST & GS do hereby undertake, declare and confirm that we shall be fully responsible for the successful performance of complete Equipment, including its satisfactory performance and achievement of all technical guaranteed parameters of the Equipment as specified in the Contract and undertake to carry out all obligations and responsibilities under this Deed of Joint Undertaking including the technical guarantees for the complete Equipment in order to discharge the Contractor's obligations and responsibilities stipulated in the Contract. Further, if the Owner sustains any loss or damage on account of any breach of the Contract(s) related to the Equipment we the Indian Manufacturer ST & GS and the Collaborator ST & GS jointly and severally undertake to promptly indemnify and pay such losses/ damages caused to the Owner on its written demand without any demur,

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reservation, contest or protest in any manner whatsoever, subject to failure on the part of the Indian Manufacturer ST & GS and the Collaborator ST & GS to rectify such breach.

Except in case of criminal negligence or willful misconduct, the Collaborator ST & GS shall not be liable to the Owner, whether in contract, tort, or otherwise, for any indirect or consequential loss or damage, loss of profit, cost of capital, cost of replacement power or increased cost of operation, provided that this exclusion shall not apply to any obligation of the Contractor to pay Liquidated Damages to the Owner.

The aggregate liability of the Collaborator to the Owner hereunder shall not exceed the US\$ 50 Million or the value of services and components supplied by the Collaborator ST & GS to the Indian Manufacturer ST & GS for Bhusawal TPS 1x660MW Unit-6 Project whichever is higher.

This is without prejudice to any right of the Owner against the Contractor under the Contract and all guarantees.

Without prejudice to the joint and several obligations of the Contractor and the Collaborator ST & GS hereunder, the analysis/ investigations of the non-performance of the Equipment manufactured by the Contractor may initially be carried out by the Contractor within a period of 15 days from the date of reference of the problem by the Owner, before the Owner approaches the Collaborator ST & GS for any such analysis/ investigation. It shall not be necessary or obligatory for the Owner to first proceed against the Contractor before proceeding against the Collaborator ST & GS (with respect to obligations and responsibilities of the Collaborator covered under this Deed of Joint Undertaking). Nor any extension of time or any relaxation given by the Owner to the Contractor shall prejudice any right of Owner under this Deed of Joint Undertaking to proceed against Indian Manufacturer ST & GS and the Collaborator ST & GS and the Contractor.

3. Without prejudice to the generality of the undertaking in para ‘1’ above. The manner of achieving the objectives set forth in para ‘1’ above shall be as follows:

a) We, the Collaborator ST & GS shall be specifically responsible for complete engineering, preparation of all designs, design calculations,

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design documents / drawings and manufacturing drawings for the Equipment; selection of their auxiliaries and interfacing / integration of Equipment with their auxiliaries so as to ensure satisfactory, reliable, safe and trouble free performance of Equipment as well as meeting all stipulated technical requirements and guaranteed parameters specified in the Contract(s). b) We, the Collaborator ST & GS shall extend our quality surveillance / supervision / quality control to the Contractor during manufacture, erection, commissioning and performance testing, both at Contractor's works and / or at Owner's project site. Without prejudice to the overall responsibilities of the Collaborator ST & GS for successful commissioning and performance of the Equipment, the Collaborator ST & GS shall depute their technical experts from time to time to the works of the Indian Manufacturer ST & GS / Owner's project site, as mutually agreed upon between the Owner and the Contractor in accordance with the stipulations of the Contract(s). c) We, the Collaborator ST & GS will supply equipment / components manufactured at our works or at our vendor's works as per requirements / schedule specified in the Contracts. d) We, the Collaborator ST & GS will be fully responsible for the quality of manufacture of all equipments / main assemblies / components for incorporation in the Equipment. For the items to be manufactured by the Indian Manufacturer ST & GS at his / or his vendor's works as per design of the Collaborator ST & GS, the Collaborator ST & GS shall ensure completeness and correctness of the design, data, document and information in every detail provided to the Indian Manufacturer ST & GS which would result in the same quality of equipment as if manufactured at the works of the Collaborator ST & GS and shall meet approval / acceptance of the Collaborator ST & GS. e) The Indian Manufacturer ST & GS shall be responsible to manufacture portion of the Equipment which are to be manufactured at its works or its vendor's works as per the design of the Collaborator ST & GS and to the quality acceptance level of the Collaborator ST & GS (to be finalized before Notification of Award). Further, the Indian Manufacturer ST & GS shall erect, commission and carry out the guarantee tests of all the Equipment		

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in accordance with the advice, procedure and guidance of the Collaborator ST & GS. In case, there is any need to modify the design / drawings / procedure in certain areas, the Indian Manufacturer ST & GS shall seek specific approval of the Collaborator ST & GS before proceeding further.

f) In the event any problem is encountered during design, manufacture, erection, testing and commissioning or if the Indian Manufacturer ST & GS fails to demonstrate during the guarantee tests that the Equipment meet the guaranteed parameters and demonstration parameters as specified in the contract, the Collaborator ST & GS shall promptly provide all technical assistance / services / support to analyze and suggest corrective measures / modifications to the equipment / systems of all the Equipment under the Contract(s) directly to the Owner and the Contractor/ Indian Manufacturer ST & GS and the Collaborator ST & GS shall promptly carry out all corrective measures and modifications (as suggested by the Collaborator ST & GS and agreed by the Owner) for each of their respective equipment / systems supplied by them at their own expense. Thereafter, the Contractor/ Indian Manufacturer ST & GS and the Collaborator ST & GS shall demonstrate the successful performance of the Equipment meeting the guaranteed parameters as stipulated under the contract.

4. We the Indian Manufacturer ST & GS do hereby declare and undertake that we shall be responsible to the Owner for the successful implementation of the Phased Manufacturing Program as specified in the said Contract(s).

5. We, the Indian Manufacturer ST & GS do hereby-undertake, declare and confirm that we shall be fully responsible for indigenizing the manufacturing of supercritical Steam Turbine Generator sets in India in a phased manner in accordance with the Phased Manufacturing Program specified in the said Contract(s).

6. We, the Indian Manufacturer ST & GS and the Collaborator ST & GS do jointly hereby undertake, declare and confirm that we shall be fully responsible for ensuring a valid technology transfer agreement including license to manufacture and supply in India between the Manufacturer ST & GS and the Collaborator ST & GS covering the type, size and rating of the Equipment specified, valid minimum up to the end of the defect liability period of the

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Contract. The technology transfer agreement necessarily covers transfer of the technological know-how for Equipment in the form of complete transfer of design dossier, design software's, drawings and documentation and quality system manuals.

7. We, the Indian Manufacturer ST & GS and the Collaborator ST & GS do further undertake, declare and confirm that we shall be fully responsible for imparting relevant training to the personnel of the Indian Manufacturer ST & GS as part of the technology transfer agreement between the Indian Manufacturer and the Collaborator ST & GS.

8. We, the Indian Manufacturer ST & GS and the Collaborator ST & GS do hereby undertake and confirm that this Deed of Joint Undertaking shall be initially valid till ninety (90) days beyond the scheduled date of completion of the defect liability period of the Equipment under the Contract (s). In case of delay in completion of the defect liability period under the contract(s) beyond the aforesaid period, the validity of this Deed of Joint Undertaking shall stand extended by such period of delay. However, this Deed of Joint Undertaking shall terminate at the latest 24 months from the scheduled end of defect liability period of the unit of 660MW under the contract. We, the Indian Manufacturer ST & GS and the Collaborator ST & GS do further undertake and confirm that this Deed of Joint Undertaking shall be irrevocable and shall not be revoked till expiry of its validity. We further agree that this Deed of Joint Undertaking shall be without any prejudice to the various liabilities of the Contractor including contract performance security as well as other obligations of the Contractor in terms of the Contract(s).

9. In case of award, in addition to the Contract Performance Securities to be furnished by the Contractor/the Indian Manufacturer, the Collaborator ST & GS shall furnish as security on demand Performance Bank Guarantee(s) in favour of the Owner as per provision of the bid specification. The value of such Bank Guarantee shall be equal to one-half percent (0.5%) of the total Contract Price of all the Contract(s) (an equivalent absolute amount to be specified at the time of award of Contract) awarded against this bid specification and it shall be guarantee towards the faithful performance/compliance of this Deed of Joint Undertaking in accordance with the terms and conditions specified herein. The bank guarantee shall be unconditional, irrevocable and initially valid till ninety (90) days beyond the scheduled date of completion of the defect liability period of the Equipment covered under the Contract(s). In case of completion of the

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defect liability period under the Contract(s) beyond the aforesaid period, the validity of this Deed of Joint Undertaking shall be extended by such period of delay. However, this bank guarantee shall terminate at the latest 24 months from the scheduled end of defect liability period of the Equipment. The guarantee amount shall be promptly paid to the Owner on demand without any demur, reservation, protest or contest.

10. Any dispute that may arise between the Owner and the Contractor in connection with this Deed of Joint Undertaking shall be finally settled as per the arbitration procedure/rules mentioned in the Contract Documents. Any dispute that may arise between the Owner and the Collaborator ST & GS in connection with this Deed of Joint Undertaking shall be finally settled by reference to Arbitration in accordance with the United Nations Commission on International Trade Law (UNCITRAL) Arbitration Rules of 1976. The Arbitral Tribunal shall consist of three members and shall be appointed in accordance with the said Rules. The appointing authority for the Third Arbitrator shall be the President of the International Chamber of Commerce, Paris. The language to be used in arbitral proceedings shall be English. The venue of arbitration shall be Singapore. The award made in such arbitration shall be final and binding and shall be enforceable in any court of competent jurisdiction.

11. This Deed of Joint Undertaking shall be construed and interpreted in accordance with the Laws of India.

12. This Deed of Joint Undertaking shall be operative from the effective date of the Contract.

13. This Deed of Joint Undertaking shall form an integral part of the Contracts.

IN WITNESS WHEREOF, the Collaborator ST & GS and the Indian Manufacturer through their authorized representatives have executed these presents and affixed common seal of their respective companies on the day, month and year first mentioned above.

Witness:	For M/s. <u>(the collaborator)</u> Signature:
_____	(Authorised Signatory)
Name: _____	Name: _____
Office Address: _____	Designation: _____

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Witness: mfr.) Signature: _____ Name: _____ Office address: _____	For M/s. (Indian Subcritical Equipment (Authorised Signatory) Name: _____ Designation: _____

‡ Insert only if the Indian Manufacturer - ST & GS

Note: Power of Attorney issued in favour of the persons signing this deed by their respective employers shall be attached along with this deed.

Annexure-I

A) List of Integral Auxiliaries of Steam Turbine Generator Set

1. Control Fluid System
2. Gland steam sealing system
3. Lube oil system
4. Exhaust hood spray system
5. Stop/Control valves
6. Turbine drain system
7. Turbine protection system
8. Turbine control system (Analog and sequence)
9. Turbine supervisory instruments

B) List of Auxiliaries of Generator

1. Generator Seal oil system
2. Generator water cooling system
3. Hydrogen, Carbon Dioxide & Nitrogen system
4. Generator Excitation system.

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The Proforma for Consortium Agreement, at page No. 99, Section I, Volume-I of the bid specification is modified as under:

Annexure - VI

Proforma for Consortium Agreement

(Refer Clause No. 4.1 (b), Section - 1, Volume - I. To be submitted on non-judicial stamp paper of INR. 200/-)

CONSORTIUM AGREEMENT

The CONSORTIUM AGREEMENT executed this ____ day of ____ Two thousand ____ by:

M/s. _____, a company incorporated under the provisions of

_____ act of (country) having its Registered Office at _____ (hereinafter referred to and called the "the qualified manufacturer ~~†SG/-TG ST~~ /GS/The EPC Contractor", which expression shall include its successors, administrators, executors and permitted assigns) who shall be acting as "the leader of consortium" for the purpose of this agreement and bidding for which this consortium is formed.

And

M/s. _____, a company incorporated under the provisions of

_____ act of (country) having its Registered Office at _____ (hereinafter referred to and called the "the qualified manufacturer ~~†SG/-TG ST~~ /GS/The EPC Contractor", which expression shall include its successors, administrators, executors and permitted assigns).

And

M/s. _____, a company incorporated under the provisions of

_____ act of (country) having its Registered Office at _____ (hereinafter referred to and called the "the qualified manufacturer ~~†SG/-TG ST~~ /GS/The EPC Contractor", which expression shall include its successors, administrators, executors and permitted assigns).

And

M/s. _____, a company incorporated under the provisions of

_____ act of (country) having its Registered Office at _____ (hereinafter referred to and called the "the qualified manufacturer ~~†SG/-TG ST~~ /GS/The EPC Contractor", which expression shall include its successors, administrators, executors and permitted assigns).

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And hereinafter, above parties are collectively referred to and called as the parties.

WHEREAS, Maharashtra State Power Generation Co. Ltd. (MAHAGENCO), a 100% owned enterprise of Govt. of Maharashtra, India registered under and by virtue of Indian Companies Act 1956 and having its registered office at 2nd Floor, 'Prakashgad', Prof. Anant Kanekar Marg, Bandra (East), Mumbai (hereinafter referred to and call as the "Owner"), has invited Bids for design, engineering, manufacture, supply, transportation to site, installation, testing, commissioning and conductance of guarantee tests and all Civil Construction and Architectural Works required for its Bhusawal Thermal Power Station 1x660 MW Unit - 6 Project which comprises apart from other equipment, the Supercritical Steam Generator including its all Auxiliaries (SG), Supercritical Steam Turbine including its all Auxiliaries (ST) and Generator Set including its all Auxiliaries (GS) (hereinafter referred to as "Plant") against its Bid Specification No. : DG/1x660MW BSL U-6/~~MP~~/T-1 vide its Invitation of Bids No. _____ dated _____.

AND WHEREAS in terms of the Qualifying Requirements of the Bid Specification Stipulated under Clause No. 4.1 (b), a bid from consortium of Qualified Manufacturer of SG or ~~TG as defined thereunder (as a leader of consortium) in consortium with Qualified Manufacturer(s) of TG and GS or SG & GS respectively~~ Qualified Manufacturer of ST, Qualified Manufacturer of GS *and An Engineering, Procurement & Construction (EPC) Contractor as defined thereunder is acceptable

AND WHEREAS the parties believe that they individually meet the qualifying requirements stipulated in the bid specification for their respective equipment which and hence they can bid as the consortium.

AND WHEREAS the parties have indicated / expressed their willingness to co-operate with each other in respect of preparing and submitting jointly to owner bid for the Project and in the event of contract (hereinafter referred to as the "CONTRACT") being awarded to the parties by owner, the Parties agree to carry out the execution of the Contract and jointly & severally share the responsibility in accordance with the said Contract if awarded.

NOW THIS INDENTURE WITNESSTH AS UNDER:

1.0 Purpose of the Agreement:

All above "Parties" hereby agree to form a consortium to jointly bid for the project under a single bid and in the event of the said single bid submitted by the parties being accepted by the owner, to enter into the Contract and to execute the same to the satisfaction of Tender Specifications. The Parties shall co-operate with each other in order to secure the successful bidding for the Project and thereafter upon its acceptance by owner to execute it successfully.

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FURTHER the Parties are desirous of entering into a Consortium for the execution of the Project and to determine, fix and define between them the respective interests, scope of responsibilities and liabilities in connection with the whole execution of their part for the **said Project.**

2.0 Consortium:

The Parties agree to form a consortium for the purposes of undertaking the Bidding Process and if the Bid is successful, for implementing the Project.

Each Party shall Co-operate with the other Party to the fullest extent possible to ensure that all filings made with, and communications to the owner are complete, accurate in all respect and made within the prescribed time limits.

3.0 Lead Member:

The lead member of the consortium i.e. M/s. _____ is authorised to take all actions on behalf of the all the members of the consortium that may be necessary or required in connection with or incidental to the Consortium's Pre-Qualification and Bid, including but not limited to:

- i. Signing and submission of all applications and other documents and written communications;
- ii. Participating in 'Bidders' and other conferences and providing information or responses to the owner;
- iii. Representing the Consortium in all matters before the owner;
- iv. Submission of the Bid;
- v. Signing and execution of all contracts and undertakings consequent to acceptance of the Bid by the owner;
- vi. To incur liabilities and receive instruction for and on behalf of the Consortium;
- vii. To take all the action for entire execution of the Contract and

† accept payments on behalf of the Consortium from the Owner. All the Members further agree and irrevocably accept that the Leader Member shall be authorized to accept payments from the Owner and upon making the payments to the Lead Member after due recoveries, if any, the owner shall have discharged himself in full from all its liabilities to the consortium.

OR

† submit invoices of the Individual Members of the Consortium duly certified, to enable the Owner to make payments to the Individual member after due recoveries, if any. All the Members further agree and irrevocably accept that upon making payments to the members of Consortium as above, the Owner shall have discharged himself in full from all his liabilities to the consortium.

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viii. To do any other act or deed in relation to or incidental to submission of the Bid, execution and implementation of the Contract on behalf of the Consortium.

Communication to and from the Lead Partner shall be binding on all the members of the consortium.

4.0 Securities Towards Contract:

In the event of award of the contract by the owner to the consortium, the lead member shall submit the contract performance security amounting to 10% of the contract price and other members of the consortium shall submit on Demand Bank guarantee amounting to 1.5% of the contract price to the owner.

5.0 Division of Responsibilities towards the Contract:

In the event of award of the contract by the owner, the Division of responsibilities of among the parties shall be as under:³

M/s. _____ :

M/s. _____ :

M/s. _____ :

M/s. _____ :

Notwithstanding anything contained above, all the members of the consortium shall be jointly and severally responsible to the owner for the performance of the contract in full.

6.0 Assignment:

Neither party to this agreement is entitled to sell or sub-let or assign or otherwise transfer any of its rights and/or obligations from or in relation to this agreement to any third party, without the prior consent of the other party and further mandatory written consent from the owner

7.0 Liability:

The Parties shall be responsible for completion of their respective scope of work and for the costs and expenses incurred in connection with the execution of the said scope of work. The project schedule for the respective scope of work shall be in tune with the master project schedule. However, each party will co-operate /give its fullest support to other party, if either party make written request for the same.

Each Party shall bear the Pre-approved costs and expenses incurred by any of the party for the bid preparation and follow up on contract until the contract is awarded to the CONSORTIUM by MAHAGENCO.

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³ The division of responsibility shall be such that entire scope of work as stipulated in bid specification is invariably covered. Any missing scope shall deemed to be included in the scope of the lead member of the consortium.

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The parties shall be jointly & severally responsible for the execution of the contract. It is clarified that the Members of the Consortium shall remain jointly and severally liable to the Owner, irrespective of whether the entire payment is made to the leader of the Consortium, or whether payment is made directly to individual Members of the Consortium.

8.0 Project Organisation:

All parties should jointly formalize a project organization chart for the execution of the entire project specifying the personnel to be employed for the project with their respective roles & responsibilities and with the respective schedule.

9.0 Authorities of the Parties and their Representatives:

The contractual responsibilities of the parties to each other, on any particular project opportunity, shall be defined by separate written agreement applicable to each such project. By executing this agreement, the Parties shall be deemed independent entities, and neither party authorizes the other to act as its agent or representative, except to the extent set forth herein. Under no circumstances shall the employees of one party be deemed to be the employees of the other party.

Each party shall indemnify and hold harmless the other from and against any and all damages, costs or expenses (including attorney's fees) arising from any representation, action, or undertaking by the indemnifying party which exceeds or is outside of the scope of this agreement.

Each party has appointed / nominated the following individual as its principal representative and will advise the other party, in writing, of any limitations on the authority of the said principal representative. The representative of the parties shall be :

For M/s. (Name of the Company)	:	(Name of the representative)
For M/s. (Name of the Company)	:	(Name of the representative)
For M/s. (Name of the Company)	:	(Name of the representative)
For M/s. (Name of the Company)	:	(Name of the representative)

Each party may change its representatives so appointed/nominated above at any point of time however a written communication in this regard will be made to other parties and the owner within a period of thirty days from the date of such changes.

10.0 Duration of the Agreement:

This agreement shall cease to exist at an earlier of the following:

- i) The bid by the consortium is disqualified by the owner.
- ii) The owner awards the contract to some other entity.
- iii) The owner abandons the project.

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iv) Either Party is declared as insolvent or gets wound up by a Court of competent jurisdiction.

v) Any change in the law which would render execution or implementation of **agreement illegal / impossible.**

11.0 Confidentiality:

a) All the documents / drawings / technical data and any other information regarding this work shall be treated as top Confidential and should not be used for any other purpose not related to execution of work under this Pre-bid Agreement.

b) Each party agrees to keep the information confidential shared with it in respect of the Project by the other Party, and not to divulge the same to any third party in subsequent discussions, negotiations, etc. or any other agency in the interest of securing the Project. The parties shall enter into a non-disclosure / confidentiality agreement to this effect separately.

12.0 Indemnities:

a) Each Party shall indemnify and hold harmless the other party against any and all damages, costs, losses or claims incurred by or made against the other party arising from:

i) Any breach, non-observance or failure by the either Party or their servants, agents or subcontractors to carry out and perform its responsibilities;

ii) Any negligent act or omission of the either Party or their servants, agents or subcontractors committed during the performance of its obligations.

b) The Parties shall indemnify and hold harmless the Owner against any financial liability towards any demand from statutory authorities towards deduction of Withholding Tax and/or Interest thereon and authorise the Owner to deduct such amounts from the bills payable and/or enforce the securities available with the Owner and pay the same to the respective Tax Authorities. The Parties shall also indemnify the Owner from any costs towards defense of suits/proceedings brought against the Owner in this regard.

13.0 Force Majeure:

No Party will be responsible for non-performance of any or all of their obligations under this Agreement if such non-performance is due to reasons beyond the reasonable control of the Parties. "Force Majeure" situations are also included in the expression "beyond the reasonable control of the Parties" including, but not, restricted to acts of god, declared or undeclared war, riots, civil wars, fires, floods, epidemics, strikes, freight embargoes, expropriation by Government authorities, rebellion, sabotage, abrupt change political / economical situations, depreciation of currency.

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14.0 Amendments:

Any amendments to this Agreement shall be only in writing and such writings shall be signed by the authorized representatives of both the Parties.

15.0 Notices:

All notices and communications which are signed by the Authorized Signatories of either party shall be sent by registered post A.D to the following addresses of the Parties:

M/s. (Name of the Company) (Address).

.....

M/s. (Name of the Company) (Address).

M/s. (Name of the Company) (Address).

M/s. (Name of the Company) (Address).

16.0 Dispute Resolution:

If any disputes, differences or controversies (collectively a dispute) arise between the Parties in respect of this agreement or the subject matter or interpretation hereof or in respect of any connected matters, then any party may deliver to the other party a notice of dispute in writing adequately identifying and providing details of the dispute (the "Notice of Dispute"). The authorized representative of the parties shall co-operate, in good faith, to attempt to amicably resolve the dispute. If any party believes that such representatives cannot resolve the dispute, such Party may invoke the further dispute resolution procedures of this clause No.15.

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All disputes and differences, arising out of or in connection with this Agreement be attempted to be resolved mutually through negotiations between the Parties failing which the same shall be referred to arbitration. The provisions of Arbitration & Conciliation Act 1996 shall be applicable to such arbitration proceedings. The provisions of this clause No.15 shall survive the expiration of this Agreement.

17.0 Jurisdiction and Governing Law:

Incidental to arbitration as hereinabove mentioned, this Agreement shall be governed by the Indian laws and will be subject to the jurisdiction of the Courts in Mumbai, having jurisdiction to entertain the dispute.

18.0 Miscellaneous:

A. Neither this Agreement nor any interest herein shall be assigned, in whole or in part, by either party hereto to any third party (is) without the prior written consent of the other party.

B. Each party represents that it has corporate power and authority to under respective governing laws enter into and to perform the obligations set forth in this agreement.

C. This 'Agreement' constitutes the entire understanding and agreement of the parties with respect to the subject matter hereon and supersedes all prior representations and agreements, oral or written. This Agreement may be modified only upon written instrument executed by the authorized representative of each party.

D. This Agreement shall not constitute, create or in any way be interpreted to create a joint venture, partnership or formal business organization of any kind among above parties and is applicable and valid only for the sole purpose and the intent expressed as above. The members of the Consortium shall otherwise be free to carry on their independent business of commercial activities for their own respective benefits under their own respective names and styles. This Consortium Agreement is limited in its operation to the specified Project named ... (Name of the Project)

19.0 Notwithstanding anything contained hereinabove, all the provisions of this agreement shall be consistent with the provisions of the bid specification No. DG/BSL U-6/2011/T-1 and/or contract if any awarded by the owner to the consortium. In case of any provisions of this agreement are contradicting to the provisions of the bid specification and/or contract awarded by the owner to the consortium, the provisions of bid specification and/or contract shall prevail over those of agreement.

In witness thereof the parties hereto have set & subscribed their respective hands to this memorandum of Understanding at Mumbai on the day, month and year first herein written above:

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Witness: _____ Signature: _____ Name: _____ Office Address: _____	For M/s. <u> (lead member of consortium) </u> (Authorised Signatory) Name: _____ Designation: _____
Witness: _____ Signature: _____ Name: _____ Office address: _____	For M/s. <u> (member of consortium) </u> (Authorised Signatory) Name: _____ Designation: _____
Witness: _____ Signature: _____ Name: _____ Office address: _____	For M/s. <u> (member of consortium) </u> (Authorised Signatory) Name: _____ Designation: _____
Witness: _____ Signature: _____ Name: _____ Office address: _____	For M/s. <u> (member of consortium) </u> (Authorised Signatory) Name: _____ Designation: _____

†Strike out whichever is not applicable

* Insert only if applicable

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The Proforma for Contract Agreement, at page No. 116, Section I, Volume-I of the bid specification is modified as under :

Annexure - XII

Proforma for Contract Agreement

(To be executed on Maharashtra non-judicial stamp paper of requisite money value purchased in the name of the contractor)

CONTRACT AGREEMENT NO. DG/BSL U-6/2011/T-1/⁴SUPPLY/ERECTION/CIVIL CONSTRUCTION

This CONTRACT AGREEMENT is made on this ____ day of _____ 20__ between Maharashtra State Power Generation Co. Ltd. (Mahagenco), a company registered under and by virtue of Indian Companies Act 1956 having its registered office at 2nd Floor, 'Prakashgad', Plot No. G - 9, Prof. Anant Kanekar Marg, Bandra (East), Mumbai - 400 051, India and M/s. _____, a company/entity registered under and by virtue of _____ Act of (country) and having its registered office at _____ (hereinafter referred to and called as 'the Contractor')/⁵(Lead Member of Consortium') in consortium with M/s. _____, a company/entity registered under and by virtue of _____ Act of (country) and having its registered office at _____ (Member of Consortium) and M/s. _____, a company/entity registered under and by virtue of _____ Act of (country) and having its registered office at _____ ('Member of Consortium') wherein all the members of the consortium jointly and severally shall be perform the obligations of the contractor and lead member of the consortium is authorised to do all acts and deeds including incurring liabilities ~~and receive payments~~ on behalf of the consortium to give effect to this contract.##.

Whereas the owner, having decided on installation of Bhusawal Thermal Power Station 1x660 MW Unit - 6 on supercritical technology, had invited International Competitive Bids conforming to Bid Specification No. DG/BSL U-6/2011/T-1 and in response to the same, the contractor had submitted its bid vide Bid Proposal No. _____ dated _____. Now, the owner has accepted the bid by the contractor and has awarded the contract for *Supply of all Equipment and Materials including Cement, Steel and other aggregates for Civil, Structural and Architectural Works and Transportation up to Site/Design, Engineering, Handling at Site (Receipt, Storage etc.) Erection, Testing & Commissioning including Performing Performance Guarantee Test of all equipment/Design, Engineering, Civil Construction, Structural and Architectural Works covered under the Bid Specification No. DG/BSL U-6/2011/T-1 read with amendments, agreed deviations thereto by letter of Award dated _____.

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⁴ Strikeout whichever is not applicable

⁵ Insert portion beyond this point and up to ## only if the contractor is the consortium of firms.

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NOW THIS AGREEMENT WITNESSES AS UNDER:

1.0 Contract Documents: the following documents shall form the integral part of the contract:

- 1) This agreement
- 2) Volume – I of the Contract Comprising of:
 - a. Notification of Award of the Contract and Schedules 1 to 9 (Section – 1).
 - b. Special Terms and Conditions of the Contract read with agreed deviations thereto (Section – 3)
 - c. General Terms and Conditions of the Contract read with agreed deviations thereto (Section – 2)
 - d. Terms and Conditions of the Contract – *Supply/Site Works and Additional Conditions of the Contract – Civil read with agreed deviations thereto (Section 2A/2B and 2C).
 - e. Consortium Agreement (If applicable)
- 3) Technical Specification, drawings, design documents etc. (Volumes II to VIII) read with agreed deviations thereto.
- 4) All correspondence exchanged between the contractor and the owner from the date of opening of techno-commercial bid till the award of contract as referred to in the Letter of Award.
- 5) Contractor’s Bid Proposal Techno-commercial bid (Part -1) in physical form opened on _____ and Price Bid (Part – 2) in electronic form opened online on _____.
- 6) Bid Specification No. DG/BSL U-6/2011/T-1.
- 7) Various sections of Volume-I shall be attached to the contracts as under :

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The documents at Sr. No. 4 to 6 are not enclosed with this agreement for the sake of convenience of handling. The documents at Sr. No. 2 and 3 above are initialled by below mentioned representatives of the owner and contractor with their respective official seal:

Name of the Owner's Representative : _____

Initials : _____

Name of the Contractor's Representative : _____

Initials : _____

2.0 Consideration: The contractor has agreed to perform the contract as per the scope detailed herein and on the terms and conditions set out herein and in consideration of the performance of the obligations of the contractor hereunder, owner hereby agrees to pay contractor the contract price which is aggregate of INR (in figures) _____ (in word INR _____), Foreign Currency 1 (in figures) _____ (in words Foreign Currency 1 _____) and Foreign Currency 2 (in figures) _____ (in words Foreign Currency 2 _____) as per the Payment Terms mentioned herein.

3.0 Effect Date of the Contract: The contract *has/shall come into effect with effect from the date of issuance of the *Letter of Award (LOA)/Notice to Proceed issued by the owner i.e. _____. The contractor has agreed to complete the works under the contract within ____ months thereafter as per the Work Completion Schedule (Schedule - 6).

4.0 Cross-fall-Breach Clause: Breach of any of the terms and conditions of this contract shall be deem breach of other contracts which shall be deem breach of other contracts which will automatically be construed as breach of other contracts which confer right on the owner to terminate the other contract(s) also at the risk & cost of the contractor.

5.0 It is expressly understood and agreed by and between the Contractor and the Owner that **the** Owner is entering into this Agreement solely on its own behalf and not on behalf of any other person or entity. In particular it is expressly understood and agreed that the Government of India and or Govt. of Maharashtra is not a party to this Agreement and has no liabilities, obligations or rights hereunder. It is expressly understood and agreed that the Owner is an Independent legal entity with power and authority to enter into contracts solely on its own behalf under the applicable laws of India and the general principles of Contract Law. The Contractor expressly agrees, acknowledges and understands that the Owner is not an Agent, Representative or Delegate of the Govt. of India and/or Govt. of Maharashtra. It is further understood and agreed that the Government of India and/or Govt. of Maharashtra is/are not and shall not be liable for any acts, omissions, commissions, breaches or other wrongs arising out of the Contract. Accordingly, the Contractor expressly waives, releases and foregoes any

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and all actions or claims, including cross claims, impleader claims or counter claims against the Government of India and/or Govt. of Maharashtra arising out of this Contract and covenants not to sue the Government of India and/or Govt. of Maharashtra as to any manner, claim and cause of action or thing whatsoever arising of or under this Agreement.

6.0 Notices: save the provisions made under the Clause No. __, Section 2(B), Volume – I of the contract, the notices to either parties shall be served on below mentioned communication details in the manner stipulated in the contract:

To the Owner:

M/s. Maharashtra State Power Generation Co. Ltd.

[*Insert Address*]

In Attention of:

Fax:

Phone:

Email:

To the Contractor:

M/s. _____

[*Insert Address*]

In Attention of:

Fax:

Phone:

Email:

Either party may change the communication details as mentioned above by giving prior written notice to another party to that effect.

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IN WITNESS WHEREOF the Employer and the Contractor have caused this Agreement to be duly executed by their duly authorized representatives the day and year first above written.

Witness: For and on behalf of the Owner

Signature: _____

Name: _____

Office Address: _____

(Signature with Seal)

Name: _____

Designation: _____

Witness: For and on behalf of the contractor

Signature: _____

Name: _____

Office Address: _____

(Signature with Seal)

Name: _____

Designation: _____

Note :

- (i) In case the bidder is an Indian Entity, Volume - I of the Contract shall be Comprising of following sections of the Volume-I of the Bid Specification

Section	Description	To be incorporated in		
		First Contract	Second Contract	Third Contract
2	General Conditions of the Contract	Yes	Yes	Yes
2A	Terms & Conditions of the Contract - Supply	Yes	No	No
2B	Terms & Conditions of the Contract - Site Services	No	Yes	Yes
2C	Additional Conditions of the Contract - Civil	No	No	Yes
3	Special Terms & Conditions of the Contract	Yes	Yes	Yes

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- (ii) In case the bidder is a Foreign Entity, Volume – I of the Contract shall be Comprising of following sections of the Volume-I of the Bid Specification

Section	Description	To be incorporated in		
		First Contract	Second Contract	Third Contract
2	General Conditions of the Contract	Yes	Yes	Yes
2A	Terms & Conditions of the Contract - Supply	Yes	Yes	Yes
2B	Terms & Conditions of the Contract - Site Services	No	No	Yes
2C	Additional Conditions of the Contract - Civil	No	No	Yes
3	Special Terms & Conditions of the Contract	Yes	Yes	Yes

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Following Schedules are added in the bid specification/modified as under: Schedule - 1 Proforma for Break-up of Prices (to be in electronic form on line)						
Sr. No.	Particulars	Price			Applicable Taxes	
		INR	FC1	FC2	Tax	Rate
1.	Supply of Equipment, Mandatory Spares and Materials					
1.1	Supply of Indigenous Equipment & Materials				Excise Duty	
					CST	
					M VAT	
1.2	Supply of Indigenous Mandatory Spares				Excise Duty	
					CST	
					M VAT	
1.3	Supply of Imported Equipment, and materials to be directly delivered to the site on CFR basis				Total Customs Duty	
1.4	Supply of Imported Mandatory Spares to be directly delivered to the site on CFR basis				Total Customs Duty	
1.5	Supply of Steel, Cement and other aggregates for Civil, Structural and Architectural Works		NA	NA	Excise Duty	
					CST	
					M VAT	
1.6	Inland Freight for FOR Site Delivery of 1.1 to 1.5 above including taxes thereon, if any		NA	NA	---	---

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Sr. No.	Particulars		Price			Applicable Taxes	
			INR	FC1	FC2	Tax	Rate
	<u>1.7</u>	<u>Amount of Taxes & Duties on 1.1 to 1.5 for the purpose of ceiling.</u>		NA	NA	---	---
	Total					---	---
2.	Erection, Testing & Commissioning						
	2.1	Equipment Related Design & Engineering (except for Civil Design & Engineering				Service Tax	
	2.2	Erection, Testing & Commissioning		NA	NA	Service Tax	
	<u>2.3</u>	<u>Amount of Taxes & Duties on 2.1 & 2.2 above, for the purpose of ceiling.</u>		NA	NA		
	Total					---	---
3.	Civil Construction, Structural and Architectural Works						
	3.1	Civil Works related Design Engineering		NA	NA	Service Tax	
	3.2	Civil Construction, Structural and Architectural Works		NA	NA	Service Tax	
	<u>3.3</u>	<u>Amount of Taxes & Duties for the purpose of Ceiling</u>		NA	NA		
	Total			NA	NA	----	----
Grand Total (1+2+3)							

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NA = Not Applicable i.e. Foreign Currency bid price and payment not acceptable for the respective element of the bid price. FC1, FC2 = Foreign Currencies of bidders option.

1. We confirm that the taxes at the rates mentioned above are applicable as on record date ~~and considering the prevailing Project Import Regulations. However, the above mentioned Taxes and Duties shall be payable at the rates prevailing considering 1) Deemed Export Benefits and 2) Mega Power Project benefits (including benefits for Expansion Unit of Mega Power Project benefits) shall only be payable to us. the same are payable as per the stipulations of Bid Specification.~~
2. ~~We confirm that subject to grant of the Mega Power Project/Expansion Unit of Mega Power Project status by the Ministry of Power for the Project (Bhusawal TPS 1x660 MW Unit-6), we shall avail all the benefits of taxes and duties so available to the project as per the prevailing rules and pass on all such benefits on this account to the owner.~~
3. ~~We confirm that in view of International Competitive Bidding, Deemed Export Benefits as per the current Foreign Trade Policy (FTP) 2009-2014 are available to the project.~~

Note :

Total Foreign currency component indicated in schedule-1, shall not exceed the foreign currency component indicated in Schedule-4, Section - 1, Volume - I of the bid specification.

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Schedule - 1A**Projected Cash Flow**

(to be submitted in Electronic form)

Month	Projected Cash Flow (In % of bid price)				
	Supply			Erection	Civil
	INR	FC1	FC2	INR	INR
1					
2					
3					
4					
5					
6					
7					
8					
9					
--					
Total	100%	100%	100%	100%	100%

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Schedule - 2

Proforma for Break-up of Prices

(to be submitted in electronic form on line by uploading the *.pdf file)

BREAK UP OF PRICES OF MANDATORY SPARES

The Break up of prices of Mandatory Spare as indicated at 1.2 and 1.4 of Price Schedule is as under:

Sr. No.	Item Description	Unit of Measure	Quantity	Rate/Unit		
				INR	FC1	FC2
Indigenously Manufactured Spares						
Total						
Imported Spares to be directly despatched to the site						
				FOB		
				CFR		
				FOB		
				CFR		
Total				FOB		
				CFR		

Note: The description and quantity of mandatory spare shall be as stipulated in the Volume - II of the bid specification and shall be same as indicated in techno-commercial bid.

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Following Proforma for Bank Guarantee against Phased Manufacturing Program is being included in the Bid Specification as Schedule-8D

Schedule - 8 (D)
Proforma for Bank Guarantee against Phased Manufacturing Program

(To be submitted on the Stamp Paper of requisite money value purchased in the name of the guarantor bank)

BANK GUARANTEE

In consideration of the Maharashtra State Power Generation Co. Ltd. (Mahagenco), a company incorporated in India, registered under the Companies Act, 1956 and having its registered office at 2nd Floor, Prakashgad, Plot No. G9, Prof. Anant Kanekar Marg, Bandra (East), Mumbai – 400 051, India (hereinafter referred to as “the Owner”), which expression shall, unless repugnant to the context or meaning thereof include its administrators, successors and assigns having awarded to M/s.....(Contractor’s Name)....with its Registered /Head Office at.....(hereinafter referred to as the ‘Contractor’ which expression shall unless repugnant to the context or meaning thereof, include its successors administrators, executors and assigns), a Contract by issue of Letter of Award No.....dated.....and the same having been unequivocally accepted by the contractor, resulting into a Contract bearing No.....dated.....valued at.....for and the Contractor having agreed to provide a Performance Guarantee for the faithful Completion of Phased Manufacturing Program for an amount equivalent to 5% (five percent) of the contract price in. to the Owner.

