

**1X660MW BHUSAWAL TPS-UNIT:6
MAHARASHTRA, INDIA.**

VOLUME: II B & III

**TECHNICAL SPECIFICATIONS
FOR
DM PLANT**

SPECIFICATION NO.: PE-TS-415-163-A001



**BHARAT HEAVY ELECTRICALS LIMITED
POWER SECTOR
PROJECT ENGINEERING MANAGEMENT
NOIDA, INDIA**



TITLE:

**TECHNICAL SPECIFICATION FOR
DM PLANT
1X660MW BHUSAWAL TPS-UNIT:6
MAHARASHTRA, INDIA.**

SPEC NO: PE-TS-415-163-A001

VOLUME: II-B

SECTION: A

REV NO: 01

DATE:

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SECTION – A SCOPE OF ENQUIRY



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1. SCOPE OF INQUIRY/ INTENT OF SPECIFICATION

- 1.1 The specification is intended to cover design, engineering, manufacture, fabrication, assembly, inspection and testing at vendor's & sub-vendor's works, painting, **mandatory spares** along with spares for erection and commissioning, startup and commissioning as required, forwarding, proper packing, shipment and delivery at site, unloading, handling & transportation at site, Erection & Commissioning, trial run, on FOR site basis, preparation & submission of "As Built" drawings, PG test at site and handing over of **DM PLANT** as per the details in different sections / volumes of this specification for **1X660 MW BHUSAWAL TPS-UNIT:6**.
- 1.2 The contractor shall be responsible for providing all material, equipment & services, which are required to fulfil the intent of ensuring operability, maintainability, reliability and complete safety of the complete work covered under this specification, irrespective of whether it has been specifically listed herein or not. Omission of specific reference to any component / accessory necessary for proper performance of the equipment shall not relieve them of the responsibility of providing such facilities to complete the supply, erection and commissioning of **DM PLANT**.
- 1.3 It is not the intent to specify herein all the details of design and manufacture. However, the equipment shall conform in all respects to high standards of design, engineering and workmanship and shall be capable of performing the required duties in a manner acceptable to purchaser who will interpret the meaning of drawings and specifications and shall be entitled to reject any work or material which in his judgment is not in full accordance herewith.
- 1.4 The extent of supply under the contract includes all items shown in the drawings, notwithstanding the fact that such items may have been omitted from the specification or schedules. Similarly, the extent of supply also includes all items mentioned in the specification and /or schedules, notwithstanding the fact that such items may have been omitted in the drawing.
- 1.5 The general terms and conditions, instructions to tenderer and other attachment referred to elsewhere are made part of the tender specification. The equipment materials and works covered by this specification are subject to compliance to all attachments referred to in the specification. The bidder shall be responsible for and governed by all requirements stipulated herein.
- 1.6 While all efforts have been made to make the specification requirement complete & unambiguous, it shall be bidders' responsibility to ask for missing information, ensure completeness of specification, to bring out any contradictory / conflicting requirement in different sections of the specification and within a section itself to the notice of BHEL and to seek any clarification on specification requirement in the format enclosed under Vol-III of the specification. In absence of any such clarifications, in case of any contradictory requirement, the more stringent requirement as per interpretation of BHEL/Customer shall prevail and shall be complied by the bidder without any commercial implication on account of the same. Further in case of any missing information in the specification not brought out by the prospective bidders as part of pre-bid clarification, the same shall be furnished by BHEL/ Customer as and when brought to their notice either by the bidder or by BHEL/ customer themselves. However, such requirements shall be binding on the successful bidder without any commercial & delivery implication.
- 1.7 Deviations, if any, should be very clearly brought out clause by clause in the enclosed schedule; otherwise, it will be presumed that the vendor's offer is strictly in line with NIT specification.
- 1.8 In case all above requirements are not complied with, the offer may be considered as incomplete and would become liable for rejection.
- 1.9 Unless specified otherwise, all through the specification, the word contractor shall have same meaning as successful bidder/vendor and Customer/Purchaser/Employer will mean BHEL and/or Customer including their consultant as interpreted by BHEL in the relevant context. Bidder to refer GCC/SCC for more clarity.
- 1.10 The equipment covered under this specification shall not be dispatched unless the same have been finally inspected, accepted and dispatch release issued by BHEL/Customer.
- 1.11 BHEL's/Customer's representative shall be given full access to the shop in which the equipments are being manufactured or tested and all test records shall be made available to him.
- 1.12 Pre-bid meeting shall be held before bid submission. Bidder to ask all their queries in pre-bid meeting.



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SECTION – B PROJECT INFORMATION

1.0 INTRODUCTION

The proposed 1x 660 MW Bhusawal Thermal Power Project will be set up by Maharashtra State Power Generation Co. Ltd. (MAHAGENCO) in Dipnagar near Bhusawal, Maharashtra, India.

The Bidder shall acquaint himself by a visit to the site, if felt necessary, with the conditions prevailing at site before submission of the bid. The information given herein under is for general guidance and shall not be contractually binding on the Owner. All relevant site data/information as may be necessary shall have to be obtained /collected by the Bidder.

2.0 APPROACH TO SITE

Deepnagar is well connected by rail and road. By road, it is about 8 Km from Bhusawal city. Nearest railway station is at Bhusawal. The nearest Airport is at Aurangabad. The nearest sea port is at Mumbai. The site is located on the Mumbai-Nagpur Highway.

3.0 LAND

Bhusawal Thermal Power Plant is already having 1x62.5 MW + 2x210 MW Units and Two (2) Units of 500 MW each are under execution stage. About 108.94 Hectares of land is acquired by MAHAGENCO near existing TPS. It is proposed to install 1x 660 MW unit on this land.

4.0 SOURCE OF COAL

Indian coal would be sourced from Machaakata coal blocks in Orissa state. The Coal will be received at Plant site directly by rail. The coal from the railway wagons would be unloaded by means of wagon tippers and will be either bunkered or stacked in the stock pile at site.

5.0 SOURCE OF WATER

The main source of water is considered Ozerkheda Reservoir which is located at around 18 km from plant site.

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6.0 ASH DISPOSAL AREA

The ash generated from 1 x 660 MW unit shall be disposed off in slurry form to the existing Ash Pond located at Velhala, approx. 12 Km from the site.

7.0 PROJECT INFORMATION

7.1	Client / Owner	:	Maharashtra State Power Generation Co. Ltd.
7.2	Consultant	:	Procon Engineers, Navi Mumbai (Division of Nimoto Consulting Engineers Pvt. Ltd.)
7.3	Project Title	:	BHUSAWAL T.P.S. UNIT – 6 : 1X660 MW
7.4	Location	:	Dipnagar, Near Bhusawal, Maharashtra, India
7.5	Nearest railway station	:	Bhusawal
7.6	Nearest Airport	:	Aurangabad
7.7	Nearest Harbour	:	Mumbai
7.8	Access Roads	:	NH 6 (Mumbai-Nagpur Highway)
7.9	Elevation above MSL	:	210 M
7.10	Longitude/latitude	:	75° 51' 10" East / 21° 02' 30" North
7.11	Seismic Zone	:	Zone III as per IS:1893
7.12	<u>AMBIENT TEMPERATURE</u>		
7.12.1	Mean of daily maximum temperature	:	48.25 °C (during May)
7.12.2	Mean of daily minimum temperature	:	18 °C (during January)
7.12.3	Highest temperature recorded	:	48.7°C

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- 7.12.4 Lowest temperature : 13°C
recorded
- 7.13 Wet bulb temperature : 27°C (Maximum)
- 7.14 Rainfall : 112 mm average annually
- 7.15 Wind Speed : 0 to 39 Km/hr
- 7.16 Wind direction : East North East to West South West

ELECTRICAL

7.17 **MAIN POWER SOURCE FROM GRID**

- 7.17.1 Rated Voltage : 400kV
- 7.17.2 Voltage variation : $\pm 10\%$
- 7.17.3 Frequency Variation : $\pm 5\%$
- 7.17.4 Rated Short Circuit : 50 kA, Three Phase Symmetrical
Level

7.18 **AUXILIARY POWER SUPPLY**

Auxiliary electrical equipment shall be suitable for operation on the following supply system:

- 7.18.1 Motors above 1000 kW : 11kV,3Ph,3wire,50Hz system
& other Power devices
- 7.18.2 Motors below 1000 kW : 3.3kV, 3 ph, 3 wire 50 Hz, Non Effectively
& above 160kW earthed
& other power devices
- 7.18.3 Motors upto 160 kW & : 415V, 3 ph, 4 wire 50 Hz
other power devices
- 7.18.4 Motor Starting Methods : Direct on Line
- 7.18.5 (a) Lighting fixtures : 240V, 1 phase, 50 Hz
Space heaters, and Supply through suitably rated transformers
single Phase to limit the short circuit level to 9kA – 1 sec.
motors

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(b) Control & : 240V, 1 Phase, 50 Hz from UPS
Instrumentation

7.18.6 Short circuit levels of 11kV, 3.3 kV and 415V system equipments

The equipment shall be suitable for the following short circuit levels

(a) 11kV Switchgears : 44 kA/3 sec

(b) 3.3kV Switchgears : 40 kA/3sec

(c) 415V PCC/ : 50 kA/1sec
PMCC/ MCC

(d) Lighting : 9 kA/1sec
Distribution
Boards & 240V
A.C. supply

7.18.7 Auxiliary DC supply

The auxiliary DC supply will be used for control, indication & protection, Turbine lube oil system, AVR, Emergency DC lighting of power plant and Control & Instrumentation etc.

(a) Voltage : (i) 220V DC for utility purpose
(ii) 24V DC for Control and
Instrumentation

(b) Voltage variation : + 10 %, - 15 %

7.18.8 Emergency power
supply

(a) Purpose : (i) Standby power to normal incomer of
emergency MCC
(ii) Alternate power source to Fire water
Pumps

(b) Rated voltage and : 415 V, 3 phase, 3 wire, 50 Hz.
frequency

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7.18.9 UPS power supply

- (a) Purpose : (i) Vital process loads
(ii) Critical lighting
(iii) Control and Instrumentation
(iv) Office for LAN power supply/Server etc.

- (b) Rated Voltage : 415V, 3 ph, neutral/240V single phase, 50Hz

7.19 The variation in voltage and frequency may be $\pm 10\%$ and $\pm 5\%$ respectively. The combined voltage and frequency variation may be $\pm 10\%$. All devices shall be suitable for continuous operation over the entire range of voltage variation without any change in their performance

7.20 Power socket shall be 415V AC, 50 Hz, 4 pin 32/63 Amps. Power socket outlets for portable tools, hand lamps etc shall be 240 volts, single phase, 3 pin, metal clad industrial type

7.21 All electrical equipment shall be designed for the following ambient conditions

- (a) Maximum ambient temperature : 50°C

- (b) Minimum Ambient temperature : 13°C

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SECTION – C
(SPECIFIC TECHNICAL REQUIREMENTS)

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SECTION – C1

(SPECIFIC TECHNICAL REQUIREMENTS FOR MECHANICAL)

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1.0 GENERAL

The **DM PLANT** and associated accessories shall conform to the technical specification.

2.0 SCOPE OF SUPPLY

Broad scope of work of this package includes all equipment and accessories and shall be as per the following (please refer P&ID) and same shall be included in bidder scope. Please also refer Electrical (Section-C1) & C&I (Section-C2) for respective scopes.