We.....(Name & Address of the Bank).....having its Head Office at.....(hereinafter referred to as the ‘Bank, which expression shall, unless repugnant to the context or meaning thereof, include its successors, administrators, executors and assigns) do hereby guarantee and undertake to pay the Owner, on demand any and all monies payable by the Contractor to the extent of Rs.....(equivalent to 5% of the total contract price) as aforesaid at any time during the validity of this Bank Guarantee without any demur, reservation, contest, recourse of protest and/or without any reference to the Contractor. Any such demand made by the Owner on the Bank shall be conclusive and binding notwithstanding any difference between the Owner and the Contractor or any dispute pending before any Court, Tribunal, Arbitrator or any other authority. The Bank undertakes not to revoke this Guarantee during its

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currency without previous consent of the Owner and further agrees that the Guarantee herein contained shall be enforceable till six months after expiry of its validity.

The Owner shall have the fullest liberty, without affecting in any way the liability of the Bank under this Guarantee, from time to time to extend the time for performance of the Contract by the Contractor. The Owner shall have the fullest liberty, without affecting this Guarantee, to postpone from time to time the exercise of any powers vested in them or of any right which they might have against the Contractor, and to exercise the same at any time in any manner, and either to enforce or to forbear to enforce any covenants, contained or implied, in the Contract between the Owner and the Contractor or any other course or remedy or security available to the Owner. The Bank shall not be released of its obligations under these presents by any exercise by the Owner of its liberty with reference to the matters aforesaid or any of them or by reason of any other act or forbearance or other acts of omission or commission on the part of the Owner or any other indulgence shown by the Owner or by any other matter or thing whatsoever which under law would, but for this provision, have the effect of relieving the Bank. The Bank also agrees that the Owner at its option shall be entitled to enforce this Guarantee against the Bank as a principal debtor, in the first instance without proceeding against the Contractor and notwithstanding any security or other guarantee that the Owner may have in relation to the Contractor's liabilities.

We shall extend the validity of this Bank Guarantee for the further period of six months, one month prior to its present validity period at the request of the Owner. We further agree that non-extension of the guarantee as above shall be sufficient ground for encashment of the same by the Owner.

Notwithstanding anything contained above:

- Guarantor's liabilities under this guarantee shall not exceed ⁶_____.
- This Bank Guarantee valid up to ⁷_____.
- The guarantor is liable to pay the guaranteed amount or any part thereof under this bank guarantee only and only if the owner serve upon us a written claim or demand on or before _____ .

56565660_____

⁶ Add value of BG

⁷ Insert the date of validity of the bank guarantee

CONSULTANT : PROCON ENGINEERS

 MAHAGENCO Maharashtra State Power Generation Co. Ltd.	MAHARASHTRA STATE POWER GENERATION CO. LTD.	Page 57 of 60
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	CORRIGENDUM - X	

IN WITNESS WHEREOF THE GUARANTOR HAS SET ITS HANDS HEREUNTO ON THE DAY, MONTH AND YEAR FIRST HEREINABOVE WRITTEN.

Signed and delivered by _____ name of the bank _____ by the hand of Shri./Smt. _____ its _____ designation _____ and authorized official.

Dated the ____ day of _____

For -----(Name of the Bank) ---

⁸[Authorised Signatory(ies)]

WITNESS:

Notes: 1) The Bank Guarantee shall be from a Bank as per provisions of Clause No. 15, Section-2 (General Terms and Conditions of the Contract) of the Bid specification (Volume-I).

2) The stamp papers of appropriate value shall be purchased in the name of guarantee issuing Bank or the party on whose behalf for BG is being issued. The Bank Guarantee shall be issued on a stamp paper of value as applicable in the State of India from where Bank Guarantee is issued or the State of India from where BG shall be operated, whichever is higher.

57575760_____

⁸ The officer(s) to sign with their Identity Nos. issued by the bank.

CONSULTANT : PROCON ENGINEERS

	MAHARASHTRA STATE POWER GENERATION CO. LTD.	Page 58 of 60
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	CORRIGENDUM - X	

Following Proforma for Bank Guarantee against Advance payment is being included in the Bid Specification as Schedule-(8E)

Schedule-8(E)

PROFORMA OF BANK GUARANTEE FOR ADVANCE

(to be submitted on the Stamp Paper of requisite money value purchased in the name of the guarantor bank)

Bank Guarantee No..... & date
(For Rs)

Issue date:

Expiry date:

Claim period:

Name & Address of the Bank

To,

Maharashtra State Power Generation Co. Ltd.,
'Prakashgad', 3rd floor,
Bandra (East),
MUMBAI-400 051

Dear Sirs,

In consideration of Maharashtra State Power Generation Co. Ltd., Mumbai (hereinafter referred to as the Owner, which expression shall unless repugnant to the context or meaning thereof, include all successors, administrators and assigns) having awarded to M/s..... with its Registered/Head Office at (hereinafter referred to as 'Contractor' which expression shall unless repugnant to the context or meaning thereof, include its successors, administrators, executors, and assigns) a contract by issue of Owner's Letter of Award No. dtd. with the contract price of Rs. for (scope of work) (hereinafter called the 'Contract') and the Owner having agreed to make an advance payment to the Contractor for performance of the above contract amounting to Rs. (Rs. only) as an advance against Bank Guarantee to be furnished by the Contractor.

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 MAHAGENCO Maharashtra State Power Generation Co. Ltd.	MAHARASHTRA STATE POWER GENERATION CO. LTD.	Page 59 of 60
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We (Name of the Bank).....having its Office at(address of the Bank)..... (hereinafter referred to as the 'Bank' which expression shall unless repugnant to the context or meaning thereof, include its successors, administrators, executors and assigns) do hereby guarantee and undertake to pay to the Owner immediately on demand, any or all amounts payable by the Contractor to the extent of Rs. (Rupees) at any time up to without any demur, reservation, recourse, contest or protest and/or without any reference to the Contractor. Any such demand made by the Owner on the Bank shall be conclusive and binding notwithstanding any difference between the Owner and the Contractor or any dispute pending before any Court, Tribunal, Arbitrators or any other authority. We agree that the Guarantee herein contained shall be irrevocable and shall continue to be enforceable till the Owner discharges this Guarantee.

The Owner shall have the fullest liberty without affecting in any way the liability of the Bank under this Guarantee from time to time to vary the advance or to extend the time for performance of the contract by the Contractor. The Owner shall have the fullest liberty without affecting this Guarantee, to postpone from time to time the exercise of any powers vested in them or of any right which they might have against the Contractor, and to exercise the same at any time in any manner and either to enforce or to forebear to enforce any covenants contained or implied in the Contract between the Owner and the Contractor or any other course or remedy or security available to the Owner. The Bank shall not be released of its obligations under this presents by any exercise by the Owner of its liberty with reference to matters aforesaid or any of them or by reason of any other act or forbearance or other acts of omission or commission on the part of the Owner or any other indulgence shown by the Owner or by any other matter or thing whatsoever which under law would, but for this provision, have the effect of relieving the Bank.

The Bank also agrees that the Owner at its option shall be entitled to enforce this Guarantee against the Bank as a Principal debtor, in the first instance without proceeding against the Contractor and notwithstanding any security or other Guarantee that the Owner may have in relation to the Contractor's liabilities

We shall extend the validity of this Bank Guarantee for the further period of six months, one month prior to its present validity period at the request of the Owner. We further agree that non-extension of the guarantee as above shall be sufficient ground for encashment of the same by the Owner.

CONSULTANT : PROCON ENGINEERS

 MAHAGENCO Maharashtra State Power Generation Co. Ltd.	MAHARASHTRA STATE POWER GENERATION CO. LTD.	Page 60 of 60
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	CORRIGENDUM - X	

Notwithstanding anything contained above –

- i) Our liabilities under this guarantee shall not exceed Rs. ----- .
- ii) This Bank Guarantee valid up to ----- .
- iii) We are liable to pay the guaranteed amount or any part thereof under this bank guarantee only and only if you (MahaGenco) serve upon us a written claim or demand on or before ----- .

In witness whereof We _____ Bank Limited have executed this on this the _____ day of -----.

WITNESS:

Signature	Signature
Name	Name
Designation	Designation

Attorney as per Power of Attorney
No..... Dated.....

Bank's Rubber Seal and Full Address.

Note :

1. The bank guarantee shall be unconditional, irrevocable and initially valid till Project Completion schedule. Later, the Bank Guarantees shall be extended by a period of Six Months, if demanded by the Owner.
2. The Contractor may, if he so desires, reduce the e of Bank Guarantee(s) submitted against advance payments after every six (6) months to the extent of advance actually adjusted. The application for reduction in the value of the Bank Guarantee shall be submitted to the Project Manager.

CONSULTANT : PROCON ENGINEERS



**MAHARASHTRA STATE POWER
GENERATION CO. LTD.**

**PROJECTS & PLANNING
DEPARTMENT**

BID SPECIFICATION NO.: DG/BSL U-6/2011/T-1

CORRIGENDUM - XIII

	MAHARASHTRA STATE POWER GENERATION CO. LTD.			
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	CORRIGENDUM - XIII			
<u>CONTENTS</u>				
SR. NO.	PARTICULARS			PAGE NO.
1.0	VOLUME I	:	COMMERCIAL AND GENERAL CONDITIONS OF CONTRACT	01

	MAHARASHTRA STATE POWER GENERATION CO. LTD.	
	BID SPECIFICATION NO.:DG/BSL U-6/2011/T-1	
	CORRIGENDUM - XIII	
<u>CORRIGENDUM TO BID SPECIFICATION</u> <u>VOLUME-I</u> <u>COMMERCIAL AND GENERAL CONDITIONS OF</u> <u>CONTRACT</u>		

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	BID SPECIFICATION NO.:DG/BSL U-6/2011/T-1			
	CORRIGENDUM - XIII			

1. Following Clauses of the Bid Specification are amended as under :

Sr No	Section/ Page No/Cl No.	Existing Particulars of Bid Stipulation including amendment/corrigendum thereof		To be read as	
1	Section 1,Page 40/ Cl. No. 19.1	4.	Auxiliary Power Consumption: Total power consumption of all the auxiliaries (as listed under Clause 6.3, Section - 3, Volume - I) at 660 MW load with Zero make up, 76mm of Hg back pressure and 100% unit load (considering lowest quoted Auxiliary Power Consumption as base)	4.	Auxiliary Power Consumption: Total power consumption of all the auxiliaries (as listed under Clause 6.3, Section - 3, Volume - I) at 660 MW load with Zero make up, 76mm of Hg(a) or lower guaranteed/design condenser back pressure and 100% unit load (considering lowest quoted Auxiliary Power Consumption as base)
2	Section 1, Annexure - V(A), Clause No. 2, Page 84	In case of any breach The liability of the Parent Manufacturer hereunder shall, however, be limited to an amount calculated at the rate of USD 221/122/343 Million.....		In case of any breach The liability of the Parent Manufacturer hereunder shall, however, be limited to an amount calculated at the rate of <u>** of Contract Price</u> ** Please insert 1. <u>In case of DJU for SG, 27% of Contract Price</u> 2. <u>In case of DJU for STG, 15 % of the Contract Price</u>	

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		BID SPECIFICATION NO.:DG/BSL U-6/2011/T-1		
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Sr No	Section/ Page No/Cl No.	Existing Particulars of Bid Stipulation including amendment/corrigendum thereof	To be read as	
3	Section 1, Annexure - V(A), Clause No. 8, Page 87	We, the parent Manufacturer, *the parent manufacturer – GS, the ‡subsidiary/Joint Venture Company and the Indian Promoter do hereby undertake and confirm that this Deed of Joint Undertaking shall be initially valid till ninety (90) days beyond the schedule date of completion of Phased Manufacturing Program under the Contract.....	We, the parent Manufacturer, *the parent manufacturer – GS, the ‡subsidiary/Joint Venture Company and the Indian Promoter do hereby undertake and confirm that this Deed of Joint Undertaking shall be initially valid till ninety (90) days beyond the schedule date of completion of <u>the defect liability period of the Equipment or Completion of Phased Manufacturing Program under the Contract (s), whichever occurs later.</u> In case of delay in completion of <u>defect liability period under the Contract(s) or delay in Phased Manufacturing</u>	
4	Corrigendum-X, Page 20 of 60, Annexure – V(B)1, Para 2 of Clause No. 2	The liability of the Collaborator SG hereunder shall, however, be limited to an amount calculated at the rate of 221 Million.....	The liability of the Collaborator SG hereunder shall, however, be limited to an amount calculated at the rate of <u>27% of the Contract Price.....</u>	
5	Section 2A,Page 235/ Cl. No. 10.1	The contract price (excluding taxes, duties, freight, insurance) less advance paid of i) Plant and Equipment, ii) Steel for Civil, Structural Works and iii) Cement shall be subject to adjustment in accordance with the formula stipulated under the Schedule 3 of the contract.	The <u>Indian Rupee Component</u> of contract price (excluding taxes, duties, freight, insurance) less advance paid of i) Plant and Equipment, ii) Steel for Civil, Structural Works and iii) Cement shall be subject to adjustment in accordance with the formula stipulated under the Schedule 3 of the contract.	
6	Section 2A,Page 235/ Cl. No. 10.2	The price adjustment of a particular item shall not exceed ± 20% of the total contract price of the particular item. This ceiling shall be applicable for the contract price of that item and not to the price billed in individual invoices or for individual shipments.	The price adjustment of a particular item shall not exceed ± 20% of the ~~total~~ <u>Indian Rupee Component</u> of contract price ~~of the particular item.~~ This ceiling shall be applicable for the <u>Indian Rupee Component</u> of contract price ~~of that item~~ and not to the price billed in individual invoices or for individual shipments.	
7	Section 2A,Page	70% payment towards the Price Adjustment on supply of	~~70%~~ <u>75%</u> payment towards the Price Adjustment on supply of	

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		BID SPECIFICATION NO.:DG/BSL U-6/2011/T-1		
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Sr No	Section/ Page No/Cl No.	Existing Particulars of Bid Stipulation including amendment/corrigendum thereof	To be read as	
	241/ Cl. No. 12.7.1	equipment/mandatory spares along with taxes thereon shall be paid against submission of invoices along with documentary evidence (one original + two copies).	equipment/mandatory spares along with taxes thereon shall be paid against submission of invoices along with documentary evidence (one original + two copies).	
8	Section 2A,Page 242/ Cl. No. 12.7.2	Balance 30% payment of price adjustment shall be released as per the provisions of Clause No. 12.4.4 and Clause 12.6 above.	Balance ~~30%~~ 25% payment of price adjustment shall be released as per the provisions of Clause No 12.4.4 and Clause 12.6 above.	
9	Section 2B,Page 270/ Cl. No. 25.2	The price adjustment shall not exceed ± 20% of the contract price. This ceiling shall be applicable for the contract price not to the price billed in individual invoice.	The price adjustment shall not exceed ± 20% of ~~the~~ <u>Indian Rupee Component of the</u> contract price. This ceiling shall be applicable for the <u>Indian Rupee Component of</u> contract price ~~of that item~~ and not to the price billed in individual invoices or for individual shipments.	
10	Section 2B,Page 273/ Cl. No. 27.5.1	70% payment towards the Price Adjustment on supply of equipment/mandatory spares services rendered along with taxes thereon shall be paid within 30 days from the date of submission of invoices along with documentary evidence (one original + two copies).	~~70%~~ 75% payment towards the Price Adjustment on <u>site works</u> ~~supply of equipment/mandatory spares~~ along with taxes thereon shall be paid against submission of invoices along with documentary evidence (one original + two copies).	
11	Section 2B,Page 273/ Cl. No. 27.5.2	Balance 30% payment of price adjustment shall be released as per the provisions of Clause No. 27.3.3 and Clause No. 27.4 above.	Balance ~~30%~~ 25% payment of price adjustment shall be released as per the provisions of Clause No. 27.3.3 and Clause No. 27.4 above.	
12	Section 3,Page 331/ Cl. No. 8.4	For not achieving the Phased Manufacturing Programme, total Liquidated Damages (over and above and independent of the Liquidated Damages payable against Clause No. 30, Section - 2, Volume - I) to the extent of 5% of the contract price shall be payable by the contractor.	For not achieving the Phased Manufacturing Programme, total Liquidated Damages (over and above and independent of the Liquidated Damages payable against Clause No. 30, Section - 2, Volume - I) to the extent of ~~5% of the contract price~~ <u>INR 900 Million for each SG and INR 650 Million for each STG</u> shall be payable by the contractor.....	
13	Section 3,Page 331/ Cl.	The Liquidated Damages against this clause shall be recovered within 10 weeks from the delay of respective	The Liquidated Damages against this clause shall be recovered within 10 weeks from the delay of respective milestone either from	

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Sr No	Section/ Page No/CI No.	Existing Particulars of Bid Stipulation including amendment/corrigendum thereof	To be read as	
	No. 8.5	milestone either from the bills of the contractor by en-cashing the bank guarantee submitted by the contractor against security of the Phased Manufacturing Programme.	the bills of the contractor or by en-cashing the bank guarantee submitted by the contractor against security of the Phased Manufacturing Programme. <u>However, in case the Contractor/Consortium Partner having already undertaken commitments for PMP in line with the advisory from CEA in this regard in the order(s) for respective Supercritical Equipment (SG and/or STG) for 660 MW project in India and submitted bank guarantees for security for default against specified PMP:</u> i) <u>The Contractor shall not be required to furnish the bank guarantees for security for default against specified PMP as indicated in Clause 8.3 above.</u> ii) <u>After completion of time periods indicated under Clause No. 8.3 above from the Date of Award of the first order against which such bank guarantee is submitted, the Contractor/Consortium Partner shall be required to undertake manufacturing activities as indicated in Clause No. 8.3 above in the Indigenous manufacturing facilities set up under the PMP for the supplies to be made against this contract and the same shall be demonstrated to the entire satisfaction of the owner, failing which, Liquidated Damages as stipulated under Clause No. 8.4 at the rates stipulated under Clause No. 8.3 above shall be recovered forthwith from the bills of the Contractor.</u>	

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	CORRIGENDUM - XIII	

2. Following Typographical errors/omissions are corrected as shown in column No. (3) below :

Sr No.	Clause No./Sr No. of Bid Specification/Corrigendum/ Amendment	Corrected as
(1)	(2)	(3)
1.	Sr. No. 3 of Corrigendum-X (Loading for evaluation on account of Duration offered) : INR 3,600,000/- (INR Three Million Six Hundred Thousand Only)	INR 3,600,000/- (INR Three Million Six Hundred Thousand Only) <u>per day</u>
2.	Sr. No. 2 of Corrigendum-III : "per Kcal/kW"	"per Kcal/kWh"
3.	Sr. No. 34 of Corrigendum-X : "per kWh"	"per kW"
4.	Sr. No. 23 of Corrigendum-X	Sr No. of the Clause shall be read as 12.13 instead of 12.12
5.	Sr. No. 28 of Corrigendum-X	Sr No. of the Clause shall be read as 27.10 instead of 27.9
6.	Table Sr. No. (i) under Cl. 31.6, Sec.-1, Vol-I of Bid Specification	Shall be read as "Price for entire scope of work as per the Bid Specification including Amount of taxes and Duties quoted by the bidder"

All other stipulations of the Vol-I of the Bid Specification shall remain unchanged

3. Following foot note is added for para 2 of Clause 1, Annexure-V (A), Section-I, Volume-I, Page 84 of Bid Specification :

Note :

Not applicable in case of the Subsidiary/Joint Venture company established before Ten years as on the date of opening of bids and the minimum subscribed and paid up share capital of such Subsidiary/Joint Venture company as on the date of opening of bid is minimum INR 500 Million (INR 50 Crores) and net worth as on the last day of previous financial year as on date of Techno-commercial bid opening is minimum INR One Billion (INR 100 Crores).

4. Following clearance is added to the Table-1 (Responsibilities of the Owner and the Contractor to obtain clearances required for the project), Page 333, Section-3, Volume-I

Sr No.	Clearance	Authority	Responsibility
45 (a)	Structural Stability Certificate as per Maharashtra Factories Rules 1983, Rule 3(a) (Form No. 1 A)	Competent Person defined in said Rules	Contractor

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CORRIGENDUM - XIII

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5. Clause No. 8.3 (The Phased Manufacturing Program shall be read as under) , Section 3, Volume-I, Page 328 of the Bid specification is modified as under :

Table A: For Steam Generator (SG):

Sr. No.	Equipment	Indicative Facilities Requirement	To be established latest by (Months from date of LOA)	Weightage factor (%age) for LD
1	Pressure Parts (straight water wall & spiral water wall)	• Straight tube butt welding facility • Automatic welding facility for panel processing • NDT facilities • Hydro testing • Continuous heat treatment furnace • Gang/panel bending facility (for straight water wall & spiral water wall tube panels)	36	35
2	Pressure Parts (Economiser, super heater and re-heater coils and panels)	• System bend facility • Welding facility • NDT facilities • Hydro testing • Continuous heat treatment furnace • Jigs & fixtures for assembly and layout checking facility • Portable equipment for material / grade identification	42	30
3	Pressure Parts (headers)	• Welding • Machining & drilling	42	20

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Sr. No.	Equipment	Indicative Facilities Requirement	To be established latest by (Months from date of LOA)	Weightage factor (%age) for LD
		- Heat treatment - Hydraulic testing - NDT facilities - Pressing facility for end caps & tees - Material identification facility - Facility for high alloy (P5 and above) continuous welding		
4	Separator (shell and dished ends)	- Rolling facility / pressing Facility - Machining & drilling - Welding - Heat treatment - Hydraulic testing - NDT facilities - Pressing arrangement for dished ends	48	15
TOTAL				100

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	CORRIGENDUM - XIII			
Table B: for Steam Turbine & Generator:				
Sr. No.	Equipment	Indicative Facilities Requirement	To be established latest by (Months from date of LOA)	Weightage factor (%age) for LD
1	Turbine Casings and Valves machining	• LP outer Casing fabrication • HP / IP / LP Casing Machining & blading • Heat Treatment / Stress Relieving • Turbine valve machining & assembly testing	36	20
2	Turbine Rotor machining	• Rotor machining including grooves & Fir Tree machining. • Rotor assembly and balancing • Turbine assembly	42	20
3	Rotating blades machining	• Rotating Blade machining & finishing	52	20
4	Generator Core and stator manufacturing	• Core stamping, fabrication facility, Heat Treatment / Stress Relieving. • Generator Stator Fabrication and Core building facility • Stator bar manufacturing and heavy machining facility for fabricated items.	40	20
5	Generator Rotor	• Rotor machining including slotting • Rotor assembly and balancing	42	15

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Sr. No.	Equipment	Indicative Facilities Requirement	To be established latest by (Months from date of LOA)	Weightage factor (%age) for LD
		- Exciter manufacturing & testing - Rotor winding facility		
6	Generator Assembly	Generator assembly and testing	48	5
TOTAL				100

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CORRIGENDUM - XIV

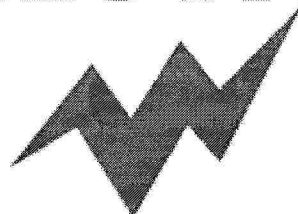
BID SPECIFICATION NO.: DG/BSL U-6/2011/T-1

DEPARTMENT

PROJECTS & PLANNING

MAHARASHTRA STATE POWER
GENERATION CO. LTD.

MAHAGENCO



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CORRIGENDUM TO BID SPECIFICATION
VOLUME-VIA

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 MAHARASHTRA STATE POWER GENERATION CO. LTD.		BID SPECIFICATION NO.:DG/BSL U-6/2011/T-1		CORRIGENDUM - XIV		Page 7 of 7
1. Following Clauses of the Bid Specification are amended as under :						
Sr No	Section/ Page No/CI	Equipment	Existing Particulars of Bid Stipulation including amendment/corrigendum thereof	Length of Bridge	1	
	Vol.VI-A, Corrigen dum -I, Page 138 of 247, CI. No. 1.1.1		Railway Bridge Portion : Two span of 20 to 25 M Total length of Bridge in Railway portion is approximately 50 M. Non-Railway Bridge Portion : 10 spans of 25.00M each i.e. @ 250.00 meters. Total length of viaduct in Non- Railway portion is 250.00 M.	Total length of Bridge in Railway portion is approximately 165M. Non-Railway Bridge Portion : 10 spans of 25.00M each i.e. @ 250.00 meters. Total length of viaduct in Non- Railway portion is 250.00M. Balance Sloping portion of Approach Shall be Reinforced earth wall on either side.		



**MAHARASHTRA STATE POWER
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**PROJECTS & PLANNING
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BID SPECIFICATION NO.: DG/BSL U-6/2011/T-1

CORRIGENDUM - XV

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<u>CONTENTS</u>			
<u>SR.NO</u>	<u>DESCRIPTION</u>		
1.0	VOLUME -II : MASTER SPECIFICATIONS		
2.0	VOLUME -III- B : STEAM TURBINE GENERATOR &AUXILIARIES		
3.0	VOLUME -III- C : COAL HANDLING SYSTEM		
4.0	VOLUME -III- D : ASH HANDLING SYSTEM		
5.0	VOLUME -III- E-1 : WATER TREATMENT SYSTEM		
6.0	VOLUME -III- F : PIPING SPECIALTIES AND THERMAL INSULATION		
7.0	VOLUME III-G : COMPRESSED AIR, AIR-CONDITIONING & VENTILATION SYSTEMS		
8.0	VOLUME -III- H : FIRE PROTECTION AND DETECTION SYSTEMS		
9.0	VOLUME -III- I : MATERIAL HANDLING AND MISCELLENEOUS EQUIPMENT		
10.0	VOLUME -IV-A : ELECTRICAL EQUIPMENT & ACCESSORIES		
11.0	VOLUME -IV-B : ELECTRICAL EQUIPMENT & ACCESSORIES.		
12.0	VOLUME -V : CONTROL AND INSTRUMENTATION		
13.0	VOLUME -VI A : CIVIL, STRUCTURAL AND ARCHITECTURAL WORKS		
14.0	VOLUME -VII A : BID PURPOSE DRAWINGS (MECHANICL)		

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MAHARASHTRA STATE POWER GENERATION CO. LTD.
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VOLUME II: MASTER SPECIFICATIONS

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CORRIGENDUM - XV					
...					
Sr. no.	Sec. No/ Page No/ Cl. No.	Equipment/S ystem	Existing Particulars	To be read as	
1.0	Section-3, Page 43 of 555	Supply of Equipment and Systems -Electrical System	Cranes, elevators, workshop equipment, laboratory equipment within power plant area	Cranes, elevators, laboratory equipment within power plant area	
2.0	Sect-4 / Page 98 of 555/ Clause 2.8 Annexure – B	General Technical Requirement - Criteria For Layout	Temporary storage areas, workshops, offices, residence etc. required at the time of erection work.	Temporary storage areas, offices, residence etc. required at the time of erection work.	
3.0	Section - 9 Pages 244 of 555, Annexure-A Clause23- 1.6	Mandatory Spare Parts – STG & Auxiliaries - Condenser	Condenser tubes - 10%	Deleted.	
4.0	Sect-9/ Page 257 of 555/ Clause 1.8	Coal Handling Systems - Rota Side Wagon Tippler		To be added. For Variable Frequency Drive	
				Thyristor	12 nos.
				Ignition transformers	12 nos.
				Firing cards	4 nos.
				Control transformers	2 nos.
				Auxiliary contactors	4 nos. each.
5.0	Sec- 9 / Page 258 of 555 / Clause 3.7and Corrigendum-I / Sr. no. 17 /	Coal Handling Systems - Apron Feeder	Apron Feeder Hydraulic Drive	Apron Feeder Variable Frequency Drive	
				Thyristor	12 nos.
				Ignition transformers	12 nos.

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		CORRIGENDUM - XV			
Sr. no.	Sec. No/ Page No/ Cl. No.	Equipment/S ystem	Existing Particulars	To be read as	
				Firing cards	4 nos.
				Control transformers	2 nos.
				Auxiliary contactors	4 nos. each.
6.0	Sec- 9 / Page 260 of 555 Clause 4.3.1/ and Corrigendum-I / Sr. no. 18	Coal Handling Systems - Stacker-Reclaimer	Bucket Wheel Complete set of Hydraulic drive Unit - One (1) set	Bucket Wheel Complete set of Drive Gear Box Unit - One (1) set	
7.0	Sec- 9 / Page 265 of 555 Clause 6.9 and Corrigendum-I / Sr. no. 29	Coal Handling Systems - Conveyor Belt	Mandatory spares for Hydraulic Drive System for conveyors	Deleted.	
8.0	Sect-9/ Page 286 of 555/ Clause 23.0 Cl.no.23.1 Cl.no 23.2 Cl.no 23.3 Cl.no. 23.4 Cl.no. 23.5 Cl.no. 23.6	Ash Handling System - Instrument Air Compressor	Complete set of Instrument Air Compressor - One (1) Complete Rotor Assembly with shaft - One (1) Set Complete Gear Box- One (1) Set Bearing (DE & NDE) - Two (2) Sets Seal Kit -One (1) Set Coupling (Motor to Gear box & gear box to Compressor) -One (1) Set	Deleted.	

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Sr. no.	Sec. No./ Page No./ Cl. No.	Equipment/ System	Existing Particulars	To be read as
	Cl.no 23.7, Corrigendum - I, /Sr. no.41, Page 28 of 247		Drive Motor -One (1) Set	
9.0	Sect -9 / Page 287 of 555/ / Cl. No.24 Cl.no.24.1 Cl.no 24.2 Cl.no 24.3 Cl.no. 23.4 Cl.no. 24.5 Cl.no. 24.6 Corrigendum - I, /Sr. no.42, Page 28 of 247	Ash Handling System - Conveying Air Compressor	Complete set of Conveying Air Compressor- One(1) Complete Rotor Assembly with shaft - One (1) set Complete Gear Box - One (1) set each type Bearing (DE & NDE)- Two(2) set each type Seal Kit - One (1) set each type Drive Motor - One (1) set each type	Deleted.
10.0	Section - 9 Page 320 of 555, 1.15.2	Mandatory Spare Parts - Pipings, Specialties & Thermal Insulation	Each type, size and class above 100 NB - 20% or Two (2) whichever is higher	Each type, size and class above 100 NB - 20% or One (1) whichever is higher.
11.0	Section - 11, Page 488 of 555, Clause 2(34) (f)	List of Approved Vendors	Coal Handling Plant TECHPRO	Coal Handling Plant TECHPRO - Deleted.

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Sr. no.	Sec. No./ Page No./ Cl. No.	Equipment/ System	Existing Particulars	To be read as
12.0	Section - 11 Page 488 of 555 Clause 2(38) (a)	List of Approved Vendors	Ash Handling Plant TECHPRO ASHTECH	Ash Handling Plant Deleted.
13.0	Corrigendum - II / Annexure - II Page 197 of 247 and clarification dtd. 07.07.12 Sr. no. 3.4 & 3.5	Workshop Equipment	Workshop Equipment	Deleted.
14.0	Corrigendum -II, Page 228 of 274, Annexure-II clause 2.4.5 (a) (v)	Workshop equipment	Electrode Drying Oven Inner Size: 80(D)x80(W)x450 (H) m	Electrode Drying Oven Inner Size: 80(D)x80(W)x450 (H) mm - Deleted
15.0	Corrigendum -II, Page 234 of 274, Annexure-II clause 2.4.9 (a) (v)	Workshop equipment	Hydraulic Puller with Hydraulic Unit - Two (2) nos	Hydraulic Puller with Hydraulic Unit - One (1) each - Deleted.
16.0	Section-11, Page 507 of 555	List of Approved Vendors - Electrical	(New)	ONLINE INSULATION MONITORING & FAULT LOCATION SYSTEM - BENDER INDIA LTD.
17.0	Section-11 Page 507 of 555	List of Approved Vendors - Electrical	(New)	FAST DEPRESSURIZATION SYSTEM - SERGI INDIA - TRANSFORMER PROTECTOR Corporation ,USA.

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**VOLUME III - B : STEAM TURBINE GENERATOR AND
AUXILIARIES**

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Sr. no.	Sec. No/ Page No/ Cl. No.	Equipment/ System	Existing Particulars	To be read as
1.0	Section - 1 Page 30 of 308, Clause 6.2.4	Turbine Design & Construction - Rotor	Critical speed of composite rotor and blade assembly shall not be within $\pm 15\%$ of operating speed	Critical speed of composite rotor and blade assembly shall not lie within a range of $\pm 10\%$ of the operating speed of 3000 rpm.
2.0	Section - 3 Page 121 of 308, Clause 3.1.25 Clarification dtd. 09.10. 13 / Sr. no. 18 and Clarification dtd. 07.07. 12 /Sr. no. 211	General Performance Requirement	The Boiler Feed Pumps shall be capable of coasting down safely to standstill after it is tripped in the event of a sudden interruption of suction flow. The Bidder shall demonstrate this capability by a suitable dry-running test at his works and shall furnish full details of this proposed test including its duration etc. in the bid. The dry running test shall not be less severe than closing of the isolation valve on the feed pump suction and tripping the pump simultaneously. In this condition, the pump shall be capable of coasting down safely to standstill without any damage and shall be capable of being in normal service.	The Boiler Feed Pumps shall be capable of coasting down safely to standstill after it is tripped in the event of a sudden interruption of suction flow. The Bidder shall demonstrate this capability by a suitable dry-running test at his works as per CEA guidelines and shall furnish full details of this proposed test including its duration etc. in the bid. The dry running test shall not be less severe than closing of the isolation valve on the feed pump suction and tripping the pump simultaneously. In this condition, the pump shall be capable of coasting down safely to standstill without any damage and shall be capable of being in normal service. However, if the tests (Pressure Pulsation, Dry

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Sr. no.	Sec. No/ Page No/ Cl. No.	Equipment/ System	Existing Particulars	To be read as	
				Running, Thermal Shock, and Visual Cavitation) are not performed as per manufacturer's standard practice, Bidder shall submit the test results earlier carried out on identical design except dry run test.	
3.0	Section - 3 Page 155 of 308, Data Sheet A Clause 1.7 (a)	Specific Design Criteria for Condensate Extraction Pumps	Total dynamic head (TDH) at design capacity - While establishing the design TDH the following shall be considered : 125% of de-aerating feed water heater operating pressure at TG VWO (1% Make-up and design CWT)	Total dynamic head (TDH) at design capacity - While establishing the design TDH the following shall be considered : As per CEA guidelines, 110% of de-aerating feed water heater operating pressure at TG VWO (1% Make-up and design CWT)	

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VOLUME III - C : COAL HANDLING SYSTEM

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Sr. no.	Sec. No/ Page No/ Cl. No.	Equipment/Sy stem	Existing Particulars	To be read as
1.0	Page no. 11 of 245 Clause no. 2.1.12, Corrigendum -II, Sr. 21 and Clarification dtd.07.07.12 / Sr. no. 4	System Description	For blending operation, imported coal shall be reclaimed by conveyor 8 with the help of necessary hopper & pay loader. Capacity of Ground hopper shall be 150 Tonnes. Rated Capacity of Conv.8 shall be 450 TPH. Design Capacity of Conv.8 shall be 500 TPH.	For blending operation, imported coal shall be reclaimed by conveyor 8 with the help of necessary hopper & pay loader. Design and Rated Capacity of Conv.8 shall be 750 TPH.
2.0	Page 14 of 145/Clause no. 2.3	System Capacity	Two streams of conveyors and equipment (2x100%) with rated capacity of 1500 TPH shall be provided for coal handling system	Two streams of conveyors and equipment (2x100%) with Design capacity of 1500 TPH shall be provided for coal handling system
3.0	Page 14 of 145/ Clause 3.1.1	Wagon Tippler Complex	Rota side Wagon Tippler complete with all accessories including hydraulic drive system complete with hydraulic motor directly coupled to drive pinion (without any gear box), -----in data sheet enclosed.	Rota side Wagon Tippler complete with all accessories including Electro-Mechanical drive system (VFD) as specified in Volume-IV-A, coupled to drive pinion -----in data sheet enclosed.
4.0	Page 15 of 145/Clause no. 3.1.5	Wagon Tippler Complex	One (1) Operator's Cabin cum control room common for both wagon tipplers for controlling the	One (1) Independent Operator's Cabin cum control room for each wagon tippler for controlling the

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Sr. no.	Sec. No./ Page No./ Cl. No.	Equipment/System	Existing Particulars	To be read as
			operation of Wagon Tippers in conjunction with side arm charger and weight recorder with totaliser.	operation of Wagon Tippers in conjunction with side arm charger and weight recorder with totaliser.
5.0	Page 15 of 145/ Clause no. 3.1.7	Wagon Tippler Complex	One (1) set of Apron Feeder --- for evacuating ROM Coal at the rate of 1500 TPH from Wagon Tippler Hopper.	One (1) set of Apron Feeder --- for evacuating ROM Coal at the Design rate of 1500 TPH from Wagon Tippler Hopper.
6.0	Corrigendum - I/ # 5	Wagon Tippler Complex	One portable oil filtration machine in each of the following areas to filter oil of two (2) microns and minimum of Eight (8) lpm capacity shall be provided for conveyors.	Deleted.
7.0	Page 15 of 145/ Clause 3.1.14	Wagon Tippler Complex	One portable oil filtration machine in each of the following areas to filter oil of two (2) microns and minimum of Eight (8) lpm capacity shall be provided. (a) W.T. & Side arm charger (b) Apron feeder below W.T. complex (c) Stacker Reclaimer	One portable oil filtration machine in each of the following areas to filter oil of two (2) microns and minimum of Eight (8) lpm capacity shall be provided. (a) W.T. complex (b) Stacker Reclaimer
8.0	Page 16 of 145/ Clause 3.1.15	Wagon Tippler Complex	Online oil filtration system shall be provided for side arm charger and W.T. with	Online oil filtration system shall be provided for each of the hydraulically operated

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Sr. no.	Sec. No./ Page No./ Cl. No.	Equipment/System	Existing Particulars	To be read as
			dedicated hydraulic power packs.	equipment of CHP.
9.0	Page 18 of 145/ Clause no. 3.5.4	Chutes and Supporting Structures	One (1) portable hydraulic press --- ---- supplied. The machine shall be suitable for vulcanising 2200 mm belt used --- in the plant i.e. Belt Feeder.	One (1) portable hydraulic press --- ---- supplied. The machine shall be suitable for vulcanising 1800 mm belt used --- in the plant i.e. Belt Feeder.
10.0	Page 19 of 145 / Clause 3.9.6 Clarification dtd. 07.07.12 / Sr. no. 26	Miscellaneous	One (1) Grizzly hopper with Vibro feeder for feeding coal to Conveyor 8. Vibro-feeder capacity - 450TPH	One (1) Grizzly hopper with Vibro feeder for feeding coal to Conveyor 8. Vibro-feeder capacity - 750TPH - Design / Rated
11.0	Page 28 of 145 / Clause No. 5.1.10(a) to (d)	Design and Constructional Requirements	Mechanical Equipment / System Conveyor Drive	Deleted.
12.0	Page 29 of 145/ Clause 5.1.11 (b) Clarification dtd. 07.07. 12 /Sr. no. 51 and Clarification dtd. 09.10. 13/Sr. no. 7	Design and Constructional Requirements	Gear box Except belt feeder and reversible belt feeders all conveyor drives shall be hydraulic.	Gear box All conveyor drives shall be electro-mechanical.
13.0	Page 33 of 145/ Clause 5.1.12 Clarification dtd. 07.07. 12 /Sr. no. 51 and Clarification dtd. 09.10. 13/Sr. no. 7	Design and Constructional Requirements	Fluid Coupling Except belt feeder and reversible belt feeders all conveyor drives shall be hydraulic.	Fluid Coupling All conveyor drives shall be electro-mechanical

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Sr. no.	Sec. No./ Page No./ Cl. No.	Equipment/System	Existing Particulars	To be read as
14.0	Page 34 of 145/ Clause 5.1.13 Clarification dtd. 07.07.12 /Sr. no. 51 and Clarification dtd. 09.10.13/ Sr. no. 7	Design and Constructional Requirements	Couplings Except belt feeder and reversible belt feeders all conveyor drives shall be hydraulic.	Couplings All conveyor drives shall be Electro-Mechanical.
15.0	Page 38 of 145/ Clause 5.1.18 (a)	Design and Constructional Requirements	Hoppers, Chutes & Skirt Boards	To be added Before Wobbler Feeder, Banana Chute / Deflector Plate in chute shall be provided to avoid direct impact on wobbler bars.
16.0	Page 40 of 145/ Clause No. 5.2.2	Belt Feeders / Reversible Belt Feeders	Width of belt feeder in crusher house shall be ----- to screen. Belt speed shall be 3.0 m/sec. However, in no case the belt width should be less than 2000 mm.	Width of belt feeder in crusher house shall be -- ----- to screen. Belt speed shall be 3.0 m/sec. However, in no case the belt width should be less than 1600 mm.
17.0	Page 43 of 145/ Clause 5.4.1	Wagon Tippler	The Wagon Tippler shall be hydraulically operated Rota-side type having hydraulic clamping system for all box type open wagons.	The Wagon Tippler shall be Electro-Mechanically (VFD)) operated Rota-side type having hydraulic clamping system for all box type open wagons.
18.0	Page no. 44 of 245 Clause no. 5.4.5	Wagon Tippler	The tippler structure --- ----- in the process of tipping. Shock absorbing spring shall	The tippler structure ---- ----- in the process of tipping. Shock absorbing spring /
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Sr. no.	Sec. No./ Page No./ Cl. No.	Equipment/System	Existing Particulars	To be read as
			be provided to ensure smooth sitting of the cradle. Top and side supports of wagon.	Roller & cup arrangement shall be provided to ensure smooth sitting of the cradle. Top and side supports of wagon.
19.0	Page 45 of 145/ Clause 5.4.10	Wagon Tippler	Tippler shall be driven by suitable separate hydraulic systems for operation of hydraulic motors and hydraulic clamp cylinders. The individual hydraulic power pack to be located away from tippler shall be provided inside a room at ground floor of MCC/WT Control room. Wagon tippler drive shall be comprising of independent hydraulic motor each mounted directly on the shaft of drive pinion meshing with cast steel rakes bolted to the periphery of one end section of wagon tippler. All hydraulic motors shall be provided with disc brakes to hold the tippler at any position during rotation.	Tippler shall be driven by suitable Electro-Mechanical system (VFD) as specified in Volume-IVA and separate hydraulic systems for operation of hydraulic clamp cylinders shall be provided. The individual hydraulic power pack to be located away from tippler shall be provided inside a room at ground floor of MCC/WT Control room. Appropriate breaking arrangement shall be provided to hold the trippler at any position in case of failure of drive or failure of electric supply.
20.0	Page 46 of 145 / Clause 5.5.6	Apron Feeder	The hydraulic drive system ----- minimize pressure drop in pipelines.	Deleted. Instead of Hydraulic drive, Electro-Mechanical Drive (VFD) as specified in Volume-IV A shall be provided.