The DM Plant with net capacity of 100 CuM/HR (each stream of UF outlet), as specified in Technical data sheets & technical specifications, and shall consist of at least the followings:

- Two (2) numbers (2X100%) (1Working+1Standby) DM Plant Supply (Feed) pumps along with motors, piping, valves, fittings, instrumentation & all other accessories as required.
- Two (2) numbers (2X100%) (1Working+1Standby) Dual Media Filters (DMF) each complete with internals, integral pipe works, valves, activated carbon, fittings, instrumentation and all other accessories as required.
- Two (2) numbers (2X100%) (1Working+1Standby) Air Blowers for Dual Media Filter along with suction filter, silencer, motors, acoustic hood, piping, valves, fittings, instrumentation and all other accessories as required.
- Complete valves, fittings, instrumentation and all other accessories required for one (1) no. Overhead Backwash Water Storage Tank (MOC-RCC) for Dual Media Filter Units.
- Two (2) numbers (2X100%) (1Working+1Standby) Activated Carbon Filters (ACF) each complete with internals, integral pipe works, valves, activated carbon, fittings, instrumentation and all other accessories as required.
- Two (2) numbers (2X100%) (1Working+1Standby) Strong Acid Cation Exchangers along with ion exchange resin, integral pipe works, internals, resin traps, valves, fittings, instrumentation, and accessories associated with the same.
- Two (2) numbers (2X100%) (1Working+1Standby) forced draft Degasser Towers [One (1) nos. on each Degassed Water Storage Tank] along with internals. integral pipe works, valves, fittings, instrumentation and accessories associated with the same.
- Three (3) numbers (3X50%) (2Working+1Standby) Degasser Air Blowers along with suction filter, silencer, motors, acoustic hood, piping, valves, fittings, instrumentation and all other accessories as required.
- Two (2) numbers (2X100%) (1Working+1Standby) Degassed Water Storage Tank along with piping, valves, fittings, instrumentation and accessories associated with the same.
- Two (2) numbers (2X100%) (1Working+1Standby) Degassed Water Pumps along with motors, piping, valves, fittings, instrumentation and accessories associated with the same.
- Two (2) numbers (2X100%) (1Working+1Standby) Strong Bases Anion Exchangers along with ion exchange resin, resin trap, integral pipe works, internals, valves, fittings, instrumentation and accessories associated with the same.
- Two (2) numbers (2X100%) (1Working+1Standby) Mixed Bed Exchangers along with ion exchange resin, resin trap, integral pipe works, internals, valves, fittings, instrumentation accessories associated with the same.
- Two (2) numbers (2X100%) (1Working+1Standby) Air Blowers for Mixed Bed Exchangers (common for Neutralization Pit) along with suction filter, silencer, motors, acoustic hood, piping, valves, fittings, instrumentation and all other accessories as required.
- One (1) no. Resin Transfer Vessel with integral pipe works, internals, valves, fittings, instrumentation accessories associated with the same.
- One (1) no. Instrument Air Receiver with integral pipe works, internals, valves, fittings, instrumentation accessories associated with the same.
- Two (2) nos of hose stations for unloading of Hydrochloric Acid. The hose station shall have two (2) nos of

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80 mm NB flexible hose connection.

- 17) Two (2) numbers (2X100%) (1Working+1Standby) Hydrochloric Acid Unloading Pumps along with motors, piping, valves, fittings, instrumentation and accessories associated with the same.
- 18) Two (2) numbers (2X100%) (1Working+1Standby) Bulk Hydrochloric acid Storage Tanks along with piping, valves, fittings, instrumentation and accessories associated with the same.
- 19) Two (2) numbers (2X100%) (1Working+1Standby) Hydrochloric acid Measuring Tanks for Cation Exchangers along with piping, valves, fittings, instrumentation and accessories associated with the same.
- 20) Two (2) numbers (2X100%) (1Working+1Standby) Hydrochloric acid Measuring Tanks for Mixed Bed Exchangers along with piping, valves, fittings, instrumentation and accessories associated with the same.
- 21) One (1) no. Hydrochloric acid Measuring Tanks for Neutralisation at NPIT along with piping, valves, fittings, instrumentation and accessories associated with the same.
- 22) One (1) no. Hydrochloric Acid Dosing ejectors for Cation Exchangers along with accessories. Both water and acid shall be thoroughly mixed in the ejector.
- 23) One (1) no. Hydrochloric Acid Dosing ejectors for Mixed Bed Exchanger along with accessories. Both water and acid shall be thoroughly mixed in the ejector.
- 24) Two (2) nos of hose stations for unloading of Caustic. The hose station shall have two (2) nos of 80 mm NB flexible hose connection.
- 25) Two (2) numbers (2X100%) (1Working+1Standby) Caustic Unloading Pumps along with motors, piping, valves, fittings, instrumentation and accessories associated with the same.
- 26) Two (2) numbers (2X100%) (1Working+1Standby) Caustic Recirculation Pumps along with motors, piping, valves, fittings, instrumentation and accessories associated with the same.
- 27) Two (2) numbers (2X100%) Bulk caustic Storage Tanks along with piping, valves, fittings, instrumentation and accessories associated with the same.
- 28) One (1) no. Activated Carbon Filter for caustic each complete with internals, integral pipe works, valves, activated carbon, fittings, instrumentation and all other accessories as required.
- 29) Two (2) numbers (2X100%) Caustic Measuring Tanks for Anion Exchangers along with piping, valves, fittings, instrumentation and accessories associated with the same.
- 30) Two (2) numbers (2X100%) Caustic Measuring Tanks for Mixed Bed Exchangers along with piping, valves, fittings, instrumentation and accessories associated with the same.
- 31) One (1) no. Caustic Measuring Tanks for Neutralisation at NPIT along with piping, valves, fittings, instrumentation and accessories associated with the same.
- 32) One (1) no. Brine solution preparation Tanks along with agitators, agitator motors, piping, valves, fittings, instrumentation and accessories associated with the same.
- 33) One (1) no. Hot Water Tank along with Regeneration Water heaters, piping, valves, fittings, instrumentation and accessories associated with the same.
- 34) Two (2) numbers (2X100%) (1Working+1Standby) Alkali Transfer cum Recirculation Pumps along with motors, piping, valves, fittings, instrumentation and accessories associated with the same.
- 35) One (1) no. Caustic Dosing ejectors for Anion Exchangers along with accessories. Both water and Caustic shall be thoroughly mixed in the ejector.
- 36) One (1) no. Caustic Dosing ejectors for mixed bed Exchangers along with accessories. Both water and Caustic shall be thoroughly mixed in the ejector.
- 37) Two (2) numbers (2X100%) (1Working+1Standby) DM Regeneration Water Pumps along with motors, piping, valves, fittings, instrumentation and accessories associated with the same.
- 38) Neutralization Pit (RCC- By BHEL). However, instrumentation, piping, valves, fittings and accessories

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associated with the same shall be in bidder's scope.

- 39) Two (2) numbers (2X100%) (1Working+1Standby) Neutralized Effluent Disposal Pumps along with motors, piping, valves, fittings, instrumentation and accessories associated with the same.
- 40) 2 x 100% Ultrafiltration System along with piping, valves, fittings, instrumentation and associated accessories. The UF system provided must be proven and the required details in support of the provenness shall be provided during detail engineering including selection of basic design criterion.
- 41) 2 x 100% UF Backwash cum fast flush Pumps along with motor, piping, valves, fittings, instrumentation and associated accessories.
- 42) 2 x 100% basket strainers at Inlet to each UF stream along with necessary piping, valves, fittings, instrumentation and associated accessories.
- 43) One (1) no. UF Chemical Cleaning System consisting of 2 nos. (2 x 100%) UF Chemical Cleaning Tank and 2 nos. (2 x 100%) UF Chemical Cleaning Dosing Pumps along with motor, piping, valves, fittings, instrumentation and associated accessories.
- 44) One (1) no. Acid Dosing System (for dosing Acid in UF backwash line to UF System) consisting of 2 Nos. (2 x 100%) Acid Measuring Tank and 2 nos. (2 x 100%) Acid Dosing Pumps along with motor, piping, valves, fittings, instrumentation and associated accessories.
- 45) One (1) no. Alkali Dosing System (for dosing Alkali in UF backwash line to UF System) consisting of 2 Nos. (2 x 100%) Alkali Measuring Tank and 2 nos. (2 x 100%) Alkali Dosing Pumps along with motor, piping, valves, fittings, instrumentation and associated accessories.
- 46) One (1) no. Hypo Dosing System (for dosing Hypo in UF backwash line to UF System) consisting of 2 Nos. (2 x 100%) Hypo Measuring Tank and 2 nos. (2 x 100%) Hypo Dosing Pumps along with motor, piping, valves, fittings, instrumentation and associated accessories.
- 47) DMF, ACF and UF Backwashed Water Pit (RCC- By BHEL). However, instrumentation, piping, valves, fittings and accessories associated with the same shall be in bidder's scope.
- 48) Two (2) numbers (2X100%) (1Working+1Standby) ACF and UF Backwashed Water Transfer Pumps along with motors, piping, valves, fittings, instrumentation and accessories associated with the same.
- 49) Safety equipments as per Data Sheet-A.
- 50) Two (2) nos. safety shower near acid/ caustic storage tanks.
- 51) One (1) no. Central Sampling Rack (to be located at express laboratory to be located at ground floor of DM Plant building).
- 52) First fill of filter media, resin, and degasser tower packings for all the units complete with make-up filter media, resin and packings for first three years of operation. Quantity of make-up resins shall be calculated on the basis of 3% and 5% attrition loss per annum for cation and anion resin respectively and 10% deration over the corrected exchange capacity (obtained from manufacturer's resin literature). For filter make-up a loss of 10% per annum shall be considered.
- 53) All vessels as per P&ID & Data Sheet-A complete with inlet and outlet connections, bed support cum under drain system, inlets water distributors, all fittings and appurtenances etc. as specified and as required.
- 54) External resin/media traps at the outlet of each of the vessels, designed for in place manual backwashing.
- 55) All tanks as per P&ID & Data Sheet-A complete with inlet and outlet connections, drain system, inlets water connection, all fittings and appurtenances etc. as specified and as required.
- 56) Bidder to note that the equipment, valves, instruments indicated in the P&ID (PE-DG-410-163-A001) attached in the technical specification are minimum and are in bidder's scope. During detailed engineering, bidder to furnish complete and detailed scheme in all respects including all valves, equipment's etc. for smooth, safe, efficient and trouble free operation of the plant meeting the specification requirement and also considering the

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applicable statutory requirement.

- 57) Necessary piping, fitting, valves, drains, vents, sampling etc. required for the complete DM Plant. Pipe racks shall be provided by BHEL wherever available, wherever pipe racks are not available, pipe shall be laid on pedestal to be provided by BHEL. However, all auxiliary steel structure (U-clamps, nuts, bolts, channels etc) for fixing pipes on pedestal or racks shall be in bidder's scope.
- 58) All insert plates, rung ladder, nuts and bolts, and flanges and matching counter flanges wherever applicable.
- 59) All necessary valves and fittings for the installations with the actuators necessary for their remote operation.
- 60) Embedment plates with lugs shall also be provided by bidder as per system requirement.
- 61) All channels & brackets, mounting plates as required for mounting of motors, pumps, stirrers, tank etc shall be in bidder's scope.
- 62) Start-up and commissioning spares as required.
- 63) Mandatory spares as indicated elsewhere in the specification.
- 64) All special tools necessary for proper maintenance or adjustment of the equipment packed in permanent box. Operating platforms, permanent ladders (not rugs), supports and other structural works for each tanks, valves etc. to facilitate accessibility for operation and maintenance.
- 65) All necessary structural steel for pipe supporting structure, platforms, walkways / pathways and access stairs, mechanical plant and equipment, mechanical services and pipe work associated with DM Plant.
- 66) Finish paints for touch up painting of equipments after erection at site in sealed container.
- 67) All pipes, fittings etc required for hand railing, platforms, and ladders shall be in the scope of bidder.
- 68) All handrails shall be of 32 mm nominal bore MS pipes (medium class) as per IS: 1161 galvanised using 750 gm/sq. m of zinc. Hand railing shall be a two-rail system with the top rail 1000 mm above the walkway surface and the intermediate rail 450 mm below the top rail. Handrail post spacing shall be limited to 1500 mm as far as possible but can be proportioned to the length of the opening. In such a case spacing shall not exceed 1850 mm centre to centre of posts. Hand railing shall be shop fabricated for specific locations and field welded or bolted to the erected structural steel. Railings shall be provided with 100 mm wide and
- 69) 8 mm thick MS strip at bottom as toe guard all along the length of railing in horizontal plane. For RCC stairs, hand railing with 20 mm square MS bar balustrade with suitable MS flat and Aluminium / Teakwood handrail shall be provided, unless specifically mentioned otherwise.
- 70) Monitoring gadgets, instruments and equipments required for commissioning & maintenance (till PG test and plant handover).
- 71) Instrument hook up material shall be in bidder's scope.
- 72) Permanent ladder (not rungs) for approaching the top of tanks, valves for All steel inserts with lugs, plates, bolts, nuts, sleeves, edge angles and all other embedding components etc as required to grout in civil works and to support/hold the equipments being supplied under this specification for opening/maintenance purpose.
- 73) Wherever pipe racks are not available, pipes shall run on pedestals or below ground. All auxiliary structure & fixing items such as U clamps, nuts, bolts, channels, insert plates etc. required to lay the pipes on pedestals shall be in bidder's scope of work. Wrapping, coating and protection of all the buried pipe is also in bidder's scope.
- 74) Wrapping, coating and protection of the entire buried pipe shall be as per IS 10221 or AWWA C 203-93.
- 75) Any item/work either supply of equipment or erection material which have not been specifically mentioned in 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 and shall be in bidder's scope without any commercial, technical and delivery implication to BHEL.
- 76) All other items are also included in scope of supply as specified in other part of the specification.
- 77) All required elbow, tee, pipe fittings etc. required for erection of the complete system including piping shall