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Sr. no.	Sec. No./ Page No./ Cl. No.	Equipment/System	Existing Particulars	To be read as
21.0	Page 47 of 145 / Clause 5.5.7	Apron Feeder	The hydraulic motor output in terms of speed and torque shall be monitored using a suitable electronic controller installed in the power pack, which receives speed signal from the machine PLC. In turn, the controller supplies signals to the machine PLC regarding actual speed, hydraulic pressure etc. -----	The Electro Mechanical Drive (VFD) output in terms of speed and torque shall be monitored, which receives speed signal from the machine PLC. In turn, the controller supplies signals to the machine PLC regarding actual speed etc. -----
22.0	Page 47 of 145 / Clause 5.5.9	Apron Feeder	Hydraulic Motor The hydraulic motor shall be of fixed displacement ----- and start-up condition.	Drive unit Deleted.
23.0	Page 47 of 145 / Clause 5.6.2	Wobbler Feeder	This shall ----- gear boxes. The shaft shall be fitted with spherical roller bearings, which are mounted on heavy structural frame.	This shall ----- gear boxes. The shaft shall be fitted with concealed type spherical roller bearings, which are mounted on heavy structural frame.
24.0	Page 47 of 145 / Clause 5.6.3	Wobbler Feeder	Bearings shall be well protected from inside dust and against heavy vibrations.	Bearings shall be concealed type, well protected from inside dust and against heavy vibrations.
25.0	Page 51 of 145/Clause no. 5.7.16	Side Arm charger	The equipment shall be ----- R.C.C foundation. The SAC shall be operated automatically and	The equipment shall be -----R.C.C foundation. The SAC shall be operated automatically and

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Sr. no.	Sec. No./ Page No./ Cl. No.	Equipment/System	Existing Particulars	To be read as
			controlled from common W.T. control room.	controlled from respective W.T. control room.
26.0	Page 53 of 245 / Clause No. 5.8.17, Data Sheet-A/ Sr.no.3.4	Crusher	The housing is divided ----- stiffened suitably. SS Liners shall be arranged inside the housing.	The housing is divided - ----- stiffened suitably. Mn steel Liners shall be arranged inside the housing.
27.0	Page 56 of 145 / Clause 5.9.8	Stacker - Cum-Reclaimer (Bucket Wheel Type)	The slewing mechanism shall have hydraulic drives.	The slewing mechanism shall have Electro-Mechanical drives, as specified in Volume-IV-A.
28.0	Page 56 of 145 / Clause 5.9.9	Stacker - Cum-Reclaimer (Bucket Wheel Type)	The slewing movement shall be limited by operation & backup limit switch. Slewing shall be around ± 105 deg. Slew Hydraulic Motors: Radial Piston Cam Curve type. Number of pistons shall be even to eliminate unbalanced radial loads on hydraulic motor shaft bearing.	The slewing movement shall be limited by operation & backup limit switch. Slewing shall be around ± 105 deg.
29.0	Page 57 of 145 / Clause 5.9.15	Stacker - Cum-Reclaimer (Bucket Wheel Type)	The bucket wheel drive shall be through high torque low speed hydraulic motor without reduction gear unit.	The bucket wheel drive shall be through Electro-Mechanical Drive system, as specified in Volume-IV-A.
30.0	Page 76 of 245/ Clause	Belt Vulcaniser	Splicing of 2000 mm belt or widest belt used in the plant i.e.	Splicing of 1800 mm belt .

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Sr. no.	Sec. No./ Page No./ Cl. No.	Equipment/System	Existing Particulars	To be read as
	5.22.8(e)		belt feeder.	
31.0	Page 102 of 145/ Clause 5.34 Corrigendum - I/Sr # 28 and Clarification dtd. 07.07.12/Sr. no. 50	Annunciation	Hydraulic motor driven conveyors	Deleted.
32.0	Page 102 of 145/ Clause 8.1.9 Corrigendum - I /Sr. no. 31	Performance Tests and Guarantee	Bidder shall guarantee the performance requirement of all coal handling paths for the specified capacity of 1500 TPH for each stream considering loaded start of conveyors and equipment, as applicable.	Bidder shall guarantee the performance requirement of all coal handling paths for the designed capacity of 1500 TPH for each stream considering loaded start of conveyors and equipment, as applicable.
33.0	Page 129 of 245 / Data Sheet-A Sr. no. 5	Idler	Rate of flow - 1500 TPH (Rated)	Rate of flow - 1500 TPH (Design)
34.0	Page 133 of 245 / Data Sheet-A Sr. no. 1.5	Hopper Chutes & Skirt Board	Belt width - 1800mm / 2000mm	Belt width - 1400mm / 1600mm
35.0	Page 133 of 245 / Data Sheet-A Sr. no. 1.7	Hopper Chutes & Skirt Board	Rate of flow - 1500 TPH (Rated)	Rate of flow - 1500 TPH (Design)
36.0	Page 145 of 245 / Data Sheet-A	Belt Feeder / Reversible Belt Feeder	Capacity - Rate of flow - 1500 TPH (Rated)	Capacity - Rate of flow -

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Sr. no.	Sec. No./ Page No./ Cl. No.	Equipment/System	Existing Particulars	To be read as
	Sr. no. 1.5			1500 TPH (Design)
37.0	Page 149 of 245 / Data Sheet-A Sr. no. 1.6	Fixed tripper	Rate of flow - 1500 TPH (Rated)	Rate of flow - 1500 TPH (Design)
38.0	Page 157 of 245 / Data Sheet-A Sr. no. 1.6	Fixed tripper	Capacity - 1500 TPH (Rated)	Capacity - 1500 TPH (Design)
39.0	Page 180 of 245 / Data Sheet-A Sr. no. 4.4 (a)	Stacker-Cum-Reclaimer (Bucket Wheel Type)	Type of drive Hydraulic motor directly mounted on the drive shaft without any gear box unit.	Type of drive Electro-Mechanical Drive
40.0	Page 180 of 245 / Data Sheet-A Sr. no. 4.9	Stacker-Cum-Reclaimer (Bucket Wheel Type)	Slewing Mechanism of Boom Shall consist of horizontal ring bearing with geared rim. Drive shall consist of hydraulic motor and power pack unit without any gear box.	Slewing Mechanism of Boom Shall consist of horizontal ring bearing with geared rim. Drive shall be of Electro-Mechanical (VFD) as specified in Volume-IV- A
41.0	Page 191 of 245 / Data Sheet-A Sr. no. 3	Wagon Tippler	Type of drive : Hydraulic drive	Type of drive : Electro-Mechanical (VFD)
42.0	Page 194 of 245 / Data Sheet-A Sr. no. 11	Apron Feeder and Dribble Conveyor	Drive Details: Hydraulic motor directly mounted on the drive shaft without any gear box unit.	Drive Details: Electro-Mechanical (VFD) as specified in Volume-IV- A
43.0	Addendum - VI	SHFTABLE HEAD	SERVICE REQUIREMENT	SERVICE REQUIREMENT

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Sr. no.	Sec. No./ Page No./ Cl. No.	Equipment/Sy stem	Existing Particulars	To be read as
	Data sheet – A		Type Electrically/Hydraulic ally operated	Type Electrically operated

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VOLUME III-D: ASH HANDLING SYSTEM

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Sr. no.	Sec. No/ Page No/ Cl. No.	Equipment /System	Existing Particulars	To be read as
1.0	Page 20 of 175, Clause 3.9.1 Clarification dtd. 07.07.12 / Sr. no.20	System Description	Water Supply System	To be added : The system shall be designed without ETP RO requirements. Based on the type of system operational requirements, Zero Liquid Discharge shall be achieved.
2.0	Page 32 of 175 / Clause 4.15 Clarification dtd. 07.07.2012 / Sr. no. 50 & 51	Make -Up Water - DMCW System	One plate type heat exchanger with all accessories. PHE shall be designed considering heat load of ash conveying compressors, IA compressors, fluid coupling of Ash Slurry Pumps and HCSD Pump under working condition. Bidder shall explore the possibility of using DMCW system for Boiler Island. For detailed specification of PHE, please refer Volume-III-E.	Two (1W+1S) plate type heat exchanger with all accessories. PHE shall be designed considering heat load of Ash Conveying compressors, AHP IA compressors, fluid coupling of Ash Slurry Pumps and HCSD Pump under working condition. For detailed specification of PHE, please refer Volume-III-E.
3.0	Page 32 -33 of 175/ Clause 4.16	Make -Up Water - DMCW System	One DM water storage tank with all accessories. Capacity of DM Water tank shall be such that it can accommodate one hour cooling water requirements considering requirement of ash	One DM water storage tank with all accessories. Capacity of DM Water tank shall be such that it can accommodate one hour cooling water requirements considering requirements of Main Plant Service Compressors, Main Plant

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Sr. no.	Sec. No./ Page No./ Cl. No.	Equipment /System	Existing Particulars	To be read as
			conveying compressors, IA compressors, fluid coupling of Ash Slurry Pumps and HCSD Pump. For detailed specification of DMCW tank, please refer Volume-III-I.	Instrument Air (IA) Compressors, Coal Mill Reject Handling System Compressors, Ash Conveying compressors, AHP IA compressors, fluid coupling of Ash Slurry Pumps and HCSD Pump under working condition. For detailed specification of DMCW tank, please refer Volume-III-I.
4.0	Addendum - VI, Page 10 of 175	Hydro - Ejector System	Hydro-Ejector Fly Ash Evacuation System for first two fields of ESP hoppers	Hydro-Ejector Fly Ash Evacuation System for first two fields of ESP hoppers Alternatively, bidder can provide Fly Ash Evacuation System that would directly go to common Ash Slurry Sump through jet pumps below ESP hoppers.
5.0	Page 12 of 175 Clause 3.1.2	Bottom Ash Removal System	Bottom ash generated in -----Bottom ash generation shall be calculated at 100%PLF considering generation of bottom ash as 25% of total ash with worst coal.	Bottom ash generated in --- --Bottom ash generation shall be calculated at 100% PLF considering generation of bottom ash as 20% of total ash with worst coal.
6.0	Page 39 of 105 Clause 5.0(g) (i)	Ash Handling Plant -	Bottom Ash generation per shift (8 hours) considering worst coal at 100% PLF with 25% of total ash generation.	Bottom Ash generation per shift (8 hours) considering worst coal at 100% PLF with 20 % of total ash generation.

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		CORRIGENDUM - XV												
Sr. no.	Sec. No/ Page No/ Cl. No.	Equipment /System	Existing Particulars					To be read as						
	Page 40 of 175 Cl. No. 5.1.1 (c)		Input Data	Basis of Design	Quantity (TPH)			Input Data	Basis of Design	Quantity (TPH)				
		Ash collection data	Bottom Ash Collection (% of total ash)	25%	45.96			Bottom Ash Collection (% of total ash)	20%	36.78				
	Page 40 of 175	Design Capacity For Ash Handling System Description	Unit	Bottom Ash	Eco. Zone	AH Zone	ESP Zone	Unit	Bottom Ash	Eco. Zone	AH Zone	ESP Zone		
	Clause 5.2 (a)	Percentage of collection rate	%	25	5	5	90	TPH	20	5	5	90		
	Clause 5.2 (b)	Ash collection rate	TPH	45.96	9.2	9.2	165.47	TPH	36.78	9.2	9.2	165.47		

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VOLUME III-E1: WATER TREATMENT SYSTEMS

CONSULTANT : PROCON ENGINEERS

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		CORRIGENDUM - XV			
Sr. no.	Sec. No/ Page No./ Cl. No.	Equipment /System	Existing Particulars	To be read as	
1.0	Section -2 / page 41 & 42 of 313, Annexure-I	Analysis of Raw Water	-	To be added. Note: DM plant shall be designed considering total silica [i.e. Colloidal + reactive] and shall be less than 50% of BTG requirement. For example if BTG requirement is 0.02 ppm, it shall be less than 0.01 of BTG requirement. The same shall be included in Auxiliary Power Consumption.	

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VOLUME III-F: PIPING, SPECIALTIES & THERMAL INSULATION

CONSULTANT : PROCON ENGINEERS

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Sr. no.	Sec. No/ Page No/ Cl. No.	Equipment /System	Existing Particulars	To be read as
1.0	Section -2/ 85 of 158 / Annexure- I/ C - 1 & 2	Specification of Pipes For Different Services	Service: De-mineralised Water, Service and Instrument air piping less than and equal to 40 NB Materials of Pipes: Stainless Steel as per ASTM A-312 Gr 304. Thickness schedule 40S as per ANSI-B 36.19	Services : De-mineralised Water System less than and equal to 40 NB. Materials of Pipes: Stainless Steel as per ASTM 312 Gr 304. Thickness schedule 40S as per ANSI-B 36.19 Services : Instrument & Service Air System : As per IS-1239 (GI) Heavy Grade up to 150 NB. The pipes shall be galvanized as per IS: 4736.
2.0	Section -2/ 85 of 158 / Annexure- I/ D - 1 & 2	Specification of Pipes For Different Services	Service: De-mineralised Water, Service and Instrument air piping for sizes equal to or greater than 50 NB. Materials of Pipes: Stainless steel as per ASTM A-312 Gr 304. Size up to 250 NB as per schedule 10S, ANSI B 36.19	Service: DM Water System: Materials of Pipes: Stainless steel as per ASTM A-312 Gr 304. Size up to 250 NB as per schedule 10S, ANSI B 36.19 Instrument & Service Air System : IS-3589 for sizes above 150 NB. The pipes shall be

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Sr. no.	Sec. No./ Page No./ Cl. No.	Equipment /System	Existing Particulars	To be read as
				galvanized as per IS: 4736.
3.0	Section -2/ 102 of 158 /Clause 5.1.2	Design and Construction Large Diameter Piping	Pipe thickness shall be calculated based on AWWA standard (AWWA -M 11, chapter - 4) for internal pressure, external pressure, deflection and buckling criteria considering water filled pipe as well as vacuum condition that may prevail, transient / surge conditions, truck load, rail load and weight density for compacted soil etc. as applicable in line with relevant code. Contractor shall furnish pipe thickness calculations justifying the thickness selected.	Pipe thickness shall be calculated based on AWWA standard (AWWA -M 11, chapter - 4) for internal pressure, external pressure, deflection and buckling criteria considering water filled pipe as well as vacuum condition that may prevail, transient / surge conditions, truck load, rail load and weight density for compacted soil etc. as applicable in line with relevant code. Besides above, additional Design criteria for Large Diameter piping as per Annexure - III, shall also be considered while designing underground LD pipelines. Contractor shall furnish pipe thickness calculations justifying the thickness selected.

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VOLUME III-G: COMPRESSED AIR, AIR-CONDITIONING & VENTILATION SYSTEMS

CONSULTANT : PROCON ENGINEERS

 MAHARASHTRA STATE POWER GENERATION CO. LTD. BID SPECIFICATION NO.: DG/BSL U-6/2011/T- 1 CORRIGENDUM - XV		Page 32 of 71		
Sr. no.	Sec. No/ Page No/ Cl. No.	Equipment /System	Existing Particulars	To be read as
1.0	Section -3, Page 120 of 171 , Clause 3.16.16	Technical requirements - Extent of Package	Ventilation provision for Auxiliary Buildings in various locations shall be done as follows: Toilet area of Fire Station Building : Wall mounted exhaust fans	Ventilation provision for Auxiliary Buildings in various locations shall be done as follows: Deleted.
2.0	Section -3, Page 121 of 171 , Clause 3.21	Technical requirements - Extent of Package	Ventilation provision for Auxiliary Buildings in various locations shall be done as follows: Work shop Building	Ventilation provision for Auxiliary Buildings in various locations shall be done as follows: Deleted.
3.0	Section -3, Page 121 of 171 , Clause 3.30	Technical requirements - Extent of Package	Ventilation provision for Auxiliary Buildings in various locations shall be done as follows Fire Station Building	Ventilation provision for Auxiliary Buildings in various locations shall be done as follows Deleted.
4.0	Section -3, Page 124 of 171 , Clause 5.1.2 (n)	Technical requirements - Areas To Be Covered Under Ventilation System:	Other areas such as, Fire station, Workshop, Store etc, which are not covered by Air-Conditioning system.	Other areas such as, Store etc, which are not covered by Air-Conditioning system.

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VOLUME III-H: FIRE PROTECTION & DETECTION SYSTEM

CONSULTANT : PROCON ENGINEERS

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Sr. no.	Sec. No/ Page No/ Cl. No.	Equipment /System	Existing Particulars	To be read as
1.0	Page 11 of 123 Clause 3.1(o)	System Description	Hydrant Systems Cylinder shed & fire station area.	Hydrant Systems Cylinder shed
2.0	Page 13 of 123 Clause 3.2.2	System Description - Category - B	High Velocity Water Spray System (Hvw System) The operation of Deluge Valves shall be annunciated in the Local Zone Fire Alarm Panel as well as in the Central Fire Detection and alarm Panel with repeat alarm at Fire Station Buildings.	High Velocity Water Spray System (Hvw System) The operation of Deluge Valves shall be annunciated in the Local Zone Fire Alarm Panel as well as in the Central Fire Detection and alarm Panel with repeat alarm at Existing Fire Station Building of 2x500MW units.
3.0	Page 13 of 123 Clause 3.3	System Description	Medium Velocity Water Spray System (MVWS System) This system essentially consists of a network -- ---- with repeat alarm at Fire Station Buildings.	Medium Velocity Water Spray System (MVWS System) This system essentially consists of a network ----- with repeat alarm at Existing Fire Station Building of 2x500MW units.
4.0	Page 18 of 123 Clause 3.11(h)	System Description	All pump houses namely CW/ACW Pump House, Raw water / Fire water pump house, ---- F.O. Pump House and HCSD pump house etc.	All pump houses namely, CW/ACW Pump House, Raw water/Fire water pump house, ----- F.O. Pump House and HCSD pump house , condensate & Boiler Fill pump house etc

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Sr. no.	Sec. No./ Page No./ Cl. No.	Equipment /System	Existing Particulars	To be read as
5.0	Page 24 of 123 Clause 4.4.1	Functional requirement of various panels in Fire Protection System	PLC based Local Fire Water Control Panel ----- as well as in Fire Station Building -----	PLC based Local Fire Water Control Panel -- ----- as well as in Existing Fire Station Building of 2x500MW units -----
6.0	Page 25 of 123 Clause 4.4.5	Operational Philosophy -	One Repeater Fire Alarm Panel and one Operating cum engineering station with 24" TFT colour Monitor with Printer located in Fire Station, which shall receive:	One Repeater Fire Alarm Panel and one Operating cum engineering station with 24" TFT colour Monitor with Printer located in Existing Fire Station Building of 2x500MW units which shall receive:
7.0	Page 34 of 123 Clause 5.4.4	Scope of Work Electrical	Repeater Fire Alarm to be located in the Fire Station.	Repeater Fire Alarm to be located in the Existing Fire Station Building of 2x500MW units.
8.0	Page 34 of 123 Clause 5.4.6	Scope of Work Electrical	Main Fire Detection and Alarm Panels in CCR, local Fire Alarm Panels and Repeater Fire Alarm Panel in Fire Station shall be integrated-----	Main Fire Detection and Alarm Panels in CCR, local Fire Alarm Panels and Repeater Fire Alarm Panel in Existing Fire Station Building of 2x500MW units shall be integrated ----- -----
9.0	Page 34 of 123 Clause 5.4.8	Scope of Work Electrical	Two (2) sets (1 working & 1 standby, 100% capacity) ----- Repeater Fire Alarm Panel in Fire Station.	Two (2) sets (1 working & 1 standby, 100% capacity) --- ----- Repeater Fire Alarm Panel in Existing Fire Station Building of 2x500MW units.
10.0	Page 41 of 123 Clause 6.2.2	Scope of Work Design	The fire detection and alarm system shall essentially ----- -with LCD Key Board	The fire detection and alarm system shall essentially ----- with LCD Key Board

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Sr. no.	Sec. No./ Page No./ Cl. No.	Equipment /System	Existing Particulars	To be read as
		Basis and Input - Electrical	Station located in Fire Station,-----	Station located in Existing Fire Station Building of 2x500MW units.
11.0	Page 41 of 123 Clause 6.2.4	Scope of Work Design Basis and Input - Electrical	The Fire Detection and Alarm Panels shall also be connected to a Master Fire Alarm Panel, to be installed in Fire Station for repetition ----- -	The Fire Detection and Alarm Panels shall also be connected to a Master Fire Alarm Panel, to be installed in Existing Fire Station Building of 2x500MW units for repetition -----
12.0	Page 42 of 123 Clause 6.2.6(b)	Scope of Work Design Basis and Input - Electrical	Notify automatically central fire station.	Notify automatically central fire station (Existing) Building of 2x500MW units.
13.0	Page 61 of 123 Clause 7.9.1 (d)	Design and Construction	Battery and Battery Charger All controls, interlocks, indications, ----- and the Master Panel (located in Fire Station), shall -----	Battery and Battery Charger All controls, interlocks, indications, ----- and the Master Panel (located in Existing Fire Station Building of 2x500MW units , shall -----
14.0	Page 63 of 123 Clause 7.10.1.3	Fire Panels	Repeater Fire Alarm Panel in Fire Station	Repeater Fire Alarm Panel in Existing Fire Station Building of 2x500MW units.
15.0	Page 68 of 123 Clause 7.10.2.3	Fire Panels	Repeater Fire Alarm Panel in Fire Station	Repeater Fire Alarm Panel in Existing Fire Station Building of 2x500MW units.

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Sr. no.	Sec. No/ Page No/ Cl. No.	Equipment /System	Existing Particulars	To be read as	
16.0	Page 76 of 123 Clause 7.14.2	Fire Panels - Microprocessor Based Fire Alarm System	Detector System Selection of type and number of detectors shall be ----- along with repeat display at fire alarm panel in Fire Station.	Detector System Selection of type and number of detectors shall be ----- along with repeat display at fire alarm panel in Existing Fire Station Building of 2x500MW units.	
17.0	Clarification dtd.07.07.12 / Sr. no. 26 Corrigendum -I / Sr. No. 3 and Section-3, Page 43, of 555 Clause 1.11.6 Clarification dtd. 07.07. 12 /Sr. No. 26 & 27	Fire Detection and Fire Protection Systems	5.1.32 Transformers of 220 KVA and above shall be Provided with Nitrogen Injection based Fire Protection System in addition to HVW Spray system. Nitrogen Injection based Fire Protection system shall be provided to Generator transformer, Station transformer and Unit Aux. Transformer, in addition to HVW Spray system.	5.1.32 Transformer Protector Based on Dynamic Pressure rise (Explosion Preventor) Protection system shall be provided to Generator transformer and Station transformer in addition to HVW Spray system. The specification is attached as Annexure -I. Nitrogen blanketing System shall be provided for Unit Transformers in addition to HVW Spray system.	

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VOLUME III-I: MATERAIL HANDLING EQUIPMENT AND ACCESSORIES

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Sr. no.	Sec. No./ Page No./ Cl. No.	Equipment / System	Existing Particulars	To be read as
1.0	Section-I/ C / Page 106 of 328 Annexure-I	Material Handling Equipment And Accessories	List of Location for Monorail Hoists Condensate Transfer Pump House	List of Location for Monorail Hoists Condensate Transfer Pump House/Condensate pump & Boiler Fill pump room

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VOLUME IV-A: ELECTRICAL EQUIPMENT & ACCESSORIES

CONSULTANT : PROCON ENGINEERS

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Sr. no.	Sec. No/ Page No./ Cl. No.	Equipment /System	Existing Particulars	To be read as
1.0	Section-1 / Page 16 of 440 / Clause 1.7(m)	Scope Of Supply & Work	Cranes, elevators, workshop equipment, laboratory equipment within power plant area	Cranes, elevators, laboratory equipment within power plant area
2.0	Section-1 / Page 27 of 440 / Clause 5.5.9	System Description	L.V. SYSTEM A separate room shall be provided power plant EPC Vendor to house fire alarm and annunciation panels and equipment.	L.V. SYSTEM Power plant EPC Vendor shall house fire alarm and annunciation panels and equipment in Existing Fire Station Building of 2x500MW units.

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VOLUME IV-B: ELECTRICAL EQUIPMENT & ACCESSORIES

CONSULTANT : PROCON ENGINEERS

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Sr. no.	Sec. No/ Page No/ Cl. No.	Equipment /System	Existing Particulars	To be read as
1.0	Section-7 Page 242 of 457 Annexure-A (m)	Electrical Equipment & Accessories	Broad List of Areas to be Illumined DG & Compressor BLDG.	Broad List of Areas to be Illumined (i) DG Room (ii) Compressor Building
2.0	Section-7 Page 242 of 457 Annexure-A (v)	Electrical Equipment & Accessories	Broad List of Areas to be Illumined Work shop	Broad List of Areas to be Illumined Deleted.
3.0	Section-7 Page 243 of 457 Annexure-A (kk)	Electrical Equipment & Accessories	Broad List of Areas to be Illumined Fire station	Broad List of Areas to be Illumined Deleted.
4.0	Section-7 Page 243 of 457 Annexure-A	Electrical Equipment & Accessories		To be added Broad List of Areas to be Illumined - Condensate & Boiler Fill Pump house -
5.0	Section-8 / Page 338 of 440 Clause 1.32 Annexure-A	Indicative List of 415V PCCS/PM CCS/MCC s / DBS/ SVBS /FBS/DC Starters	415V Work shop MCC 1 no.	Deleted.
6.0	Section- 8 / Page 338 of 457 Annexure-A	Electrical Equipment & Accessories	Indicative List of 415V PCCs/PMCCs/ MCCs/ DBs/ SVBs/FBs/DC Starters	Indicative List of 415V PCCs/PMCCs/ MCCs/ DBs/ SVBs/FBs/DC Starters Condensate and Boiler Fill Pump house - One (1)

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		CORRIGENDUM - XV		
7.0	Section-10 / Page 300 of 457 / Clause 2.3	Installation of Cabling, Grounding and Lightning Protection System	Material for electronics earthing system (electronics earth electrode, earthing bus and single core copper cable from earth pit to electronic earthing bus) shall be of hard drawn copper wire as per equipment vendor supplier's requirement. Connection from electronic earth bus to individual equipment shall be with minimum 6 sq. mm. copper cable or equipment supplier recommendation whichever is higher.	For electronic earthing , Earth pit shall be prepared with 100 NB C.I pipe electrode and filled with Bentonite (i.e. volcanic ash) material with watering arrangement. 1) Four no of treated earth pit shall be connected in parallel for BTG area earthing. For BTG area earthing electronic earth pits to grounding bus / grounding cubical and or distribution board shall be connected with single core copper cable of following size a) 70 mm² for length < 120 mtrs b) 95 mm² for length < 180 mtrs c) 120 mm² for length < 250 mtrs 2) For BOP area electronic (PLC) earthing two no of earth pits with 100 NB C.I pipe electrode shall be used. Earth pit shall be filled with Bentonite material and watering arrangement shall be provided. Two no of earth pits shall be connected in parallel. From earth pit to common grounding bus cu cable of 16 sq mm shall be used.

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VOLUME - V: CONTROL AND INSTRUMENTATION

CONSULTANT : PROCON ENGINEERS

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Sr. no.	Sec. No./ Page No./ Cl. No.	Equipment /System	Existing Particulars	To be read as
1.0	Section – 4 / Page 214 of 718 Clause 14	Fire Detection & Alarm System (for entire plant)	Control through HMI (Control, Monitoring & Programming) One (1) no. OS+ One (1) no. ES in CCR and One (1) no. OS cum ES in Fire station	Control through HMI (Control, Monitoring & Programming) One (1) no. OS+ One (1) no. ES in CCR and One (1) no. OS cum ES in Existing Fire station of 2x500MW units.
2.0	Section – 4 / Page 214 of 718 Clause 14	Fire Detection & Alarm System (for entire plant)	Remarks One(1) no main panel in CCR. One (1) no. Repeater panel in fire station. Fire alarm & detection panel shall also be provided at CHP, AHP, WTP, ESP, Fuel oil area.	Remarks One(1) no main panel in CCR. One (1) no. Repeater panel in Existing fire station of 2x500MW units. Fire alarm & detection panel shall also be provided at CHP, AHP, WTP, ESP, Fuel oil area
3.0	Section-5 Page 440 of 718 Corrigendum -I , Clause 13.0	Special Requirements of Instrumentation based on Energy Audit Programme – Coal	Coal Station Coal Measurement (Coal Receipt Measurement)	Coal Station Coal Measurement (Coal Receipt Measurement) Please refer Annexure-II
4.0	Section-7A Page 499 of 718 Annexure-A Clause 13.0	Types of Telephone System Equipment - Desk Top Push Button Operated TYPE – X –	Areas of Use Various areas in including : Control Room In-charge's ---- and Laboratory for DM Plant, Fire Station, --	Areas of Use Various areas in including : Control Room In-charge's - --- and Laboratory for DM Plant, , -----

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Sr. no.	Sec. No./ Page No./ Cl. No.	Equipment /System	Existing Particulars	To be read as
5.0	Section-7A Page 502 of 718 Annexure-B Clause 13.0	Instrumentation & Control	List of Distribution of Telephone Extension Sets Fire Station Building	List of Distribution of Telephone Extension Sets Existsing Fire Station Building of 2x500MW units.
6.0	Section-7A Page 502 of 718 Annexure-B Clause 14.0	Instrumentation & Control	List of Distribution of Telephone Extension Sets Workshop	Deleted.
7.0	Section-7A Page 502 of 718 Annexure-B		List of Distribution of Telephone Extension Sets New Clause	To be added - DG set Room
8.0	Section-7A Page 502 of 718 Annexure-B		List of Distribution of Telephone Extension Sets New Clause	To be added - Condensate & Boiler Fill Pump house

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**VOLUME -VI A: CIVIL, STRUCTURAL AND ARCHITECTURAL
WORKS**

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Sr. no.	Sec. No./ Page No./ Cl. No.	Equipment /System	Existing Particulars	To be read as
1.0	Section-1, Page 47 of 639, Clause 3.4(b)	Auxiliary Plant / Non Plant Buildings	Fire Station, Work Shop , Construction / Fabrication Yard (temporary / permanent structure if any)	Construction / Fabrication Yard (temporary / permanent structure if any)
2.0	Section-1, Page 108 of 639, Clause 4.7.20.2	Plant structures / component : Tower Design Consideration	Size and Shape Hb is the vertical distance from the throat to basin sill level and 'D' is the base diameter at basin sill level. However, ----- the Owner reserves the right to accept / reject the shell profile.	Size and Shape Hb is the vertical distance from the throat to basin sill level and 'D' is the base diameter at basin sill level. Please refer - IV attached with Corrigendum -XV. However, ----- the Owner reserves the right to accept / reject the shell profile.
3.0	Section-2, Page 207 of 639, Clause 10.0	Specific Design Requirements - Civil	New Clause	To be added: Besides above, additional Design criteria for Large Diameter piping as per Annexure - III, shall also be considered while designing underground LD pipelines.
4.0	Section-2, Page 316 of 639, Clause 5.6 (a) to (e) of Exhibit - IV	Specific Design Requirements - Civil-Finish items - Painting	(a) Ensure that the surface are blast cleaned to near white metal surface (SA 2.5) (b) Painting with inorganic zinc silicate primer (DFT-75 microns) (c) Ist coat of epoxy based finish	The painting specifications under Clause 5.6 of Exhibit IV of Section -2 of Volume – VIA stands replaced by the specifications given in Annexure -V attached with Corrigendum -XV.

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Sr. no.	Sec. No./ Page No./ Cl. No.	Equipment /System	Existing Particulars	To be read as
			polyamide cured painting, DFT - 75 micron (d) 2nd Coat of epoxy based finish polyamide cured painting, DFT-75 micron. (e) Polyurethane finish paint DFT - 25 micron	
5.0	Section-3, Page 368 of 639, Clause 1.7	Specific Design Requirement – Structural	Shop primer paint will be single coat of red oxide zinc- chromate primer conforms to IS-2074 ---- paint shall not be less than 110 microns.	Please refer Specification under Annexure - V attached with Corrigendum-XV.
6.0	Section-4, Page 411 of 639, Clause 2.28(aa)	Design Requirements - Miscellaneous Work	Steel work, which is encased in concrete or galvanized, ----- surfaces shall be Aliphatic Polyurethane composed of 56% solids by volume and of 40 – 50 DFT.	Please refer Specification under Annexure- V attached with Corrigendum-XV.
7.0	Section-4, Page 444 of 639, Clause 5.1.13(f)	Design Data for Architectural Works - Painting	All structural steel ----- to IS-2074 and shall have minimum 110 micron DFT.	Deleted.
8.0	Section-4, Page 460 of 639, Clause 6.0(kk)	Interior Finish Schedule for Buildings	Fire station Building – Fire Tender Parking area (provision of 3 nos. of fire tenders).	Deleted.
9.0	Section-4,	Interior	Fire Station Building –	Deleted.

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Sr. no.	Sec. No./ Page No./ Cl. No.	Equipment /System	Existing Particulars	To be read as
	Page 460 of 639, Clause 6.0(II)	Finish Schedule for Buildings	Offices, Lobby, Control room, Rest room,	
10.0	Section-4, Page 460 of 639, Clause 6.0(mm)	Interior Finish Schedule for Buildings	Fire Station Building - Toilets	Deleted.
11.0	Section-4, Page 464 of 639, Clause 6.1(o)	Doors / Windows Schedules	Fire Station building	Deleted.
12.0	Section-4, Page 464 of 639, Clause 7.0(a)	Minimum Sizes of Non-Plant Buildings	Fire Station building	Deleted.
13.0	Section-4, Page 465 of 639, Clause 7.0(b)	Minimum Sizes of Non-Plant Buildings	Canteen Building - Approximate Plan Area - 25m X 15m	Canteen Building - Approximate Plan Area - 20m X 15m
14.0	Section-4, Page 465 of 639, Clause 7.0(e)	Minimum Sizes of Non-Plant Buildings	Work shop	Deleted.
15.0	Section-6, page 197 of 247, Clause 5.1.17.12 (a) Corrigendum -I,	ROB Work at Railway Crossing - Laying of Open Ducts	Open ducts with suitable removable covers shall be preferred in sub stations, switch rooms, plant rooms, workshop etc.	Open ducts with suitable removable covers shall be preferred in sub stations, switch rooms, plant rooms, etc.
16.0	Corrigendum -II, / Sr. no. 107	Workshop	Capacity of EOT Crane shall be 10 T.	Deleted.

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Sr. No.	Page No./Sr. No.	Dwg. No.	Revision	TITLE
1.0	VII A1	PE-189-GA-101	P9	PLOT PLAN
2.0	VII A2	PE-189-PF-209	P4	PROCESS FLOW DIAGRAM : COOLING WATER & AUXILIARY COOLING WATER SYSTEM
3.0	VII A2	PE-189-PF-210	P1	PROCESS FLOW DIAGRAM : CLOSED CYCLE COOLING WATER SYSTEM
4.0	VII A2	PE-189-PI-237	P5	P & I DIAGRAM : BOTTAM ASH HANDLING SYSTEM
5.0	VII A2	PE-189-PI-241	P2	P & I DIAGRAM : HIGH CONCENTRATION SLURRY DISPOSAL SYSTEM

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o.	Sec. No/ Page No/ Cl. No.	Equipment /System	Existing Particulars	To be read as
1.0	Plot Plan 1.12	Power Block Area	Air Compressor Building /DG Building / Cond. Pump and Boiler Fill Pumps Area - 24mx52m	Air Compressor Building /Mill Reject Compressors and Control room. - 14m x 48m
				DG Room (To be added) - 20m x 26m
				Cond. Pump and Boiler Fill Pumps Area(To be added) - 7.5m x 15m
2.0	Plot Plan 9.1	Non- Plant Building	Service Building - 15m x 48m	Service Building - 12m x 42m
3.0	Plot Plan 9.3	Non- Plant Building	Lube Oil Storage Shed with Storage yard - 30m x 15m	Lube Oil Storage Shed with Storage yard - 15m x 15m
4.0	Plot Plan 9.8	Non- Plant Building	Canteen - 15m x 25	Canteen - 15m x 20
5.0	PE-189-PF- 202, E4	Process Flow Diagram: Power Cycle System Condensate	Main condensate control station is 2 x 100% pneumatic control valve and 1 x 100% motorized ball valve.	Condensate level control valves shall be 1 x 30% pneumatic control valve + 1 x 100% pneumatic control valve + 1 x 100% motorized ball valve.

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ANNEXURE - I

Transformer Protector Based on Dynamic Pressure rise (Explosion Preventor) Protection System

Supply, Installation, Testing and commissioning of Explosion and Fire Prevention System for Transformer including Main Tank, On Load Tap Changer, Oil Cable Boxes and Oil Bushing Cable Boxes.