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be in bidder's scope. Bidder to provide the detailed BOQ during detail engineering

- 78) Bidder shall perform the guarantee parameters as per specification requirement to the satisfaction of owner. The exact modalities of verifying guarantee for the parameters indicated in the specification shall be finally as agreed with the owner during detailed engineering & mutually agreed.
- 79) Initial fill of resins, media and degasser tower packing for all vessels as required.
- 80) Two no. Electric Hoist with Monorail and traveling trolley with trailing cable of minimum 1000 kg capacity. Capacity of hoists shall be selected considering a minimum margin of 10% over the maximum weight of the heaviest equipment / component to be handled by the Hoist.
- 81) All the first fill and six months topping requirements of consumable such as greases, oil, lubricants, servo fluids/control fluids etc. which will be required to put the equipment covered under the scope of specifications, into successful commissioning / initial operation and to establish completion of facilities shall be in bidder's scope. Suitable standard lubricants as available in India are desired. Efforts should be made to limit the variety of lubricants to minimum.
- 82) Monitoring gadgets, instruments and equipments required for monitoring (till PG test and plant handover).
- 83) Chemicals (**Excluding HCL and NaOH for DM Plant regeneration**) for First fill including top up chemicals and all required chemicals for pre-commissioning, commissioning, trial run and PG test+6 months of chemical after successful commissioning at rated capacity are in bidder scope
- 84) All blank flanges/counter flanges, isolations valves, tees etc. to interconnect the pipes at all terminal points.
- 85) All necessary structural steel for pipe supporting structure, platforms, walkways / pathways and access stairs for mechanical plant and equipment, mechanical services and pipe work associated with Effluent Treatment Plant.
- 86) All steel inserts with lugs, plates, bolts, nuts, sleeves, edge angles and all other embedding components etc as required to grout in civil works and to support/hold the equipments being supplied under this specification for opening/maintenance purpose.

87) PIPING

All the piping as listed below shall be in bidder's scope. The below indicated pipes shall be designed, supplied, erected, laid and tested by the bidder. Elbows, tees, flanges Hangers and supports, embedment plates with lugs etc required for the below given piping shall also be provided by the bidder.

- 1) All piping within the DM Plant.
- 2) Inlet and outlet pipes for each vessel, pumps, other equipments, etc. with pipe connections to the respective vessels/equipments.
- 3) 600 meter DM plant feed piping from Clarified water pump house where (DM Feed pumps are located) to DM plant. For details, please refer plot plan.
- 4) 30 meter DM water piping from DM plant to each DM Water storage tanks.
- 5) 30 meter DM water recirculation piping from DM water regeneration pumps to each DM Water storage tanks.
- 6) 30 meter DM water piping from common suction header of DM Water storage tanks to DM water regeneration pumps.
- 7) 800 meter neutralize effluent disposal piping from Neutralization pit in DM plant area to Central monitoring basin in Effluent treatment plant area.
- 8) 800 meter neutralize effluent disposal piping from DMF, ACF and UF Backwashed Water Pit in DM plant area to Central monitoring basin in Effluent treatment plant area.
- 9) Service water piping, instrument air piping, service air piping, etc. as applicable as per the Terminal Points.
- 10) In addition, any additional piping and associated accessories required to complete the system shall also be in

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bidder's scope.

3) SCOPE OF SUPPLY (ELECTRICAL)

Complete electrical as per specification and details indicated in Section C2 (Specific Technical Requirement Electrical) and D2 (General Technical Requirement Electrical).

4) SCOPE OF SUPPLY (C&I)

Complete C&I as per specification and details indicated in Section C3 (Specific Technical Requirement C&I) and D3 (General Technical Requirement C&I).

5) SCOPE OF SUPPLY (CIVIL)

Total Civil is in BHEL's Scope of work, however complete grouting for equipment, fixing and any concreting inside the vessels and lining shall be in bidder's scope.

Also detailed Civil Input drawing shall be provided by bidder. Successful bidder shall furnish civil assignment drawings. The corresponding CIVIL drawing prepared by BHEL / CIVIL agency, based on civil assignment drawing of bidder will be furnished to the successful bidder for concurrence

6) SCOPE OF SERVICES

The bidder's scope also includes following services for scope under this specification:

- 1) Erection and Commissioning, unloading, storage and handling at site.
- 2) Arrangement of all instruments, reagents, monitoring gadgets for monitoring, pre-commissioning, carrying out trial run & commissioning and Performance guarantee test.
- 3) Monitoring gadgets, instruments and equipments required for maintenance.
- 4) Complete grouting for equipment, fixing and any concreting inside the vessels and lining.
- 5) All personnel required during maintenance, Commissioning and Performance guarantee test.
- 6) Trial run for requisite period.
- 7) Performance guarantee test.
- 8) Painting shall be as specified in "Surface Preparation & Painting" Sec-D1 of this technical specification. Bidder to note that paint shed shall be finalized during detailed engineering as per customer & BHEL requirement and any variation in the painting schedule as finally approved by customer shall be taken care by bidder without any commercial and delivery implication.
- 9) Final touch up paint at site.

7) TERMINAL POINTS

- 1) 25 NB Instrument air supply at 5 to 7 kg/cm² (g) – At 5 meter distance from the DM Plant area. However distribution and piping inside DM Plant area shall be in bidder's scope.
- 2) 25 NB Service air supply at 5 to 7 kg/cm² (g) - At 5 meter distance from DM Plant area. However distribution and piping inside DM Plant area shall be in bidder's scope.
- 3) Service water connection (50 NB connections) at 5 meter distance from DM Plant area. Piping inside DM Plant area for mentioned services will be in bidder's scope.
- 4) Drinking water (or potable water) of 25 NB connections - At 5 meter distance from the DM Plant area. However distribution and piping inside DM Plant area shall be in bidder's scope.

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- 5) DM Water piping from DM plant upto nozzle flange of respective DM water storage tanks.
- 6) DM Water recirculation piping from DM water regeneration pumps upto nozzle flange of respective DM water storage tanks.
- 7) DM Plant N-pit effluent upto Central Monitoring basin at Effluent treatment plant.
- 8) ACF and UF Backwashed Water upto Central Monitoring basin at Effluent treatment plant.

8) EXCLUSIONS

- 1) All civil works including foundation of equipment. However complete grouting for equipment, fixing and any concreting inside vessels and lining shall be in the scope of the bidder. Also civil works including operating / maintenance platforms and interconnection platforms (if any) with ladders / stairs & handrails, structural supports and hangers for pipes / cables / ducts, crane rails, all embedment's and inserts with lugs including anchor fasteners, bolts etc., dressing of foundations, grouting of pockets and underpinning of base plates for equipment / structures and fixing supports, filling and finishing of openings in walls, floors, cladding, roof and trenches shall be in bidder's scope.
- 2) Instrument air & service air up to terminal points.
- 3) Air conditioning, ventilation & fire fighting facilities.
- 4) Other exclusions are mentioned in the electrical & C&I parts of this specification.
- 5) Drinking water (or potable water), service water up to terminal points.
- 6) Regeneration effluents and other drains from equipments, vessels, tank etc shall be drained to N-pit through drain trenches. the required piping, valves fittings, instruments etc shall be in bidder's scope.

9) QP AND SUB VENDOR APPROVAL

- 1) The quality assurance plan is enclosed elsewhere in technical specification. However requirement of detailed QP, inspection checklist, certificate of conformance etc. for each equipment and sub-vendor shall be finalized during detailed engineering stage; decision of BHEL/customer shall be binding on vendor in this regard. Any changes/additional tests insisted upon by Owner during approval of QAP's shall be accepted by bidder without any commercial and delivery implication to BHEL/Customer. Bidder shall submit the quality plans in BHEL format during detailed engineering stage. Bidder to note further that during detailed engineering all the QAP's/check lists etc. shall be submitted to Customer/BHEL for approval. All inspection & testing etc. shall be carried out accordingly.
- 2) The sub vendor list enclosed elsewhere in technical specification is indicative only and is subject to approval / acceptance by customer. Bidder to propose his sub vendor list with back up documents (experience list, end user certificate as applicable) etc. The same shall subject to BHEL and Customer approval during detailed engineering stage without any technical, commercial & delivery implication to BHEL.

10) PERFORMANCE GUARANTEE TEST

Water Quality at the outlet of UF:	
Conductivity, micro mho/cm	< 0.1 at 25 Deg C
SiO ₂ (Total)	<0.01 ppm as SiO ₂
pH	6.8-7.2

The Performance guarantee for other parameters shall be as indicated elsewhere in this specification.

11) DESIGN/ CONSTRUCTION

In addition to the requirements of Section C & D the following shall also be complied under scope of this specification.

The P&ID for DM Plant (**Dwg.No.- PE-DG-415-163-A001**) is enclosed herein in this section for bidders compliance.

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The material of construction specified in data sheet-A are minimum requirements and material of construction for other components not specified shall be similarly selected by the bidder for intended duty which shall be subject to BHEL / Customer approval during detail engineering without any commercial & delivery implication to BHEL.

12) DRAWING/DOCUMENTS REQUIREMENT

For the Drawings/Documents submission schedule, please refer **MDL enclosed in Vol-III**.

For the Drawings/Documents Submission Procedure, please refer **Sec-C1**. The bidder has to submit the revised drawing/document along with the compliance sheet indicating enumerate reply to all BHEL and customer comments or observations. Without compliance sheet the submission of the drawings/documents will not be considered and the delay on this account will be solely on bidder's side only. Bidder to comply with the observations of the BHEL and CUSTOMER without price & delivery implication.

13) SPARES

1. All the spares for the equipment under the contract provided by the vendor will strictly conform to the specifications and documents and will be identical to the corresponding main equipment/components supplied under the contract.
2. The quality plan and the inspection requirement finalized for the main equipment will also be applicable to the corresponding spares.
3. The list of mandatory spares to be considered is available elsewhere in this Technical specification.

All mandatory spares shall be delivered at site at least two months before scheduled date of initial operation of the first unit. However, spares shall not be dispatched before dispatch of corresponding main equipments.

Wherever quantity is specified both as a percentage and a value, the Bidder has to supply the higher quantity until and unless specified otherwise.

4. Start-up and commissioning spares are in bidder's scope of supply.
Start-up and Commissioning spares are those which would be required during equipment or system testing, start-up and commissioning. All spares used until the plant is finally handed over by the bidder to the customer come under this category. All start-up and commissioning spares as required shall be provided by the bidder without any additional cost to the BHEL and customer. List of spares shall be furnished by BIDDER along with the offer.

Bidder shall be responsible for the ready and timely availability for all the startup and commissioning spares as required during various stages of testing, cleaning and commissioning up to handing over of each unit of the total plant.

An adequate stock of start-up spares shall be available at the site such that the start-up and commissioning of the equipment/systems, Performance guarantee test and handing over the equipment/ systems to the customer will be carried out without hindrance and delay. All start-up spares which remain unused after the taking over of the plant shall remain the property of the customer.

5. In addition to the spare parts mentioned above, the Bidder shall also provide a list of recommended spares for 3 years of normal operation of the plant and indicate the list and unit prices in Price Schedules. This list shall take into consideration the mandatory spares specified elsewhere in this specification and should be independent of the list of the mandatory spares. The BHEL reserves the right to buy any or all of the recommended spares. The recommended spares shall be delivered at project site at least two months before the scheduled date of initial operation of first unit. However, the spares shall not be dispatched before the dispatch of the main equipment. Price of recommended spares will not be used for evaluation of the bids. However, the Bidder shall be liable to provide necessary justification for the quoted prices for these spares as desired by BHEL.

The vendor warrants:

- (i) That all spares supplied will be new and in accordance with the contract document and will be free from defects in design, material and workmanship and shall further guarantee as under:
- (ii) In case of any failure in the original component/equipments due to faulty designs, materials and workmanship, the corresponding spare parts if any, supplied will be replaced without any extra cost to the

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BHEL and customer unless a joint examination and analysis by BHEL and/or customer of such spare parts prove that the defect found in the original part that failed can safely be assured not to be present in spare parts.

- (iii) The long term availability of spares to the BHEL and the customer for the full life of the equipment covered under the contract and that before going out of production of spare parts of the equipment covered under the contract, vendor and his sub-vendors shall give the BHEL and the customer at least 24 (Twenty Four) months advance notice so that the latter may order his bulk requirements of spares, if he so desires. The same provision will also be applicable to the sub-vendors. Further, in case of discontinuance of manufacture of any spares by the vendors or his sub-vendors the vendors and his sub-vendors, will provide the BHEL and the customer, 2 (two) years in advance, with full manufacturing drawings, material specifications and technical information required by the BHEL and the customer for the purpose of manufacture of such items and also the right to manufacture such spares for their own requirements.
- (iv) Further in case of discontinuance of supply of spares by the vendors or his sub-vendors, the vendor will provide the BHEL and the customer with full information for replacement of such spares with other equivalent makes, if so required by the BHEL and the customer.
- (v) Notwithstanding the above, the vendor shall be responsible for supply of spares for the lifetime of the package at reasonable prices. The prices of all future requirements of spares shall be derived from the corresponding ex-works price at which the orders for such spares have been placed by the BHEL and the customer as a part of the mandatory or long term or any other kind of spares. The base indices for calculating ex-works price shall be commissioning of last equipment under main contract.

6. The vendor will indicate the delivery period of the spares, which the BHEL and the customer may procure in accordance with this clause.
7. In case of emergency requirements of spares, the vendor would make every effort to expedite the manufacture and delivery of such spares on the basis of mutually agreed time schedule.
8. In case the vendor fails to supply the mandatory or long term or any other kind of spares on the terms stipulated above, the BHEL and the customer shall be entitled to purchase the same from the alternate sources at the risk and the cost of the vendor and recover from the vendor, the excess amount paid by the BHEL and the customer over the rates as per the contract. In the event of such risk purchase by the BHEL or the customer, the purchases will be as per the works and procurement policy of the BHEL and the customer prevalent at the time of such purchases and BHEL & the customer at his option may include a representative from the vendor in finalizing the purchases.
9. It is expressly understood that the final settlement between the parties in terms of relevant clauses of the tender document shall not relieve the vendor of any of his obligations under the provision of long term availability of spares and such provisions shall continue to be enforced till the expiry of 30 (thirty) years period reckoned from the scheduled date of completion of trial operation of the last equipment unless otherwise discharged expressly in writing by the BHEL or the customer.

14) BIDDER to furnish 4 sets of techno-commercial bid including following documents/information (For Electrical and C&I please refer the respective section of the specification).

- Deviation if any in the enclosed Schedule of deviation with cost of withdrawal only with mention of specification clause for which deviation is being asked. (Stamped & Signed).
- Equipment layout. (Stamped & Signed).
- Compliance certificate. (Stamped & Signed)
- Schedule of Declaration. (Stamped & Signed)
- Electrical Load data in BHEL format (Stamped & Signed)
- Price Schedule duly filled in. (Stamped & Signed).
- List of Start-up & commissioning spares. (Stamped & Signed).
- List of Recommended spares. (Stamped & Signed).

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

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15) ADDITIONAL REQUIREMENT

- Wherever pipe racks are not available, pipes shall run on pedestals or below ground. All fixing items such as U clamps, nuts, bolts etc. required to lay the pipes on pedestals shall be in bidder's scope of work. Coating, wrapping and protection required for buried pipes shall be in bidder's scope of work.
- Wherever pipes are running on pipe rack, Bidder will consider 15 m static head + 10% margin, in addition to the losses in straight length and bend in pipes and valves etc. while selection of pump head during detailed engineering.
- All the first fill and one Year's topping requirements or 10 % of first fill quantity, whichever is more of consumable such as greases, oil, lubricants, servo fluids/control fluids, gases and etc. which will be required to put the equipment covered under the scope of specifications, into successful commissioning / initial operation and to establish completion of facilities shall be furnished by the bidder. Suitable standard lubricants as available in India are desired. Efforts should be made to limit the variety of lubricants to minimum.
- Document approval by customer under Approval category or information category shall not absolve the vendor of their contractual obligations of completing the work as per specification requirement. Any deviation from specified requirement shall be reported by the vendor in writing and require written approval. Unless any change in specified requirement has been brought out by the vendor during detail engineering in writing while submitting the document to customer for approval, approved document (with implicit deviation) will not be cited as a reason for not following the specification requirement.
- In case vendor submits revised drawing after approval of the corresponding drawing, any delay in approval of revised drawing shall be to vendor's account and shall not be used as a reason for extension in contract completion.
- Bidders shall make Site visit in order to familiarize themselves with existing condition of site before submitting the bid in order to make their offer complete. During detail engineering also, the successful bidder shall be responsible for the correctness of details w.r.t. existing facility at site. Customer approval on any drawing having details of existing facility shall not be cited by the successful bidder a valid reason for any shortcoming in the work by them. BHEL shall also not entertain any cost implication for any lack of input data with regard to site during detail engineering.
- Final Electrical Load list will be submitted by the successful bidder as per agreed drawing/ doc submission schedule. Thereafter any change in the electrical load list shall be entertained only subject to its feasibility, and BHEL reserves the right to debit the vendor cost of any changes necessitated in the switch gear /MCC on account of changed loads.
- Wherever CIVIL works is excluded from the bidder's scope, successful bidder shall furnish civil assignment / scope drawings. The corresponding CIVIL drawing prepared by BHEL / CIVIL agency, based on civil assignment drawing of bidder will be furnished to the successful bidder for concurrence. In case any modification is required in the civil work already carried out based on final civil inputs given by vendor, BHEL reserves the right to debit cost of such rework to vendor".
- The complete system shall be proven and necessary design documentation in support of proveness shall be submitted by the successful bidder in support of the systems, if asked by the customer without any price and delivery implication to BHEL and customer.
- System to be designed to meet all the statutory requirements. Preparation of all necessary drawings/data/ documents for obtaining necessary Approval of statutory authorities like CCOE , IBR , Weight & Measures Department and any other agency/ competent authority ,on behalf of the customer, related to installation of DM plant (if required) is included in bidder's scope. All expenses required to obtain the approval shall also be borne by the successful bidder. Successful bidder shall inform customer well in advance requirement of authority letter along with format for the same. After issuance of authority letter by customer, it will be vendor's responsibility to regularly follow up with the concerned authorities to obtain timely approval from these authorities. Any delay on account of the same, unless any specific information related to above approval to be furnished by customer is delayed by customer, shall be to vendor's account and shall not be used as a reason for extension in contract completion.
- Vendor to attend regular engineering meeting with BHEL and customer fortnightly in BHEL or customer office as decided during detail engineering. Vendor will depute all his concerned engineering representative along with the

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project manager for discussion and approval. Meeting can be held at site also.

12. Space available for D.M. plant (**refer Key Plan**) are attached in Section-C1 of this specification. Bidder to accommodate their equipment within the space provided.
13. Bidder to submit BBU during detailed engineering after approval of Basic documents. BBU shall be equal to BOQ for the package and there shall be no price and delivery implication is applicable to BHEL / CUSTOMER for the same. None of the items supplied for the project as non-billable. Incomplete BBU shall not be review by BHEL.
14. Preparation of drawings / document / P&ID's in 3D modelling software and providing soft copy of same to BHEL.
15. Training of plant Owner's personnel, O&M operators' personnel on plant operation and maintenance.
16. Relevant requirements as per GTR, GCC, ECC & SCC.
17. Any statutory requirement / clearance required for the packages from government / local body shall be in bidder's scope.
18. Service water shall be available near DM plant/ system building/ area at approximately 1.5 to 2.0 Kg/ Cm². Hence, bidder to take care for cooling/ lubrication of the pumps being supplied by the bidder under this technical specification. If service water pressure requirement is more than available pressure, bidder to consider two (2) nos. cooling pump for package.
19. In case of any conflict and repetition of clauses in the specification, the more stringent requirements among them are to be complied with.
20. Latest version of all codes and standards to be followed.
21. All the vertical pumps shall be considered as self-lubricating type unless specifically mentioned.
22. The depth of the water pits shall be considered as 3.0 meters (minimum) unless specifically mentioned.
23. Air distribution line to all final control elements like control valves, pneumatic dampers (both regulating / on-off type), SOV operated valves shall be through SS manifolds and SS isolating valves only. These valves shall be properly tagged also with KKS tag no. and description of final control element / instrument for which they are intended.
24. SITE VISIT BEFORE SUBMISSION OF OFFER.

Bidders shall make Site visit in order to familiarize themselves with existing condition of site before submitting the bid in order to make their offer complete. During detail engineering also, the successful bidder shall be responsible for the correctness of details w.r.t existing facility at site. Customer approval on any drawing having details of existing facility shall not be cited by the successful bidder a valid reason for any shortcoming in the work by them. BHEL shall also not entertain any cost implication for any lack of input data with regard to site during detail engineering.

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LIST OF SUB VENDORS (TABLE-1)

ALL THE FINALLY SELECTED SUB VENDORS SHALL BE SUBJECT TO CUSTOMER APPROVAL DURING DETAILED ENGINEERING WITHOUT ANY DELIVERY/ COMMERCIAL IMPLICATIONS TO BHEL/ CUSTOMER.

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2.0 LIST OF APPROVED VENDORS – MECHANICAL

<u>SR. NO.</u>	<u>ITEM</u>		<u>VENDORS</u>
1.0	<u>BOILER, TURBINE, GENERATOR (BTG)</u>		
1.1	CONDENSOR ON LINE TUBE CLEANING SYSTEM	(a)	GEA-BGR
		(b)	TAPROGGE GMBH
1.2	CARBON STEEL PIPE FITTING	(a)	ALLIED INTERNATIONAL S.P.A. ITALY
1.3	PAINTINGS	(a)	ASIAN PAINTS
		(b)	BURGER PAINTS
		(c)	SHALIMAR PAINTS
		(d)	NEROLAC PAINTS
		(e)	JOHNSON & NICHOLSON
1.4	SPRING SUPPORT AND SPRING HANGERS	(a)	SARATHI
1.5	BOILER FEED PUMP	(a)	WEIR PUMPS
		(b)	KSB AKTIENGESELLSCHAFT
		(c)	SULZER PUMPS
		(d)	TORISHIMA PUMPS
1.6	CONCRETE VOLUTE PUMPS	(a)	KBL
		(b)	FLOWERVE INDIA CONTROL PVT LTD, INDIA
1.7	STEAM TRAPS	(a)	SPIRAX MARSHALL PVT LTD
		(b)	GREAVES LTD
		(c)	PENNANT ENGINEERING PVT LTD
		(d)	LEADER VALVES LTD
		(e)	CRESCENT VALVES MFG CO PVT LTD
1.8	VACCUM PUMPS	(a)	SIEMENS

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		(b)	UNIQUE SYSTEM, NEW JERSY, USA
1.9	RAPH	(a)	L & T HOWDEN PVT LTD
1.10	ID/FD/PA FANS	(a)	L & T HOWDEN PVT LTD
1.11	SEAL AIR FANS	(a)	TLT ENGINEERING INDIA PVT LTD, GUJARAT
1.12	SCANNER COOLING AIR FAN	(a)	C. DOCTOR
1.13	MILLS	(a)	L & T-MHI
		(b)	BHEL
1.14	GEAR BOX (COAL MILL)	(a)	FLENDER
1.15	SOOT BLOWERS	(a)	CLYDE BERGEMANN INDIA, NOIDA
1.16	BOILER CIRCULATION PUMP	(a)	M/S HAYWARD TYLER LIMITED, UK
1.17	METALLIC EXPANSION JOINTS	(a)	MILLAR FITTINGS, UK
1.18	NON- METALLIC EXPANSION JOINTS	(a)	KE – BURGMANN FLEXIBLE INDIA PVT. LTD.
1.19	SCREW PUMPS	(a)	TUSHACO PUMPS PVT. LTD.
1.20	INSULATION	(a)	LLYODS INSULATION (INDIA) LTD.
		(b)	ROCKWOOL INDIA LTD.
		(c)	HYDERABAD INDUSTRIES LTD.
		(d)	MINWOOL ROCK FABRICS LTD.
1.21	PLATES (BOILER)	(a)	SAIL
		(b)	TATA STEEL
		(c)	JINDAL STEEL
1.22	SECONDARY STRUCTURE & BUCKSTAY FOR BOILER	(a)	METALFAB HIGHTECH PVT. LTD., NAGPUR