The transformer shall be equipped with, Explosion and Fire Prevention System for Transformer including Main tank, On Load Tap Changer, Oil Cable Boxes and Oil Bushing Cable Boxes. The system shall be complete in all aspects to perform the required functions and shall include not only of the transformer main tank explosion prevention and fire protection but also of the On-load tap changers, Oil bushing Cable boxes and Oil cable boxes, as applicable for transformers, using the principle of a Fast Depressurization System as mentioned in the NFPA Codes 850 & 851, Edition 2010. The system shall include a Nitrogen injection to evacuate the explosive gases in a remote area, after an incident occurs. The depressurization process shall operate mechanically, without need of any actuator.

For Power transformers having the Oil filtration or filter units for the OLTC or cable Box, the same should be completely isolated from the OLTC/OCB during insert gas injection. The system shall ensure a complete protection for the transformer main tank, On load tap changer, Oil bushing cable boxes, Oil cable Boxes, as applicable for transformers, from any explosion in case of occurrence of internal short-circuits.

The principle of operation shall be such that in the event of high intensity fault resulting to excessive energy or dielectric oil over pressure, the system shall initiate the depressurization process within milliseconds after the fault occurrence. The depressurization shall be performed thanks to the first dynamic pressure peak of the shock wave, activating the depressurization set. After depressurization, nitrogen flow shall forbid the self -inflammable gases contact with the air (oxygen). However, nitrogen injection process shall operate only with the presence of the following signals.

- The activation of any of the integrated rupture disk explosion detector confirming the over pressure state and the beginning of the depressurization process and;

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- The activation of any of the electrical protection signal, confirming the electrical fault of the protected transformer.

The system operation shall be properly coordinated with the required input to avoid mal-operation and malfunction of the total system. Activation of only one signal among the conditions stated in above paragraph shall prevent the operation of nitrogen injection process and shall only generate remote annunciation/signal at the control room. Only at the presence of both signals shall the electrical actuator triggers the nitrogen injection process.

The nitrogen injection function shall:

- Start after a period of time but before the maintenance team open the transformer;
- Immediately stop the explosive and flammable gas production (hydrogen, methane, acetylene etc.);
- Evacuate the explosive hydrogen stocked in the tank upper parts;
- Replace the generated explosive and inflammable gases by a nitrogen atmosphere inside the vessel;
- Avoid air oil contact by slightly pressurizing the transformer with the nitrogen gas;
- Limit the damage caused by temperature gradient in the metal parts;
- Completely cool down the transformer by injecting nitrogen at the required time (normally 45 minutes) to bring the short circuit parts temperature down below the oil flash point.

The design of the nitrogen injection process shall also include manual activation of the nitrogen in the event that the DC power supply source for the transformer protector system fails.

All alarm signals associated with the transformer protector system i.e. AC, DC power supply failure, nitrogen cylinder low pressure alarm, system actuation audible alarm, etc. shall be sent to the control room at the control board annunciator system.

The depressurization system of the offered system shall be activated by the first dynamic pressure peak of the shock wave, avoiding transformer

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explosion before static pressure increases and should not be dependent on the activating signals from the Transformer accessories for prevention.

The design of the Transformer, On Load Tap Changer, Oil Cable Boxes and Oil Bushing Cable Boxes system shall be such that in maintaining the power transformer, the system can be isolated without affecting any of its components. All accessories necessary for this purpose shall be included in the scope of supply for the Transformer, On Load tap Changer, Oil Cable Boxes and Oil Bushing Cable Boxes System.

If required in the Technical Data Sheet of the transformer, the explosion and fire prevention shall be backed with Nitrogen Fire Extinguishing system. The principle shall consist of injecting nitrogen at the transformer base to extinguish fire.

Just like Explosion and Fire Prevention System, injection of nitrogen can be activated only in the presence of the following signals:

- The activation of any Linear Heat Detector (LHD) confirming the occurrence of fire and
- The activation of any of the electrical protection signal, confirming the electrical fault of the protected transformer.

The system operation of the backup system shall be properly coordinated with the required input to avoid mal-operation and mal-function of the backup system. Activation of only one signal among the two mentioned below:

- The activation of the LHD confirming the occurrence of fire; and
- The activation of any of the electrical protection signal, confirming the electrical fault of the protected transformer.

shall prevent the operation of nitrogen injection process and shall only generate remote annunciation/signal at the control room. Only at the presence of both signals shall the electrical actuator trigger the nitrogen injection process.

LHD for the backup system shall be located at the appropriate location in the tank, OLTC, Oil cables Boxes and Oil Bushing Cable Boxes, as applicable.

The design of the whole system shall be submitted to the Owner for review and approval before any manufacturing has to be done for the Transformer Explosion Prevention and Fire Prevention System.


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The whole system shall be installed and tested by the Transformer Manufacturer or Contractor under the supervision of Equipment manufacturer and shall be commissioned by the Equipment manufacturer.

Contractor or Transformer manufacturer should ensure that the necessary provisions to adapt this system are considered in the Transformer design.

Also, pipes, valves, cables, Oil gas separation tank and other accessories which is deemed necessary for completion of the installation of system are in the scope of Transformer manufacturer or Contractor.

The OEM of the offered equipment should have design and field experience of the similar system at least for the period of 5 years. Activation / experience certificate issued by the users evidencing this should be submitted in their bid.

This is considered to be critical equipment which needs to respond at appropriate time and well design for each transformer. Further, failure of this system at the time of need reflect in huge loss to the user. Contractor shall be exclusively responsible for any mishap in this regard and shall replenish the equipment without any additional cost to Mahagenco. Confirmation on this should be submitted by the bidder from the OEM at the time of submission of this tender.

An official test certificate from recognized and independent high voltage laboratory shall be provided by the supplier. Transformer, On load Tap Changer, Oil cable Boxes and Oil Bushing cable Boxes Explosion and Fire Prevention System be designed as per recommendation given in the National Fire Protection Association for Fast Depressurization system.



ANNEXURE - II

13.0 SPECIAL REQUIREMENTS OF INSTRUMENTATION BASED ON ENERGY AUDIT PROGRAMME

13.1 INTRODUCTION

Measurement of important parameters which affect the input costs like coal, oil, water need to be measured and not estimated. Both receipt and consumption need to be separately monitored and reconciled through computerized system. There must not be human intervention in the measurement and recording systems of coal, fuel oil and water resources which affect the station input costs. Supply chain optimization of raw material inputs through modernization of technology needs to be taken up. Transit loss, specific fuel consumption and GCV are interlined and realistic quantification of these will only be possible if a fuel monitoring system is in place.

The system should aim at procurement of digital instrumentation which can be seamlessly integrated into a DDCMIS. Intelligent Electronic Devices (IEDs) must be the preferred Instrumentation Systems. Information and communication system needs to be got audited for obtaining a holistic picture of its structure and efficiency.

13.2 COAL

13.2.1 Unit Coal Measurement (Coal Consumption Measurement)

- (a) The coal entry into the boilers shall be measured. The various technologies for coal measurement are given elsewhere in this section.
- (b) An online process (without any human intervention) which would give the online coal consumption with uncertainties of $\pm 1.0\%$ shall be envisaged and the technology for the same must be well proven and established. The conventional stacking method can be used for reconciliation of data/cross verification only and not for coal consumption measurement.
- (c) The stacking inventory procedure shall not be used for measurement of coal for declaring the station heat rate. Instead the use of fully automated, tamper-proof modern instrumentation without human intervention for on-line coal inflow and consumption shall be envisaged.

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(d) The difference in belt weighers/gravimetric feeders and receiving end coal measurements must not exceed more than 0.06 kg/kWh (0.03 kg/kWh for increase in moisture from tripling to bunkering, stones weights and 0.03 kg/kWh for handling loss).

(e) Based on an assessment of the different technologies the following are recommended:

- (i) Installation of Belt Weighers for all coal conveyors. The offered system shall monitor the time elapsed by a belt over a given bunker and which involves integration of the output of the Belt Weighers over the total bunkers of the unit in a given period of time. The bidder must come out with a viable and innovative scheme for monitoring the bunker wise coal from the belt weigher data.
- (ii) Microwave or Ultrasonic Bunker Level Monitoring System with digital data output, communication of data to system server or control room is required.
- (iii) Coal flow for the plant shall be monitored by gravimetric feeders which provide accurate and authentic coal flow measurements, in addition to belt weighers. The differences in the two are to be within 0.5%. The data from the belt weighers and the gravimetric feeder can be cross verified, calibrated and reconciled. Necessary signal exchange shall be considered by the bidder.
- (iv) Necessary software shall be included in the offer for online coal energy management in the plant. The software shall take input data from the various field instruments for coal receipt from various sources and coal consumption at various bunkers.
- (v) Computation of unit coal consumption. This is purely from the reading of the belt weigher and bunker monitoring system. This coal consumption is to be used for computation of unit and station heat rate for normal and cycling operations.

In all the above instruments, the following must be considered:

- (i) The instruments must function as Intelligent Electronic Devices (IEDs) by digitally communicating with DDCMIS/ control room through down loading of data continuously.

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A Fuel Oil Monitoring software Package shall be provided. When ultrasonic level measurement for tanks is used, the software package shall calculate the oil receipts.

13.3.4 DM Water and Associated Water Systems

On-line monitoring of DM water flow and unit make up with integrators shall be envisaged to control the energy efficiency as the make-up is directly proportional to the steam lost from the system and affects the unit heat consumption and heat rate. Hence, it is envisaged to go in for fully automatic on line measurement of water consumption for both production and consumption measurement of raw water, DM water, soft water and drinking water.

The following are to be considered for DM (De-mineralized) and associated water systems:

- (a) Both DM water production and DM water consumption must be separately measured and audited.
- (b) Installation of differential pressure orifice plate or nozzle type flow meters with digital output, communication media to relay the data to the DM control room computer and provision for downloading the data into a data base for on line monitoring of make-up especially during cycling operations. On line monitoring would help in control of unit heat rate as well as give an accurate account of the chemicals consumed for DM water production.
- (c) Water Monitoring Software Package shall be provided. The package must have capability to draw inputs from the various field instruments and make an on-line continuous data base grid of the information for generation various types of information such as consumption per shift, consumption during cycling operations, operator-wise consumption, etc. to enable the performance optimization group to take control action on the areas of wastage and

excessive consumption. Consumption and production shall be separately monitored.

13.4 METHODS OF MEASUREMENT OF COAL USED IN THE BOILERS

- (a) Belts weightment at the entrance of the raw coal bunkers.
- (b) Bunker level calibration and flow measurement based on bunker level.

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	(c) Volumetric measurement based on raw coal feeder speed. (d) Volumetric measurement based on pulverized coal feeder speed. (e) Gravimetric measurement at outlet of raw coal feeder. (f) Pressure drop across pulverized coal pipe leading to the burner through fixed geometry devices. (g) (Variable orifice dampers. (h) Dirty pitot tube measurement in the coal pipe leading to the burner. (i) Passive Electrostatic Sensors (j) Screw-in Microware Sensor. (k) Passive Acoustic Sensors (l) Laser through beam or retro reflex sensors (m) Calibration of mills as a function of their power input.	
13.5	<u>SPECIFICATIONS OF BELT WEIGHER</u>	
13.5.1	Particulars Of Belt Weighers	
	(n) Micro Processor based electronic belt weighers with communication facility to continuously transmit the data to a control room as well as local reading. (i) Type : Electronic, Multi-idler type (ii) Location : Refer mechanical specification of Coal Handling Plant (iii) Belt Speed : Refer mechanical specification of Coal Handling Plant (o) Coal Properties and Capacity (i) Bulk density : Refer mechanical specification of Coal Handling Plant (ii) Capacity : Refer mechanical specification of Coal Handling Plant	

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(p)	Duty Conditions		
(i)	Moisture	: Refer mechanical specification of Coal Handling Plant	
(ii)	Dust	: Refer mechanical specification of Coal Handling Plant	
(iii)	Rain and high RH	: Refer mechanical specification of Coal Handling Plant	
(q)	Accuracy	: $\pm 0.25\%$ or better of actual flow rate (dynamic). Weigh idler deflection less than 0.025 mm at full load.	
(r)	Reliability Index	: SAIDI (System Average Interruption During Index) : 48 hours/year or better SAIFI (System average interruption frequency index): 2 times/year or better.	
(s)	Overload Capacity	: Up to 25% with 100% overload protection	
(t)	Capacity range of accuracy	: 0 to 100%	
(u)	Electronic Components	: Electronic digitiliser / monitors, cable, totalizer, sub- totalizer, tacho generator, printer, transmission of the impulse of flow rate as well as total quantity conveyed to control room through communication media. Fully digital with microprocessor and battery back-up memory.	
(v)	Mode of weighment primary sensors	: Super precision stainless steel strain gauge load cell applied in tension for highly accurate load measurement.	
		Hermetically enclosed measuring device, compact designed, suitable for all customary belt widths.	

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(w) Outputs (x) Printout weigh, total and error reports (y) Special trunion bushes to absorb normal shocks and transverse forces. (z) Fully automatic tare and span calibration. (aa) Self-checking diagnostics for fault indications. Speed measurement: Brushless digital tacho provides accurate measurement of speed. : Electronic signals to control room and to local instrument display. Status Annunciator for set points. : Provision for zero setting on empty belt and further calibration. Special electronic calibration facility for frequent calibration checks without handling standard weights.			



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ANNEXURE - III

In addition to above, following points shall also be considered while designing the underground L.D. Pipe Lines.

- (a) The design ground table at 1.0m below finished ground level shall be considered for design of pipes.
- (b) The suitability of local soils for structural backfill around pipes shall be established by conducting laboratory / field tests and suitable modulus of soil reactions of corresponding backfill soil for submerged condition shall be considered while designing the pipes.
- (c) Backfilling of pipes shall be done with non-expensive soils only. If the natural soils are having medium to high expensive characteristics, the same shall be replaced by suitable non-expensive soil for backfilling around pipes.
- (d) If soils having medium to high plasticity i.e. having liquid limit more than 50% is to be used for backfilling around pipes; in such cases the modulus of soil reaction shall be considered as 'O' while designing the pipe i.e. no strength of such soils shall be considered for design of underground pipes.
- (e) To ensure quality control for backfilling work of pipeline at site, Field Quality Plans for quality of filling soil & bedding materials, construction activities like laying of bedding layer / backfilling layers, optimum moisture content of back soil, type of compaction equipment, method of compaction, relative degree of compaction etc. including laboratory & field tests to be conducted prepared during execution of work shall be prepared & got approved from Owner / Consultant and work shall be carried out strictly in accordance with approved Field Quality Plans.
- (f) The micro grading of nearby area of pipe corridor shall be carried out such that no storm water will flow towards pipe corridor area and accordingly storm water drainage arrangement of areas around pipe corridor shall be provided.
- (g) Adequate numbers of thrust blocks, anchors, etc. shall be provided as per requirement to prevent displacement, uplift movement of underground pipes.

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(h) Transient analysis of CW / ACW pipelines shall be carried out from recognized institute and locations of air release valves, etc. shall be decided accordingly and the details shall be submitted to Owner / Consultant for review / information. (i) The procedure for hydro testing of pipes shall be prepared and got approved from Owner / Consultant and hydro testing of pipes shall be carried out in accordance with approved procedures.		



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ANNEXURE - IV**Design Specification for Dimensions of Natural Draft Cooling Tower**

(This paragraph shall be considered before last paragraph of Clause No. 4.7.20.2 – Size and shape, Page no. 108, Section -1, Volume-VI A)

The following method shall be used to evaluate the minimum height required for Natural Draft Cooling Tower (NDCT).

- 1.0 Design shall be in confirmation with BS: 4485. Air properties published by BS would be used for evaluation.
- 2.0 Performance number KaV/L
 - (a) Demand / Required KaV/L shall be calculated using Tchebycheff's integration method described in CTI: ATC-105/ BS: 4485.
 - (b) Supply KaV/L
 - (i) Fill KaV/L shall be calculated using Fill Manufacturer's curve for given L/G. Designer shall submit Fill characteristic curve along with sizing calculations.*
 - (ii) Fill KaV/L shall constitute at least 90% of total KaV/L of tower.
 - (c) Supply KaV/L shall be more than 'Or' equal to design KaV/L.



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3.0 Draught Loss Calculations

Losses in air path will be calculated using the formulae:

$$H = \sum_1^n h_x = \sum_1^n k_x \rho \times \frac{V_x^2}{2} \dots \dots \frac{N}{m^2}$$

Where H=Total Draught. Loss .in. mmwc

..... .h=Draught. Loss. in. particular. zone. in. mmwc

.....K=Empherical. Coefficient. in. that. zone.

.....K1 =5.0.... for.. air. inlet. (including. rain. below. fill)

.....K2. for.. fill=As. per. Manufacturer. data*

.....K3 = 1.5....for. Water. Spray. above. Fill

.....K4.. for. Drift. Eliminator....=As. per. Manufacturer. Data

.....K5 = 1.0....for.. Stack. Top

.....ρ = Air.Density.in.that.zone.in.kg/cu.m

.....V = Air. Velocity.in. m/sec

4.0 Minimum required tower height shall be calculated using BS: 4485 formulae.

* -- If published curves are available in literature, conservative among them would be considered for evaluation.



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ANNEXURE - V

The Specifications for Painting of **Steel Structures** Pertaining to Civil Works

Structural Steel which is encased in concrete or galvanized shall not be painted. All other steel members of buildings & structures shall be provided with suitable painting as Protective coating against corrosion considering the exposure to the atmosphere pollution conditions.

For sheltered steel structures, where sides of the structures are not fully covered such as deaerator floor, bunker building, etc. both exterior & interior steel structures shall be considered as exposed to non-polluted inland atmosphere condition.

For other steel structures exterior structures shall be considered as exposed to non-polluted inland atmosphere condition and interior structures shall be considered as normally dry condition.

- (a) The painting scheme for steel structures exposed to non-polluted inland atmosphere condition shall be provided in line with Clause No. 2.28(aa), Section-4, Vol.-VI-A as below:
 - i. Minimum total 75 micron DFT of Inorganic zinc primer composed of 85% zinc (by volume) shall be applied in two coats over blast cleaned surfaces of the structure. One coat of primer minimum 35 micron DFT shall be applied as shop primer paint and second coat of primer shall be applied after erection and final alignment of the erected structures.
 - ii. Minimum total 125 microns DFT of polyamide epoxy paint composed of 77% solids (by volume) shall be applied in three coats as intermediate and finishing coat.
 - iii. Minimum 50 micron DFT of Aliphatic polyurethane composed of 56% solids (by volume) shall be applied as top finishing coat.
- (b) The painting scheme for steel structures exposed to normally dry condition shall be provided in line with Clause No. 2.28(aa) , Section-4, Vol.VI-A as below:

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(i) Minimum total 75 micron DFT of Inorganic zinc primer composed of 85% zinc (by volume) shall be applied over blast cleaned surfaces of the structure. One coat of primer of minimum 35 micron DFT shall be applied as shop primer paint and second coat of primer shall be applied after erection & final alignment of the erected structures. (ii) Minimum total 150 micron DFT of polyamide epoxy paint composed of 77% solids (by volume) shall be applied in three coats as finishing coat over primer coat. (c) The painting scheme for all internal steel doors, ventilators, louvers, rolling shutters, etc. shall be provided in line with clause No. 1.7 of Section – 3 of Vol.-VI-A as below: (i) Shop primer paint shall be single coat of red oxide / zinc chromate primer conforming to IS-2074 shall be applied after surface preparation in accordance with IS-1477 (Part-I& II). Second coat of primer shall be applied after erection and final alignment of the structure. (ii) Two coats of synthetic enamel paint conforming to IS: 2932 of approved shade and quality shall be applied after erection on primer coat. (iii) Total dry film thickness of finished paint shall not be less than 110 microns. (d) The painting specifications for steel structures pertaining to chimney, cooling tower, structures exposed to chemical fumes, etc., shall be as per painting specifications given under relevant Sections of Vol.-VI-A. (e) The painting specifications of E&M equipment, structural steel of Boiler & ESP shall be as per corresponding E&M bid specifications.		



**MAHARASHTRA STATE POWER
GENERATION CO. LTD.**

**PROJECTS & PLANNING
DEPARTMENT**

BID SPECIFICATION NO.: DG/BSL U-6/2011/T-1

CORRIGENDUM - XVI

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Following Clauses of the Bid Specification are amended as under :

Sr. No	Section /Page No/Cl. No.	Provision of the Bid Specification updated so far	Amendment to the Clause - To be read as -
1	Section 1, Page 128/ Schedule-3, Cl. No. 1.5	In the event of the shipment beyond scheduled date of supply completion of respective Equipment/Spare/Material as the case may be, for the reasons not attributable to the Contractor, the price adjustment shall be worked out based on i) the scheduled date of supply completion of respective Equipment /Spare/Material and ii) the actual date of supply completion of the same and whichever is beneficial to the Owner shall be payable.	In the event of the shipment beyond scheduled date of supply completion of respective Equipment/Spare/ Material as the case may be, for the reasons attributable to the Contractor, the price adjustment shall be worked out based on i) the scheduled date of supply completion of respective Equipment /Spare/Material and ii) the actual date of supply completion of the same and whichever is beneficial to the Owner shall be payable.
2	Section 1, Page 130 / Schedule-3, Clause 3.2	In the event of the work performed beyond scheduled date of completion of the respective activity, for the reasons not attributable to the Contractor, the price adjustment shall be worked out based on i) the scheduled date of completion of respective activity and ii) the actual date of completion of the activity and whichever is beneficial to the Owner shall be payable.	In the event of the work performed beyond scheduled date of completion of the respective activity, for the reasons attributable to the Contractor, the price adjustment shall be worked out based on i) the scheduled date of completion of respective activity and ii) the actual date of completion of the activity and whichever is beneficial to the Owner shall be payable.
3	Section 1, Page 152 / ,Schedule 8(C)	-----we, the guarantor do hereby guarantee and undertake to pay to the Owner on demand any and all monies to the extent of _____ ² only as aforesaid at any time upto six months from the date of the validity of the bank guarantee without any demur, reservation, context, recourse or protest and/or without any references to the consultant on whose behalf this Bank Guarantee is issued. Any such demand made by the ----- other Authority. The guarantor undertakes not to revoke this guarantee during its currency without previous consent of the Owner and further agrees that the guarantee herein contained shall be enforceable till ninety six months after	-----we, the guarantor do hereby guarantee and undertake to pay to the Owner on demand any and all monies to the extent of _____ ² only as aforesaid at any time upto six months from the date of the validity of the bank guarantee without any demur, reservation, context, recourse or protest and/or without any references to the consultant on whose behalf this Bank Guarantee is issued. Any such demand made by the ----- other Authority. The guarantor undertakes not to revoke this guarantee during its currency without previous consent of the Owner and further agrees that the guarantee herein contained shall be enforceable till six months after expiry of its validity.

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		expiry of its validity.		
4	Section 2, Page 167 / Cl. No. 3.0	Definition of Terms: v. "Contract Period"/"Work completion period" shall mean the time for completion of works as stated in the contract commencing from the Zero Date	Definition of Terms: v. "Contract Period"/"Work Completion Period"/" Work Completion Schedule " shall mean the time for completion of works as stated in the Schedule-6 of Contract commencing from the Zero Date, as amended for the reasons not attributable to the Contractor pursuant to provisions of the Contract.	
5	Section 2, Page 174 / Cl. No. 6.2	The contractor shall be deemed to have inspected the site and its surrounding and ----- obligations / responsibilities to be discharged and performed under the contract as per schedule within the contract price.	The contractor shall be deemed to have inspected the site and its surrounding and ----- obligations / responsibilities to be discharged and performed under the contract as per schedule within the contract price. However, any Asbestos material found during excavation etc., the same shall be disposed by the Owner at its own risks and costs.	
6	Section 2, Page 178 / Cl. No. 12.1	Unless otherwise stated in the contract, the notices to be given under this contract shall be in writing in English language and shall be delivered by a hand delivery, registered post/speed post/air mail, special courier, cable or telefax to the applicable communication details of the relevant party as set out in the contract with following provisions.	Unless otherwise stated in the contract, the notices to be given under this contract shall be in writing in English language and shall be delivered by a hand delivery, registered post/speed post/air mail, special courier or telefax to the applicable communication details of the relevant party as set out in the contract with following provisions:	
7	Section 2, Page 178 / Cl. No. 12.1.1	Any notice sent by cable, telefax shall be confirmed within two days of despatch by notice sent by hand delivery, registered post/speed post/air mail or courier.	Any notice sent by telefax shall be confirmed within two days of dispatch by notice sent by hand delivery, registered post/speed post/air mail or courier.	
8	Section 2, Page 178 / Cl. No. 12.1.2	The notice sent by registered post/speed post/air mail, courier shall be deemed (in absence of earlier receipt) to have been delivered within ten (10) days from the date of issuance of the same.... recipient.	The notice sent by registered post/speed post/air mail, courier shall be deemed (in absence of earlier receipt) to have been delivered within ten (10) working days from the date of issuance of the same.... recipient.	

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9	Section 2, Page 179/Cl. No. 12.1.3	The notice delivered by Cable or by telefax shall be deemed to have been delivered on the date of its despatch	The notice delivered by telefax shall be deemed to have been delivered on the date of its dispatch.	
10	Section 2, Page 181 / Cl. No. 18.2	All costs, damages or expenses that the owner may have incurred, for which under the contract the contractor is liable, shall be recovered by the owner as and when they are incurred from the contractor's bills becoming due under this contract or any other contract awarded by the Owner to the Contractor. Such recoveries shall be supported by appropriate documents or explanations, to enable the contractor to properly identify such claims. These amounts may be recovered by actions of law or otherwise, if the contractor fails to satisfy the owner of such claims.	All costs, damages or expenses that the owner may have incurred, for which under the contract the contractor is liable, shall be recovered by the owner as and when they are incurred from the contractor's bills becoming due under this contract or any other contract awarded by the Owner to the Contractor. Such recoveries shall be supported by appropriate documents or explanations in writing to enable the contractor to properly identify such claims. These amounts may be recovered by actions of law or otherwise, if the contractor fails to satisfy the owner of such claims.	
11	Section 2, Page 183 / Cl. No. 21.8	Add New Clause	Making Regular payments to the Sub-contractors is a matter of paramount importance for ensuring smooth and timely execution of the Project. The Contractor shall submit Sub-contractor wise Reconciliation Statement of Payments made to respective Sub-Contractor jointly signed by the authorised representatives of the Contractor and the Sub-contractor depicting therewith details of invoices raised by the Sub-contractor, recoveries/retentions if any, amounts due, their due dates, dates of payments made, balance payment etc. The format for such statement shall be finalised during the execution of the Contract. In the event any Sub-contractor approaches the Owner complaining delay in payments by the Contractor and the Owner is convinced that such delay is hampering or likely to hamper the progress of the Project, without prejudice to the provisions of Clause No. 30.1	

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			below (Clause related to Delay LD), the Owner may directly pay Sub-contractor the payments due to the Sub-contractor as per the Reconciliation Statement submitted and any further payments those may have become due subsequent to submission of the Statement and recover from the amounts due or becoming due to the Contractor such payments made along with interest at the prevailing rate of borrowings for the Project for the period commencing from date of making payment to the Sub-contractor till the date of recovery.	
12	Section 2, Page 192 / Cl. No. 31.1	In case the Contractor's performance is delayed due to any act or omission on the part of the owner/ his authorised agents or other contractors appointed by the owner, then the contractor shall be given due extension of time for the completion of works to the extent such omission has caused delay in the contractor's performance of his work. Regarding reasonableness or otherwise of the extension of time, the decision of the Engineer shall be final subject to arbitration as provided for in the contract.	In case the Contractor's performance is delayed due to any act or omission on the part of the owner/ his authorised agents or other contractors appointed by the owner, then the contractor shall be given due extension of time for the completion of works to the extent such act or omission has caused delay in the contractor's performance of his work. Regarding reasonableness or otherwise of the extension of time, the decision of the Engineer shall be final subject to arbitration as provided for in the contract.	
13	Section 2, Page 192 / Cl. No. 31.2	Apart from the extension of time as above, no compensation shall be payable to the contractor on account of such delay except as provided under Clause No. 36, Section 2B, Volume - I of the contract.	In addition, the Contractor shall be entitled to claim demonstrable and reasonable compensation if such delays have resulted in any increase in the cost. The Owner shall examine the justification for such a request for claim and if satisfied, the extent of compensation shall be mutually agreed depending upon the circumstances at the time of such an occurrence.	

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14	Section 2, Page 192 / Cl. No. 32.0	32.0 Suspension of the Work: 32.1 The Owner reserves the right to suspend and reinstate execution of the whole or any part of the contract without invalidating the provisions of the contract. Orders for suspension or reinstatement of the works shall be issued by the Engineer to the Contractor in writing. The time for completion of the works shall be extended for a period equal to the duration of the suspension. 32.2 The owner, however, shall not grant such extension of work completion period if suspension or delay is due to default on the part of the contractor or his sub-contractor.	32.1 Suspension by the Owner: 32.1.1 The Owner/Project Manager, by notice to the contractor, may order suspension of performance of any or all his obligations under the contract. Such notice shall specify the obligation of which the performance is to be suspended, effective date of the suspension and the reasons there for. The contractor shall thereupon suspend the performance of such obligation, except those obligations necessary for care or preservation of the Works, Materials, until the order in writing to resume such performance by the Owner/Project Manager. 32.1.2 If by virtue of such suspension order, other than by reasons of Contractor's default or breach of the contract, Contractor's performance of any of its obligation is suspended for an aggregate period of more than one hundred and twenty (120) consecutive days or two hundred and forty (240) in aggregate, then at any time thereafter and provided at that time such performance is still suspended, the Contractor may give notice to the Owner/Project Manager requiring that, Owner shall, within 28 days from the date of receipt of such notice, order resumption of such performance or request and subsequently order variation in accordance with Clause No. 46.0 below, excluding the performance of such obligations from the Contract. 32.1.3 If the Owner fails to do so within such period, the Contractor may, by a further notice to the Owner, elect or treat such suspension, where it affects the part only of the works under the contract, as deletion of such part in	

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			accordance with the Clause No. 46.0 below or, where it affects the whole of the work, as termination of the Contract under Clause No. 61.3, Termination for Owner's Convenience. 32.2 Suspension by the Contractor: If a) the Owner has failed to pay the Contractor any sum due under the Contract within the specified period, has failed to approve any invoice or supporting documents without just cause or commits a substantial breach of the Contract, the Contractor may give a notice to the Owner that requires payment of such sum, requires approval of such invoice or supporting documents, or specifies the breach and requires the Owner to remedy the same, as the case may be. If the Owner fails to pay such sum, fails to approve such invoice or supporting documents or give its reasons for withholding such approval, or fails to remedy the breach or take steps to remedy the breach within fourteen days (14) days after receipt of the Contractor's notice or b) the Contractor is unable to carry out any of its obligations under the Contract for any reason attributable to the Owner, including but not limited to the Owner's failure to provide possession of or access to the Site or other areas, or failure to obtain any governmental permit necessary for the execution and/or completion of the works which the Owner is required to obtain as per provisions of the Contract; then the Contractor may by fourteen (14) days' notice to the Owner suspend performance of all or any of its	

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			obligations under the Contract, or reduce the rate of progress. 32.3 If the Contractor’s performance of its obligations is suspended or the rate of the progress is reduced pursuant to this Clause No. 32.0, then the time for completion shall be extended by such period as shall be fair and reasonable in all circumstances and as shall fairly reflect the delay or impediment sustained by the contractor, and any and all additional costs and expenses incurred by the contractor as a result of such suspension or reduction shall be paid by the Owner to the Contractor in addition to the Contract Price, except in case of suspension order or reduction in rate of the progress by reasons of the Contractor’s default or breach of the contract. 32.4 During the period of suspension, the contractor shall not remove from the site any of Plant and Equipment, any part of the Works or any Contractor’s equipment, without the prior written consent of the Owner.	
15	Section 2, Page 193 / Cl. No. 35.1	Clause No. 35.0: Change in Quantity: 35.1 The owner reserves the right to vary the quantities of items or groups of items ordered, as may be necessary, during the execution of the contract without change in unit price or other terms & conditions. The variation in contract price due to this change in quantity shall be limited to increase or decrease by up to 15% (fifteen percent only) of the original contract price. In case unit prices are not available the prices for the items added or deleted shall be mutually agreed	Clause No. 35.0: Change in Quantity: 35.1 The owner reserves the right to vary the quantities of items or groups of items <u>covered under Schedule - 6 or Mandatory Spares or if ordered 3 Years O&M Spares (Recommended Spares)</u>, as may be necessary, during the execution of the Contract without change in unit price or other terms & conditions. The variation in Contract Price due to this change in quantity shall be limited to increase or decrease by up to 15% (fifteen percent only) of the original Contract Price. In case unit prices are not available the prices for the items added or deleted	

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		upon.	shall be mutually agreed upon.	
16	Section 2, Page 198/ Cl. No. 41.1	The owner shall accord final acceptance of the unit and takeover the unit from the contractor for commercial operation only if: - The trial operation of the unit in accordance with the provisions of the contract is completed successfully. - The Performance Guarantee Test is successfully completed (All the tests covered under LD clauses and under corrections). - Submission of Performance Guarantee Test reports by the contractor and acceptance of the same by the Owner. - All permits required to operate and maintain the Unit/Block/Plant which are to be obtained by the Contractor have been so obtained. - All documents/manuals required under the contract to start up, operate and maintain the plant are delivered to the owner. - All the mandatory spares and special tools and tackles to be supplied against the contract are delivered to the owner. - Contractor has successfully completed the training programme for Operation and Maintenance personnel	The owner shall accord final acceptance of the unit and takeover the unit from the contractor for commercial operation only if: - The trial operation of the unit in accordance with the provisions of the contract is completed successfully. - The Performance Guarantee Test is successfully completed (All the tests covered under LD clauses and under corrections). - Submission of Performance Guarantee Test reports by the contractor and acceptance of the same by the Owner. - All permits required to operate and maintain the Unit/Block/Plant which are to be obtained by the Contractor have been so obtained. - All documents/manuals required under the contract to start up, operate and maintain the plant are delivered to the owner. - The mandatory spares and special tools and tackles <u>ordered against the Contract and which Owner considers essential</u> to be supplied <u>before Taking Over of Plant for uninterrupted Operation of the Plant</u> are delivered to the owner. - Contractor has successfully completed the training programme for Operation and Maintenance personnel	

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17	Section 2, Page 200 / Cl. No. 42.1	Operating the Plant Before Taking Over:42.1 Owner reserves the right to take possession of and use for any intended purpose, any portion or all of any delivered but as yet unaccepted Plant. The taking of possession at any time or use of any of such portion of Plant shall not be deemed to be an acknowledgement of owner acceptance of Unit or the Plant, and shall not be exclusive with respect to the contractor until owner acceptance of the Plant, has occurred. Owner shall provide contractor with reasonable and timely access to complete its obligations hereunder. It is the expectation of the parties that any such modifications or repairs will be accomplished by Contractor with minimal interference with operation of the Plant, and that reduction in and shutdowns of Plant operations will be required only when necessary.	Clause No. 42.0: Operating the Plant before taking Over: 42.1 Owner reserves the right to take possession of and use for any intended purpose in larger public interest pursuant to National or State directives, emergencies and not for commercial gain , any portion or all of any delivered but as yet unaccepted Plant. The taking of possession at any time or use of any of such portion of Plant shall not be deemed to be an acknowledgement of owner acceptance of Unit or the Plant, and shall not be exclusive with respect to the contractor until owner acceptance of the Plant, has occurred. Owner shall provide contractor with reasonable and timely access to complete its obligations hereunder. It is the expectation of the parties that any such modifications or repairs will be accomplished by Contractor with minimal interference with operation of the Plant, and that reduction in and shutdowns of Plant operations will be required only when necessary.	