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<u>SR. NO.</u>	<u>ITEM</u>		<u>VENDORS</u>
1.23	BOILER DUCTS & SECONDARY STRUCTURE	(a)	SEAM INDUSTRIES NAGPUR
		(b)	ENESTEE ENGINEERING LTD, NAGPUR
1.24	HANDRAILS & GRATING	(a)	INDIANA GRATING PVT. LTD., MUMBAI
1.25	COAL MILL COMPONENT	(a)	M/S AIA ENGINEERING LTD., AHMEDABAD
1.26	COAL PIPES	(a)	M/S PRATIBHA INDUSTRIES LTD., MUMBAI
1.27	MISC. TANK FABRICATION	(a)	SEAM INDUSTRIES NAGPUR
		(b)	ENESTEE ENGINEERING LTD, NAGPUR
		(c)	ERA BUILDING SYSTEM
		(d)	RATNAMANI TUBES & METAL
1.28	GASKETS (METALLIC & RUBBER)	(a)	IGP (MADRAS)
1.29	BOLTS & NUTS (FASTENERS)	(a)	DEEPAK FASTENERS LTD. LUDHIYANA
		(b)	POINEER NUT & BOLTS PVT. LTD. LUDHIYANA
1.30	SAFETY VALVE	(a)	DRESSER
		(b)	FISCHER CONTROLS
1.31	SAFETY RELIEF VALVE	(a)	SPIRAX MARSHALL
		(b)	LEADER VALVES
1.32	CERAMIC LINED BENDS	(a)	CARBORUNDUM UNIVERSAL LTD. TAMILNADU
1.33	FAB/CAST/FORGED STRAINERS/ Y TYPE STRAINERS	(a)	SPIRAX MARSHALL
		(b)	GUJARAT OTOFILT
		(c)	MULTITEX FILTRATION
		(d)	GRAND PRIX FAB
		(e)	MICON VALVES (I) PVT. LTD

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<u>SR. NO.</u>	<u>ITEM</u>		<u>VENDORS</u>
		(f)	FLOWTECH ENGINEERS
1.34	STEEL CASTINGS FOR COAL MILL	(a)	SYNERGY STEELS LTD, NEW DELHI
		(b)	SRINATHJI ISPAT LTD., GAZIABAD
		(c)	G.S. ALLOY CASTINGS LTD., ANDHRA PRADESH
		(d)	N.S. ENGINEERING COMPANY PVT. LTD., YDERABAD
1.35	FUEL OIL HEATING & PRESSURISING SYSTEM	(a)	TECHNOFAB ENGINEERING LTD., NEW DELHI
		(b)	THERMOSYSTEM PVT. LTD., HYDERABAD
1.36	BFP DRIVE TURBINE	(a)	HTC, CHINA
1.37	FORGED STEEL VALVE (UP TO 50 NB SIZE)	(a)	FOURESS LIMITED
		(b)	KSB LIMITED
		(c)	L & T
		(d)	BANKIM
		(e)	BDK VALVES
		(f)	LEADER
1.38	FORGED CARBON STEEL VALVE	(a)	FOURESS LIMITED
		(b)	CRESCENT
		(c)	TECHNO VALVES
		(d)	R & D MULTIPLES
		(e)	BHEL
		(f)	LEADER
		(g)	A.V. ENGG.
1.39	RUBBER EXPANSION JOINT	(a)	D'WAREN & CO.
		(b)	S.L. MANEKLAL

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<u>SR. NO.</u>	<u>ITEM</u>		<u>VENDORS</u>
		(c)	CORI ENGG. PVT. LTD
1.40	CONDENSATE EXTRACTION PUMPS	(a)	WEIR PUMPS
		(b)	KIRLOSKAR BROS. LTD., PUNE
1.41	GEAR BOX FOR BFP	(a)	TRIVENI ENGG. & IND. PVT. LTD., MYSORE
1.42	CONDENSER TUBES	(a)	PLYMOUTH, USA
		(b)	SHIN HAN METAL CO. LTD., KOREA
		(c)	REMI EDELSTAL TUBULARS LTD.
1.43	FABRICATION & SUPPLY OF STEEL STRUCTURE	(a)	DIAMOND ENGG. , TAMILNADU
		(b)	VASAN INDUSTRIES,, TAMILNADU
		(c)	ERA BUILDING SYSTEM LTD., RUDRAPUR
1.44	WINDBOX	(a)	GK SONS ENGG. ENTERPRISES PVT. LTD., TRICHY
1.45	STRUCTURAL STEEL FABRICATED COMPONENTS FOR ESP	(a)	VRINDA ENGG. PVT. LTD., KOLKATA
		(b)	S.S. FABRICATORS & MANUFACTURERS, NAGPUR
		(c)	DYNAMECH DESIGNER COMPANY , JABALPUR
		(d)	JAS EQUIPMENT & ENGINEERS PVT. LTD., DURGAPUR
		(e)	THE UNITED ENGINEERS, KOLKATA
		(f)	UNI PROFILES PVT. LTD., ORISSA
		(g)	FRIENDS ENGG. CORPORATION. BHILAI
		(h)	ENCORE PROJECTS PVT. LTD., BHILAI
		(i)	QUALITY ENGG. WORKS, KOLKATA
		(j)	EASTERN ENGINEER & ASSOCIATES, KOLKATA

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<u>SR. NO.</u>	<u>ITEM</u>		<u>VENDORS</u>
		(k)	DEHU ENGINEERS (I) PVT. LTD., PUNE
		(l)	NAAISON ENGINEERS PVT. LTD., HYDERABAD
		(m)	SRINIVASA ENGINEERS PVT. LTD, HYDERABAD
1.46	ALUMINUM SHEET	(a)	BHARAT ALUMINUM CO. LTD.
		(b)	HINDALCO INDUSTRIES LTD.
		(c)	NATIONAL ALUMINUM COMPANY LTD.
1.47	C.S. PIPING & ALLOY STEEL PIPING	(a)	VALCOVNY TRUB CHIUMUTOV
		(b)	ARCELOR MITTAL TUBULAR ROMAN S.A., ROMANIA
1.48	SLIDING BEARING FOR ESP	(a)	METAL ENGG. & TREATMENT CO. PVT.LTD., KOLKATA
		(b)	ROLLON BEARING PVT. LTD., BANGALORE
1.49	PLATE TYPE HEAT EXCHANGER	(a)	GEA ECOFLEX INDIA, NAVI MUMBAI
		(b)	FUNKE WARMETAUSCHER, Gmbh GERMANY
		(c)	TRANTER INDIA PVT. PUNE
1.50	HYDRAULIC UNIT FOR LOADING DEVICE & ROLLER TILTING	(a)	HYDAC (INDIA) PVT. LTD., MUMBAI
1.51	DUCTING SUPPORT & HANGER	(a)	PIPE HANGER & SUPPORT VT. LTD., CHENNAI
1.52	ESP FOUNDATION BOLTS	(a)	VRINDA ENGINEERING PVT. LTD., KOLKATA
		(b)	COMMERCIAL ENGINEERING BODY BUILDERS CO. PVT. LTD, JABALPU

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<u>SR. NO.</u>	<u>ITEM</u>		<u>VENDORS</u>
2.0	<u>WATER TREATMENT PLANT</u>		
		(a)	DRIPLEX, NEW DELHI
		(b)	ION EXCHANGE , MUMBAI
		(c)	THERMAX, PUNE
		(d)	VA-TECH WABAG, CHENNAI
		(e)	DOSHION
3.0	<u>WATER TREATMENT PLANT EQUIPMENT</u>		
3.1	CHEMICAL DOSING SYSTEM (FOR STORAGE TANKS – HOT WATER, ACID & ALKALI)	(a)	ATS. CHEM. EQUIPMENTS PVT. LTD. HOSUR , TAMILNADU
3.2	CHEMICAL DOSING SYSTEM	(a)	S.J. INDUSTRIES, CHENNAI
		(b)	PSI ENGINEERING, CHENNAI
		(c)	XL FLOW SYSTEM, CHENNAI
		(d)	POSITIVE METERING SYSTEM, NASIK
3.3	CONDENSATE POLISHING UNIT	(a)	DRIPLEX,NEW DELHI
		(b)	ION EXCHANGE, MUMBAI
		(c)	BGR ENERGY SYSTEMS LTD., CHENNAI
3.4	RESIN	(a)	DOW
		(b)	LANXESS
3.5	CONDENSER ON-LINE TUBE CLEANING SYSTEM	(a)	M/S. TECHNOS, FRANCE
		(b)	M/S. EIMCO WATER TECHNOLOGIES, USA
		(c)	M/S. CLUMPS & KOLLER, GERMANY
		(d)	M/S. BGR ENERGY LTD., CHENNAI
3.6	OZONISATION SYSTEM	(a)	OZONE RESEARCH & APPLICATION (I) PVT LTD. NAGPUR

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<u>SR. NO.</u>	<u>ITEM</u>		<u>VENDORS</u>
		(b)	FLUID TECHNOLOGIES, NAGPUR
3.7	DEBRIS FILTER	(a)	M/S. TAPROGGE, GERMANY
		(b)	M/S. EIMCO WATER TECHNOLOGIES, USA
		(c)	M/S. CLUMPS & KOLLER, GERMANY
		(d)	M/S. BGR ENERGY LTD., CHENNAI
4.0	ETP ITEMS, a. TPI & API Separators, b. Filter Press	(a)	K-PACK SYSTEMS
		(b)	ISHA ENGINEERS & CO.
5.0	OIL HANDLING PLANT	(a)	RAUNAK INTERNATIONAL
		(b)	TECHNO ELECTRIC
		(c)	UNITECH MACHINES
		(d)	BRIDGE & ROOF
6.0	VERTICAL TURBINE PUMPS	(a)	KIRLOSKAR BROTHERS LTD. (KBL)
		(b)	MATHER & PLATT
		(c)	WPIL
		(d)	JYOTI PUMPS
		(e)	FLOWMORE
		(f)	SAM
7.0	HORIZONTAL CENTRIFUGAL PUMPS	(a)	KBL
		(b)	KSB PUMPS
		(c)	MATHER & PLATT
		(d)	SAM TURBO
		(e)	WPIL
		(f)	JYOTI PUMPS
		(g)	FLOWMORE

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<u>SR. NO.</u>	<u>ITEM</u>		<u>VENDORS</u>
		(h)	SULZER
		(i)	KISHOR PUMPS
8.0	METERING/DOSING PUMPS	(a)	MILTON ROY INDIA (P) LTD.
		(b)	V.K. PUMPS
		(c)	SHAPO TOOLS
9.0	SUMP PUMP	(a)	KIRLOSKAR BROTHERS LTD. (KBL)
		(b)	SAM
		(c)	KISHOR PUMPS
		(d)	FLOW MORE
		(e)	KSB
		(f)	VARTAK PUMPS
		(g)	MAXFLOW
10.0	FUEL OIL PUMPS	(a)	TUSHACO
		(b)	ALKETON, MADRAS
		(c)	PSI ENGINEERING
		(d)	ROTO PUMPS
		(e)	BOURNMEN, GERMANY
		(f)	DELTA CORPORATION
		(g)	ALL WEILER, GERMANY
		(h)	TMO, SWEDEN
11.0	AIR BLOWER (LOBE TYPE)	(a)	EVEREST TRANSMISSION
		(b)	KAY ENGG. WORKS
		(c)	SWAM PNEUMATICS
		(d)	ROOTS
12.0	BUTTERFLY VALVES	(a)	KIRLOSKAR BROTHERS LTD.