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18	Section 2, Page 203 / Cl. No. 45.1	The contractor shall also ensure that before going out of production of spare part of the equipment covered under the contract, he shall give the owner at least 12 (twelve) months advance notice so that the latter may order his bulk requirement of spares, if he so desires. The same provision shall also be applicable to the sub- contractors. Further, in case of discontinuance of manufacture of any spares by the Contractor or his sub- contractor, the contractor shall provide the owner, one year in advance, with full manufacturing drawings, material specification and technical information required by the owner for the purpose of manufacture of such items.	Clause No. 45.0, Long Term Availability of Spares: 45.1 The Contractor shall ensure the long term availability of spares to the owner for the full life of the equipment covered under the contract. The contractor shall also ensure that before going out of production of spare part of the equipment covered under the contract, he shall give the owner at least 12 (twelve) months advance notice so that the latter may order his bulk requirement of spares, if he so desires. The same provision shall also be applicable to the sub- contractors. Further, in case of discontinuance of manufacture of any spares by the Contractor or his sub- contractor, the contractor shall provide the owner, one year in advance, with full manufacturing drawings, material specification and technical information required by the owner for the purpose of procurement of such items.	
19	Section 2, Page 205 / Cl. No. 46.3	In any case in which the contractor has received instructions from the Engineer as to the requirement of carrying out the altered or additional substituted work which either then or later on will, in the opinion of the contractor, involve a claim for additional payments, the contractor shall immediately and in no case later than 30 (thirty) days after receipt of the instructions aforesaid and before carrying out the instructions, advise the Engineer to that effect, the parties shall agree to the extent of any change in the contract price. But the Engineer shall not become liable for the payment of any charges in respect of any such variations unless, the instructions for the same shall be confirmed by the Engineer.	In any case in which the contractor has received instructions from the Engineer as to the requirement of carrying out the altered or additional substituted work which either then or later on will, in the opinion of the contractor, involve a claim for additional payments and/or extension for Time for Completion , the contractor shall immediately and in no case later than thirty (30) days after receipt of the instructions aforesaid and before carrying out the instructions, advise the Engineer to that effect, the parties shall agree to the extent of any change in the contract price and/or extension for Time for Completion . But the Owner shall not become liable for the payment of any charges and/or extension of Time for Completion in respect of any such variations unless, the instructions for the same shall be confirmed by the	

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20	Section 2, Page 205 / Cl. No. 46.4	If any variation in works results in increase or reduction of Contract Price, the parties shall agree, to the extent of any change in the contract price. Any agreed difference in cost occasioned by any such variation shall be added to or deducted from the contract price as the case may be. In all such cases, in the event of a disagreement as to the reasonableness of the said sum, the decision of the Engineer shall prevail subject to arbitration as provided for in the contract.	If any variation in works results in increase or reduction of Contract Price and/or Time for Completion , the parties shall agree, to the extent of any change in the Contract Price and/or Time for Completion . Any agreed difference in cost occasioned by any such variation shall be added to or deducted from the Contract Price as the case may be and the time for Completion shall be extended to by such period which in all circumstances reflects the delay or impediment sustained by the contractor due to such variation. In all such cases, in the event of a disagreement as to the reasonableness of the said sum and/or the extension of Time for Completion , the decision of the Engineer shall prevail subject to Arbitration as provided for in the Contract.	
21	Section 2, Page 208 / Cl. No. 52.0	Add New Clauses 52.4 & 52.5 after Cl. No. 52.3 as	Clause No. 52.0 Contractor's Documents, Drawings & Instruction Manuals: To add following clauses under Clause No. 52.3 52.4 : The Copyright in all the Drawings, Documents and other material containing data and information generated by the Contractor and furnished to the Owner by the Contractor shall remain vested in the Contractor, or if they are furnished to the Owner directly or through the Contractor by any third party, including suppliers of materials, the Copyright in such materials shall remain in such third parties. The Owner shall however be free to reproduce all the drawings, documents and other material furnished to the Owner for the purpose of the Contract, including, if required, for operation and maintenance of the Plant and Equipment covered under the Contract. 52.5 : Notwithstanding anything contained hereinabove, the Copyright of all the non-plant buildings, Plot Plan etc., irrespective	

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			whether generated by the Contractor or any third party, shall remain vested in the Owner and the Owner will have the right to use these designs and drawing at some other places or at other power stations with or without modification, alterations etc. without any payments of royalty, fees etc. to the Contractor for the same.	
22	Section 2, Page 211 / Cl. No. 61.1	61.1.1 Occurrence of either of the following circumstances shall constitute Contractor's Default: a) The contractor refuses honour the award of the contract issued by the owner or fails to submit the performance security deposit within the period stipulated/extension granted by the owner for this purpose. b) The contractor assigns or sublets the contract to any other entity violating the provisions of Clause No. Error! Reference source not found. above. c) The contractor, in judgement of the owner has indulged in fraudulent or corrupt practices in connection with execution of the contract. d) The contractor abandons the contract or without valid reasons or suspends the execution of the contract for the period of more than 30 days. e) Persistently fails/neglects to execute the contract and/or its perform its obligations in accordance with terms and conditions of the contract and neglects the owner's written notices in this regard. f) The contractor fails to maintain the progress of execution of the project as per agreed work completion	61.1 Termination for Contractor's Default 61.1.1 The Owner, without prejudice to rights and remedies it may posses, may terminate the contract forthwith in the following circumstances by giving the notice of Termination and its reasons therefor to the Contractor referring to this Clause No. 61.1: a) if the Contractor becomes bankrupt or insolvent, has a receiving order issued against it, compounds with its creditors, or, if the Contractor is a corporation, a resolution is passed or an order is made for its winding up (other than a voluntary liquidation for the purpose of amalgamation or reconstruction), a receiver is appointed over its undertaking or assets or if the Contractor takes or suffers any other analogous action in consequence of debt. c) If the Contractor assigns or transfers the Contract or any right or interest therein in violation of provisions of the Clause No. 20.0 above. d) If the Contractor, to the judgment of the Owner has indulged into Fraudulent or Corrupt practice in competing or in executing the Contract. For the purpose of this Clause: "Corrupt practice" means offering, giving, soliciting anything of value to influence the action of the employees, agents, consultants of the Owner in the procurement process or in execution of	

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		schedule except for the reasons beyond its control and on receipt of the notice from the owner in this regard, fails or neglects to take actions to the satisfaction of the owner the satisfaction of the owner to increase the pace of the execution of the project. g) The contractor becomes bankrupt or being a company, goes into liquidation for the reasons other than reconstruction or amalgamation. 61.1.2 In case any one of the situation as stipulated under Clause 0 above arises, the owner may, without prejudice to other remedies available under the contract, give notice to the contractor stating the nature of the default(s) and requiring the contractor to remedy the same. 61.1.3 If the contractor fails to remedy or take steps to remedy such default(s) within fourteen days from the date of receipt of such notice, the employer may terminate the contract forthwith at risk and costs of the contractor by giving notice of Termination of the Contract to the Contractor. 61.1.4 In the event of termination of the contract for Default of the Contractor, the owner may complete the balance works by itself or by employing another agency. In such an event, the owner take possession of contractor's construction	the Contract. “Fraudulent practice” means misrepresentation of the facts in order to influence the procurement process or execution of the contract to the detriment of the Owner and includes collusive practice among the Bidders (prior or after bid submission) designed to establish the bid price at artificial non-competitive levels and to deprive the Owner form the benefits of free and open competition. 61.1.2 If the Contractor: a) refuses to honour the Award of the Contract issued by the Owner or fails to submit the performance security deposit within the period stipulated/extension granted by the owner for this purpose b) has abandoned or repudiated the contract c) has without valid reasons has failed to commence the works promptly or has suspended the progress of performance of the contract (other than pursuant to Clause No. 32.2 above) for more than twenty-eight (28) days after receiving written instruction from the Owner to proceed d) persistently fails to execute the Contract in accordance with the Contract or persistently neglects to carry out its obligation under the contract without just clause e) refuses or unable to provide sufficient materials, service or labour to execute the works in the manner specified in the Work Completion Schedule appended to the Contract at the rate that give reasonable assurance to the Owner that the Contractor can attain completion of the work within the Time for Completion as amended Then the Owner may, without prejudice to any rights and remedies it may	

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		equipment at site for use either by itself or through another agency so employed by making payment of reasonable rent for the same to the contractor for completion of the balance work. All expenses for maintenance and/or making good the damages to the equipment during the possession of owner shall be to the owner's account. 61.1.5 The contractor shall be entitled to be paid the costs of work executed till the date of termination of the contract subject to recoveries, if any. 61.1.6 If the sum payable to the contractor as per Clause 61.1.5 and the costs incurred by the owner in execution of the balance works by pursuant to this clause exceed the contract price, the contractor shall be liable for such excess. 61.1.7 In addition, such action by the Owner as aforesaid shall not relieve the Contractor of his responsibility to pay liquidated damages for delay in completion of the works as defined in this contract. 61.1.8 In the event of Termination of the contract for Default of the Contractor, the owner may debar the contractor from participating in bids invited by the owner for the period of three years. However, in case of Default due to Fraudulent Behaviour/Corrupt Practices,	possess under the Contract, give notice to the Contractor stating the nature of the default and the Contractor requiring remedy the same. If the Contractor fails to remedy or take steps to remedy the same within fourteen (14) days of its receipt of the notice, then the Owner may terminate the Contract by giving notice of Termination that refers to this Clause No. 61.1. 61.1.3 Upon receipt of the notice of termination under Clauses 61.1.1 or 61.1.2 above, the Contractor shall, either immediately or upon such date specified in the notice of termination, (a) cease all further work, except for such works as specified by the Owner for sole purpose of protecting the works already executed, or the works required for leaving the site in safe and clean condition (b) terminate all subcontracts, except those to be assigned to the Owner pursuant to paragraph (d) below (c) deliver the Owner, the parts of the Works already executed upto the date of termination (d) to the extent legally possible, assign to the Owner all rights, title and benefits of the Works and to Plant and Equipment as at the date of termination, and, as may be required by the Owner, in any subcontracts concluded between the Contractor and its subcontractors (e) Deliver to the Owner all drawings, specifications and other documents prepared by the Contractor and its subcontractors as at the date of termination in connection with the execution of the Contract. 61.1.4 The Owner may enter upon the site, expel the Contractor and Complete the	

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		the contractor shall be blacklisted. 61.1.9 The termination of the contract under this clause shall not entitle the Contractor to reduce the value of the performance guarantee nor the time thereof. The performance guarantee shall be valid for the full value and for the full period of the contract and 90 days period after the end of the guarantee period.	Works itself or by employing third party. In such an event, the Owner may take possession of Contractor's construction equipment at site, by making payment of reasonable rent for the same to the Contractor and with an indemnification by the Owner for all liability including damage or injury to persons arising out of use of such equipment by the Owner, for use either by itself or through another agency so employed for completion of the balance work. All expenses for maintenance and/or making good the damages to the equipment during the possession of owner shall be to the Owner's account. Upon completion of the works or at such earlier date the Owner thinks appropriate, the Owner shall give notice to the Contractor that such Contractor's equipment shall be returned to the contractor at site or near the site and shall return such Contractor's equipment to the Contractor in accordance with such notice. The Contractor shall thereafter, without delay and its cost shall remove or arrange removal of the same from the site. 61.1.5 Subject to Clause 61.1.6 below, the Contractor shall be entitled to be paid the costs of works executed as at the date of termination and the costs, if any, incurred in protection of the work executed and leaving the site if clean and safe condition pursuant to paragraph (a) of Clause 61.1.3 above. Any sums due to the Owner accruing prior to the date of termination shall be deducted from the amounts to be paid to the Contractor under this Contract. 61.1.6 If the Owner completes the works under the Contract, the costs of	

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			completing the works shall be determined. If the sum, the Contractor is entitled to be paid pursuant Clause 61.1.5 above, plus the costs incurred by the Owner in completing the works, exceeds the Contract Price, the Contractor shall be liable for such excess. If such excess if greater than the sums due to the Contractor under to Clause 61.1.5 above, the Contractor shall pay the balance to the Owner, and, if such excess is less than the sums due to the Contractor under to Clause 61.1.5 above, the Owner shall pay balance to the Contractor. 61.1.7 In addition, such action by the Owner as aforesaid shall not relieve the Contractor of his responsibility to pay liquidated damages for delay in completion of the works as defined in this contract. 61.1.8 In the event of termination of the contract pursuant to Clause 61.1.2 above, the Owner may debar the Contractor from participating in the bids invited by the Owner for the period of three (3) years. However, in case the Contract is terminated pursuant to Clause No. 61.1.1 above, the contractor shall be blacklisted. 61.1.9 Termination of the Contract under this Clause No. 61.1 shall not entitle the Contractor to reduce the value of the performance guarantee nor the time thereof. The performance guarantee shall be valid for the full value and for the full period of the contract and 90 days period after the end of the guarantee period.	

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23	61.3	61.3 Termination for the Owner's Convenience: 61.3.1 The owner may, at any time during the execution of the contract, terminate the contract by giving 30 days notice of termination to the contractor referring to this Clause No. 61.3. 61.3.2 The Contractor upon receipt of such notice shall discontinue the work on the date and to the extent specified in the notice, make all reasonable efforts to obtain cancellation of all orders and contracts to the extent they are related to the Owner, stop all further sub-contracting or purchasing activity related to the work terminated, and assist the Owner in protection and disposition of the works acquired under the contract by the owner. 61.3.3 In the event of such termination, the Contractor shall be eligible for compensation, equitable and reasonable, dictated by the circumstances prevalent at the time of termination. In such cases, the Engineer's decision shall be final and binding on the Contractor subject to arbitration as provided for in the contract. 61.3.4 Notwithstanding the anything stipulated above, such compensation shall not exceed	61.3 Termination for Owner's Convenience: 61.3.1 The Owner may at any time terminate the Contract for any reason by giving contractor a notice that refers to this Clause 61.3. 61.3.2 Upon receipt of the notice under the Clause No. 61.3, the Contractor shall either immediately or upon date notified in the notice of termination (a) cease all further work, except for such works as specified by the Owner for sole purpose of protecting the works already executed, or the works required for leaving the site in safe and clean condition (b) terminate all subcontracts, except those to be assigned to the Owner pursuant to paragraph (d) (ii) below (c) remove all Contractor's equipment from the site, repatriate Contractor's and Subcontractors' personnel from the site, remove from the site any wreckage, rubbish and debris of any kind from the site and leave the whole site in safe and clean condition. (d) In addition, subject to payment mentioned under Clause 61.3.3 below, the Contractor shall (i) Deliver to the Owner the parts of the Works executed by the Contractor as at the date of termination. (ii) to the extent legally possible, assign to the Owner all right, title and benefit to the Contractor to the Works and to the Plant and Equipment as at the date of Termination, and, as may be required by the Owner, in any subcontracts concluded between the Contractor and his Subcontractors (iii) Deliver to the employer all non-proprietary drawings, specifications	

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		the contract price minus the sums already paid to the contractor against this contract and recoveries, if any from the contractor.	and other documents prepared by the Contractor and its Subcontractors as at the date of termination in connection with the Contract. 61.3.3 In the event of termination of the Contract under Clause No. 61.3, the Owner shall pay to the Contractor the following amounts: (a) the Contract Price, properly attributable to the Works already executed by the Contractor as at the date of termination (b) the Costs reasonably incurred by the Contractor for removal Contractor's equipment from the site and in the repatriation of Contractor's and Subcontractors' personnel (c) any amounts to be paid by the Contractor to its Subcontractors in connection with the termination of any subcontracts, including any cancellation charges (d) costs incurred by the Contractor in leaving the site in clean and safe condition pursuant paragraph (a) of Clause 61.3.2 above (e) the costs of satisfying all other obligations, commitments and claims that the Contractor may have undertaken in good faith with third parties in connection with the contract and that are not covered in paragraphs (a) through (d) above. Notwithstanding the anything stipulated under this Clause, total amount payable under paragraphs (a) through (e) above shall not exceed the Contract price minus the sums already paid to the contractor against this contract and recoveries, if any from the contractor.	

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24	Section 2, Page 214 / Cl. No. 62	62.2Either party shall, within 15 (fifteen) days from the occurrence of such a cause, notify the other in writing of such causes. Unless otherwise directed by the owner in writing, the contractor shall continue to perform its obligations under the contract as far as reasonably practical and shall seek all reasonable alternative means for performance not prevented by the Force Majeure event. 62.3The contractor or the owner shall not be liable for delays in performing their respective obligations resulting from any Force Majeure cause as referred to and / or defined above. The date of completion shall be extended by a reasonable time even though such cause may occur after the contractor's performance of his obligations has been delayed for other causes. 62.4However, for delay by the contractor or his sub-contractor which may result directly or indirectly from his negligence, mistakes, improper co-operation or failure to supply full information, the work completion period shall not be extended.	Clause No. 62: Force Majeure: 62.1 Remain unchanged 62.2 If either party is prevented, hindered or delayed from or in performing any of its obligations under the Contract by an event of Force Majeure, then it shall notify the other of the occurrence of such event and circumstances thereof within fifteen (15) days after the occurrence of such event. 62.3 The party giving such notice shall be excused from performance or punctual performance of its obligations under the Contract for so long as the relevant event of Force Majeure continues and to the extent that such parity's performance is prevented, hindered or delayed. The time for Completion shall be extended to the extent of such period. 62.4 The party or the parties affected by the event of the Force Majeure shall use reasonable efforts to mitigate the effect there of upon its or their performance of the Contract and to fulfil its or obligations under the Contract, but without prejudice to either party's right to terminate the Contract under Clause 62.6 below. 62.5 No delay or non performance by either party hereto caused by the occurrence any event of Force Majeure shall (a) constitute a default or breach of the Contract (b) give rise to any claim, damages or additional cost or expenses occasioned thereby if and to the extent that such delay or non-performance is occasioned by any event of Force Majeure. 62.6 If performance of the Contract is substantially prevented, hindered or	

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			delayed for the single period more than one hundred and eighty (180) days on account of one or more reasons of Force Majeure during the currency of the Contract, the parties will attempt to develop a mutually satisfactory solution, failing which the dispute shall be resolved in accordance with Clause 63.0, Settlement of Disputes stipulated hereunder. 62.7 Notwithstanding Clause 62.5, the Force Majeure shall not apply to Owner's obligation to make payments to the Contractor herein.	
25	Section 2A, Page 226 / Cl. No. 3.1	The inspection of goods to be supplied by the owner/owner's authorised representative shall be generally carried out as stipulated hereunder at pre-identified customer hold points as per the approved Quality Plan. However, the owner or his authorised representative shall have unrestricted access to the premises of contractor/subcontractor where goods to be supplied against this contract are being manufactured during the process of manufacturing of goods.	The inspection of goods to be supplied by the owner/owner's authorised representative shall be generally carried out as stipulated hereunder at pre-identified customer hold points as per the approved Quality Plan. However, the owner or his authorised representative shall have unrestricted access to the area of the plant of contractor/subcontractor, where goods to be supplied against this contract are being manufactured during the process of manufacturing of goods.	
26	Section 2A, Page 226 / Cl. No. 3.2.2	The contractor, at-least one month prior to expected date of attaining the respective stage of manufacturing/readiness of the goods, shall submit the inspection call indicating the date of inspection to the Controller of the Quality appointed by the owner/IIA under intimation to the Controller of Quality.	The contractor, at-least 21 days prior to expected date of attaining the respective stage of manufacturing/readiness of the goods, shall submit the inspection call indicating the date of inspection to the Controller of the Quality appointed by the owner/IIA under intimation to the Controller of Quality.	
27	Section 2A, Page 228 / Cl. No. 3.3.4	Offshore Supplies: The contractor, at least two months before the expected date of attaining such stage of manufacturing/readiness of goods, shall intimate the Chief Engineer (P&P). The Chief	The contractor, at least 45 days before the expected date of attaining such stage of manufacturing/readiness of goods, shall intimate the Chief Engineer (P&P). The Chief Engineer.....of visa etc.	

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		Engineer.....of visa etc.		
28	Section 2A, Page 233 / Cl. No. 8.11	The contractor shall be solely responsible for payment of all taxes & duties including the taxes and duties stipulated above applicable to for supplies against this contract to appropriate authorities and shall indemnify the owner from any law, suits and litigation whatsoever that arise due to non-compliance of payment of taxes & duties by the contractor -----	The contractor shall be solely responsible for payment of all taxes & duties including the taxes and duties stipulated above applicable to for supplies against this contract and assessable against Contractor/Sub-contractor to appropriate authorities and shall indemnify the owner from any law, suits and litigation whatsoever that arise due to non-compliance of payment of taxes & duties by the contractor -----	
29	Section 2A, Page 234/ Cl. No. 8.13	No tax applicable as on record date other than stipulated under this clause No. 8.0 -----however be limited to the amount of taxes & duties indicated in the price schedule.	No tax applicable as on record date other than stipulated under this clause No. 8.0 ----- however be limited to the amount of taxes & duties indicated in the price schedule. However, increase/decrease in amount of taxes and duties owing to foreign currency variation and taxes and duties payable on Price Adjustment shall accrue to the Owner. Such Increase/decrease in taxes and duties shall be apart from the amount of taxes and duties indicated in the price schedule.	
30	Section 2A, Page 236 / Cl. No. 11.12.1	Mandatory Spares and Special Tools & Tackles: The deliveries of Mandatory Spares and Special Tools & Tackles -----in accordance with Clause No. 41, Section- 2, Volume - I.	Mandatory Spares and Special Tools & Tackles: The deliveries of Mandatory Spares and Special Tools & Tackles -----in accordance with Clause No. 41, Section- 2, Volume - I. However, imported spares may be supplied alongwith respective equipment.	

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31	Section 2A, Page 243 / Cl. No. 13.1.5	In case of delay in supply of Mandatory Spares and if ordered the 3 Year's O&M (Recommended) Spares, Liquidated Damages @ ½% per week of delay or part thereof on the contract value (excluding taxes and duties thereon) and the amount of the price adjustment of delayed spares shall be payable by the contractor. However, total Levy of Liquidated Damages on account of delay in supply shall not exceed 10% of contract value (excluding the taxes and duties) and the amount of the Price Adjustment of Mandatory Spares or Recommended Spares, as the case may be ordered against this contract.	13.1.5 In case of delay in supply of Mandatory Spares and if ordered the 3 Year's O&M (Recommended) Spares, Liquidated Damages @ ½% per week of delay or part thereof on the amount of Contract Value (excluding taxes and duties thereon) of delayed spares plus the amount of the price adjustment thereon shall be payable by the Contractor. However, total Levy of Liquidated Damages on account of delay in supply of Mandatory Spares and if ordered, the 3 Year's O&M (Recommended Spares), shall not exceed 10% of Contract Price (excluding the taxes and duties thereon) of Mandatory Spares or the Recommended Spares, as the case may be, ordered against contract plus the amount of the Price Adjustment thereon.	
32	Section 2B, Page 253 / Cl. No. 2.2	Regulations of Local Authorities and Statute	All registration and statutory inspection fees, if any, in respect of his work pursuant to this Contract shall be to the account of the Contractor. However, the Contractor shall not be liable for such expenses for items mentioned in Table-1, Section-3 where the Owner is responsible.	
33	Section 2B, Page 257 / Cl. No. 7.1	~ If the Works of the contractor is delayed because of any acts or omission of another contractor, the Contractor shall have no claim against the owner on that account other than an extension of time for completing his works.'	~ If the Works of the Contractor is delayed because of any acts or omission of another Contractor, the provisions of Clause No. 31.0, Section - 2 shall apply.	
34	Section 2B, Page 266 / Cl. No. 19.1	~. The Engineer may impose such restrictions on the facilities provided to the Contractor such as electricity, water etc. as he may think fit in the interest of the Owner and the Contractor shall strictly adhere to such restrictions and co-operate with the Engineer.	~. The Engineer may impose such restrictions on the facilities provided to the Contractor such as electricity, water etc. at such places as he may think fit in the interest of the Owner and the Contractor shall strictly adhere to such restrictions and co-operate with the Engineer.	

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35	Section 2B, Page 269 / Cl. No. 23.6	The total amount payable to the contractor as per the rates of Taxes & Duties at Clause 23.1 to 23.5 above applicable as on record date shall however be limited to the amount of taxes & duties indicated in the price schedule.	The total amount payable to the contractor as per the rates of Taxes & Duties at Clause 23.1 to 23.5 above applicable as on record date shall however be limited to the amount of taxes & duties indicated in the price schedule. However, increase/decrease in amount of taxes and duties owing to foreign currency variation and taxes and duties payable on Price Adjustment shall accrue to the Owner. Such Increase/decrease in taxes and duties shall be apart from the amount of taxes and duties indicated in the price schedule.	
36	Section 2B, Page 275 / Cl. No. 30.1	The Contractor shall be responsible for any damage resulting from his operations. He shall also be responsible for protection of all persons including members of public and employees ~	The Contractor shall be responsible for any damage resulting from his operations. He shall also be responsible for protection, from any damage resulting from his operation of all persons including members of public and employees ~	
37	Section 2B, Page 283 / Cl. No. 36.0	Compensation for Over run Period: 36.1 The entire works against this contract are required to be completed within the contractual completion period from the commencing from the zero date as per the Project Completion Schedule. 36.2 The Contractor shall not be liable for any compensation if the works get prolonged for 6 (six) months beyond the contract period due to the nonfulfillment of the obligations on the part of the Owner and this 6 (six) months period will be treated as free over run period to the Owner. 36.3 The Contractor shall be liable for compensation, only if the contract period gets extended beyond 6 (six) months from the scheduled date of completion due to non-fulfillment of the obligations by the owner/or his authorised representative/other agencies under his control at the rate of	Clause No. 36.0 of Section 2B is deleted	

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		INR 1,500,000/- (In words INR One Million Five Hundred Thousands only) per month and prorata for part of the month. This rate shall be firm.		
38	Section 2C, Page 293 / Cl. No. 8.1	All works under this contract, unless specified otherwise, shall conform to the latest revision and/or replacement of Indian Standard Specification and Codes of Practice. In case specifically Indian Standard Specification does not cover any particular aspect of work, any other standard practice may be specified by the Engineer shall be followed.	All works under this contract, unless specified otherwise, shall conform to the latest revision and/or replacement of Indian Standard Specification and Codes of Practice as on "Record Date" . In case specifically Indian Standard Specification does not cover any particular aspect of work, any other standard practice may be specified by the Engineer shall be followed.	
39	Section 2C, Page 294 / Cl. No. 12.1	The owner reserves the right to make any changes in the design and plans of the works and the contractor shall be bound to carry them out. No claim or compensation would be allowed on this account.	Clause No. 12.1 deleted. The provisions of Clause No. 46 read with Clause 25 shall be applicable	
40	Section 2C, Page 295 / Cl. No. 13.6	The approval to the design and drawing submitted by the contractor shall generally be given with	Clause 13.6 deleted. The provisions of Clause No. 25.0, Section 2 shall be applicable.	
41	Section 2C, Page 295 / Cl. No. 13.10	It may also be noted that after the payment have been made to the contractor for drawings and design as per ...	Clause to be deleted. Refer proposed amendment to Clause 52.0, Section 2.	
42	Section 2C, Page 300 / Cl. No. 22.1	Notification of Delivery / Despatch: The notification of delivery or dispatch in regard to each and every consignment shall be made by Fax and by detailed letter to the Owner's Engineer at Site Bombay-400 019.	The notification of delivery or dispatch in regard to each and every consignment shall be made by Fax or e-mail and by detailed letter to the Owner's Engineer at Site..... Mumbai - 400 019.	
43	Section 3, Page 309 / Cl. No.	The contractor shall guarantee 90% availability of the plant for one (1) year from the date of trial operation. In case this is not achieved, such period shall	1.3 The Contractor shall guarantee 90% availability of the plant for one (1) year from the date of Taking Over of the plant in terms of the Contract . In case this is not	

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	1.3	be further extended to one year from the date of repair of the equipment, until such availability is achieved till such time Contract Performance Security shall required to be extended. The contractor shall maintain full fledged supervisory staff until such period.	achieved, such period shall be further extended to one year from the date of repair of the equipment, until such is achieved till such time Contract Performance Security shall required to be extended. The availability of the plant shall be calculated as under : % Availability = (OT + IT)/ 8760 Where - OT = Actual operating hours of the Plant during the one (1) year period (8760 hours) starting from the date of Taking Over of the plant IT = Time in hours when the Plant may be idle in the one (1) year period (8760 hours) due to reasons not attributable to the Contractor. The Plant's 'Availability' guarantee will be based on the following conditions: a) Operation and Maintenance shall be done as per applicable Standard Operating Procedures, O&M manuals and OEM recommendations. b) Outage of the equipment/ system shall be taken as and when indicated by the Contractor to prevent extensive damage. c) Loss of availability due to natural calamities, inclement weather conditions such as heavy rainfall, flood etc. shall treated as reasons not attributable to the Contractor d) The shutdown period for arranging Performance Test and other tests required as per the Contract shall not be counted as an outage. Period for	

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			planned maintenance including statutory inspection time shall be considered as Plant Available period. e) The Contractor shall be given unrestricted access to operational records/trends/data/history maintained in the systems by the Owner during the one year period to assess the general condition of the plant and suggest steps to improve the plant availability. f) The Contractor at their discretion may maintain necessary staff in the general shift, specifically for event monitoring. Contractor shall not provide technical advice or supervise Operation & Maintenance. Role of Contractor's personnel shall be limited to observing/ tracking of the O&M of the plants/systems and bring to the notice of the Owner any departures/deviations thereof.	
44	Section 3, Page 322/ Cl. No. 4.1	Currently, no benefits of exemption of taxes and duties for supply of goods to power plant are available to this project.	Currently, no benefits of exemption of taxes and duties for supply of goods to power plant are available to this project except for allowing imports on payment of Customs Duty at concessional rate pursuant to provisions of Customs Notification No. 12/2012 as amended. The owner shall arrange for Essentiality Certificate or any other certificate(s) at the request of the Contractor for the same to enable it to clear the goods required for the project on payment of concessional rate of Customs Duty. However, Owner's responsibility shall be limited to arrangement of the Certificates as required and the Contractor shall be responsible for availing such benefit. The Customs Duty on the goods directly dispatched to the site paid by Contractor as per the concessional rate	

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			applicable as on date of customs clearance or Record Date, whichever is lower, shall be reimbursed to the Contractor against documentary evidence admissible as per the Statute in force. Provisions of Clause No. 8.1.1, Section - 2A are modified to this extent.	
45	Section 3, Page 322/ Cl. No. 4.2.2	In the event, benefits of exemptions (part or complete) of taxes & duties including but not limited to, those on input raw materials required to manufacture the equipment are extended to this project during the execution of contract, the contractor shall pass on such benefits to the owner. The owner shall issue, if he is empowered to do so, necessary certificates/declarations as may be required under the statute in force so as to enable the contractor to claim such benefits.	In the event, benefits of exemptions (part or complete) of taxes & duties including but not limited to, those on input raw materials required to manufacture the equipment are extended to this project or it is revealed that such exemption (part or complete) or any other concession are available for this project, during the execution of contract, the contractor shall pass on such benefits to the owner. The owner shall issue, if he is empowered to do so, necessary certificates/declarations as may be required under the statute in force so as to enable the contractor to claim such exemption / concession.	

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 Maharatna Company	1x660MW BHUSAWALTPS Unit # 6 SPECIFIC TECHNICAL REQUIREMENTS	SPECIFICATION NO.	
		VOLUME – II B	
		SECTION - C	SUB-SECTION -
		REV.0	DATE 22.06.2019
		SHEET 1 OF 4	

3.00.00	GEO-TECHNICAL INVESTIGATION & FOUNDATION SYSTEM
3.01.01	BHEL had carried out detailed geo-technical investigation in the proposed PT Plant. The sub-strata details encountered at various bore holes (BH-47,48, & 50) in the PT Plant area are enclosed as Annexure-1 The geotechnical data attached shall be solely for the purpose of guidance to the bidder. BHEL/owner does not take any responsibility about the accuracy and applicability of the geo-technical data furnished herewith. The onus of correct assessment/interpretation and understanding of the existing sub-strata conditions is on the bidder. Any variation in the data between the one furnished and to that found during execution of the work at site shall not constitute a valid reason in affecting the terms & conditions of this bid and the bidder shall note that nothing extra will be payable on this account. The bidder shall fully satisfy himself about the nature of sub-strata expected to be encountered including the type of foundation, ground water table and construction methodology to be adopted etc prior to the submission of the bid.
3.01.02	Detailed geo-technical Investigation report shall be made available to the successful bidder during contract engineering stage. If the bidder desires to carry out additional geo-technical investigation, he/she may do so with prior information/permission of BHEL/owner at no extra cost to BHEL/owner. No extension in time schedule shall be permitted on this account. The bidder shall obtain approval on the agency for conducting geo-technical investigation work, field and laboratory testing schedule proposed by the bidder etc from BHEL/owner before undertaking the geo-technical investigation work. However, the net safe bearing capacity (SBC) of shallow foundation to be adopted for the design of foundations during detailed engineering shall be limited to the values mentioned elsewhere in the specification and any value of net SBC higher than the one indicated shall not be accepted. However, bidder shall note that the net safe bearing capacity and foundation depth/ safe load carrying capacity of pile to be adopted for design during detailed engineering stage shall be got approved by BHEL/owner.
3.02.00	Foundation System
3.02.01	General Requirements a. All equipments/structures shall be supported on suitable open foundation along with any special requirements/remedial measures/treatment called for subsoil/foundations as approved by BHEL/owner.

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		b. All foundations shall be designed in accordance with the provisions of relevant part of the latest revision of Indian Standards. c. No foundation shall rest on filled up soil. /Loose soil d. No foundation shall rest on expansive soil. e. A combination of open and pile foundations shall not be permitted under the same structure. f. Foundations shall be designed to resist loading derived from environmental loads including loads due to wave, current, wind or seismic, gravity loads, construction loads, static and moving loads and any other loads as applicable and as specified elsewhere in the specification. g. Foundation shall be designed for worst combination of loads as described elsewhere in the specification.	
3.02.02	Open foundations In case shallow/open foundations are adopted then the following shall be strictly adhered to.		
		i. Minimum width of foundation shall be 1m. ii. Minimum founding level shall be as mentioned in Table-1. iii. The net safe bearing capacity (SBC) of shallow/open foundations at different founding level shall be limited to the values as mentioned in the following Table-1 and any value of net SBC higher than the one indicated shall not be accepted. However, bidder shall note that the net safe bearing capacity and depth of foundation to be adopted for design during detailed engineering stage shall be got approved by BHEL/owner.	



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Table-1

Net Safe Bearing Capacity

Unit	Type of Foundation	Founding Level (m)	Net Safe Bearing capacity (T/sq.m)	Finished Ground Level (FGL) (m)	Remarks
1	Isolated/Raft	(+)213.00	15	R.L (+)214.00	Minimum founding level shall be RL(+)213.00 M
2	Isolated/Raft	(+)212.50	25		
3	Isolated/Raft	(+)211.50	35		
4	Isolated/Raft	(+)210.50	40		

- iv. It shall be ensured that all foundations of a particular structure/building/equipment shall rest on one bearing stratum.
- v. The permissible settlement as mentioned under para “permissible settlement of foundations” or permissible settlement from functional requirement which ever more stringent shall be adopted for the design.
- vi. The permissible total settlement and differential settlement of foundation resting on soil mass shall be governed by IS: 1904 and from functional requirements whichever is more stringent. Unless otherwise mentioned, the total settlement of PT Plant foundation resting on soil shall be restricted to 40 mm and 12mm in case of rock.

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	vii. Analysis and proportioning of footings to minimize differential settlements shall be carried out for all major foundations and the same shall be submitted for BHEL/owner’s approval. viii. In case any soft soil/loose stratum is met with at the founding level or below during execution, the same shall be completely removed and filled back with PCC 1(cement):4(sand):8(stone aggregates) up to desired foundation level. ix. Expansive soil shall not be used for filling/back filling around foundation		

**TITLE:**

**TECHNICAL SPECIFICATION FOR
PRE TREATMENT PLANT (PT PLANT)
1X660 MW BHUSAWAL TPS, UNIT # 6**

BHEL DOCUMENTS NO.: PE-TS-415-158A-A001**VOLUME II-B****SECTION-D****REV. NO. 00****DATE:**

**SECTION-D
(GENERAL TECHNICAL REQUIRMENT)**

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1.0 <u>CODES AND STANDARDS</u> 1.1 Except where otherwise specified, the Plant shall comply with the appropriate Indian Standard or an agreed internationally accepted Standard Specification as listed in the Annexure to this Section and mentioned in detailed Specifications, each incorporating the latest revisions at the time of tendering. Where no internationally accepted standard is applicable, the Bidder shall give all particulars and details as necessary; to enable the Owner to identify all of the Plant in the same detail as would be possible, had there been a Standard Specification. 1.2 Where the Bidder proposes alternative codes or standards, he shall include in his tender one copy (in English) of each Standard Specification to which materials offered shall comply. In such case, the adopted alternative standard shall be equivalent or superior to the standards mentioned in the specification. 1.3 Wherever specified or required, the Plant shall conform to various statutory regulations such as Indian Boiler Regulations, Indian Electricity Rules, Indian Explosives Act, Factories Act etc. Wherever required, approval for the plant supplied under the specification from statutory authorities shall be the responsibility of the Bidder. 1.4 In the event of any conflict between the codes and standards referred above and the requirements of this specification, the requirements, which are more stringent, shall govern. 1.5 In case of any change of code, standards and regulations between the date of purchase order and the date the Contractor proceeds with manufacturing, the Owner shall have the option to incorporate the changed requirements. It shall be the responsibility of the Contractor to advise Owner of the resulting effect. 1.6 Successful Bidder shall furnish two (2) sets of latest of national/international codes and standards to owner. 2.0 <u>RESPONSIBILITY FOR DESIGN</u> 2.1 The Bidder shall assume full responsibility for the design of the whole and every part of the Plant, whether or not the design work was undertaken		

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specifically in relation to the Contract and whether or not the Contractor was directly involved in the design work. 2.2 Notwithstanding the Owner's wish to receive the benefits of new, advanced and improved technologies, a prime requirement is that all the systems and components proposed shall have been already adequately developed and shall have demonstrated good reliability under similar or more arduous conditions elsewhere, at least one (1) plant for a period not less than one (1) year as on the date of bid opening. 2.3 The successful bidder shall have to carry out surge analysis and other transient condition studies as may be necessary and as required by the Owner as per proven engineering practice. 2.4 The Bid shall include a detailed discussion on the development status of and the reasons for any changes made in proposed systems or components for the Plant, as compared with similar items previously supplied in other installations cited by the bidder as reference plants. 2.5 The Bidder may also make alternate offers, provided such offers are superior in his opinion in which case adequate technical information, operating feed back etc are to be enclosed with the offer, to enable the Owner to assess the superiority and reliability of the alternatives offered. In case of each alternative offer, its implications on the performance, guaranteed efficiency, auxiliary power consumptions etc shall be clearly brought out to the Owner to make an overall assessment. In any case, the base offer shall necessarily be in line with the specifications i.e. Base offer shall be as per the technical specifications and the same will be considered for techno-commercial evaluation. 3.0 <u>NAME PLATES (RATING PLATES)</u> 3.1 Instruction plates, nameplates or labels shall be permanently attached to each main and auxiliary item of Plant in a conspicuous position. These plates shall be engraved with the identifying name, type and manufacturers serial number, together with the loading conditions under which the item of Plant has been designed to operate. 3.2 Items such as valves etc which are subject to hand operation, shall be provided with nameplates so constructed as to remain clearly legible throughout the life of the plant giving due consideration to the difficult climatic conditions to be encountered. Nameplates shall be securely mounted where		

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they will not be obscured in service by insulation, cladding, actuators or other equipment. Direction of flow is also to be engraved. 3.3 All trade nameplates and labels shall be in English language. All measurements shall be in M.K.S. Units. 3.4 The size and location of nameplates shall be subject to Approval of the Engineer. 4.0 <u>SAFETY AND SECURITY</u> 4.1 The design shall incorporate every reasonable precaution and provision for the safety of all personnel and for the safety and security of all persons and property. The design shall comply with all appropriate statutory regulations relating to safety. All structures and equipment shall be designed and constructed to withstand every foreseeable static and dynamic loading condition, including loading under earthquake conditions, with an adequate margin of safety. 4.2 Ready and safe access with clear head room shall be provided to all parts of the plant for operation, inspection, cleaning and maintenance. 4.3 Escape routes and clear ways shall be provided to allow speedy evacuation of the plant in the event of fire or explosion and the plant layout shall allow for ease of access to all parts of the Works by rescue and fire fighting teams. The plant layout shall be designed to localize and minimise the effects of any fire or explosion. The recommendations of NFPA, OSHA and TAC etc as necessary shall be followed in all respects. 4.4 The use of corrosive, explosive, toxic or otherwise hazardous materials shall be kept to a minimum during construction and the design of the plant shall minimise the requirement for such materials during operation and maintenance. Where such materials must be used, all necessary precautions shall be taken in the design, manufacture and layout of equipment to minimise the resulting hazard and all equipment necessary for the protection and first-aid treatment of personnel in the event of accidents shall be provided. Particular attention is drawn to avoid the use of materials containing asbestos in any form. 5.0 <u>GUARDS</u>		

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5.1	Effective guards and fences must be provided to prevent injury to operators through accident or malpractice.	
5.2	Mesh guards which allow visual inspection of equipment with the guard in place are generally preferable. The guards shall be constructed of mesh attached to a rigid framework of mild steel rod, tube, or angle and the whole galvanised to prevent loss of strength by rusting or corrosion. The guards shall be designed to facilitate removal and replacement during maintenance.	
5.3	All drive belts, couplings, gears, sharp metallic edges and chains must be safely guarded. Any lubricating nipple requiring attention during normal running must be positioned where they can be reached without moving the guards.	
5.4	Guards for couplings and rotating shafts shall be in accordance with BS 5304-1975 or similar approved standard. All rotating shafts and parts of shafts must be covered.	
5.5	Suitable fencing shall be provided to enclose all openings or doorways used for the hoisting and lowering of machinery etc. This fencing must be securely fixed but quickly detachable when required. A secure hand hold must be provided on each side of the opening or doorway.	
6.0	<u>LOCATION AND LAYOUT REQUIREMENTS</u> The majority of plant and equipment shall all be of indoor installation. Layout should facilitate access for operation-maintenance and inspection of any one or more equipment / components at a time without disturbing the operation or installation of rest of the plant. Further, Bidder should comply with the criteria given under the various equipment and system specifications as well as those stipulated in Annexure-B attached to this section. Enclosed General Layout and other tender layout drawings show the location of major installations and auxiliary buildings. The Bidder shall try to retain these locations as far as practicable. The layout of equipment within the powerhouse as shown in the tender drawings is indicative. The Bidder may, subject to Owner's approval alter the same to suit the space requirement of the equipment offered. Bidder may give as an alternative his own preferred layout clearly indicating the advantages and other implications, if any. Such alternative will not be considered for evaluating the bid, but may be considered with the successful	

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Bidder if Owner / Engineer find the proposal more attractive in terms of techno-economic consideration.		
6.1	While developing the layout of buildings the following criteria shall be given effect:	
6.1.1	The minimum width of clear access corridors around equipment shall be one (1) meter.	
6.1.2	Each building shall have an identified vacant space for equipment unloading and maintenance and preferably a separate bay altogether in buildings housing heavy equipment. Provision for handling equipment by monorail hoist and/or overhead crane shall be made as specified.	
6.1.3	The plinth level with respect to the existing grade level shall be as indicated elsewhere in this specification. Finished Grade Level (FGL) above Mean Sea Level (MSL) for the plant area, CHP area and for PWS area inside plant to be developed. Mean sea level for the plant is 210 m.	
6.1.4	The minimum clear height available between two consecutive floor slabs shall not be less than five (5) meters. A clear head room of two (2) meters shall be maintained between the floor and any overhead piping/cables or other obstruction. Adequate provision for natural ventilation and illumination shall be made as per good engineering practices. For cable vault, the clear distance will be 3.5 m .	
6.1.5	There shall be at least two (2) main access doors, one on either side of each building, of which one shall be minimum three (3) meters wide with rolling shutters for equipment entry. For multistoried buildings, at least two (2) regular staircases diagonally opposite to each other shall be provided connecting all the floors and roof. These minimum requirements shall be augmented as required depending on the floor area, statutory requirements and TAC recommendations.	
6.1.6	All buildings including All Transfer points in Coal Handling Plant, Bunker Floor shall be provided with adequate number of Toilets with effluent discharge system and facility for Drinking water which shall include water cooler and UV Purifier of reputed make as may be approved by Owner. The criteria for ventilation, fire protection and illumination of building spaces specified elsewhere in this specification shall be complied with.	