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	(MANUAL/PNEUMATIC)	(b)	FOURESS
		(c)	L & T
		(d)	INTERVALVE (INDIA) LTD
		(e)	R&D MULTIPLES
		(f)	AUDCO
		(g)	INSTRUMENTATION LTD
		(h)	HAWA VALVES
		(i)	VENUS PUMPS & ENGINEERING WORKS
		(j)	BHEL
		(k)	FLOW VEL
		(l)	LEADER VALVES
13.0	RUBBER EXPANSION JOINT	(a)	D'WAREN & CO
		(b)	S.L. MANEKLAL
		(c)	SRM EXOFLEX PVT LTD
		(d)	CORI ENGINEERS
14.0	STRAINERS	(a)	SPIRAX MARSHALL
		(b)	MICON VALVES (I) PVT. LTD.
		(c)	FLOWTECH ENGINEERS
		(d)	FOURESS LTD.
		(e)	KSB LTD.
		(f)	L & T
		(g)	LEADER
		(h)	PROCEDYNE ENGINEERS
15.0	CAST IRON VALVE (GATE /GLOBE/CHECK/AIR RELEASE VALVE)	(a)	LEADER VALVE
		(b)	VENUS PUMP

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		(c)	FOURESS
		(d)	LEVCON
		(e)	DURGA ENGG CO.
		(f)	L & T
		(g)	R & D MULTIPLES
		(h)	FLUIDLINE VALVES CO PVT LTD
		(i)	INTER VALVE (INDIA) LTD
		(j)	NSSL LIMITED
16.0	CAST STEEL VALVES (GATE/GLOBE/CHECK/ BALL VALVE)	(a)	L & T
		(b)	KIRLOSKAR BROS. LTD
		(c)	CRESENT VALVES
		(d)	AUDCO
		(e)	KSB
		(f)	LEVCON
		(g)	FOURESS
		(h)	R & D MULTIPLES
		(i)	FLUIDLINE VALVES
		(j)	NSSL LIMITED
		(k)	VENUS PUMP
		(l)	DURGA ENGG CO.
		(m)	HAWA VALVES
		(n)	A.V.VALVES
17.0	STAINLESS STEEL (GATE/GLOBE/CHECK VALVE)	(a)	CRESCENT
		(b)	FOURESS
		(c)	R & D MULTIPLES

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<u>SR. NO.</u>	<u>ITEM</u>		<u>VENDORS</u>
18.0	GUN METAL/BRASS/ BRONZE VALVES	(a)	LEADER VALVES
		(b)	SARKAR
		(c)	LEVCON
		(d)	BOMBAY METAL & ALLOYS
		(e)	SANT ENGG
		(f)	BANKIM & COMP.
		(g)	BDK
19.0	FORGED STEEL VALVE	(a)	FOURESS LIMITED
		(b)	KSB LIMITED
		(c)	L & T
		(d)	BANKIM
		(e)	BDK VALVES
		(f)	LEADER
		(g)	A.V.ENGG
		(h)	CRESCENT
		(i)	BHEL
20.0	L.D. PIPING	(a)	SETH & SURA ENGG. CO. LTD.
		(b)	IVCRL
		(c)	RAUNAQ
		(d)	ZUBERI
		(e)	INDIAN HUME PIPES LTD
		(f)	DYNAMIC SS ENGG PVT LTD
21.0	L.P.PIPING	(a)	UNITECH MACHINES, NEW DELHI
		(b)	AARTI INFRASTRUCTURE, NAGPUR
		(c)	ZUBERI, JAIPUR

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		(d)	SETH & SURA ENGG CO. LTD
22.0	DIESEL ENGINES	(a)	KIRLOSKAR CUMMINS
		(b)	GREAVES COTTON
		(c)	ASHOK LEYLAND
23.0	FLANGES & FITTINGS	(a)	ALLIANCE
		(b)	JYOTI
		(c)	EBY
24.0	AIR DRYING UNIT (Refrigerant Type)	(a)	DONALDSON
		(b)	SABRO
25.0	<u>EOT CRANE</u>		
25.1	EOT CRANE (More than 100 Ton)	(a)	UNIQUE IND. HANDLERS
		(b)	ANUPAM INDUSTRIES
		(c)	MUKAND
		(d)	WMI
		(e)	FAFECO
		(f)	CENTURY CRANE ENGINEERS (P) LTD.
25.2	EOT CRANE (Less than 100 T)	(a)	UNIQUE INDUSTRIAL HANDLERS
		(b)	ANUPAM INDUSTRIES
		(c)	MUKAND
		(d)	FAFECO
		(e)	TURBO FUEGUSON
		(f)	WMI
		(g)	CONSOLIDATED HOIST
		(h)	HERCULES
		(i)	ELECON

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		(j)	HASK ENGINEERS
		(k)	BRADY & MORRIS ENGG. CO. LTD.
		(l)	McNALLY BHARAT KOLKATA
		(m)	SHREE ENGINEERS
		(n)	CENTURY CRANE ENGINEERS (P) LTD.
26.0	MANUAL HOIST & CHAIN PULLEY BLOCK	(a)	TRACTEL TRIFOR INDIA (P) LTD.
		(b)	LIFTING EQUIPMENT & ACCESSORIES
		(c)	INDEF (HERCULES)
		(d)	BATLIBOI
		(e)	UNIVERSAL
		(f)	ABHAY INDUSTRIES
27.0	ELECTRICAL HOIST	(a)	BATLIBOI
		(b)	PBL
		(c)	GREAVES
		(d)	HOISTOMECH
		(e)	SHREE ENGINEERS
		(f)	ABHAY INDUSTRIES
		(g)	INDEF
		(h)	UNIVERSAL
		(i)	SWIFT
		(j)	TRACTEL TRIFOR INDIA (P) LTD.
		(k)	CENTURY CRANE ENGINEERS (P) LTD.
		(l)	HERCULES HOISTS LIMITED
28.0	PAINTINGS	(a)	ASIAN PAINTS (I) LTD.
		(b)	BERGER PAINTS INDIA LTD.

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		(c)	SHALIMAR PAINTS LTD.
		(d)	NEROLAC
		(e)	JHONSON & NICHOLSON
29.0	ANTI COROSSIVE COAL TAR COATING	(a)	IWL LTD
		(b)	A.R.LAMINATORS
30.0	FABRICATED MS STEEL TANK	(a)	SEAM INDUSTRIES
		(b)	ENESTEE ENGG LTD
		(c)	ERA BUILDING SYSTEM
		(d)	DIAMOND FABRICATORS (I) PVT LTD
		(e)	THERMO SYSTEMS PVT LTD
		(f)	TECHNOFAB ENGG LTD
		(g)	RATANMANI TUBES AND METALS
31.0	WELDING FLUX & FILLER WIRE	(a)	PRECISION WELD ARC LTD
		(b)	S. CHEM & ALLIED PRODUCTS PVT LTD.
32.0	<u>FIRE DETECTION & PROTECTION SYSTEM</u>		
		(a)	TYCO
		(b)	HITECH ENGINEERING SERVICES
33.0	<u>FIRE DETECTION & PROTECTION SYSTEM EQUIPMENTS</u>		
33.1	PUMPS	(a)	KBL
		(b)	MATHER & PLATT
		(c)	FLOW MORE
33.2	HIGH VELOCITY NOZZLES	(a)	PREUSSAGE (WEST JRMANY)
		(b)	H D FIRE
33.3	MEDIUM VELOCITY NOZZLES	(a)	PREUSSAGE (WEST JRMANY)
		(b)	GEM, USA

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		(c)	RELIABLE
		(d)	FIRE TECH
		(e)	H D FIRE
33.4	DELUGE VALVE	(a)	VIJAY
		(b)	PREUSSAGE (WEST JRMANY)
		(c)	H. D. FIRE
		(d)	GEM, USA
33.5	FIRE HOSE	(a)	JAYSHREE
		(b)	NEWAGE
		(c)	TIGER
		(d)	EQPTS HOSES
		(e)	COMOS
		(f)	SBJ, AHMEDABAD
33.6	DETECTORS (IONISATION)	(a)	FENWAL
		(b)	AUTRONICA
		(c)	BRK
		(d)	CERBERUS
		(e)	APPOLO
33.7	DETECTOR PHOTO ELECTRIC	(a)	FENWAL
		(b)	AUTRONOICA
		(c)	BRK
		(d)	CERBERUS
33.8	HEAT DETECTOR	(a)	FENWAL
		(b)	AUTRONICA
		(c)	APPOLO

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		(d)	B ARK
		(e)	CERBERUS
		(f)	NITTAN HOCHIKI
33.9	INFRARED DETECTOR	(a)	TQ
		(b)	CROWCON
		(c)	TRITECH
		(d)	DETRONICS
		(e)	TECHICAL TRADELINK
		(f)	PATOL
		(g)	ODTI
33.10	FRANJIBLE BULB DETECTORS	(a)	ANGUS
		(b)	SPRAY SAFE
		(c)	PRESSAGE
		(d)	GRINNEL
33.11	WATER MONITORS	(a)	AVON
		(b)	RELIABLE
		(c)	VIJAY
		(d)	H. D. FIRE
33.12	BRANCH PIPES & NOZZLES	(a)	NEWAGE
		(b)	VIJAY
		(c)	KOOVERJI
		(d)	H. D. FIRE
		(e)	SBJ, AHMEDABAD
33.13	CAST STEEL NON RETURN VALVE	(a)	R & D MULTIPLE
		(b)	UPADHYA

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<u>SR. NO.</u>	<u>ITEM</u>		<u>VENDORS</u>
		(c)	SHIVDURGA
		(d)	FOURESS
		(e)	DEWRANCE
		(f)	MECHANELL AKSON MECH INDIA
		(g)	CRESENT TUBE
		(h)	PRODUCTS INDIA
		(i)	BUMKIN
		(j)	IVC
		(k)	DURGA ENGINEERING CORPORATION , THANE
33.14	CAST IRON SLUICE VALVE	(a)	KIRLOSKAR
		(b)	LEADER
		(c)	H. SARKER & CO.
		(d)	VENUS ABC CALCUTTA
		(e)	SHIVDURGA
		(f)	FOURESS
		(g)	R & D
		(h)	MULTIPLES
		(i)	CRESENT
		(j)	TUBE PRODUCTS INDIA UPADHYA
		(k)	UPADHYA
		(l)	KALPANA
		(m)	IVC
		(n)	BANKIM
		(o)	ELOMATIC

**TECHNICAL SPECIFICATION FOR
DM PLANT
1X660MW BHUSAWAL TPS-UNIT:6
MAHARASHTRA, INDIA.**

<u>SR. NO.</u>	<u>ITEM</u>		<u>VENDORS</u>
		(p)	DURGA ENGINEERING CORPORATION , THANE
33.15	BUTTERFLY VALVE / PLUG VALVE	(a)	FOURESS
		(b)	CRESENT
		(c)	L&T
		(d)	GEETA IRON & BRASS
		(e)	R & D MULTIPLES
		(f)	INDIAN VALVE CO.
		(g)	DEWRANCE AMCNEILL
		(h)	ELOMATIC
		(i)	CRAWLEY & RAY
		(j)	KALPANA
		(k)	DURGA ENGINEERING CORPORATION , THANE
		(l)	HAWA ENGINEERS LTD.
33.16	GM BRASS BRONZE VALVE	(a)	BOMBAY METAL & ALLOY
		(b)	LEADER ENGG.
		(c)	SANT ENGG.
33.17	PIPELINE STRAINERS	(a)	GRADPRIX
		(b)	CHEMPHARM
		(c)	GUJARAT OTOFILT
		(d)	MULTIPLEX ENGRS.
		(e)	SUPERFLOW
		(f)	GUJARAT OTOFILT (Y & BASKET)
33.18	SEAMLESS CARBON STEEL PIPES	(a)	RITC
		(b)	BHEL

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1X660MW BHUSAWAL TPS-UNIT:6
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<u>SR. NO.</u>	<u>ITEM</u>		<u>VENDORS</u>
		(c)	MSL
33.19	CS- ERW PIPE	(a)	SAIL
		(b)	AJANTA STEEL
		(c)	JINDAL PIPES
		(d)	ZENITH STEELS
33.20	FLANGES & FITTINGS	(a)	ALLIANCE
		(b)	JYOTI
		(c)	EBY
33.21	AIR COMPRESSORS	(a)	INGERSOLL RAND (I) LTD.
		(b)	KIRLOSKAR PNEUMATICS
		(c)	ATLAS COPCO
33.22	LANDING VALVES (HYDRANT VALVES)	(a)	NEWAGE
		(b)	KOOVERJI
		(c)	HD FIRE
		(d)	WINCO VALVES PVT. LTD.
33.23	QD DETECTORS	(a)	NEW AGE INDUSTRIES, MUMBAI
		(b)	HD FIRE PROTECT PVT. LTD., THANE
33.24	HYDRANT VALVES	(a)	WINCO VALVES PVT. LTD., AHMEDABAD
33.25	PIPE STRAINERS	(a)	GRAD PRIX
		(b)	CHEMPHRAM
		(c)	GUJARAT AUTO FILT
		(d)	MULTIPLEX ENGINEERS
		(e)	SUPER FLOW
34.0	<u>COAL HANDLING PLANT</u>		
		(a)	ELECON

**TECHNICAL SPECIFICATION FOR
DM PLANT
1X660MW BHUSAWAL TPS-UNIT:6
MAHARASHTRA, INDIA.**

<u>SR. NO.</u>	<u>ITEM</u>		<u>VENDORS</u>
		(b)	LARSEN & TOUBRO
		(c)	TRF
		(d)	THYSSEN KRUPP
		(e)	McNALLY BHARAT
		(f)	TECHPRO
35.0	<u>COAL HANDLING EQUIPMENT</u>		
35.1	STACKER RECLAIMER	(a)	ELECON
		(b)	L&T
		(c)	STRANCHAN & HENSHAW
		(d)	KRUPP
		(e)	TRF
35.2	SIDE ARM CHARGER	(a)	ELECON
		(b)	L&T
		(c)	STRANCHAN & HENSHAW
		(d)	KRUPP
		(e)	TRF
35.3	WAGON TIPLER	(a)	ELECON
		(b)	L&T
		(c)	STRANCHAN & HENSHAW
		(d)	KRUPP
		(e)	TRF
35.4	INTEGRAL WEIGH BRIDGE	(a)	PRAYAS ENGINEERING LTD.
		(b)	L&T
		(c)	AUTOMEASURMATIC