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6.1.7	All rail/road crossings for pipe/cable racks / conveyors shall be done with minimum 8.5 meters headroom from top of rail/road to bottom of rack/Conveyor structure. All the clauses related to the head room at rail/road crossings in entire specification stands modified to this extent. Similarly, top cover over underground pipes/cables shall be minimum one (1) meter.	
6.1.8	Cubicle for operating personnel shall be located at safe place near the equipment.	
6.1.9	Cable racks / pipe racks shall have hand railings in walkways on both sides at appropriate heights. Cable racks / pipe racks shall have single in walkways @ centre of each tier.	
6.1.10	Concept of various mechanical and electrical equipment location and building dimensions (including column-row spacing) as shown in Plot Plan/Floor Plan drawing are to be adhered as far as possible. Any departure from this suggestive layout is primarily not recommended. There is no mismatch in the Tender Requirement as per the two clauses. Bid specification shall prevail. Bidder shall note that the dimensions indicated in Plot Plan & Tender Documents are minimum requirements and any increase in these dimensions, if required, from the point of safe and hassle free approach for Operation & Maintenance of the equipment, shall be in the scope of the Bidder only.	
6.2	The following requirements for equipment layout shall be complied with:	
6.2.1	The regular basement floor is not acceptable in Boiler & Mill Bunker bay building. Further, local pits/trenches shall be avoided as far as possible.	
6.2.2	Mills shall be located by the side of Boiler. The width of Mill/Bunker building shall be 12.5 M and the length of the same shall be 10.5 M per Mill. A clear walkway of 1200 mm (min) shall be ensured between the mills/ its foundation/ mill reject vessel edge and inner face of mill bay column. Raw coal bunker shall be circular in shape unless otherwise approved.	
6.2.3	Interconnecting walkways (minimum 2 m width) between main plant building and boiler (on either side of boiler) at Ground, Mezzanine, Operating, PRDS and Deaerator floor levels shall be provided. Also inter-connecting platform between Boiler and Coal Tripper floor level and roof of Mill maintenance floor level, Feeder floor level, Bunker Building at Mill bay shall be provided. Number of interconnecting platforms between Boiler and Coal Bunker	

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building for each level / floor specified above shall be two (2) on each side of Boiler i.e. four (4)/floor. 6.2.4 Two of the landing levels of the Goods Elevator shall preferably coincide with the feeder and tripper floor elevations. In case of difference in levels, electric hoists to shift goods from elevator floors to feeder/ tripper floors shall be provided. 6.2.5 Fuel Oil (F.O.) piping shall be routed over trestles. The headroom for F.O. trestle in Boiler/ESP/ID fan/Chimney area shall be 8.0 M till the road behind chimney and 7.0 M in CD bay area. The headroom for F.O. trestle in outlying area shall be 3.0 M except at rail/road crossing where the headroom shall be 8.5 M. 6.2.6 Clear walkways along A-row & B-row of TG building shall be provided as indicated below: (a) 1.5 m at all levels of AB Bay. (b) 3.5 m along B-row at operating floor level for interconnection with service Building & in front of control room. 6.2.7 The layout of the steam turbine unit shall permit sufficient lay down area for all the parts/components to enable carrying out maintenance and overhauling operations. 6.2.8 Steam turbine and generator (except stator) and other equipments located in the turbine hall shall be accessible by the EOT cranes for their handling during erection and maintenance. For all other equipment/components, suitable handling arrangement for erection and maintenance shall be provided. 6.2.9 In TG bay at crane rail level, walkway with handrails is envisaged for entire column sectional depth for full length of the building. In addition, it shall be ensured that on A-row and B-row columns, through walkway (without hindrance) of minimum 600 mm clear width is available from the face of the column to the handrail of the platform. 6.2.10 Layout of facilities and equipment shall allow removal of Generator Stator, Generator transformers, Station & Unit transformers without disturbing equipments, piping, cabling, duct routed in the area.		

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6.2.11	Adequate space and handling arrangement shall be provided for handling/removal of pumps, heaters, heat-exchanger, fans, mills during maintenance.	
6.2.12	Valves shall be located in accessible positions and operating/maintenance platforms shall be provided along with approach ladders & handrails for the same.	
6.2.13	While developing the layout, all fresh air ventilation louvers shall be considered 1000 mm from floor level and directed downwards at an angle. Ventilation fans on AB bay roof shall be kept staggered and shall not be near the centerline of turbo generator set.	
6.2.14	Each equipment room shall be provided with alternate exits in case of fire/accidents as per requirements of factory Act and Statuary bodies/Insurance companies.	
6.2.15	All other safety requirements as per the factories Act, Rules/regulations made under Electricity Act, 2003 and applicable codes/standards shall be observed while developing the layout.	
7.0	<u>OPERATION, MAINTENANCE & AVAILABILITY CONSIDERATIONS</u>	
7.1	Equipment/works offered shall be designed for high availability, high reliability, low maintenance and ease of operation & maintenance. The Bidder shall specifically state the design features incorporated to achieve high degree of reliability, availability, operability and ease of maintenance. He shall also furnish details of availability records in plants stated in his experience list.	
7.2	Ample space for ease of operation and maintenance including equipment removal, tube bundle / cartridge / rotor pulling etc shall be provided. All valves, gates, dampers and other devices shall be located and oriented in such a way that they are accessible from operating floor levels. Where this cannot be adhered to, platforms and walkways with access ladders shall be provided to facilitate operation and maintenance.	
7.3	Motorised lifting devices, i.e. hoists, chain pulleys, jacks, etc. shall be provided for handling and carrying out maintenance of any equipment and/or part. Suitable beams, hooks etc. for this purpose shall be provided in the Buildings.	

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7.4	Lifting devices like lifting tackles, slings etc. to be connected to hook of the hoist/crane shall be provided by the Bidder for lifting the equipment, accessories covered under this specification.	
7.5	All similar parts of the equipment shall be made to gauge and shall be interchangeable with and shall be made of same material and workmanship as the corresponding parts of the equipment. Where ever feasible, common components shall be employed in different pieces of equipment in order to optimize the spares inventory and utilization.	
8.0	<u>MATERIALS</u>	
8.1	In selecting materials of construction of equipment, the Contractor shall pay particular attention to the atmospheric conditions existing at the Site and the nature of material/ fluid handled. Wherever deviations are taken in respect of materials specified, the reasons shall be spelt out clearly in the proposal. All materials shall be new, and shall be of the quality most suited to the proposed application.	
8.2	In as far as is possible; materials shall be in accordance with Indian or international standard specifications and shall be used in accordance with Indian or International codes of practice. Where such standards or codes of practice are not available, sufficient information shall be provided to allow the Engineer to assess the suitability of the material for the particular application. All materials used shall have performed lengthy satisfactory service in similar or more arduous conditions to those proposed by the Contractor.	
8.3	All parts which could deteriorate or corrode under the influence of the atmospheric, meteorological or soil conditions at the Site, or under the influence of the working conditions shall be suitably and effectively protected so that such deterioration or corrosion is a minimum over the life of the plant.	
9.0	<u>LUBRICATION</u>	
9.1	Provision shall be made for suitable efficient lubrication where necessary to ensure smooth operation free from undue wear.	
9.2	Non ferrous capillary tubing shall be used throughout.	

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9.3	Gear boxes and oil baths shall be provided with filling and drain plugs, both of adequate size. An approved means of oil indication including level switches and temperature indication shall be provided.	
9.4	All high speed gears shall be oil bath lubricated. Low speed gears shall be lubricated by means of soft grease. Removable and accessible drip pans shall be provided to collect lubricant which may drop from operating parts.	
9.5	All lubrication points shall be conveniently situated for maintenance purposes. It must be possible to carry out lubrication from a gangway or landing and without the removal of guarding or having to insert the hand into it. Where accessibility to a bearing for oiling purposes would be difficult a method of remote lubrication shall be fitted.	
9.6	The Contractor shall supply grease gun equipment suitable to service each type of nipple fitted.	
10.0	<u>LUBRICANTS AND CONTROL FLUIDS</u>	
10.1	The Contractor shall provide a detailed and comprehensive specification for all lubricating oils, greases and control fluids required for the entire plant. A sufficient supply of these shall be provided by the Contractor for initial commissioning, first fill and till COD of unit.	
10.2	The Contractor shall supply a detailed schedule giving the lubricant testing, cleaning and replacement procedures. All equipment and facilities necessary for the testing, cleaning and changing of lubricants and control fluids shall be provided. The Contractor shall endeavor to reduce the varieties and grades of required lubricants and control fluids to a minimum, matching them where possible to those already in use in the generating station in order to simplify procurement and minimise storage requirements. All lubricants and control fluids shall be of internationally recognized standards and shall be easily obtainable from a large number of Indian suppliers. Bidder shall also indicate the equivalent Indian Standard for the above for easy procurement in future.	
10.3	No lubricant or control fluid shall have toxic or other harmful effects on personnel or on the environment.	
11.0	<u>OPERATION AND MAINTENANCE</u>	
11.1	The plant shall be designed and constructed so that operation and maintenance manpower requirements are minimized.	

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The design and layout shall facilitate inspection, cleaning, maintenance and repair. The importance of continuity of operation is second only to that of safety. 11.2 Spare parts for equipment shall be interchangeable with the original components and, so far as possible, be of common design and manufacture. 11.3 All similar standard components/parts of similar standard equipment provided shall be interchangeable with one another. Further, identical equipments shall be provided for similar duties so that the same are interchangeable with one another in totality and component wise. 11.4 All heavy parts (500 Kg and above) must be provided with a convenient arrangement for slinging and handling during erection and overhaul. Any item of plant normally stripped or lifted during periods of maintenance and weighing one tonne or above, shall be clearly marked with its weight. 11.5 On completion of commissioning, a complete set of tools for the maintenance of the entire plant shall be provided by the Contractor. This shall include all necessary spanners, special wrenches, extraction equipment and any special tools reasonably required by the Engineer. Tools used during erection and commissioning shall not be accepted except with the specific approval of the Engineer. 11.6 All equipment and major valves should be provided with adequate maintenance approach and facility. 12.0 <u>PLANT LIFE AND MODE OF OPERATION</u> The complete plant including all the equipment and systems individually and collectively shall be designed for continuous operation for an economic service life of thirty (30) years under the prevailing site conditions and for the type of duty intended. The critical components of the major equipments like Steam Generator, Turbine-Generator and Auxiliary equipment, the life of which is limited by time and temperature dependent mechanisms such as thermal stress, creep and low cycle fatigue, are to be designed considering expected (hot, warm and cold) start-up, shut-down and cyclic load variations.		

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The unit would be operated on base load with cyclic load variation. The load variation is expected to be as per schedule depending on power demand.

The expected start-ups should be considered as minimum
(Based on HPT metal temperature)

(a)	Cold start-up	:	>72 hrs : 150
(b)	Warm start-up	:	10-72 hrs : 1000
(c)	Hot start-up	:	<10 hrs : 4000

The allowable stresses shall be so selected so that life expectancy to minimum 2,00,000 hours of operation can be achieved. The Bidder shall discuss this aspect in his technical proposal.

13.0 PACKAGING & MARKING

All the equipment shall be suitably protected, coated, covered or boxed and crated to prevent damage or deterioration during transit, handling and storage at site till the time of erection. While packing all the materials, the limitations from the point of view of availability of railway wagon sizes in India shall be taken into account. Bidder shall consider the details of various wagons normally available with Indian Railways for transportation of heavy equipment. The Contractor shall be responsible for all loss or damage during transportation, handling and storage due to improper packing.

As per the information available, the dimensions of OD consignment for transportation of the equipment by rail (if any equipment to be handled through rail transportation) are as below:

(a)	Width of the Package (from centre-line of rails-1.6 metres on both sides)	:	3.2 Meters
(b)	Height of the package from rail top	:	4.47 Meters

The above indicates the dimensions, which can be normally transported on the wagons without infringement of the "moving gauge". This is however not indicative of the consignment which can be carried out with infringement of "moving gauge" duly authorised and approved by the Indian Railways. There may be difference between the "moving gauge" and the "fixed structure gauge" and consignments infringing the "moving gauge" can be moved after

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investigation regarding possible infringement with the fixed structures. As the critical fixed structures in each route are different, consignments infringing moving dimensions have to be individually investigated to select a route and also determine the restrictions under which such movement is to be carried out. Such routes selected or other mode of transport envisaged is to be clearly brought out in the proposal wherever transport of over dimensional equipment is involved.

Bidder shall consider unloading of material delivered through rail transportation, at near by railway station/ site unloading siding. The subsequent transportation up to project work place shall be considered by road only. All unloading and handling equipment both at railway station siding and at project site shall be arranged by the Bidder. Necessary arrangement to be organized with the railway authority for such purpose shall also be under the scope of services of the Bidder. Bidder may consider entire material delivered up to site through rail transportation only.

The identification marking indicating the name and address of the consignee shall be clearly marked in indelible ink on two opposite sides and top of each of the packages. In addition, the Contractor shall include in the marking gross and net weight, outer dimension and cubic measurement. Each package shall be accompanied by a packing note (in weather proof paper) quoting specifically the name of the Contractor, the number and date of contract and names of the office placing the contract, nomenclature of contents and Bill of Material.

For imported equipment and material, suitable port facilities may be used in which case material may be transported from the port by tractor-trailer. Bidder may consider this aspect.

Specification of Packaging and Marking has been described in detail in Volume I: General Condition of Contract of the Specification.

14.0 PROTECTION

Equipment having antifriction or sleeve bearings shall be protected by weather-tight enclosures. Coated surfaces shall be protected against impact, abrasion, discoloration and other damages. Surfaces that are damaged shall be repainted.

Electrical equipment controls and insulations shall be protected against moisture and water damages. All external gasket surfaces and flange faces, couplings, rotating equipment shafts, bearings and like items shall be

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15.0 15.1	thoroughly cleaned and coated with rust preventive compound as specified above and protected with suitable wood, metal or other substantial type covering to ensure their full protection. All exposed threaded parts shall be greased and protected with metallic or other substantial type protectors. All piping, tubing and conduit connections on equipment and other equipment openings shall be closed with rough usage covers or plugs. Female threaded openings shall be closed with forged steel plugs. The closures shall be taped to seal the interior of the equipment. Open ends of piping, tubing and conduit shall be sealed and taped. Returnable containers and special shipping devices shall be returned by the manufacturer's field representative at the Contractor's expense. <u>PAINTING</u> <u>GENERAL</u> All exposed metallic surfaces subject to corrosion shall be protected by shop application of suitable coatings. Surfaces not easily accessible after shop assembly shall be treated before-hand and protected for life of the equipment. Surfaces to be finish painted after installation shall be shop painted with at least two (2) coats of primer. Steel surfaces, which are not to be painted, shall be coated with suitable rust preventive compound subject to the approval of the Owner. All paints shall be used in accordance with the manufacturer's instructions. No thinners or other substance shall be added to the coating material without the approval of the Engineer. The quality and vendor of the paints shall require approval of the Owner. All paints, when applied in a normal full coat, shall be free from runs, sags, wrinkles, patchiness, brush marks or other defects. All primers shall be well marked into the surface, particularly in areas where pitting is evident, and the first priming coat shall be applied as soon as possible after cleaning, within four hours maximum. The paint shall be applied by brush, roller or airless spray, according to the manufacturer's instructions. Spray painting shall be carried out by operators trained and thoroughly experienced in the use of the equipment. If the drying interval between successive coats, which should not exceed one week, has been so long as to endanger the	

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adhesion of the following coat, the paint already applied shall be lightly rubbed down with fine abrasive paper before putting on the next coat. Paint spraying on large surfaces shall not normally be done indoors, except with the approval of the Engineer. Spray guns shall not be used outdoors in windy weather or near unprotected surfaces of a contrasting colour and under no circumstances shall spray guns be used where spray may be carried into or onto exposed electrical equipment. Paint containers shall not be opened until required and the paint shall be mechanically mixed thoroughly before use, and agitated occasionally during use. Electrical equipment shall be shop finished with one or more coats of primer and two coats of high-grade oil resistant enamel. The interior of all panels' cabinets and enclosures shall be finished with gloss white enamel. The Contractor shall furnish sufficient touch-up paint for one complete finish coat on all exterior factory surfaces of each item of equipment. The touch-up paint shall be of the same type and colour as the factory applied paint and shall be carefully packed to avoid damage during shipment. Complete painting instructions shall be furnished. The Contractor shall select shop primer for steel and iron surfaces, which will have a continuous operating temperature below 35°C, in accordance to the relevant standard. Special high temperature primer shall be used on surface exposed to operating temperature above 35°C. The Owner/Engineer shall submit the colour scheme during execution of contract for approval.		
15.2	<u>PREPARATION</u> Oil and grease shall be removed from the surface by washing with a suitable detergent, rinsing with clean water, and drying. Surfaces to be shot blasted shall be cleaned to Swedish Standard SA 2.5 or equivalent, and all dust remaining after cleaning shall be removed. The priming coat shall be applied without delay.	
15.3	<u>DAMAGED PAINTWORK</u>	

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Any damaged paintwork shall be made good as follows: 15.3.1 The damaged area, together with an area extending 25 mm around its boundary, shall be cleaned down to bare metal. 15.3.2 A priming coat shall be immediately applied, followed by a full paint finish equal to that originally applied and extending 50 mm around the perimeter of the original damage. 15.3.3 The repainted surface shall present a smooth surface. This shall be obtained by carefully chamfering the paint edges before and after priming 15.4 <u>PAINTING SYSTEMS</u> The requirements for the Dry Film Thickness (DFT) of paint and the materials to be used shall be as stated below, unless otherwise specified elsewhere in this specification. 15.4.1 Surfaces subject to Weathering All surfaces shall have a minimum of four coats of paint made up as follows: <table><tr><td>(a)</td><td>Primer coat</td><td>:</td><td>35 micron DFT</td></tr><tr><td>(b)</td><td>Tie coat</td><td>:</td><td>35 micron DFT</td></tr><tr><td>(c)</td><td>Finishing coat (Two Nos.)</td><td>:</td><td>35 micron DFT per coat</td></tr><tr><td>(d)</td><td>The total minimum DFT</td><td>:</td><td>140 micron</td></tr></table> 15.4.2 Surfaces Inside Buildings All surfaces shall have a minimum of three coats of paint made up as follows: <table><tr><td>(a)</td><td>Primer coat</td><td>:</td><td>35 micron DFT</td></tr><tr><td>(b)</td><td>Tie coat</td><td>:</td><td>35 micron DFT</td></tr><tr><td>(c)</td><td>Finishing coat (Two Nos.)</td><td>:</td><td>25 micron DFT per coat</td></tr><tr><td>(d)</td><td>The total minimum DFT</td><td>:</td><td>120 micron</td></tr></table>			(a)	Primer coat	:	35 micron DFT	(b)	Tie coat	:	35 micron DFT	(c)	Finishing coat (Two Nos.)	:	35 micron DFT per coat	(d)	The total minimum DFT	:	140 micron	(a)	Primer coat	:	35 micron DFT	(b)	Tie coat	:	35 micron DFT	(c)	Finishing coat (Two Nos.)	:	25 micron DFT per coat	(d)	The total minimum DFT	:	120 micron
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The Contractor shall select the type and colour of primer & finish coat after approval by the Owner. For detail painting on building & structural steel elements, please refer Volume VI / A & B of this specification. 16.0 <u>COLOUR CO-ORDINATION & FINISH</u> 16.1 Exterior surfaces throughout the plant shall be finished in colours and textures which will blend harmoniously together and with the surrounding landscape. 16.2 Interior surfaces throughout the plant shall be finished in colours and textures which will blend harmoniously together and which will be conducive to; the comfort, well-being and high productivity of the operators. Operating plant and services provided shall be colour coded for ease of identification. 16.3 All finishes shall be durable and as far as possible maintenance free. Finishes shall be easily cleaned. 16.4 Final colours and finishes shall be to the Approval of the Engineer. 17.0 <u>ENVIRONMENT PROTECTION AND NOISE LEVEL REQUIREMENT</u> 17.1 <u>ENVIRONMENT PROTECTION</u> The plant shall be designed for installation and operation in harmony with the surrounding environment and all measures of pollution control shall be ensured by the Bidder to restrict pollution from the liquid effluent and Stack emission within the limits as given below with due consideration of Environment (Protection) Rules 1986 as amended till date. In case the Ministry of Environment & Forest stipulates any other conditions not specified hereunder while clearing the project, same shall be complied with by the Contractor. The document is available on MOEF website in Public domain. 17.1.1 For Liquid Effluent (a) Provision laid down in Schedule-I for Thermal Power Plants and also in Schedule-VI: General Standards for discharge of Environmental Pollutants Part-A: Effects of Environmental (Protection) Rules 1986, as amended till date.		

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(b) Any specific requirement of State Pollution Authorities over and above the above stipulation 17.1.2 For Air Emission (a) Suspended Particulate Matter i.e. dust burden at Chimney outlet - Maximum 50 mg/Nm³ (with worst coal and one field out). (b) NO_x : 365 ppm (maximum) or 750 mg/Nm³ (Equivalent NO₂). (c) SO₂ : As per prevailing Indian/ World Bank standards The Bidder shall include in his scope all necessary equipment and measuring instruments to comply with above requirements. Location and accessibility of the instruments shall be properly coordinated. MOEF guideline to be follow for SO₂. 17.2 <u>NOISE LEVEL REQUIREMENT</u> The plant shall be designed, constructed and provided with suitable acoustic measures to ensure the noise level criteria as per the following stipulations. 17.2.1 Maximum noise level shall not exceed 85 dB (A) 1.0 M equipment outline. 17.2.2 Any statutory changes in stipulations regarding noise limitation that may occur in future according to Maharashtra Pollution Control Board or Central Pollution Control Board or Ministry of Environment & Forest regulation during tenure of the contract, the Contractor shall comply with the requirement. An exception will be made for the plant at startup operations and other big pressure reducing devices operating during emergency periods and for the safety valves. 18.0 <u>INSPECTION AND TESTING</u> 18.1 <u>GENERAL:</u> 18.1.1 An indicative list of Inspection and testing requirements for each package has been given for equipments across various volumes of this specification. Bidder shall note that these testing and inspections listed herein are the		

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minimum requirements as perceived by the Owner; the bidder shall consider this only as a general guidance and is not meant to be exhaustive. The bidder shall consider requisite testing and inspections across the equipments / systems forming the proposed power plant unit based on his own experience and in line with the current industry practices for identically rated power plant for the technology under consideration. The comprehensive list of tests considered for each of the equipment/ systems shall be furnished as part of the bid.		
18.2	<u>INSPECTION AND TESTS DURING MANUFACTURE</u>	
18.2.1	The method and techniques to be used by the Contractor for the control of quality during manufacture of all plant and equipment shall be agreed with the Owner prior to the Award of Contract.	
18.2.2	The Owner's general requirements with respect to quality control and the required shop tests are set out elsewhere in this Specification.	
18.2.3	Before any item of plant or equipment leaves its place of manufacture, the Owner shall be given the option of witnessing inspections and tests for compliance with the specification and related standards.	
18.2.4	Advance notice shall be given to the Owner as agreed in the Contract, prior to the stage of manufacture being reached, and the piece of plant must be held at this stage until the Owner has inspected the piece, or has advised in writing that inspection is waived. If having consulted the Owner and given reasonable notice in writing of the date on which the piece of plant will be available for inspection, the Owner does not attend the Contractor may proceed with manufacture having forwarded to the Owner duly certified copies of his own inspection and test results. The Contractor shall forthwith forward to the engineer duly certified six (6) copies of the Test Certificates. Distribution of six (6) copies of Test Certificates for approval will be two (2) copies to Owner and four (4) copies to Consultant. These four (4) copies will be further distributed by Consultant after approval to Owner, site and bidder. One copy will be retained with the Consultant for record purpose. Further, nine (9) copies of Shop Test Certificates shall be bound with Instruction Manuals referred to elsewhere. Distribution of nine (9) copies of Shop Test Certificates for approval will be Two (2) copies to Owner, Three (3)	

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copies to site, Two (2) copies to Consultant, Two (2) copies to Owner's library / record. 18.2.5 Under no circumstances any repair or welding of castings shall be carried out without the consent of the Engineer. Proof of the effectiveness of each repair by radiographic and/or other non-destructive testing technique, shall be provided to the Engineer. 18.2.6 All the individual and assembled rotating parts shall be statically and dynamically balanced in the works. Where accurate alignment is necessary for component parts of machinery normally assembled on site, the Contractor shall allow for trial assembly prior to despatch from place of manufacture. 18.2.7 All materials used for the manufacture of equipment covered under this specification shall be of tested quality. Relevant test certificates shall be made available to the Owner. The certificates shall include tests for mechanical properties and chemical analysis of representative material. 18.2.8 All pressure parts connected to pumping main shall be subjected to hydraulic testing at a pressure of 150% of shut-off head for a period not less than one hour. Other parts shall be tested for one and half times the maximum operating pressure, for a period not less than one hour. 18.2.9 All necessary non-destructive examinations shall be performed to meet the applicable code requirements. 18.2.10 All welding procedures adopted for performing welding work shall be qualified in accordance with the requirements of Section-IX of ASME code or IBR, as applicable. All welded joints for pressure parts shall be tested by liquid penetrant examination according to the method outlined in ASME Boiler and Pressure Vessel code. Radiography, magnetic particle examination, magnuflux and ultrasonic testing shall be employed wherever necessary/ recommended by the applicable code. At least 10% of all major butt welding joints shall be radiographed. 18.2.11 Statutory payments in respect of IBR approvals including inspection for design and manufacturer of equipment shall be made by the Bidder. All payment for erection and testing at site (i.e. under IBR Maharashtra Jurisdiction) shall also be made by the Bidder. In such case, Contractor's		

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scope shall also be extended to preparation of all necessary documents, co-ordination and follow-up with IBR authorities for above approval. 18.3 <u>PERFORMANCE TESTS AT SITE</u> 18.3.1 The full requirements for testing the system shall be agreed between the Owner and the Bidder prior to Award of Contract. The completely erected system shall be tested by the Contractor on site under normal operating conditions. The Contractor shall also ensure the correct performance of the system under abnormal conditions, i.e. the correct working of the various emergency and safety devices, interlocks etc. 18.3.2 The Bidder shall provide complete details of his normal procedures for testing, for the quality of erection and for the performance of the erected plant. These tests shall include site pressure test on all erected pipe work to demonstrate the quality of the piping and the adequacy of joints made at site. 18.3.3 The Contractor shall furnish the quality procedures to be adopted for assuring quality from the receipt of material at site, during storage, erection, pre-commissioning to tests on completion and commissioning of the complete system/equipment. 18.4 For details of specific tests required on individual equipment, refer to respective section of this specification. 19.0 <u>TRAINING OF OWNER'S PERSONNEL</u> The Contractor shall extend all possible assistance and co-operation to the Owner Number of man-days of training as mentioned below shall be included in Tender. 19.1 <u>TRAINING AT CONTRACTOR'S PREMISES</u> The Contractor shall conduct training of Thirty (30) engineers of the Owner on engineering, operation and maintenance of the Plant at the Contractor's or Associates or Sub-contractor's premises where adequate training facilities are available during the design and manufacturing stage of the Contract. The total man-months for training of engineers shall be maximum Thirty (30), having following indicative break-up:		

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	Discipline	Number of Engineers	Number of Man-month
(a)	Operation	10 heads	10
(b)	Maintenance (Boiler & Turbine)	10 heads	10
(c)	Electrical Maintenance	4 heads	4
(d)	Control & Instrumentation	4 heads	4
(e)	Maintenance Planning	2 heads	2
		30 heads	30

However, the details of the training programme will be discussed and finalised with the successful Bidder.

The training may also be arranged by the Contractor in any Plant where the equipment manufactured by the Contractor or his Associates is under installation, operation or testing to enable the trainees to become familiar with the equipment being furnished by the Contractor. All expenses inherently related to the training shall be borne by the Contractor and shall include but not limited to travel expenses (international and inland fares), lodging and per diem charges as well as medical insurance, instructors fee, programme and miscellaneous cost to be incurred during the training.

The training programme shall be adequate for the trainees to acquire the necessary expertise and competence in the area of engineering, operation and maintenance and as trainers for in-house technology transfer programme of the Owner.

The Contractor shall be responsible for the development of the Training Module and Programme Schedule, which shall be submitted to the Owner for approval.

The components of the training modules shall include but not be limited to the training procedures/methodology, instructional materials such as audio visual materials, CDs and slides and manuals for each trainee.

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Three (3) sets of the materials included in the training modules shall be handed over to the Owner upon completion of the training. An evaluation shall be jointly undertaken by the Contractor and the Owner's representative on the adequacy, appropriateness and relevance of the training and the programme effectiveness after the training. The training material shall be in English language only. The content of the training programme shall include but not be limited to: (a) Coal fired thermal plant principles in management and practice for operators, technicians and maintenance personnel. (b) Plant operation and systems training for operators including simulator training as applicable. (c) Maintenance training programme covering electrical, mechanical and instrumentation and control. Said training programme shall be submitted to the Owner for approval. The timing of the training should be such that the participants will be conversant with sufficient know-how to participate in the pre-commissioning and commissioning tests of the Plant. The Contractor shall provide qualified English speaking instructors and training coordinator (s) during the tenure of the training programme. 19.2 <u>OPERATION AND MAINTENANCE TRAINING AT SITE</u> The Contractor shall provide a comprehensive training programme related to design application, plant management, operation and maintenance, including trouble shooting of the Contractor's supplied system and equipment at the Site starting from Start of Commissioning and thereafter up to the Final Acceptance of the Unit. The following instructors shall be at the Site continuously during the training: (a) One (1) for Steam Generator and Auxiliaries ; (b) One (1) for Turbine Generator and Auxiliaries ; (c) One (1) for Electrical Works ;		

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(d) One (1) for Instrumentation and Control (Boiler and Auxiliaries) ; (e) One (1) for Instrumentation and Control (Turbine and Auxiliaries). Instructors shall also be available for Coal handling Plant, Ash Handling Plant, Water Treatment Plant and other specific areas as per requirement. 19.3 <u>ON-THE-JOB TRAINING</u> During the period of pre-commissioning, commissioning and trial operation, the Owner shall provide operation and maintenance personnel to assist the Contractor in the operation and maintenance of his supply and work under the direction of the Contractor for the purpose of on-the-job training. The Owner shall have the right to send to the Site his employees later intended to operate and maintain the equipment supplied under this Contract. The Contractor shall, without additional cost, use his site staff to instruct these employees on the operation and maintenance of the equipment. All instructions shall be in the English language.		

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LIST OF STANDARDS FOR REFERENCE

ANNEXURE – A

1.0	International Standards Organisation (ISO)
2.0	International Electro-technical Commission (IEC)
3.0	American Society of Mechanical Engineers (ASME)
4.0	American National Standards Institute (ANSI)
5.0	American Society for Testing and Materials (ASTM)
6.0	American Institute of Steel Construction (AISC)
7.0	American Welding Society (AWS)
8.0	Architecture Institute of Japan (AIJ)
9.0	National Fire Protection Association (NFPA)
10.0	National Electrical Manufacturer's Association (NEMA)
11.0	Japanese Electro-technical Committee (JEC)
12.0	Institute of Electrical and Electronics Engineers (IEEE)
13.0	Federal Occupational Safety and Health Regulations (OSHA)
14.0	Instrument Society of America (ISA)
15.0	National Electric Code (NEC)
16.0	Heat Exchanger Institute (HEI)
17.0	Tubular Exchanger Manufacturer's Association (TEMA)
18.0	Hydraulic Institute (HIS)
19.0	International Electro-Technical Commission (IEC) Publications

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20.0	Power Test Code for Steam Turbines (PTC)	
21.0	Applicable German Standards (DIN)	
22.0	Applicable British Standards (BS)	
23.0	Applicable Japanese Standards (JIS)	
24.0	Electric Power Research Institute (EPRI)	
25.0	Standards of Manufacturer's Standardization Society (MSS)	
26.0	Bureau of Indian Standards (BIS)	
27.0	Indian Electricity Rules	
28.0	Indian Boiler Regulations (IBR)	
29.0	Indian Explosives Act	
30.0	Indian Factories Act	
31.0	Tariff Advisory Committee (TAC) rules	
32.0	Emission regulation of Central Pollution Control Board (CPCB)	
33.0	Pollution Control regulations of Dept. of Environment, Govt. of India	
34.0	Central Board of Irrigation and Power (CBIP) Publications	
35.0	The Air Prevention and Control of Pollution Act	
36.0	The Environmental Protection Act	
37.0	The Public Liability Insurance Act	
38.0	The Forest Conservation Act	
39.0	The Wildlife protection Act	
40.0	The EIA Notification, 1994	

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41.0 IS: 14665-Specification for Electric Traction Lift 42.0 Any other statutory Codes/Standards/Regulation (a) European Standards(EN) (b) American Water Works Association(AW WA) (c) VDI/VDE		

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<u>CRITERIA FOR LAYOUT</u>			
<u>ANNEXURE – B</u>			
<u>SR. NO.</u>	<u>ITEM</u>	<u>SPECIFICATION REQUIREMENT</u>	
1.0	<u>SITE CONDITIONS TO BE CONSIDERED</u>		
1.1	Prevalent wind direction during summer (for deciding cooling tower orientation)	See wind-rose in plot plan.	
1.2	Prevalent wind direction (s) during dry seasons (for deciding the location of coal stock pile and ash dump/unloading areas, minimising the pollution effect due to dust)	See wind-rose in plot plan.	
1.3	Location of		
1.3.1	Raw Water intake point	As shown in Plot Plan	
1.3.2	Plant drainage outfall point (s)	In Existing Drainage/Effluent treatment Plant	
1.3.3	Railway entries & exits	As shown in Plot Plan	
1.3.4	Road entries & exits	As shown in Plot Plan	
1.3.5	Electrical power transmission grid system	As shown in Plot Plan	
1.3.6	Preferred / selected ash dump area	Velhala nearly 10 Km from the site	
1.3.7	Nearest residential area	Existing Colony	
2.0	<u>LAYOUT REQUIREMENTS</u>		

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<u>SR. NO.</u>	<u>ITEM</u>	<u>SPECIFICATION REQUIREMENT</u>	
2.1	<u>MAXIMUM PERMISSIBLE SLOPE IN</u>		
2.1.1	Rail track	1 in 400	
2.1.2	Road	1 in 30	
2.1.3	Sides of unpaved embankment	1 in 2	
2.2	<u>REQUIRED ROAD WIDTH</u>		
2.2.1	Main roads	14.00 Metres with 1.0 m wide shoulders on either side for outer roads on western and eastern side and 7 meters with 1.5 m wide shoulders for other two sides of power block.	
2.2.2	Auxiliary interconnections	Minimum 4 Metres without shoulders on either side and shall vary upto 7 m subject to availability of space. For carriage way, 5 Metre wide with 0.5 Metre shoulders and 7.0 Mtre wide with 1.5 Metre shoulders.	
2.2.3	Road to the power house unloading bay		
(a)	Only for entry to the unloading bay	Yes	
(b)	To pass through the unloading bay	No	
2.3	Required minimum horizontal distance between the nearest points of		
2.3.1	Plant boundary and the boundary of residential area	(Local municipality/factory rule)	

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2.3.2	Electrical transformer and any other	As per the Tariff Advisory Committee Rules	
2.3.3	Fire water supply installation and any building / facility subject to fire risk.	As per the Tariff Advisory Committee Rules	
2.3.4	Inflammable liquid (fuel oil, etc.) storage & handling installation and their fencing and other buildings/facilities	Rules of the Indian Explosive (Indian Explosives Act) and Indian Petroleum Code	
2.4	Required minimum vertical clearance		
2.4.1	Under pipes/cable racks at road crossings	8.0 Metres	
2.4.2	Soil coverage over underground pipes	1.0 Metre (minimum)	
2.4.3	Pipe/Cable trench	Not Acceptable Provisions of Vol IV A, Section 1 Cl 1.8.1 is applicable for transformer yerd only.	
2.5	Railway Wagon clearance	Rules of the Indian Railways	
2.6	Minimum Clearance between any road edge and building/ structure / any fixed installation	3 Metres	
2.7	Required level, above the local developed grade level, of		
2.7.1	Top of all roads	150 mm	
2.7.2	All outdoor paved areas	150 mm	

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2.8	Temporary storage areas, workshops, offices, residence etc. required at the time of erection work.	Yes
2.9	Green belt around power plant area	As per environmental guidelines of MOEF, Govt. of India.

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<u>BUILDING/ EQUIPMENT LAYOUT REQUIREMENTS</u>			
<u>ANNEXURE – C</u>			
<u>SR. NO.</u>	<u>ITEM</u>	<u>SPECIFICATION REQUIREMENT</u>	
1.0	Minimum clear space required at all working and walking areas for operating & maintenance personnel		
1.1	<u>HORIZONTAL, IN ALL DIRECTIONS</u>		
1.1.1	Adjacent to any electrical equipment, electrical cables, running (rotating / reciprocating) equipment, safety valve or vent / drain pipe outlet, pipe / equipment of surface temperature exceeding 60°C.	1200 mm	
1.1.2	Adjacent to any other plant facilities (including walls / structures)	1000 mm	
1.2	<u>VERTICAL</u> (head-room clearance)		
1.2.1	Under any pipe / equipment surface of temperature exceeding 60°C and any electrical cables or other electrical items.	Minimum 2.5 Metre	
1.2.2	Under any other plant facilities (including structures, pipes etc.)	2.0 Metre	
1.3	For all areas where any equipment (including trucks, trolleys and other material handling equipment) move or manoeuvre.	Minimum 500 mm clear in all direction from the outer edges of the equipment	
1.4	Minimum clear hand space required for		

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1.4.1	The application of thermal insulation	100 mm	
1.4.2	Welding work	150 mm	
1.4.3	Bolt tightening	150 mm	
2.0	<u>FLOORS, PLATFORMS, STAIRCASE, LADDERS, WALLS, DOORS & WINDOWS</u>		
2.1	Statutory Requirement	As per the regulations of Tariff Advisory Committee, Indian National Building Code, Indian Factories Act, Local Municipal Rules, etc.	
2.2	<u>OPERATION & MAINTENANCE REQUIREMENT</u>		
2.2.1	Adequate floor space shall be kept to permit dismantling, temporary storing and in-situ Maintenance of plant & equipment parts, satisfying the clear space requirements stated above. A separate unloading bay for such purpose is required.	Yes	
2.2.2	Floors or fixed/portable platforms with stairs/ ladders shall be provided for easy approach to any plant item, including valves, instruments, etc. to be operated, observed and/or to be frequently (more than once a month) maintained.	Yes	
2.3	Minimum access opening required (with rolling shutter) transportation,	3.5 M wide x 4 M high or wherever entry of truck, for material depending upon the envisaged equipment size to be handled.	

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2.4	Plinth level of all buildings, above the local developed for power house building.	300 mm	
3.0	<u>OTHER MAINTENANCE REQUIREMENT</u>		
3.1	Generator stator handling In case the Generator stator cannot be handled by the turbine house crane, all provisions for its overhauling, including the arrangement to slide the stator on the turbine house floor, the foundation work for stator jacking / lowering assembly, dismantling of building end walls / structures etc. shall be kept. If Strand Jack Arrangement is opted for lifting of generator stator, provision of strand jack for stator lifting shall be provided only during erection and no such provision for generator stator handling shall be provided during normal maintenance of the generator stator.	Yes	
3.2	Maintenance of the internals / impellers of all important equipment, like Boiler Feed Pumps, Feed Water Heaters, Surface Condenser, fans of the boiler draft plant, Intake and circulating water pumps, Cooling Water Pumps, Coal Mills, Air Compressors, Blowers, Heat Exchangers, Fuel Oil Pumps, Filters etc.	Shall be possible without disconnecting or dismantling any piping/ducting.	

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3.3	Overhauling and handling of the casings for the above items	Shall be possible without disturbing / dismantling any piping / ducting not directly connected to them.	
3.4	Crane Approach Wherever required, the unobstructed approach of the crane hook / other hoisting equipment hook to various plant & equipment shall be possible.	Yes	
4.0	<u>CENTRAL CONTROL ROOM</u> All electronic equipment other than those directly associated with control, operation or presentation of displays shall be mounted external to the control room in air conditioned control equipment room.	Yes	
5.0	The bidder shall describe in his bid the proposed layout philosophy of the Central Control Room and Control Equipment Room and the arrangement of equipment best suited for the system offered by him and as per good ergonomically consideration.		
5.1	However, as a guide line, following features are given:		
5.1.1	False ceiling shall be provided as per Volume VI A section 4 clause no. 4.1c & clause no. 6		

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5.1.2	Uniform height, colouring schemes for cabinets etc. shall be available.		
5.1.3	The total area of floor space covered by Control Consoles/Panels in the Control Room shall not exceed 15% of floor area.		
5.1.4	No opening shall be provided from Boiler side.		
5.1.5	Two double leaf doors, suitably located for entering the Control room shall be provided with opening towards the turbine floor.		
5.1.6	Cable entry for the panels/consoles shall be from bottom and suitable openings shall be provided.		
5.1.7	The Control Room lighting shall be designed to provide a glare free uniform illumination. The level of illumination shall be minimum 300 LUX.		
5.1.8	Necessary Air Conditioning shall be provided for Central Control room, Control Equipment Room and SWAS room etc.		
5.1.9	Basic amenities like toilet, Tiffin rooms, wash basins, rest rooms etc. shall be provided near the Control Room.		

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6.0	Toilet and drinking water facility	Required in all buildings and on all floors wherever operating personnel are to be deployed.	

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SPECIFIC LAYOUT CONSIDERATIONS

ANNEXURE-D

While developing the layouts, the following major layout parameters shall be ensured, as a minimum:

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1.0	AB bay, BC & CD bay widths	36.0 M, 12.0 M & 12.0M
2.0	Arrangement of TG set	Longitudinal
3.0	Floor levels in AB bay	0.0 M, 9.0 M, 17.0 M
4.0	Floor levels in B-C bay	0.0 M, 9.0 M, 17.0 M 24.0M, 28.0 M 32.8 M, 38.0 M
5.0	Level of operating floor	17.0 M
6.0	Level of mezzanine floor	9.0 M Elevation can be altered by bidder subject to provision of adequate clearances between equipments, trouble free access for O & M etc. However, the acceptance of this deviation is subject to comprehensive review and approval of the layout considering all aspects during detailed engineering. In case the bidder intends to alter the elevation, it shall be subject to provision of adequate clearances between equipments, trouble free access for O & M etc. However, the acceptance of elevation other than 9.0 m shall be subject to comprehensive review and approval of the layout considering all aspects

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		during detailed engineering.	
7.0	HT/LT Switchgear and MCC location	HT Switchgear at 3.5 M and LT Switchgear & MCC at 12.0 M in AB bay	
8.0	Area of unloading bays	750 sq. M	
9.0	Lay down Area (Minimum on operating floor) with EOT Crane approach.	750 sq. M.	
10.0	Minimum clear working space around the equipment	1200 mm	
11.0	Location of Deaerator	In BC bay at EL. 38.0 M	
12.0	Location of Heaters	HP Heaters/LP Heaters at Operating Floor/ Mezzanine Floor respectively in B-C Bay.	
13.0	Location of BFP	TDBFP at Operating Floor and MDBFP at Ground Floor in AB Bay. As an alternative, TDBFP can be located at mezzanine floor; however, this is subject to the bidder meeting all requirements related to engineering and O & M aspects; However, the acceptance of this alternative is subject to comprehensive review and approval of the layout considering all aspects during detailed engineering.	
14.0	Location of Boiler MCC	At 28.0 M in BC bay	
15.0	Clear Head room within Main plant Building for pipes, structures & cable trays, ducts etc.	2.5 M shall be minimum.	

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16.0	Number of Fire Escape staircases in the main plant with fire doors at each landing	Minimum Four (4)
17.0	Minimum width of all staircases landings	1500 mm
18.0	Passenger Elevators	One (min)
19.0	Clear approach width in front and rear of ESP	10 M (Height = 8 M)
20.0	Head Room for pipe/cables trestles at rail, road crossing	8.0 M
21.0	Minimum straight length in Flue gas duct at ESP outlet for Opacity meters.	As required for accurate dust measurement within the battery limits.
22.0	Elevation of ID Ducts entering Chimney	12.75 (Min.) (Bottom of steel)

20.0 GUIDELINES FOR ENGINEERING SERVICES

- 20.1 Prior to commencement of the engineering work as part of design submissions, all aspects of design viz criteria for selection and sizing of all equipment and systems, design margins etc including that for structural steel and civil work shall be outlined and these shall form the basis for the detailed engineering work.
- 20.2 Engineering work shall be performed on modern and proven concepts and internationally accepted good engineering practices but fully compatible with the Indian environments. Owner shall have the right to review and approve the engineering work by themselves and/or through consultant and ask for any clarifications and changes/modifications to the work performed by Contractor.
- 20.3 At any stage during the performance of assignment, the Contractor may be required to make certain changes/modification/improvements in design/drawing/other documents which are applicable to any unit of 660 MW

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individually or severally, which in the opinion of the Owner could result in better improved design, layout, operability, plant availability, maintainability, reliability or economy of the plant and its systems/ sub-systems in view of revised and more accurate information/data available at a later date (s) or feedback (s) received during execution/operation of similar units. Such changes/modifications/improvements required could be identified by Owner and/or consultant and mutually discussed. Owner requires the Bidder to incorporate such action in the subject assignment appropriately without any additional cost liability and time implication to the Owner and same shall be within the responsibilities and scope of the Contractor.		
20.4	During the course of review of detailed engineering stages, it may be essential in the opinion of Owner to obtain certain classified data for review purposes only. In case Owner so desires, the Bidder shall submit such data to Owner.	
20.5	During the course of review of detailed engineering, it may be essential in Owner's opinion to obtain data and information on similar equipment and plants engineered by the Bidder. In case Owner so desires, the Bidder shall submit such data and information to the Owner.	
20.6	It is not the intent to give details of every single task covered in the total engineering work to be carried out by Contractor, however, all engineering work required for the satisfactory completion of the plant/systems as specified shall be carried out by the Contractor. Broadly, the following are the minimum requirements in respect of scope of major items of work:	
20.6.1	Preparation, updating and finalisation of scheme drawings, control and interlock diagrams, detailed and fully dimensioned layout drawings (plant layout and equipment layout detailed plan, elevation and cross-sectional drawings at different elevations/ floor levels) covering all mechanical, electrical, C&I, civil and structural items, equipment, systems and facilities. Drawings and Schedules prepared by the Contractor from time to time, as detailed designs are developed, shall be submitted for Owner's/ Consultant's approval before the work is taken up. Revisions, corrections, additions to drawings and schedules shall not be considered to change the scope of work.	
20.6.2	Preparation of detailed technical specifications including data sheets, tender drawings and bill of material for all bought out items and also finalisation of corresponding sub-contractors.	

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20.6.3	Review of sub-contractor's data, drawings, design calculations, schedules, bill of materials, instruction manuals etc. for all equipment, before forwarding them to Owner /Consultant for approval.	
20.6.4	Preparation of civil construction drawings for all equipment showing foundation details and full details regarding equipment loads, floor openings, details of embedments etc required for preparation of civil construction drawings and also as referred at relevant sections of Scope, Terminal Points & Exclusions. These documents shall be preceded by appropriate design calculations, static and dynamic analysis, as necessary.	
20.6.5	Preparation and finalisation of process piping and instrumentation diagrams and schematics, complete in all respects for all systems/packages of the power plant.	
20.6.6	Preparation of consolidated schedules and bills of materials, including line numbers, tag numbers, source of supply, service conditions, specifications, materials, types and connections details, quantities for items of the plant including dampers, steam traps, strainers, instrumentations, ducting.	
20.6.7	Sizing of all piping and equipment as per the stipulated design criteria, carrying out the flexibility analysis/dynamic analysis as necessary, hangers & support engineering.	
20.6.8	Final revision of all documents including preparation and compilation of Instruction Manuals for installation, commissioning, operation and maintenance for all equipment and systems. Refer clause 5.0 for the specific requirement in this regard.	
20.6.9	Certification and submission of final as-built drawings for all areas.	
20.6.10	Preparation and compilation of all drawings, schedules and instructions which may be required at site, whether separately mentioned or not.	
20.6.11	All erection and assembly drawings which may be required at site.	
20.6.12	For all bought out item packages, the Contractor shall provide complete material/ component list along with detail specification, drawings, component part number etc during detail engineering stage prior to final approval. Such approved drawing / document shall be made available at site in adequate number prior to commencement of work. Moreover, such document/drawing shall be provided in soft form (CD).	

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20.6.13	Preparation of necessary documentation, design calculations etc required for submission to statutory authorities like IBR, Chief Electric Inspector etc.	
21.0	<u>OPERATING MANUALS AND MAINTENANCE INSTRUCTIONS</u>	
21.1	The Contractor shall provide all necessary maintenance manuals and operating instructions at least six (6) months before the time of commissioning and before taking over of the plant and equipment. The instruction manual shall be submitted in the form of Two (2) soft copy in CD and 15 hard copies.	
21.2	The information provided, which shall be contained in loose leaf stiff backed covers, shall include:	
21.2.1	A complete inventory of all main items of plant, with identification details.	
21.2.2	Service manuals for all plant and equipment giving full descriptions of the main items and auxiliary items such as power packs, hydraulic equipment, actuators, lubricating pumps etc.	
21.2.3	A separate electrical manual covering items such as switchgear, cabling, instrumentation, controls, cabling layouts and wiring diagrams.	
21.2.4	A schedule of recommendations for routine maintenance of all electrical and mechanical equipment, recommended inspection point, information on detection, cause and rectifications of troubles & faults.	
21.2.5	A lubrication schedule with all necessary drawings, diagrams to identify the lubrication points.	
21.2.6	Manufacturer's literature.	
21.3	The instruction manual shall be subject to the approval of Owner.	
21.4	The contractor shall submit the complete equipment list. The list shall be updated every three (3) months.	
22.0	<u>PLANT HANDBOOK</u>	
	The Contractor shall submit to the Engineer, a preliminary plant handbook preferably in A-4 size sheets which shall contain the design and performance data of various plant, equipment and systems, covering the complete project	

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including single line flow diagrams, within twenty four (24) months from the date of his acceptance of the Letter of Award. The final plant handbook complete in all respects shall be submitted by the Contractor six (6) months before start-up and commissioning activities. The plant handbook shall be submitted in the form of two (2) soft copy in CD/DVD (one to Owner and one to Consultant) and twenty five (25) hard copies in decent bound forms. 23.0 <u>CONTRACT STAGE DOCUMENT SUBMISSION AND APPROVAL PROCEDURE</u> 23.1 Within fifteen (15) days of issue of Letter of Award (LOA) by the Owner, the Contractor shall furnish a schedule of drawings and design document to be submitted by him to the Owner/Engineer indicating dates against each document. The documents shall be divided into two categories: (a) for approval and (b) for information/further engineering and co-ordination by the Owner. This document submission schedule shall require approval by the Owner/Engineer. 23.2 All contract documents shall be marked, without fail, with the name of the Owner, the Project, the specification title and number and the unit designation. All dimensions shall be in metric units. All notes, markings etc. shall be in English. 23.3 Documents/Drawings, submitted during tender stage, shall be revalidated or revised as required and submitted as certified contract document for approval/information of the Owner/Engineer. 23.4 Unless specified otherwise, the following categories of documents/drawings would require approval of the Owner/Consultant: 23.4.1 List of sub-vendors (from Owner only)		

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23.4.2	System scheme and instrumentation diagrams	
23.4.3	Design basis justifying selection of equipment & process parameters where not specified in the Contract	
23.4.4	Equipment data sheets and general arrangement drawings	
23.4.5	Predicted performance curves of equipment**	
23.4.6	Materials of construction	
23.4.7	Layout drawings	
23.4.8	Operation logic diagrams	
23.4.9	Typical control circuit	
23.4.10	Drawings of Instrumentation and Control	
23.4.11	Any deviation from contract (by Owner)	
	** For all critical equipments (boiler and turbine auxiliaries etc), submission of this data shall be mandatory for approval of equipment data sheets / GA drawings.	
23.5	Unless specified otherwise, the following categories of documents/ drawings would be treated for information/further engineering by the Owner/Engineer. The Contractor shall, however, incorporate all additional information and clarifications in these documents/ drawings as and when desired by the Owner/Engineer.	
23.5.1	Equipment foundation drawings	
23.5.2	Equipment cross-section drawings, product literature etc which are of proprietary nature	
23.5.3	Various bills of quantity, schedules etc	
23.5.4	Piping fabrication drawings, isometrics etc	
23.5.5	Panel wiring diagrams	

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23.5.6	Instruction/Operation manuals	
23.5.7	Service manuals and troubleshooting guide for C & I system including field instruments	
23.5.8	Cable schedule and interconnection chart	
23.5.9	Drive/feeder wise control scheme showing all external interfaces.	
	In essence, the Contractor is solely responsible for corrections and adequacy of design & engineering for documents under this category.	
23.6	Upon review, the Owner/Engineer shall put his remarks and one of the following action stamps on the drawing/document:	
23.6.1	Approved	
23.6.2	Approved except as noted, forward final drawing	
23.6.3	Approved except as noted, resubmission required	
23.6.4	Disapproved	
23.6.5	For information/reference only	
	For action stamps in category (c) & (d), documents must be resubmitted for review by the Owner / Engineer. For action stamp in category (b), further review by Owner / Engineer would not be necessary provided the Contractor agrees & incorporates the minor comments made on the document.	
	Except for action stamp under category (c) & (d), the Contractor can proceed with manufacturing and other sequential activities for those areas of a drawing/document which do not have any review comment by the Owner/Engineer.	
	The Owner/Engineer may accord approval in category (c) or (d) in more than one submission of a document till he is satisfied that the intent of the specification has been fully complied with. The Contractor shall be responsible for delay in such cases and no extension of time shall ordinarily be allowed on such grounds. Approval of contract documents by the Owner/Engineer shall not relieve the Contractor of his responsibility for any errors and fulfillment of contract requirements.	

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The Contractor's work shall be in strict accordance with the finally approved drawings and no deviation shall be permitted without written approval of the Owner/Engineer. 23.7 Except key plan/general yard plan, any layout drawing requiring scrutiny shall not be drawn to a scale less than 1:50. 23.8 For review by the Consulting Engineer, the Contractor shall furnish three (3) prints of each drawing. Two (2) prints of such submission shall also be sent to the Owner. After review, one (1) stamped print will be returned to the Contractor. Upon action under category (a) or (e), the Contractor shall directly distribute the documents to the various offices of the Owner and other agencies in number of copies as specified in the contract document. Such distribution copies shall be marked with the reference and date of the letter by which the Owner/Engineer has accorded his final approval. Penal action shall be taken against the Contractor for any unauthorised revision in the drawings so distributed from the drawings approved by the Owner/Engineer. The contractor shall furnish three (3) CD's of all as built/final drawings for Owner / Consultant site. 23.9 In case of contradiction between the stipulations above and those stated elsewhere in the specification, the stipulations herein shall prevail. For details of documentation for Civil, Structural and Architectural works, please refer civil specification.		

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**TITLE:**

**TECHNICAL SPECIFICATION FOR
PRE TREATMENT PLANT (PT PLANT)
1X660 MW BHUSAWAL TPS, UNIT # 6**

BHEL DOCUMENTS NO.: PE-TS-415-158A-A001

VOLUME II-B

SECTION-D

REV. NO. 00

DATE:

GENERAL TECHNICAL REQUIREMENT OF PUMPS

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VOLUME III-E2 SECTION – 2 HORIZONTAL CENTRIFUGAL PUMPS		

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DATASHEET – A	HORIZONTAL CENTRIFUGAL PUMPS

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1.0 <u>GENERAL INFORMATION</u> 1.1 This section presents the general guidelines and details of Horizontal Centrifugal Pumps to be procured and shall not be limited to the pumps specified under. For other horizontal centrifugal pump, these general guidelines as specified hereinafter shall be followed. 2.0 <u>CODES AND STANDARDS</u> 2.1 The design, manufacture and performance of the Horizontal Centrifugal Pumps as specified hereinafter, shall comply with the requirements of the following codes and standards and shall include all the latest amendments subsequent to the year of publication as mentioned below. 2.1.1 IS-6595 Part-2/1993 : Horizontal Centrifugal pumps for clear, cold and fresh water. 2.1.2 IS-5120/1977 : Technical requirements for Rotodynamic special Purpose pumps 2.1.3 IS-5639/1970 : Pumps for handling chemicals & corrosive liquids 2.1.4 IS-5659/1970 : Pumps for process water 2.1.5 IS-6536/1972 : Pumps for handling volatile liquids 2.1.6 IS-9137/1978 : Code for acceptance tests for centrifugal, mixed flow and axial flow pumps – Class 'C' 2.1.7 BS EN ISO 9906: 2000 : Acceptance tests for Centrifugal, mixed flow and axial flow pumps – Class 'B' & 'C' Tests 2.1.8 API-610/1989 : Centrifugal pumps for general refinery services. 2.1.9 Standards of the Hydraulic Institute of USA (1983)		

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PTC 8.2/1965 : Power Test Codes – Centrifugal pumps.

2.2 In case of any contradiction with the above standards and Datasheet – A, the stipulations in the Datasheet – A shall prevail and shall be binding to the Contractor.

3.0 SCOPE OF WORKS

3.1 SCOPE OF SUPPLY

3.1.1 The scope of supply under this section shall be as below. Items specifically not mentioned but deemed necessary by the Bidder for making the system completely reliable and efficient shall also be included.

(a) Equipment

(i)	DMCW Pumps (Turbine Island)	Three (3) Horizontal Centrifugal Pumps and drives complete with all accessories as specified in this section and in the Datasheet – A attached with this section.
(ii)	DMCW Pumps (Boiler Island)	Two (2) Horizontal Centrifugal Pumps and drives complete with all accessories as specified in this section and in the Datasheet – A attached with this section.
(iii)	Cycle make-up Pumps	Two (2) Horizontal Centrifugal Pumps and drives complete with all accessories as specified in this section and in the Datasheet – A attached with this section.
(iv)	Boiler Fill Pumps	Two (2) Horizontal Centrifugal Pumps and drives complete with all accessories as specified in this section and in the Datasheet – A attached with this section.
(v)	Any other Horizontal Centrifugal Pump(s) included by the Bidder.	

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(b) Equipment Accessories Each pump set for all the above groups shall be supplied with the following accessories: (i) Couplings of approved design to connect pump shaft directly with the motor shaft. (ii) Sets of base plates, support plates, grounding pads, lifting lugs, eye bolts, nuts etc for each pump and motor set. (iii) Slip-on type drilled steel flanges of proper rating for both suction and discharge connections of each pump set. All the counter-flanges shall be complete with requisite number of bolts, nuts, gaskets etc. (iv) Air release cocks and drain plugs for each pump set. (v) Discharge line pressure gauge and suction line pressure/ vacuum gauges complete with isolating cocks for each pump set. (vi) All internal/integral piping with valves, fittings, and pressure gauges for lubrication, cooling and sealing, wherever applicable, shall be tapped of directly from respective pump discharge. 3.2 For details regarding scope of services and works, Volume II of this specification shall be referred to. 4.0 <u>PERFORMANCE REQUIREMENT</u> 4.1 Performance requirements for the pumps shall be as guided in Section-I of this volume and by the Datasheet – A enclosed with this section. 4.2 Pumps shall preferably be designed to have the best efficiency at the specified duty point. The pumps shall be suitable for continuous operation at any point within the “Range of Operation” as stipulated in the Datasheet – A attached with this section.		

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4.3	Pumps shall preferably have continuously rising head-capacity characteristics from the specified duty point towards shut-off point, the maximum being at shut-off to enable parallel operation. Under all circumstances, the 'Range of Operation' of the pumps shall exclude any unstable operating zone of the head – capacity curve.	
4.4	Wherever specified in the Datasheet – A attached with this section, pumps of each category shall be suitable for parallel operation. The head vs capacity, the BHP vs capacity characteristics etc shall be identical to ensure equal load sharing and trouble-free operation of any pump when the other pump (s) working in parallel with it, trips.	
4.5	The pump set along with the drive motor shall run smooth without undue noise and vibration. Acceptable peak to peak vibration limits shall be generally guided by the Hydraulic Institute Standards of USA.	
5.0	<u>DESIGN AND CONSTRUCTION</u>	
5.1	<u>PUMP CASING</u>	
5.1.1	Pump casing shall be provided with adequate number of vents and priming connections with valves unless the pump is made self- venting and priming. Casing drain, as required, shall be provided complete with drain valves.	
5.1.2	Pump design must ensure that the nozzles are capable of withstanding external reactions not less than those specified in API-610.	
5.1.3	In cases where an expansion joint is located at pump discharge, the pump assembly will be subjected to an additional thrust which will be transmitted to the foundation. This additional thrust shall be taken into the consideration for pump design.	
5.2	<u>IMPELLER</u>	
5.2.1	The rotor assembly shall be dynamically balanced and designed with critical speed substantially above the operating speed.	

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5.3	<u>WEARING RINGS</u>	
5.3.1	Replaceable type wearing rings shall be furnished to prevent damage to impeller and casing.	
5.4	<u>SHAFT</u>	
5.4.1	Shaft size shall be selected considering that the critical speed shall be away from the operating speed as recommended in applicable Code/Standard. The critical speed shall also be at least 10% away from runaway speed.	
5.5	<u>SHAFT SLEEVES</u>	
5.5.1	Renewable type fine finished shaft sleeves shall be provided at the stuffing boxes/mechanical seals. Length of the shaft sleeves must extend beyond the other faces of gland packing or seal end plate so as to distinguish between the leakage past shaft and shaft sleeve and that past the seals/glands.	
5.5.2	Shaft sleeves shall be properly fastened to the shaft to prevent any leakage or loosening. Shaft and shaft sleeve assembly should ensure concentric rotation.	
5.6	<u>BEARINGS</u>	
5.6.1	Bearings shall be easily accessible without disturbing the pump assembly. A drain plug shall be provided at the bottom of each bearing housing.	
5.6.2	Heavy duty sleeve/ball/roller type bearings shall be provided to take care of the radial loads.	
5.6.3	In case of sleeve type radial bearings, axial thrust shall be absorbed in suitable hydraulic devices and/or thrust bearings.	
5.6.4	Bearings and hydraulic devices (if provided for balancing axial thrust) shall be of adequate design for taking the entire pump load arising from all probable conditions of continuous operation, as specified in the Datasheet – A. Life of the bearings shall be guided by the design standard of the	

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pump or as specified in Datasheet – A. Thrust bearing shall be capable of running continuously at maximum load. 5.6.5 The bearings shall be oil/grease lubricated. Suitable lubricating arrangement for the bearings shall be furnished with the pump complete with all accessories like pump, filters, pipings, fittings, valves, interlocking and supervising instruments etc as necessary and specified in the Datasheet – A. The design shall be such that the bearing lubricant does not contaminate the liquid being pumped. 5.7 <u>STUFFING BOXES</u> 5.7.1 Stuffing box design shall permit replacement of packing without removing any part other than the gland. 5.7.2 Stuffing boxes shall be sealed/cooled by the fluid being pumped/external clear water, as specified in the Datasheet – A. All necessary pumps, piping, fittings, valves, instruments etc as required for safe and trouble-free operation of the pumps and as specified in the Datasheet – A shall be provided. 5.8 <u>MECHANICAL SEALS</u> 5.8.1 Mechanical seals shall be provided for all pumps. The pump supplier shall co-ordinate with the seal maker in establishing the circulation rate for maintaining a stable film at the seal face in the chamber. The seal piping system shall form an integral part of the pump assembly. 5.8.2 When handling liquids near their boiling point, suitable arrangement for external cooling shall be provided so as to prevent flashing at the seal faces. 5.8.3 For the seals under vacuum service, the seal design must ensure sealing against atmospheric pressure, even when the pumps are not operating. 5.9 <u>DRIVE UNIT</u> 5.9.1 The pumps shall be driven by electric motor or other driving equipment like diesel engine etc directly coupled or through a gear box/belt drives, as		

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5.9.2	specified in the Datasheet – A. A heavy-duty coupling along with coupling guard shall be provided between the pump and drive unit (except for belt drives). Unless otherwise specified in Datasheet – A, drive unit power rating shall be the larger of the following requirements. (a) 10% margin over the pump shaft input power at the rated duty point. (b) 5% margin over the maximum pump shaft input power required within the 'Range of Operation'. (c) Pump shaft input power required considering the overloading of the pump assuming single pump operation in the event of tripping of one or more of the pumps operating in parallel. 6.0 <u>DRAWINGS, DATA, CURVES AND INFORMATION</u> Refer Volume VIII A.	

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<u>HORIZONTAL CENTRIFUGAL PUMPS</u>					
<u>DATASHEET - A</u>					
Sr. No.	Description	DMCW Pump – Turbine Island	DMCW Pump – Boiler Island	Cycle Make-up pump	Boiler Fill Pump
1.0	Service	D. M. Water	D. M. Water	D. M. Water	D. M. Water
2.0	Designation	Demineralised Cooling Water Pump - Turbine Island	Demineralised Cooling Water Pump - Boiler Island	Cycle Make-up Pump	Boiler Fill Pump
3.0	Duty	Continuous	Continuous	Continuous/ Intermittent	Continuous/ Intermittent
4.0	Location	Indoor	Indoor	Indoor	Indoor
5.0	Number of Pumps required	Three (3)	Two (2)	Two (2)	Two (2)
6.0	Number of pumps working	Two (2)	One (1)	One (1)	One (1)
7.0	Number of pumps standby	One (1)	One (1)	One (1)	One (1)
8.0	Number of pumps working in parallel	Two (2)	Not Applicable	Not Applicable	Not Applicable
9.0	Liquid handled	D.M. Water	D.M. Water	D.M. Water	D.M. Water
10.0	Design Temperature	45 ^o C (design), 48 ^o C (maximum)	45 ^o C (design), 48 ^o C (maximum)	35 ^o C	35 ^o C

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Sr. No.	Description	DMCW Pump – Turbine Island	DMCW Pump – Boiler Island	Cycle Make-up pump	Boiler Fill Pump
11.0	Suction Lift/ Head available (MLC)	Flooded suction shall be ensured			
12.0	Pump Performance Requirements				
(a)	Performance standard	IS-1520 / HIS	IS-1520 / HIS	IS-1520 / HIS	IS-1520 / HIS
(b)	Rated Capacity (m³/hr)	To be computed and indicated by the Bidder as per guidelines stipulated in Section-I of this Volume.			
(c)	Total Dynamic Head as per IS-5120 at Rated Capacity (MLC)	To be computed and indicated by the Bidder as per guidelines stipulated in Section-I of this Volume			
(d)	Rated Speed (RPM)	Refer note 1			
(e)	Noise Level	For details, refer Volume-II, Section-IV			
(f)	Permissible Tolerance in Rated Capacity (%)	<----- As per IS:1520 ----->			
(g)	Permissible Tolerance in Efficiency at Rated Capacity (%)	<----- No Negative tolerance ----->			

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Sr. No.	Description	DMCW Pump – Turbine Island	DMCW Pump – Boiler Island	Cycle Make-up pump	Boiler Fill Pump
(h)	Range of Operations	By bidder			
13.0	Design Standard	<--Hydraulic Institute Standard /IS-5120/ Equivalent Standard ->			
14.0	Impeller Type	Closed	Closed	Closed	Closed
15.0	Type of Gland Lubrication and Sealing	Self-water	Self-water	Self-water	Self-water
16.0	Shaft Sealing Arrangement	<----- Mechanical Seal ----->			
17.0	Type of Pump-motor Connection	Direct	Direct	Direct	Direct
18.0	Type of Coupling	Flexible	Flexible	Flexible	Flexible
19.0	Mode of Pump Starting	<----- Discharge Valve Fully Closed ----->			
20.0	Material of Construction				
(a)	Casing	<----- ASTM-A296 Gr. CF8M ----->			
(b)	Casing Liner	<----- ASTM-A296 Gr. CF8M ----->			
(c)	Diffuser	<----- ASTM-A296 Gr. CF8M ----->			
(d)	Impeller	<----- ASTM-A296 Gr. CF8M ----->			

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Sr. No.	Description	DMCW Pump – Turbine Island	DMCW Pump – Boiler Island	Cycle Make-up pump	Boiler Fill Pump
(e)	Wearing Rings	<----- ASTM-A296 Gr. C440 ----->			
(f)	Shaft	AISI-410	AISI-410	AISI-410	AISI-410
(g)	Shaft Sleeves	<----- ASTM-A276 Type 316 ----->			
(h)	Mechanical Seal	<----- Manufacturer's Standard ----->			
(i)	Base Plate	IS-2062	IS-2062	IS-2062	IS-2062
(j)	Wetted Fastener	Stainless Steel AISI-304	Stainless Steel AISI-304	Stainless Steel AISI-304	Stainless Steel AISI-304
21.0	Supply of Accessories & Services				
(a)	Base Plate	Yes	Yes	Yes	Yes
(b)	Foundation Bolts, Nuts, Sleeves etc.	Yes	Yes	Yes	Yes
(c)	Suction and Discharge Companion Flanges with Bolts, Nuts and Gaskets	Yes	Yes	Yes	Yes
(d)	Gland Sealing and Cooling Arrangement	Yes	Yes	Yes	Yes

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Sr. No.	Description	DMCW Pump – Turbine Island	DMCW Pump – Boiler Island	Cycle Make-up pump	Boiler Fill Pump
(e)	Bearing Lubrication and Cooling Arrangement	Yes	Yes	Yes	Yes
(f)	Suction and discharge pressure Indicator	Yes, along with Diaphragm Seal	Yes, along with Diaphragm Seal	Yes	Yes
(g)	Priming Connection with 3-way SS Isolating Valve	Yes	Yes	Yes	Yes
(h)	Pump-motor Coupling Guard	Yes	Yes	Yes	Yes
(i)	Vent with 3-way SS Isolating Valve	Yes	Yes	Yes	Yes
(j)	Drain Connection with Valve	Yes	Yes	Yes	Yes
(k)	Eye-bolts, Lifting Tackle etc.	Yes	Yes	Yes	Yes

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Note 1: Speed shall be selected based on the pump parameters, trading off amongst operation range, NPSH margins and efficiency.		

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VOLUME III-E2
SECTION – 3A
VERTICAL PUMPS

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DATASHEET - A	VERTICAL PUMPS FOR ACW	

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1.0 <u>GENERAL INFORMATION</u> The general guidelines as illustrated in the subsequent clauses of this section shall be applicable for all vertical pumps to be installed by the Bidder. 2.0 <u>CODES AND STANDARDS</u> 2.1 In addition to the requirements spelt out in Volume II of this specification, the equipment to be provided under this section shall specifically conform to the following codes, standards, specifications and regulations, as applicable, including all the latest amendments subsequent to the year of publication as mentioned below. <table border="0"> <tr> <td>2.1.1</td><td>IS 1710/1989</td><td>: Vertical Turbine Mixed & Axial flow Pumps for Clear, Cold and Fresh Water.</td></tr> <tr> <td>2.1.2</td><td>IS 5120/1977</td><td>: Technical requirements - Rotodynamic special purpose pumps.</td></tr> <tr> <td>2.1.3</td><td>IS 5639/1970</td><td>: Pumps for handling chemicals and corrosive liquids.</td></tr> <tr> <td>2.1.4</td><td>AWWAE 101 (ANSI B58-1)</td><td>: Vertical Turbine Pumps – Line Shaft and Submersible Types.</td></tr> <tr> <td>2.1.5</td><td>IS 5659/1970</td><td>: Pumps for process water</td></tr> <tr> <td>2.1.6</td><td>IS 6536/1972</td><td>: Pumps for handling volatile liquids.</td></tr> <tr> <td>2.1.7</td><td>IS 9137/1978</td><td>: Code for acceptance for centrifugal, mixed flow and axial flow pumps - Class 'C'.</td></tr> <tr> <td>2.1.8</td><td>BS EN ISO 9906: 2000</td><td>: Acceptance tests for Centrifugal, mixed flow and axial flow pumps – Class 'B' & 'C' Tests</td></tr> <tr> <td>2.1.9</td><td>ANSI B 73.2M/ 1984</td><td>: Vertical inline centrifugal pumps for chemical process.</td></tr> </table>			2.1.1	IS 1710/1989	: Vertical Turbine Mixed & Axial flow Pumps for Clear, Cold and Fresh Water.	2.1.2	IS 5120/1977	: Technical requirements - Rotodynamic special purpose pumps.	2.1.3	IS 5639/1970	: Pumps for handling chemicals and corrosive liquids.	2.1.4	AWWAE 101 (ANSI B58-1)	: Vertical Turbine Pumps – Line Shaft and Submersible Types.	2.1.5	IS 5659/1970	: Pumps for process water	2.1.6	IS 6536/1972	: Pumps for handling volatile liquids.	2.1.7	IS 9137/1978	: Code for acceptance for centrifugal, mixed flow and axial flow pumps - Class 'C'.	2.1.8	BS EN ISO 9906: 2000	: Acceptance tests for Centrifugal, mixed flow and axial flow pumps – Class 'B' & 'C' Tests	2.1.9	ANSI B 73.2M/ 1984	: Vertical inline centrifugal pumps for chemical process.
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2.1.10	API 610/1989 : Centrifugal pumps for general refinery services.		
2.1.11	Hydraulic Institute Standards of USA (1983)		
2.1.12	PTC 8.2/1965 : Power Test Codes - Centrifugal pumps		
2.1.13	Other accepted Standards like DIN/JIS/GOST etc, which may be equivalent or superior to those specified above.		
2.1.14	In case of any contradiction between the above standards and Datasheet - A attached to this section, the stipulations in the Datasheet - A shall prevail and shall be binding on the Contractor.		
3.0	<u>SCOPE OF WORKS</u>		
3.1	<u>SCOPE OF SUPPLY</u>		
3.1.1	The scope of supply under this section and pertaining to 1 x 660 MW Unit shall be as below. Items not specifically mentioned but deemed necessary by the Bidder for making the system completely reliable and efficient shall also be included.		
	(a) Equipments		
	(i) ACW Pumps : Two (2) (One working + One Standby) Vertical Wet Pit type Auxiliary Cooling Water (ACW) Pumps complete with electric motor drives together with all other accessories as specified and corresponding to the ratings obtained in strict conformance with the guidelines specified.		
	(ii) Any other vertical pump to be installed by the Contractor.		
	(b) Equipment Accessories		
	Each pump set for all the above groups shall be supplied with the following accessories, as applicable.		

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(i) Heavy-duty couplings of approved design to connect the pump shaft directly with the motor shaft. (ii) Sets of base plates, support plates, grounding pads, thrust blocks, fitting lugs, eyebolts, nuts etc for each pump and motor set. (iii) Slip on type drilled steel counter flanges of proper rating to suit the discharge flange of each pump set. All the counter flanges shall be complete with requisite number of bolts, gaskets etc. (iv) Thrust pads, if required, for pump discharge head complete with all necessary fixing and bolting arrangement, fasteners etc. (v) One (1) pressure indicator with isolating cocks at the discharge side of each pump; Two (2) additional stubs with isolating root valves for pressure tapings and Two (2) thermo wells for temperature tapings at the discharge side of each pump for performance testing. Thrust bearing shall be furnished with dial type thermometer, temperature switch for high temperature annunciation and oil level gauge. (vi) All internal/integral piping with valves, fittings and instruments for lubrication, cooling and sealing, if applicable, shall be tapped off from respective pump discharge. 3.2 For detailed scope of services and works, Volume II of this specification shall be referred to. 4.0 <u>PERFORMANCE REQUIREMENTS</u> 4.1 Performance requirements for the pumps shall be as specified in Datasheet – A. 4.2 Pumps shall preferably be designed to have the best efficiency at the specified duty point. Further, the pumps shall be suitable for continuous operation at any point within its `range of operation.		

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4.3	Pumps shall preferably have continuously rising head-capacity characteristics, with maximum head at pump discharge shut-off, to enable parallel operation. Power capacity characteristics shall preferably be non-overloading type. Under all circumstances, the 'range of operation' of the pumps shall exclude any unstable operating zone of the head-capacity curve.	
4.4	For parallel operation of the pumps, pump shall have identical characteristics to ensure equal load sharing and shall ensure trouble-free operation of any pump when the other pumps, working in parallel with it trips.	
4.5	The pump and motor shall be designed to withstand run away speed attained with reverse rotation caused by reverse flow continuously in case the device provided to prevent the reverse rotation fails.	
5.0	<u>DESIGN AND CONSTRUCTION</u> Pumps shall be of vertical shaft, complete with bowl, column pipe, discharge head and base plate with all accessories. General design and constructional features of the pumps shall be as follows:	
5.1	<u>BOWL ASSEMBLY</u>	
5.1.1	This shall be either a single or multi-stage centrifugal, mixed flow or axial flow type with discharge co-axial with shaft. Type of impeller shall be chosen on the basis of the pump specific speed and the characteristics of handling fluid.	
5.1.2	Pumps shall have provision for adjustment of impellers in vertical direction from an accessible location, preferably at the housing (where separate thrust bearing for the pump is provided). The adjustment mechanism must take into consideration the extension of the line shaft due to hydraulic down thrust, weight of the shaft and impeller.	

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5.2	<u>DISCHARGE HEAD</u> In case, expansion joint is to be used at the pump discharge, pump base plate shall either be adequately designed to take the unbalanced forces and moments from the use of such expansion joint or a separate thrust block at the pump discharge head shall be provided to transmit these forces to the external supporting structure. Calculation of thrust load shall be done considering the highest pressure seen by the pump and internal diameter of the arch of the expansion bellow.	
5.3	<u>COLUMN PIPE</u> 5.3.1 Column pipe shall be flanged have bolted connection and shall be designed for full internal vacuum. 5.3.2 In case pump discharge, is below the floor level and the water level is at or above the discharge valve level, the column pipe piece located at the intermediate floor level shall be provided with suitable floor sealing device. 5.3.3 In case of multi-piece column pipe and shaft assembly, the design shall permit raising/lowering of the pump assembly piece by piece without any difficulty. Any fixtures, clamps etc necessary for such purpose shall be supplied by the Contractor under this section. The Contractor shall also submit a write-up describing clearly the procedure of handling the pump.	
5.4	<u>IMPELLER SHAFT, LINE SHAFT AND HEAD SHAFT</u> 5.4.1 Shaft size shall be selected on the basis of maximum torque to be applied on the pump shaft. 5.4.2 Critical speed of the shaft shall be sufficiently away from the pump operating speed and in no case shall lie between 90% and 110% of the rated speed. 5.4.3 Impeller shaft shall be guided by bearings provided in each bowl or above and below the impeller shaft assembly. The butting faces of the shaft shall be machined square to the assembly and the shaft shall be chamfered at the edges.	