**TECHNICAL SPECIFICATION FOR
DM PLANT
1X660MW BHUSAWAL TPS-UNIT:6
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<u>SR. NO.</u>	<u>ITEM</u>		<u>VENDORS</u>
		(d)	KRUPP
35.5	APRON FEEDER	(a)	ELECON
		(b)	L&T
		(c)	STRANCHAN & HENSHAW
		(d)	KRUPP
		(e)	TRF
35.6	IMPACTOR / CRUSHER	(a)	L&T
		(b)	ELECON
		(c)	KRUPP
		(d)	UNIVERSAL ENGG. CORPN.
		(e)	PENNSYLVANIA CRUSHER CORPN.
35.7	MAGNETIC SEPARATOR	(a)	ELECTROMAG
		(b)	PRAYAS ENGINEERING LTD.
		(c)	ERICSON
35.8	ELECTRONIC BELT WEIGHER	(a)	MERRICK
		(b)	IPA
		(c)	PRAYAS ENGINEERING LTD.
		(d)	RAMSAY
		(e)	ASEA
35.9	CONVEYOR BELT	(a)	NIRLON
		(b)	HILTON
		(c)	HINDUSTAN RUBBER
		(d)	PHOENIX YULE LTD.
		(e)	NRC
		(f)	ANIL RUBBER

**TECHNICAL SPECIFICATION FOR
DM PLANT
1X660MW BHUSAWAL TPS-UNIT:6
MAHARASHTRA, INDIA.**

<u>SR. NO.</u>	<u>ITEM</u>		<u>VENDORS</u>
		(g)	NEELKANTH RUBBER MILLS
		(h)	PENTAGON RUBBER PVT. LTD.
		(i)	FORECH
35.10	IDLERS	(a)	I.G.P.
		(b)	KALI
		(c)	ELECON
		(d)	L&T
		(e)	SYSTEM
		(f)	TRF
		(g)	KRUPP
		(h)	VVN MFG.
		(i)	INVESTA LTD.
		(j)	PRAYAS ENGINEERING LTD.
		(k)	MINISTAR ENGINEERING CORPORATION, PONDICHERY
		(l)	MINISTAR ENGINEERING CORPORATION, CHENNAI.
35.11	PULLEYS	(a)	I.G.P.
		(b)	KALI
		(c)	ELECON
		(d)	L&T
		(e)	KRUPP
		(f)	TRF
		(g)	VVN MFG.
		(h)	INVESTA LTD.
		(i)	MINISTAR ENGINEERING

**TECHNICAL SPECIFICATION FOR
DM PLANT
1X660MW BHUSAWAL TPS-UNIT:6
MAHARASHTRA, INDIA.**

<u>SR. NO.</u>	<u>ITEM</u>		<u>VENDORS</u>
			CORPORATION, PONDICHERY
		(j)	MINISTAR ENGINEERING CORPORATION, CHENNAI
35.12	WOBLER FEEDER	(a)	L&T
		(b)	ELECON
		(c)	KRUPP
		(d)	UNIVERSAL ENG.
		(e)	TRF
35.13	PADDLE FEEDER	(a)	ELECON
		(b)	L&T
		(c)	KRUPP
		(d)	TRF
35.14	FLAP GATE	(a)	HEIN-LEHMAN
		(b)	ELECON
		(c)	KRUPP
		(d)	L&T
		(e)	ACTUATOR INDIA
		(f)	TECHNOMECH
35.15	DUST EXTRACTION & SUPPRESSION SYSTEM	(a)	GEC
		(b)	DUVENT
		(c)	AEIROVENT
		(d)	FLAKT-INDIA
		(e)	ELECON
		(f)	ANDREW YULE
		(g)	F-HARLEY

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1X660MW BHUSAWAL TPS-UNIT:6
MAHARASHTRA, INDIA.**

<u>SR. NO.</u>	<u>ITEM</u>		<u>VENDORS</u>
		(h)	THERMAX
		(i)	HYDERABAD POLLUTION CONTROL
		(j)	PREMIER
		(k)	IRRIGATION
		(l)	WRC
		(m)	TPS
		(n)	CHEMTROLS SAMIL (INDIA) PVT. LTD.
		(o)	RIECO INDUSTRIES LTD, PUNE
35.16	DRY FOG DS SYSTEM	(a)	TPS
		(b)	CHEMTROLS SAMIL (INDIA) PVT. LTD.
		(c)	SPRAYING SYSTEM (I) PVT. LTD.
35.17	WATER MONITORS	(a)	AVON
		(b)	RELIABLE
		(c)	VIJAY
		(d)	H D FIRE
35.18	ULTRASONIC BUNKER LEVEL INDICATOR	(a)	BIN MASTER
		(b)	KAB INSTRUMENT
		(c)	THERMO RAMSEY
35.19	METAL DETECTOR	(a)	ELECTROMAG
		(b)	PRAYAS ENGINEERING LTD.
		(c)	STERLING
		(d)	THERMO RAMSEY
35.20	BELT CLEANER	(a)	TEGA
		(b)	PRAYAS ENGINEERING LTD.
		(c)	HOSCH EQUIPMENT (I) LTD.

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<u>SR. NO.</u>	<u>ITEM</u>		<u>VENDORS</u>
		(d)	ELECON ENGINEERING CO. LTD (Internal)
		(e)	BMH CONCARE TECHNOLOGY INC. (External)
35.21	HOLD BACK	(a)	ELECON
		(b)	DAVID BROWN
		(c)	FMG
		(d)	ALLENBURY
35.22	BEARINGS	(a)	SKF
		(b)	NBC
		(c)	NORMA
		(d)	FAG
		(e)	KOYO
		(f)	NTN
		(g)	COOPER (SPLIT CASE BEARINGS)
		(h)	HKT (SPLIT CASE BEARINGS)
35.23	IMPACT PADS	(a)	TEGA
		(b)	KAVERI
35.24	HYDRAULIC MOTORS, POWER PACK & CYLINDER	(a)	HAGGLUNDS
		(b)	REXROTH
		(c)	L&T
		(d)	MAHA HYDRAULIC
		(e)	MAC TAGGART SCOTT
35.25	FLUID COUPLING (TRACTION TYPE)	(a)	ELECON ENGINEERING CO. LTD
		(b)	GREAVES (PEMBRIL)
		(c)	FLUIDOMAT

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MAHARASHTRA, INDIA.**

<u>SR. NO.</u>	<u>ITEM</u>		<u>VENDORS</u>
		(d)	VOITH (I)
		(e)	ELECON
35.26	FLUID COUPLING (SCOOP TYPE)	(a)	ELECON ENGINEERING CO. LTD
		(b)	GREAVES (PEMBRIL)
		(c)	FLUIDOMAT
		(d)	VOITH (I)
35.27	FLEXIBLE COUPLING	(a)	ELECON ENGINEERING CO. LTD
		(b)	CONCARD
		(c)	HI-CLIFF
		(d)	FENNER
		(e)	DAVID BROWN
35.28	TRAVELLING TRIPPER	(a)	ELECON ENGINEERING CO. LTD
35.29	SKIRT BOARD SEALING	(a)	THEJO
		(b)	KAVERI
		(c)	TEGA
		(d)	SPILLBAN
35.30	PLUMMER BLOCK (BEARING HOUSING)	(a)	MASTA MACHINERY STORES PVT. LTD.
35.31	COAL SAMPLING SYSTEM	(a)	EASTMAN CRUSHERS CO. PVT. LTD.
		(b)	RAMSAY
		(c)	ADVANCE SYSTEM
35.32	THRUSTER BRAKE	(d)	ELECON ENGINEERING CO. LTD
		(e)	STROM KRAFT
		(f)	ELECTROMAGNETIC INDUSTRIES
35.33	BELT VULCANIZING MACHINE	(a)	THEJO ENGINEERING LTD.

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1X660MW BHUSAWAL TPS-UNIT:6
MAHARASHTRA, INDIA.**

<u>SR. NO.</u>	<u>ITEM</u>		<u>VENDORS</u>
35.34	CABLE REELING DRUM	(a)	ELECON ENGINEERING CO. LTD
35.35	SYSTEM INTEGRATOR FOR HYDRAULIC SYSTEM	(a)	MAHA HYDRAULIC
36.0	<u>MILL REJECT HANDLING SYSTEM</u>		
		(a)	MACAWBER BEEKAY
		(b)	UNITED CONVEYOR CORP (UCCL)
		(c)	DCIPS
		(d)	HV EQUIPMENTS PVT. LTD.
37.0	<u>MILL REJECT HANDLING EQUIPMENTS</u>		
37.1	KNIFE GATE VALVES (HOPPER ISOLATION)	(a)	VAAS INDUSTRIES (I) PVT. LTD.,
		(b)	FOURESS (I) LTD
37.2	BAG FILTERS/VENT FILTER	(a)	THERMAX
		(b)	ACCO/ORIENT FAN
		(c)	DC INDUSTRIAL PLANT SERVICES (P) LTD.
		(d)	ABB
		(e)	BATLIBOI
		(f)	SHAVO NORGRN
		(g)	WALKER
		(h)	ULTRAFILTER
38.0	<u>ASH HANDLING PLANT</u>		
		(a)	TECHPRO ASHTECH
		(b)	DEMECH
		(c)	McNALLY BHARAT
		(d)	INDURE

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<u>SR. NO.</u>	<u>ITEM</u>		<u>VENDORS</u>
		(e)	MACAWBER BEEKAY
		(f)	ENERGO ENGG. PROJECT LTD.
39.0	<u>ASH HANDLING PLANT EQUIPMENT</u>		
39.1	CASTABLE REFRACTORY	(a)	ASSOCIATED CEMENT COMPANY LIMITED
		(b)	BHASKAR REFRACTORY
		(c)	TATA REFRACTORIES
39.2	POROUS TILES	(a)	CARBORANDUM
		(b)	GRINDWELL NORTON
		(c)	KULKARNI METALURGICAL
39.3	KNIFE GATE VALVES (HOPPER ISOLATION)	(a)	VAAS INDUSTRIES (I) PVT. LTD.
		(b)	FOURESS (I) LTD
39.4	KNIFE GATE VALVES (SLURRY DUTY)	(a)	VAAS INDUSTRIES (I) PVT. LTD. Upto 10 Bar
		(b)	FOURESS
		(c)	SISTAG
39.5	PLUG VALVE (SLURRY DUTY) (FULL BORE, REGULAR PATTERN)	(a)	L & T
		(b)	SISTAG
		(c)	BDK
		(d)	FOURESS
39.6	CONVEYING INSTRUMENT AND AIR COMPRESSOR (OIL FREE, NON LUBRICATED)	(a)	ATLAS COPCO
		(b)	DENVER GARDNER ARZENER
		(c)	INGERSOL RAND
		(d)	KIRLOSKAR PNEUMATIC
39.7	FLUIDISING BLOWER	(a)	KAY INTERNATIONAL

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<u>SR. NO.</u>	<u>ITEM</u>		<u>VENDORS</u>
		(b)	SWAM PNEUMATIC
		(c)	EVEREST
		(d)	KULKARNI POWER TOOLS
		(e)	INDCOM
		(f)	SWAM
39.8	TUBE SETTLER		MM AQUA
	PLATE SETTLER		ION EXCHANGE
39.9	BASALT LINED FITTING AND PIPING.	(a)	DEMECH
		(b)	KELENBORNE/DCIPS
		(c)	ACC
	DRC LINING	(d)	DENSEN TECHNOLOGIES
39.10	METALLIC EXPANSION BELLOWS	(a)	METALLIC BELLOWS (I) PVT. LTD.
		(b)	SUR INDUSTRIES
		(c)	MBE
		(d)	M B EXPANSION
39.11	ASH SLURRY PUMPS	(a)	SAM INDUSTRIAL PUMPS PVT. LTD.
		(b)	WEIR MINERALS (I) PVT. LTD.
39.12	HIGH CONC. SLURRY DISPOSAL PUMPS (PISTON DIAPHRAGM PUMPS)	(a)	GEHO, NETHERLAND / OR PROVEN MAKE SUBJECT TO APPROVAL OF MSPGCL
39.13	ACI FITTINGS/CASINGS/LINERS	(a)	MENON METALLIKS
		(b)	CRAWLEY & RAY
		(c)	INDURE
39.14	BAG FILTERS/VENT FILTER	(a)	THERMAX
		(b)	ACCO / ORIENT FAN