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5.4.4	Line shaft may be of single or multiple pieces as required. In case of multiple pieces, line shaft shall be coupled as per the standard practice of the manufacturer. For screwed coupling, screw directions shall permit tightening of the joint during pump operation.	
5.4.5	Replaceable shaft sleeves shall be furnished at applicable locations, particularly under stuffing box and at other locations, as considered necessary.	
5.5	<u>SHAFT ENCLOSING TUBE</u> Shaft enclosing tube shall be required, unless self lubricated (and cooled) type of shaft bearings is asked for. Length of the shaft enclosing tube shall be in conformity with the shaft piece lengths.	
5.6	<u>STUFFING BOX</u> Stuffing boxes shall be of sufficient depth to accommodate ample packing. The packing glands shall be split type to facilitate repacking of the boxes. The space between the motor and the stuffing box shall be sufficient to permit removal of the packing gland and insertion of packing without dismantling the pump.	
5.7	<u>COUPLING</u> Bolts and nuts of the coupling between pump and the motor shaft shall have locking device to prevent the nuts from becoming loose during rotation at normal and reverse direction. Suitable arrangement shall be provided to adjust the vertical clearance of impeller. Bidder shall furnish necessary details of a proven arrangement in the offer. Coupling shall be flexible type if thrust bearing are provided at both pump body and motor and shall be rigid type if thrust bearing is provided only at the motor.	
5.8	<u>BASE PLATE</u> Base plate of each pump shall be of heavy structural steel. Separate heavy steel sole plates (or curb rings) shall be provided for grouting and shall be	

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designed to permit removal of entire pump along with discharge head and base plate without disturbing the sole plate or grout. The sole plate shall be blast cleaned to a clear white finish. Base plate and pump supports shall be so constructed and the pumping unit so mounted as to minimise misalignment and withstand hydraulic thrust. Pump foundation base plate shall be stress relieved and machined after welding. 80% blue matching for contact surface shall be provided by the pump manufacturer/bidder between pump sole/foundation plate and bottom surface of motor skirt flange. Similarly, 80% blue matching for contact surface shall be ensured by the bidder between top surface of flange of motor skirt and bottom surface of motor flange. All metal to metal contact surfaces for pump shall be provided with 80% blue matching prior to offering the equipment for inspection & testing. 5.9 <u>BEARINGS</u> 5.9.1 Shaft Bearings Adequate number of properly designed bearings shall be provided for smooth and trouble-free operation of the pump. Number of bearings shall consider the number of shaft pieces used and the critical speed of the shaft. Bearings shall be either lubricated by external clear water/oil/grease or self lubricated as specified in the Datasheet - A. In case of external water/oil lubrication, complete lubrication arrangement shall be furnished with the pump. Pre-lubrication of the shaft bearings, pre-lubrication tank and other accessories shall be within the scope of supply of the Bidder/Contractor. 5.9.2 Thrust Bearing Thrust bearing of adequate size and capacity shall be provided to take the vertical thrust of the impeller arising out of the pump operation and dead weight of the rotating components. Life of the thrust bearing shall be guided by the design standard of the pump. Thrust bearing shall be capable of running continuously at maximum load.		

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Thrust bearings shall be either grease or oil lubricated. Lubrication arrangement shall be such that the lubricant does not contaminate the handling fluid. The arrangement shall also be adequate to protect the bearing, while the pump coast down to stop in case of power failure of the station. Pre-lubrication of the thrust bearing, if recommended by the pump manufacturer, shall be taken care of in designing the lubrication system. Cooling of the thrust bearing, if necessary, shall be done by the handling fluid/external water. Location of the thrust bearing may be at the pump body or at the driver, or at both depending on the requirement of Datasheet - A or as per the recommendation of the pump manufacturer (and approved by Owner). 5.10 <u>REVERSE ROTATION</u> 5.10.1 The pump impeller and other rotating components shall be designed for reverse rotation, when subject to reverse flow at rated pump discharge head. 5.11 <u>DRIVE UNIT</u> 5.11.1 The pump shall be driven by electric motor. A heavy duty coupling shall be provided between the drive unit and the driven equipment (except for belt drive). 5.11.2 Unless otherwise specified in Datasheet - A, drive element power rating shall be the maximum of the following requirements. (a) 10% margin over the pump shaft input power at the rated working condition. (b) 5% margin over the maximum pump shaft input power required within its operating range including the shut off point. (c) Pump shaft input power required considering overloading of the pump assuming single pump operation in the event of tripping of the other pump(s) operating in parallel.		

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(d) Shaft input power required to bring the pump to its rated condition (or any point in its working range) while the pump is in reverse rotation due to reverse flow of the fluid at rated head with the discharge butterfly valve partially open as per the start-up logic and the other adjoining pump running. 5.11.3 The drive equipment shall preferably be air-cooled. In case the pumping fluid is water, free of abrasive and corrosive matter, the same can be used for cooling purpose. The arrangement shall be within the scope of the supplier. 6.0 <u>DRAWINGS, DATA, CURVES AND INFORMATION</u> Please refer Volume VIII A.		

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<u>DATASHEET – A</u> <u>VERTICAL PUMPS</u> <u>(AC W Pumps)</u>		
SR. NO.	DESCRIPTION	ACW PUMPS
1.0	Service	Auxiliary Cooling Water System
2.0	Designation	A C W Pumps
3.0	Duty	Continuous
4.0	Location	Indoor
5.0	Number of Pumps required	2 x 100%
6.0	Number of Pumps working	One (1)
7.0	Number of Pumps standby	One (1)
8.0	Number of Pumps working parallel	Not applicable
9.0	Liquid handled	Cooling water
10.0	Temperature	33°C (design)
11.0	Motor pedestal floor elevation	Bidder to indicate
12.0	Level of bottom of sump	Bidder to indicate
13.0	Normal water level (M)	Bidder to indicate as per guidelines in Section-I of this volume.
14.0	Minimum water level (M)	Bidder to indicate as per guidelines in Section-I of this volume.
15.0	Maximum water level (M)	Bidder to indicate as per guidelines in Section-I of this volume.

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SR. NO.	DESCRIPTION	ACW PUMPS	
16.0	<u>PUMP PERFORMANCE REQUIREMENT</u>		
16.1	Performance standard	IS-1710 / HIS	
16.2	Rated capacity (m ³ /hr)	Bidder to estimate based on criteria specified.	
16.3	Running Speed	Shall be selected trading amongst operation range, NPSH margins & efficiency	
16.4	Total dynamic head at rated capacity (MLC)	Bidder to indicate as per guidelines in Section-I of this volume.	
16.5	Static head of pumping system (MLC)	Bidder to indicate as per guidelines in Section-I of this volume.	
16.6	Pump shut off head (MLC)	Bidder to indicate as per guidelines in Section-I of this volume.	
16.7	Permissible tolerance in rated capacity (%)	± 2.5 % at rated head.	
16.8	Permissible tolerance in efficiency at rated capacity	No negative tolerance.	
16.9	Range of operation	Bidder to indicate.	
16.10	Suction specific speed	Shall be limited to 9000 US units.	
16.11	Noise level	For details refer Volume-II, Section-IV.	
17.0	<u>DESIGN AND CONSTRUCTIONAL FEATURES</u>		
17.1	Design Standard	IS-1710/ Equivalent standard	

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SR. NO.	DESCRIPTION	ACW PUMPS
17.2	Pump type	Below floor discharge
17.3	Impeller type	Closed
17.4	Reverse flow through pump to be considered for pump design	Yes
17.5	Head at reverse flow	Bidder to indicate
17.6	Type of gland lubrication and sealing	By self water
17.7	Location of thrust bearing	Separate for pump and motor
17.8	Thrust bearing to be designed for pump shut off operation	Yes
17.9	Type of coupling	Flexible
17.10	Gland lubrication and sealing	By Self water
17.11	Bearing cooling	By Self water
18.0	<u>MATERIAL OF CONSTRUCTION</u>	
18.1	Casing	2% Ni-C.I.
18.2	Column pipe	IS-2062 (MS) (Minimum 10 mm thick)
18.3	Discharge elbow	IS-2062 (MS) (Minimum 10 mm thick)
18.4	Impeller Bowl	ASTM-A-351 Gr.CF8M
18.5	Shaft sleeve	AISI-410 (Hardened)
18.6	Shaft bearing	Cutless Rubber
18.7	Base plate	IS-2062
18.8	Stuffing box	C.I.

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SR. NO.	DESCRIPTION	ACW PUMPS	
18.9	Line shaft	AISI-410	
18.10	Impeller shaft	AISI-410	
18.11	Shaft coupling	AISI-410 (Hardened)	
18.12	Fasteners	SS-316	
18.13	Companion flange	IS-2062	
19.0	<u>SUPPLY OF ACCESSORIES AND SERVICES</u>		
19.1	Sole plate	Yes	
19.2	Foundations bolts, nuts, sleeves etc.	Yes	
19.3	Discharge flanges with nuts, bolts and gaskets.	Yes	
19.4	Gland sealing/cooling and bearing cooling/lubrication system complete with pipes, valves, fittings and instruments as required.	Yes	
19.5	Suction strainers	No	
19.6	Prelubrication tank and accessories	No	
19.7	Thrust block	Yes, if applicable	
19.8	Pump motor coupling and guard	Yes	
19.9	Eye bolts, lifting tackle etc.	Yes	
19.10	Discharge pressure gauge with isolating cock	Yes	
19.11	Instrument connections	Yes	

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SR. NO.	DESCRIPTION	ACW PUMPS	
19.12	Vent with isolating cock	Yes	
19.13	All other accessories & services	Yes	
20.0	<u>PERFORMANCE TESTS</u>		
20.1	Performance Tests	Yes	
20.2	Performance test to be done on	Proto type at full speed	
20.3	Performance test required for determining	Head Vs capacity, BHP Vs capacity, Efficiency Vs capacity, submergence Vs capacity curves	
20.4	Field performance test required	Yes	
20.5	Other tests as per applicable clauses of this specification	Yes	

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PRE TREATMENT PLANT (PT PLANT)
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VOLUME II-B

SECTION-D

REV. NO. 00

DATE:

**SECTION-D
(GENERAL TECHNICAL REQUIREMENT OF PAINTING)**

**TITLE:**

**TECHNICAL SPECIFICATION FOR
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1X660 MW BHUSAWAL TPS, UNIT # 6**

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1.0 PAINTING**1.1 GENERAL**

All exposed metallic surfaces subject to corrosion shall be protected by shop application of suitable coatings. Surfaces not easily accessible after shop assembly shall be treated before-hand and protected for life of the equipment. Surfaces to be finish painted after installation shall be shop painted with at least two (2) coats of primer. Steel surfaces, which are not to be painted, shall be coated with suitable rust preventive compound subject to the approval of the Owner.

All paints shall be used in accordance with the manufacturer's instructions. No thinners or other substance shall be added to the coating material without the approval of the Engineer. The quality and vendor of the paints shall require approval of the Owner.

All paints, when applied in a normal full coat, shall be free from runs, sags, wrinkles, patchiness, brush marks or other defects.

All primers shall be well marked into the surface, particularly in areas where pitting is evident, and the first priming coat shall be applied as soon as possible after cleaning, within four hours maximum. The paint shall be applied by brush, roller or airless spray, according to the manufacturer's instructions. Spray painting shall be carried out by operators trained and thoroughly experienced in the use of the equipment. If the drying interval between successive coats, which should not exceed one week, has been so long as to endanger the adhesion of the following coat, the paint already applied shall be lightly rubbed down with fine abrasive paper before putting on the next coat.

Paint spraying on large surfaces shall not normally be done indoors, except with the approval of the Engineer. Spray guns shall not be used outdoors in windy weather or near unprotected surfaces of a contrasting colour and under no circumstances shall spray guns be used where spray may be carried into or onto exposed electrical equipment.

Paint containers shall not be opened until required and the paint shall be mechanically mixed thoroughly before use, and agitated occasionally during use.

Electrical equipment shall be shop finished with one or more coats of primer and two coats of high-grade oil resistant enamel. The interior of all panels' cabinets and enclosures shall be finished with gloss white enamel.

The Contractor shall furnish sufficient touch-up paint for one complete finish coat on all exterior factory surfaces of each item of equipment. The touch-up paint shall be of the same type and colour as the factory applied paint and shall be carefully packed to avoid damage during shipment. Complete painting instructions shall be furnished.

The Contractor shall select shop primer for steel and iron surfaces, which will have a continuous operating temperature below 35°C, in accordance to the relevant standard. Special high temperature primer shall be used on surface exposed to operating temperature above 35°C.

The Owner/Engineer shall submit the colour scheme during execution of contract for approval.

1.2 PREPARATION

Oil and grease shall be removed from the surface by washing with a suitable detergent, rinsing with clean water, and drying.

Surfaces to be shot blasted shall be cleaned to Swedish Standard SA 2.5 or equivalent, and all dust remaining after cleaning shall be removed.

The priming coat shall be applied without delay.

1.3 DAMAGED PAINTWORK

Any damaged paintwork shall be made good as follows:

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1.3.1 The damaged area, together with an area extending 25 mm around its boundary, shall be cleaned down to bare metal.

1.3.2 A priming coat shall be immediately applied, followed by a full paint finish equal to that originally applied and extending 50 mm around the perimeter of the original damage.

1.3.3 The repainted surface shall present a smooth surface. This shall be obtained by carefully chamfering the paint edges before and after priming

1.4 PAINING SYSTEMS

The requirements for the Dry Film Thickness (DFT) of paint and the materials to be used shall be as stated below, unless otherwise specified elsewhere in this specification.

1.4.1 Surfaces subject to Weathering

All surfaces shall have a minimum of four coats of paint made up as follows:

(a)	Primer coat	:	35 micron DFT
(b)	Tie coat	:	35 micron DFT
(c)	Finishing coat (Two Nos.)	:	35 micron DFT per coat
(d)	The total minimum DFT	:	140 micron

1.4.2 Surfaces Inside Buildings

All surfaces shall have a minimum of three coats of paint made up as follows:

(a)	Primer coat	:	35 micron DFT
(b)	Tie coat	:	35 micron DFT
(c)	Finishing coat (Two Nos.)	:	25 micron DFT per coat
(d)	The total minimum DFT	:	120 micron

The Contractor shall select the type and colour of primer & finish coat after approval by the Owner.

For detail painting on building & structural steel elements, please refer **civil specification**.

2.0 COLOUR CO-ORDINATION & FINISH

2.1 Exterior surfaces throughout the plant shall be finished in colours and textures which will blend harmoniously together and with the surrounding landscape.

2.2 Interior surfaces throughout the plant shall be finished in colours and textures which will blend harmoniously together and which will be conducive to; the comfort, well-being and high productivity of the operators. Operating plant and services provided shall be colour coded for ease of identification.

2.3 All finishes shall be durable and as far as possible maintenance free. Finishes shall be easily cleaned.

2.4 Final colours and finishes shall be to the Approval of the Engineer.

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SECTION-D**SITE STORAGE AND PRESERVATION**



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1. SCOPE OF THE DOCUMENT

This guideline is prepared in intent to provide proper site storage and preservation of the Mechanical, Electrical and C & I items / equipment supplied under various bought out packages/items. This storage procedure shall be followed at different power plant sites by concerned agency for storage and preservation from the date of equipment received at site until the same are erected and handed over to the customer.

2. PURPOSE OF STORAGE & PRESERVATION

Many of the items may be required to be kept in stores for long period. It shall therefore be essential that proper methods of storage and preservation be applied so that items do not deteriorate, loose some of their properties and become unusable due to atmospheric conditions and biological elements.

3. MEASURES TO BE TAKEN FOR STORAGE, HANDLING & PRESERVATION**a) GENERAL STORAGE REQUIREMENTS**

1. To the extent feasible, materials should be stored near the point of erection. The storage areas should have adequate unloading and handling facilities with adequate passage space for movement of material handling equipment such as cranes, fork lift trucks, etc. The storage of materials shall be properly planned to minimise time loss during retrieval of items required for erection.
2. The outdoor storage areas as well as semi-closed stores shall be provided with adequate drainage facilities to prevent water logging. Adequacy of these facilities shall be checked prior to monsoon.
3. The storage sheds shall be built in conformity with fire safety requirements. The stores shall be provided with adequate lights and fire extinguishers. 'No smoking' signs shall be placed at strategic locations. Safety precautions shall be strictly enforced.
4. Adequate lighting facility shall be provided in storage areas and storage sheds and security personnel positioned to ensure enforcement of security measures to prevent theft and loss of materials.
5. Adequate number of competent stores personnel and security staff shall be deployed to efficiently store and maintain the equipment / material.
7. The equipment shall be stored in an orderly manner, preserving their identification slips, tags and instruction booklets, etc., required during erection. The storage of materials shall be equipment-wise. Loose parts shall be stored in sheds on racks,

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preserving the identification marks and tags in good condition. The group codes shall be displayed on the racks

6. At no time shall any materials be stored directly on ground. All materials shall be stored minimum 200 mm above the ground preferably on wooden sleepers

b) GENERAL PRESERVATION REQUIREMENTS

1. All special measures to prevent corrosion shall be taken like keeping material in dry condition, avoiding the equipment coming in contact with corrosive fluid like water, acid etc.
2. Materials which carry protective coating shall not be wrapped in paper, cloth, etc., as these are liable to absorb and retain moisture. The material shall be inspected and in case of signs of wear or damages to protective coating, that portion shall be cleaned with approved solution and coated with an approved protective paint. Complete record of all such observations and protective measures taken shall be maintained.
3. Generally equipment supplied at site are properly greased or rust protective oil is applied on machined/ fabricated components. However periodic inspection shall be carried out to ensure that protection offered is intact.
4. While handling the equipment, no dragging on the ground is permitted. Avoid using wire rope for lifting coated components. Use polyester slings (if possible) otherwise protective material (e.g. clothes, wood block etc.) should be used while handling the components with rope / slings
5. For Equipment supplied with finished paint, touch paint shall be done in case any surface paint gets peeled off during handling. Otherwise such surfaces shall necessarily be wrapped with polythene to avoid any corrosion. Further for equipment wherein finish coat is to be applied at site, site to ensure that equipment is received with primer coat applied.
6. It shall be ensured by periodic inspection that plastic inserts are intact in tapped holes, wherever applicable.
7. Pipes shall be blown with air periodically and it shall be ensured that there is no obstruction.
8. Silica gel or approved equivalent moisture absorbing material in small cotton bags shall be placed and tied at various points on the equipment, wherever necessary.
9. Heavy rotating parts in assembled conditions shall be periodically rotated to prevent corrosion/jamming due to prolonged storage.

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10. All the electrical equipment such as motors, generators, etc. shall be tested for insulation resistance at least once in three months and a record of such measured insulation values shall be maintained.

11. Following preservatives/preservation methods can be used depending upon type of equipment

- a. Rust preventive fluid (RPF)
- b. Rust protective paints
- c. Tarpaulin covers, in case of outdoor storage
- d. De-oxy aluminate for weld-ments

c) GENERAL INSPECTION REQUIREMENTS

1. Period inspection of materials with specific reference to –

- Ingress of moisture and corrosion damages.
- Damage to protective coating.
- Open ends in pipes, vessels and equipment -
 - In case any open ends are noticed, same shall be capped.

2. Any damages to equipment / materials.

- In case of any damages, these shall be promptly notified and in all cases, the repairs / rectification shall be carried out.
- Any items found damaged or not suitable as per project requirements shall be removed from site. If required to store temporarily, they shall be clearly marked and stored separately to prevent any inadvertent use.



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4. TYPE OF STORAGE FOR VARIOUS EQUIPMENT

The types of storage are broadly classified under the following heads:

i Closed storage with dry and dust free atmosphere. (C)

The closed shed can be constructed by using cold-rolled / tubular components for structure and corrugated asbestos sheets / galvanised iron sheets for roofing. Brick walls / asbestos sheets can be used to cover all the sides. The floor of the shed can be finished with plain cement concrete suitably glazed. The shed shall be provided with proper ventilation and illumination.



ii Semi-closed storage. (S)

The semi closed shed can be constructed by using cold-rolled / tubular components for structure and corrugated / asbestos sheets for roofing. The floor shall be brick paved. If required a small portion of sides can be covered to protect components from rainwater splashing onto the components.



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iii **Open storage (O)**

The open yard shall be levelled, well consolidated to achieve raised ground with the provision of feeder roads for crane approach along with access roads running all sides. One part of the open yard shall be stone pitched, levelled and consolidated with raised ground suitable for storing / stacking heavier and critical components with due space to handle them by cranes etc . Adequate number of sleepers, concrete block etc. to be provided to make raised platforms to stack critical materials.

A separate yard to be identified as "scrap yard" slightly away from main open yard to store wooden/steel scraps, which are to be disposed off. This is required to avoid mix up with regular components as well as to avoid fire hazard.

Some of the components, which are having both machined & un-machined surfaces and are bulky, shall be stored in open storage area on a raised ground and suitably covered with water proof / fire retardant tarpaulin.





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The equipment listed below shall be stored and inspected as per requirement mentioned in the table below.

Sl. No.	Description of the equipment	Type of Storage	Check for	Remarks
Raw material /mechanical items like pipes, plates, structure sections etc.)				
1.	Steel pipes (lined/unlined)	S	Damage , paint, corrosion, rubber lining peeling	Provide end cap
2.	MS Plates	S	Damage, paint, corrosion	
3.	SS Plates	S	Damage	
4.	Non-metallic pipes	S	Damage, cracks	Provide end cap
5.	Stainless steel pipes	S	Damage ,	Provide end cap
6.	MS sections, beams	S	Damage, paint, corrosion	
7.	Cable trays	S	Damage, condition of preservations	
8.	Insulation sheets	S	Damage	
9.	Insulation	C	Damage, packing	
10.	Hangers Rods	S	Damage, paint, packing	
11.	Tubes	S	Damage, paint , packing	Provide end cap
12.	Hume pipes	O	Damage	
13.	Castings	O	Damage, paint, corrosion	
Fabricated mechanical items (pressure vessels, tanks etc.)				
14.	Pressure vessels (unlined)	O	Damage, paint, corrosion,	Covered nozzles
15.	Atmospheric storage tanks (unlined)	O	Damage, paint, corrosion	Covered nozzles



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Sl. No.	Description of the equipment	Type of Storage	Check for	Remarks
16.	Pressure vessels (lined)	S	Damage, paint, corrosion, rubber lining	
17.	Atmospheric storage tanks(lined)	S	Damage, paint, corrosion, rubber lining	
18.	Support structures	O	Damage, paint, corrosion	
19.	Flanges	C	Damage, paint, corrosion	
20.	Fabricated pipes	S	Damage, paint, corrosion	Provide end cap
21.	Vessels internals	C	Damage, paint, corrosion, packing	
22.	Grills	S	Damage, paint, corrosion	
23.	Angles	S	Damage, paint, corrosion	
24.	Bridge mechanism/clarifier mechanism	O	Damage, paint, corrosion	
25.	Cranes, rails	S	Damage, paint, corrosion	
26.	Stair cases	O	Damage, paint, corrosion	
27.	Ladders/handrails	O	Damage, paint, corrosion	
28.	Fabricated ducts	S	Damage, paint, corrosion	
29.	Isolation Gates	O	Damage, paint, corrosion	
30.	Fabricated boxes/panels	S	Damage, paint, corrosion	
Mechanical components like valves, fittings, cables glands, spares etc.)				
31.	Valves	S	Damage, packing	



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Sl. No.	Description of the equipment	Type of Storage	Check for	Remarks
32.	Fittings	S	Damage , packing	Provide end cap
33.	Cable glands	C	Damage , packing	
34.	Tools & tackles	C	Damage , packing	
35.	Nut , bolts, washers,	C	Damage , packing	
36.	Gasket & Packings	C	Damage , packing	
37.	Copper tubes	C	Damage , packing, corrosion	Provide end cap
38.	SS tubing	C	Damage , packing	Provide end cap
Rotating assemblies (pumps, blowers, stirrers, fans, compressors etc.)				
39.	Pumps	S	Damage , packing, corrosion	Shaft rotation
40.	Blowers/Compressors	S	Damage , packing, corrosion	Shaft rotation
41.	Agitators/stirrers/radial launders	C	Damage , packing, corrosion	Shaft rotation
42.	Rollers for chlorine tonner mounting	C	Damage , packing, corrosion	
43.	Centrifuge	S	Damage , packing,	
44.	Gear box	C	Damage , packing, corrosion	
45.	Bearings	C	Damage , packing, corrosion	
46.	Fans	S	Damage , packing, corrosion	
47.	Dosing skids	S	Damage , packing, corrosion	
48.	Pump assemblies	S	Damage , packing, corrosion	
49.	Air washers(INTERNALS)	S	Damage , packing	
50.	Air conditioners (split)	C	Damage , packing	



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Sl. No.	Description of the equipment	Type of Storage	Check for	Remarks
51.	Elevators(CONTAINERIZED)	O	Damage , packing, corrosion	
52.	Chillers/VA machines	S	Damage , packing	
53.	Air handling Unit/Package unit	S	Damage , packing	
54.	Chlorinators & Evaporators	C	Damage , packing	
55.	Ejectors	C	Damage , packing	
56.	Electrolyser	C	Damage , packing	
Miscellaneous items like chain pulley blocks, hoists etc.				
57.	Chain pulley blocks	S	Damage, Packing	
58.	Electric hoists	S	Damage, Packing	
59.	Fire extinguishers	C	Damage, expiry date	
60.	Fork Lift Truck	S	Damage, Packing	
61.	Hydraulic Mobile Crane	O	Damage, Packing	
62.	Mobile Pick Up & Carry Crane	O	Damage, Packing	
63.	Motor boats	O	Damage, Packing	
64.	Safety showers	S	Damage, Packing	
65.	Diffusers/dampers	S	Damage, Packing	
Chemicals and consumables (acid, alkali, paints, oils, reagents and special chemicals)				
66.	Hydro Chloric Acid (HCl)	Store in canes/ storage tank in dyke area	Date of production/ leakage/fumes	hazardous chemical
67.	Sulphuric acid (H ₂ SO ₄)	Store in canes/ storage tank in dyke area	Date of production/ leakage/fumes	hazardous chemical



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Sl. No.	Description of the equipment	Type of Storage	Check for	Remarks
68.	Sodium hydroxide (NaOH)	Store in canes/ storage tank in dyke area	Date of production/ leakage/ fumes/ breather	hazardous chemical ,breather to be checked for air ingress
69.	Sodium hypo chlorite	To be stored under shed	Date of production/ leakage/ fumes	hazardous chemical ,self-life normally 15-30 days after which strength of chemical decays
70.	Ammonia	S	Date of production/ leakage/ fumes	Store in closed storage tanks, hazardous chemical
71.	CW treatment chemicals	S	Date of production , Self-life	Store in closed canes
72.	RO/UF cleaning chemicals	S	Date of production , Self-life	Store in closed canes
73.	Lime	C	Damage to packing , seepage	Prevent moisture, rain
74.	Alum bricks	C	Damage to packing	Prevent moisture, rain
75.	Poly electrolyte	S		Store in closed storage tanks
76.	Laboratory chemicals(powder)	C	Damage, Packing self-life	
77.	Laboratory chemicals(liquid)	C	Damage, Packing self-life	
78.	Lubrication oils	C	Leakage	
79.	Paints	S	Leakage ,air tightness	
80.	Sand	O	Damage of packing	No hooks
81.	Salt (NaCl)	C	Damage of packing, water ingress	Prevent moisture, rain
82.	Anthracite	S	Damage of packing	
83.	Activated carbon	S	Damage of packing	



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Sl. No.	Description of the equipment	Type of Storage	Check for	Remarks
84.	Thermal insulation	S	Damage of packing	
85.	Cement	C	Damage of packing	Prevent moisture, rain
86.	Gravels	O	Damage of packing	
87.	ION exchange resins	C	Damage , packing	Refer manufacturer guidelines
88.	RO membranes	C	Damage , packing	Refer manufacturer guidelines
89.	UF membranes	C	Damage , packing	Refer manufacturer guidelines
90.	Cleaning chemicals	C	Damage , packing	Refer manufacturer guidelines
91.	Chemicals for analysers/calibration	C	Damage , packing	Refer manufacturer guidelines
Electrical and C & I items (motors, cables etc.)				
92.	Motors	C	Damage , packing	
93.	Cable drums	O	Damage	
94.	Control Panel /control desk, UPS ,JB	S	Damage, Packing	
95.	Instruments(gauges/analysers)	C	Damage	
Special items		As per Manufacturer's item, like Hydrogen cylinders, Ozonator, Analyser, Chlorine dioxide generators etc.		

5. CONCLUSION

Concerned storage agency at site should make sure that loss in equipment performance and wear & tear are minimised through proper storage and preservation. The above are broad guidelines and cover major equipment / materials. However specific storage practices shall be followed as per manufacturer recommendation. All the necessary measures even in addition to the ones mentioned above, if found necessary, should be taken to achieve the objective.



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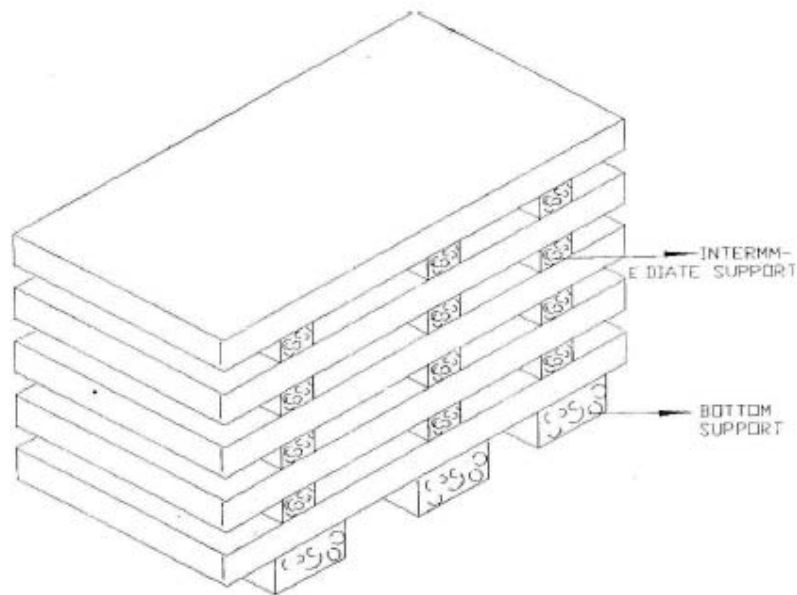


Figure – 1 – PLATE STACKING ARRANGEMENT

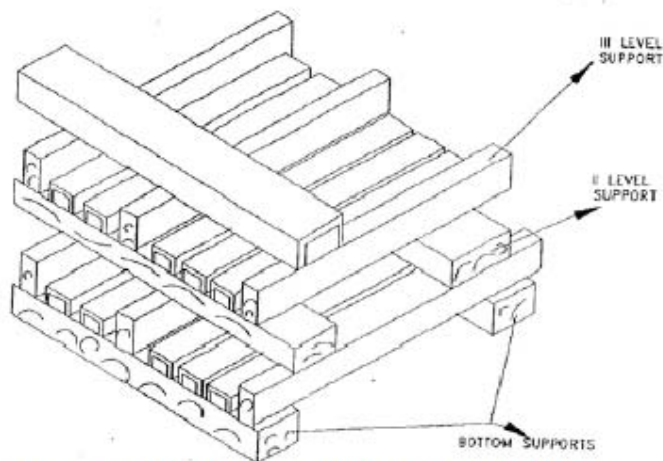


Figure – 2 – STRUCTURAL STEEL STACKING ARRANGEMENT



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LIST OF DOCUMENTS TO BE SUBMITTED ALONG WITH BID

1.0 Bidder to furnish following documents/information along with the bid (For Electrical And C&I Please Refer The Respective Section Of The Specification).

- Deviation if any strictly in the enclosed Schedule of deviation with cost of withdrawal only with mention of specification clause for which deviation is being asked. (Stamped & Signed). In case of No Technical Deviation, bidder to furnish the same format stating "No Deviation" duly Stamped & Signed.
- Guaranteed Auxiliary Power Consumption Figures (Stamped & Signed in sealed envelope)
- Compliance certificate. (Stamped & Signed)
- Schedule of Declaration. (Stamped & Signed)
- Un Price Schedule duly filled in. (Stamped & Signed)
- List of Start-up & commissioning spares if any. (Stamped & Signed)

Any other documents submitted by bidder except as asked in the bid's specification shall not be evaluated & considered as null & void.

NOTES:

- 1) Any item/work either supply of equipment or erection material which have not been specifically mentioned but are necessary to complete the works for trouble free and efficient operation of the plant shall be deemed to be included within the scope of this specification. The bidder without any extra charge shall provide the same.
- 2) All drawings/documents shall be approved by BHEL/Customer during detailed engineering stage. Successful Bidder shall comply with the comment of the customer/BHEL without any price & delivery implication.



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PRE BID CLARIFICATION SCHEDULE

All clarification from the Technical Specification shall be filled in by the BIDDER clause by clause in this format only.

VOLUME	SECTION	CLAUSE NO.	PAGE NO.	SPECIFICATION REQUIREMENT	CLARIFICATION	REASONS FOR CLARIFICATION

PARTICULARS OF BIDDER / AUTHORISED REPRESENTATIVE					COMPANY SEAL
NAME	DESIGNATION	SIGNATURE	DATE		



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SCHEDULE OF DECLARATION

I certify that all the technical data and information pertaining to this specification are correct and are true representation of the equipment/system covered by our format proposal number Dated and there is no deviation to the specification.

I hereby certify that I am duly authorized representative of the Bidder's company whose name appears above my signature.

Bidders Company Name

Authorized Representative's
Signature

Name

Bidder's Name

The bidder hereby agrees to fully comply with the requirements and intent of this specification for the price indicated.

THIS IS A PART OF TENDER TECHNICAL SPECIFICATION PE-TS-415-158A-A001**SCHEDULE OF DEVIATIONS WITH COST OF WITHDRAWAL****PROJECT:- 1X660 MW BHUSAWAL TPS UNIT-6****PRE TREATMENT PLANT (PT PLANT)****TENDER ENQUIRY REFERENCE:-****NAME OF VENDOR:-**

SL NO	VOULME/ SECTION	PAGE NO.	CLAUSE NO.	TECHNICAL SPECIFICATION/ TENDER DOCUMENT	COMPLETE DESCRIPTION OF DEVIATION	COST OF withdrawal OF DEVIATION	REFERENCE OF PRICE SCHEDULE ON WHICH COST OF withdrawal OF DEVIATION IS APPLICABLE	NATURE OF COST OF withdrawal OF DEVIATION (POSITIVE/ NEGATIVE)	REASON FOR QUOTING DEVIATION

TECHNICAL DEVIATIONS

COMMERCIAL DEVIATIONS

PARTICULARS OF BIDDERS/ AUTHORISED REPRESENTATIVE

NAME	DESIGNATIONS	SIGN & DATE

NOTES:

- For self manufactured items of bidder, cost of withdrawal of deviation will be applicable on the basic price (i.e. excluding taxes, duties & freight) only.
- For directly dispatchable items, cost of withdrawal of deviation will be applicable on the basic price including taxes, duties & freight.
- All the bidders have to list out all their Technical & Commercial Deviations (if any) in detail in the above format.
- Any deviation not mentioned above and shown separately or found hidden in offer, will not be taken cognizance of.
- Bidder shall submit duly filled unpriced copy of above format indicating "quoted" in "cost of withdrawal of deviation" column of the schedule above along with their Techno-commercial offer, wherever applicable.
- Bidder shall furnish price copy of above format along with price bid.
- The final decision of acceptance/ rejection of the deviations quoted by the bidder shall be at discretion of the Purchaser.
- Bidders to note that any deviation (technical/commercial) not listed in above and asked after Part-I opening shall not be considered.
- For deviations w.r.t. Payment terms, Liquidated damages, Firm prices and submission of E1/ E2 forms before claiming 10% payment, if a bidder chooses not to give any cost of withdrawal of deviation loading as per Annexure-VIII of GCC, Rev-06 will apply. For any other deviation mentioned in un-priced copy of this format submitted with Part-I bid but not mentioned in priced copy of this format submitted with Priced bid, the cost of withdrawal of deviation shall be taken as NIL.
- Any deviation mentioned in priced copy of this format, but not mentioned in the un-priced copy, shall not be accepted.
- All techno-commercial terms and conditions of NIT shall be deemed to have been accepted by the bidder, other than those listed in unpriced copy of this format.
- Cost of withdrawal is to be given separately for each deviation. In no event bidder should club cost of withdrawal of more than one deviation else cost of withdrawal of such deviations which have been clubbed together shall be considered as NIL.
- In case nature of cost of withdrawal (positive/negative) is not specified it shall be assumed as positive.
- In case of discrepancy in the nature of impact (positive/ negative), positive will be considered for evaluation and negative for ordering.

	TITLE: TECHNICAL SPECIFICATION FOR PT PLANT COMPLIANCE CUM CONFIRMATION CERTIFICATE	SPEC. NO.: PE-TS-415-158A-A001	
		VOLUME: III	
		S.No. A1	
		SECTION:	
		REV. NO. 0	DATE
		SHEET 1	OF 2

COMPLIANCE CUM CONFIRMATION CERTIFICATE

The bidder shall confirm compliance with following by signing/ stamping this compliance certificates (every sheet) and furnishes same with the offer.

- a) The scope of supply, technical details, construction features, design parameters etc. shall be as per technical specification & there are no exclusions, other than those resolved as per 'Schedule of Deviations', with regard to same.
- b) There are no other deviations w.r.t. specifications other than those furnished in the 'Schedule of Deviations'. Any other deviation, stated or implied, taken elsewhere in the offer stands withdrawn unless specifically brought out in the 'Schedule of Deviations'
- c) Bidder shall submit QP in the event of order based on the guidelines given in the specification & QP enclosed therein. QP will be subject to BHEL/ CUSTOMER approval & customer hold points for inspection / testing shall be marked in the QP at the contract stage. Inspection/ testing shall be witnessed as per same apart from review of various test certificates / Inspection records etc. This is within the contracted price with extra implications to BHEL after award of the contract.
- d) All drawings / data-sheets / calculations etc. submitted along with the offer shall be considered for reference only, same shall be subject to BHEL/ CUSTOMER approval in the event of order.
- e) The offered materials shall be either equivalent or superior to those specified in the specification & shall meet the specified / intended duty requirements. In case the material specified in the specifications is not compatible for intended duty requirements then same shall be resolved by the bidder with BHEL during the pre-bid discussions, otherwise BHEL/ Customer's decision shall be binding on the bidder whenever the deficiency is pointed out.

For components where materials are not specified, same shall be suitable for intended duty, all materials shall be subject to approval in the event of order.
- f) The commissioning spares shall be supplied on 'As Required Basis' & prices for same included in the base price itself. Prices for special tools & tackles, if any, shall also be included in the base price.
- g) All sub vendors shall be subject to BHEL/ CUSTOMER approval in the event of order.
- h) Guarantee for plant /equipment shall be as per relevant clause of GCC /SCC /Other Commercial Terms & Conditions.
- i) In the event of order, all the material required for completing the job at site shall be supplied by the bidder within the ordered price even if the same are additional to approved billing break up, approved drawing or approved Bill of quantities. This clause will apply in case during site commissioning additional requirements emerges due to customer and / or consultant's comments. No extra claims shall be put on this account.
- j) Schedule of drawings submissions, comment incorporations & approval shall be as stipulated in the specifications. The successful bidder shall depute his design personnel to BHEL's/ Customer's/ Consultant's office for across the table resolution of issues and to get documents approved in the stipulated time.