**TECHNICAL SPECIFICATION FOR
DM PLANT
1X660MW BHUSAWAL TPS-UNIT:6
MAHARASHTRA, INDIA.**

<u>SR. NO.</u>	<u>ITEM</u>		<u>VENDORS</u>
		(c)	DC INDUSTRIAL PLANT SERVICES (P) LTD.
		(d)	ABB
		(e)	BATLIBOI
		(f)	SHAVO NORGREN
		(g)	WALKER
		(h)	ULTRA FILTER
39.15	VACUUM PUMP	(a)	VACUUM AIR
		(b)	PPI
		(c)	GARUDA
		(d)	NASH
		(e)	SIEMENS
		(f)	INDIAN MAKE
		(g)	KAKATI
39.16	AIR HEATER	(a)	ESCORT
		(b)	RAYCOLT
		(c)	SPHERE HOT
		(d)	HEATCO
		(e)	LAMDA INDUSTRIES
		(f)	INELLCON
39.17	CONVENTIONAL CLARIFIER	(a)	DRIPLEX
	TYPE	(b)	ION EXCHANGE
		(c)	HIND DORR
		(d)	OLIVA
		(e)	THERMAX

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1X660MW BHUSAWAL TPS-UNIT:6
MAHARASHTRA, INDIA.**

<u>SR. NO.</u>	<u>ITEM</u>		<u>VENDORS</u>
39.18	MS ERW PIPE (BLACK & GALVANISED)	(a)	JINDAL
		(b)	TISCO
		(c)	SURYA ROSHINI /
		(d)	INDUS TUBES LTD
		(e)	RATNAMANI METALS & TUBES
		(f)	GOOLUCK STEEL TUBES LTD.
		(g)	PSL HOLDING
		(h)	SAW PIPES LTD.
		(i)	DADU PIPES PVT. LTD.
		(j)	ASIAN MILLS PVT. LTD.
		(k)	MAHARASHTRA SEAMLESS PIPE
39.19	MS PIPE SEAMLESS	(a)	MAHARASHTRA SEAMLESS PIPE
		(b)	BHEL
		(c)	INDIA SEAMLESS
		(d)	TISCO
39.20	CAST IRON PIPES	(a)	ELECTRO STEEL CASTINGS
		(b)	SAIL
		(c)	KUSHLAVA
39.21	G.I PIPES & FITTINGS	(a)	PRAKASH TUBES
		(b)	NAV KAR FITTINGS & FORGING PVT. LTD
		(c)	GOOD LUCK STEEL TUBES LTD.
		(d)	INDUS TUBES LTD.
39.22	SS TUBES & PIPES	(a)	APEX TUBES PVT.LTD
		(b)	REMI EDELSTAHL TUBULARS PVT.LTD
		(c)	PRAKASH STEELAGE PVT. LTD

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<u>SR. NO.</u>	<u>ITEM</u>		<u>VENDORS</u>
39.23	FLUID COUPLING	(a)	PEMBRIL
		(b)	VOITH
		(c)	FLUIDOMAT
		(d)	GREAVES LTD.
		(e)	HYDRO DYNAMIC
		(f)	FLANDER MACNEILL GEARS LTD.
		(g)	DAVID BROWN
39.24	GEAR BOX	(a)	ELECON
		(b)	SHANTHI
		(c)	RADICON
		(d)	NEW ALLENBURY WORKS
39.25	DOUBLE DISK SWING VALVE	(a)	EVERLASTING
39.26	BUTTERFLY VALVE	(a)	AUDCO
		(b)	FOURESS
		(c)	BDK
		(d)	ELOMATIC
		(e)	KEY STONE
39.27	VERTICAL DRAIN PUMP	(a)	SAM
		(b)	MBIL
		(c)	WEIR MINERAL (I) PVT. LTD.
39.28	AIR DRYING PLANT (REFRIGERANT TYPE)	(a)	DONALDSON
39.29	BALL VALVE	(a)	SHANCO
		(b)	BDK
		(c)	OSCAR

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<u>SR. NO.</u>	<u>ITEM</u>		<u>VENDORS</u>
		(d)	LEGRIS
		(e)	R B (ITALIAN)
		(f)	FLOWCON
39.30	ASH WATER PUMPS	(a)	KIRLOSKAR
		(b)	KSB
		(c)	BEACON WEIR
		(d)	MATHER & PLATT
		(e)	SAM
39.31	FLUSHING PUMP	(a)	UT PUMPS & SYSTEMS LTD.
39.32	VENTILATION FAN	(a)	FLAKT
		(b)	C.B. DOCTOR
		(c)	GEC
		(d)	ALSTOM
		(e)	CG
		(f)	BATLIBOI
		(g)	BAJAJ
		(h)	USHA
39.33	AGITATOR WITH GEAR BOX / ACCESSORIES	(a)	RATHI VESSELS & SYSTEMS PVT.LTD.
40.0	<u>VENTILATION EQUIPMENT</u>		
40.1	VENTILATION SYSTEM	(a)	BLUE STAR Ltd.
		(b)	Hyderabad Pollution Controls Ltd.
		(c)	VOLTAS LIMITED
		(d)	AEROVENT PROJECTS LIMITED
		(e)	WRC ENGINEERING COMPANY PVT LIMITED

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<u>SR. NO.</u>	<u>ITEM</u>		<u>VENDORS</u>
40.2	AIR FILTER	(a)	PUROLATOR
		(b)	TENACITY
		(c)	UCCO
		(d)	JOHN FLOWER
		(e)	AIR TECH
		(f)	DYNAFILTERS
40.3	FRESH AIR FANS	(a)	GEC
		(b)	KAITAN
		(c)	FLAKT
40.4	V.BELTS & PULLEY	(a)	DUNLOP
		(b)	FENNER
40.5	FIRE DAMPAR	(a)	TSC
		(b)	AIR TECH
		(c)	GEORGE RAO
		(d)	RAVISTAR INDIA PVT LIMITED.
40.6	BEARINGS	(a)	SKF
		(b)	NORMAN
		(c)	NBC
		(d)	FAG
41.0	<u>AIR CONDITIONING</u>		
41.1	REFRIGERATION RECIPROCATING COMPRESSOR	(a)	ACCL,KOLKATA
		(b)	KIRLOSKAR,PUNE
		(c)	VOLTAS,MUMBAI
		(d)	CARRIER,MUMBAI
		(e)	TRANE (INDIA) PVT.LTD.,MUMBAI

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<u>SR. NO.</u>	<u>ITEM</u>		<u>VENDORS</u>
41.2	CONDENSER & CHILLER	(a)	NMW (I) PVT. LTD., HOWRAH (W.B)
		(b)	PATEL AIR TEMP, AHMEDABAD
		(c)	JAYPEE ENGG. WORKS,KOLKATA
		(d)	BLUE STAR,MUMBAI
		(e)	CARRIER,MUMBAI
		(f)	VOLTAS,MUMBAI
41.3	COOLING COILS	(a)	JAYPEE , AHMEDABAD
		(b)	BLUE STAR , MUMBAI
		(c)	CARRIER,MUMBAI
		(d)	COOL TECH,MUMBAI
		(e)	V.M. ENGG., PUNE
41.4	AIR HANDLING UNITS	(a)	FLAKT (ABB)
		(b)	BLUE STAR,MUMBAI
		(c)	CARRIER, MUMBAI
		(d)	COOL TECH, MUMBAI
		(e)	V.M. ENGG.,PUNE
		(f)	HYDERABAD POLLUTION CONTROLS PVT. LTD
41.5	CONDENSER CHILLED WATER PUMPS	(a)	KIRLOSKAR
		(b)	BEACONWEIR
		(c)	GREAVES LTD.
		(d)	JYOTI
		(e)	KSB
		(f)	CROMPTON GREAVES
41.6	FRESH AIR FANS	(a)	GEC

**TECHNICAL SPECIFICATION FOR
DM PLANT
1X660MW BHUSAWAL TPS-UNIT:6
MAHARASHTRA, INDIA.**

<u>SR. NO.</u>	<u>ITEM</u>		<u>VENDORS</u>
		(b)	KHAITAN
		(c)	FLAKT(ABB)
41.7	AIR FILTER	(a)	PUROLATOR
		(b)	TENACITY
		(c)	UCCO
		(d)	JOHN FLOWER
		(e)	AIR TECH
		(f)	DYNA FILTERS
41.8	COLD INSULATION MATERIAL	(a)	BEORDESEL
		(b)	FGP
		(c)	LLOYD
		(d)	UP TWIGA
		(e)	BASF
41.9	FAN COIL UNITS	(a)	BLUE STAR
		(b)	FLAKT
		(c)	ACCO
		(d)	TEXCHEM
41.10	BEARINGS	(a)	SKF
		(b)	NORMAN
		(c)	FAG
		(d)	NBC
41.11	V BELTS & PULLEY	(a)	DUNLOP
		(b)	FENNER
41.12	FALSE CEILING MATERIAL	(a)	LUXALON 84 C & BIGGER WIDTH 124 C
41.13	MOTORISED DAMPERS	(a)	HIN

**TECHNICAL SPECIFICATION FOR
DM PLANT
1X660MW BHUSAVAL TPS-UNIT:6
MAHARASHTRA, INDIA.**

<u>SR. NO.</u>	<u>ITEM</u>		<u>VENDORS</u>
		(b)	LEHMAN
		(c)	TECHNOMECH
		(d)	BACHMANN
		(e)	TEE INSTRUMENT
41.14	COOLING TOWERS	(a)	PAHARPUR
		(b)	HIMGIRI
41.15	FIRE DAMPER	(a)	TSC
		(b)	AIR TECH
		(c)	GEORGE RAO
41.16	MIXING VALVES	(a)	HONEYWELL
		(b)	TSC
		(c)	AVCON
41.17	MODULATING MOTORS	(a)	HONEYWELL
		(b)	TSC
		(c)	AVCON
41.18	MODULATING THERMOSTAT	(a)	PROTO-TECH
42.0	<u>ELEVATOR</u>		
		(a)	OTIS ELEVATORS
		(b)	KONE ELEVATORS INDIA PVT. LTD.
		(c)	CITY LIFTS
		(d)	MEKASTER ENGG. LTD., HALOL(GUJARAT)
		(e)	ECE INDUSTRIES LTD.,KOLKATA
42.1	CONTROLLER, COP, LOP, CABLES ETC.	(a)	SAMIL ELTEC CO. LTD., KOREA

**TECHNICAL SPECIFICATION FOR
DM PLANT
1X660MW BHUSAWAL TPS-UNIT:6
MAHARASHTRA, INDIA.**

<u>SR. NO.</u>	<u>ITEM</u>		<u>VENDORS</u>
42.2	TRACTION MACHINE ASSEMBLY	(a)	HAISUNG, KOREA
42.3	ROPE	(a)	KISWIRE, KOREA
43.0	<u>AIR COMPRESSOR</u>		
		(a)	KIRLOSKAR PNEUMATICS
		(b)	ATLAS COPCO
		(c)	INGERSOL-RAND

**TECHNICAL SPECIFICATION FOR
DM PLANT
1X660MW BHUSAWAL TPS-UNIT:6
MAHARASHTRA, INDIA.**

3.0 LIST OF APPROVED VENDORS-ELECTRICAL

<u>SR. NO.</u>	<u>ITEMS</u>		<u>VENDORS</u>
1.0	MOTOR ACTUATORS	(a)	ROTORK
		(b)	AUMA
		(c)	LIMITORQUE
		(d)	ANTIREB
2.0	DRY TYPE TRANSFORMERS	(a)	KIRLOSKAR
		(b)	VOLTAMP
		(c)	CROMPTON
		(d)	VIJAY ELECTRICALS, HYD.
		(e)	BHEL
		(f)	MEGAWIN SWITCHGEAR
3.0	(A) GENERATOR TRANSFORMER	(a)	TELK
		(b)	BHEL
		(c)	ABB
		(d)	AREVA
		(e)	CGL
		(f)	SIEMENS
	(B) UNIT & STATION TRANSFORMER	(a)	TELK
		(b)	BHEL
		(c)	ABB
		(d)	AREVA
		(e)	CGL
		(f)	SIEMENS
		(g)	VOLTAMP
	(C) AUXILIARY	(a)	AREVA

**TECHNICAL SPECIFICATION FOR
DM PLANT
1X660MW BHUSAWAL TPS-UNIT:6
MAHARASHTRA, INDIA.**

<u>SR. NO.</u>	<u>ITEMS</u>		<u>VENDORS</u>
	TRANSFORMER (Oil Filled)	(b)	ABB
		(c)	CROMPTON GREAVES LTD.
		(d)	VOLTAMP TRANSFORMERS (P) LTD.
		(e)	VIJAY ELECTRICALS
		(f)	KIRLOSKAR
		(g)	BBL
		(h)	MEGAWIN
		(i)	BHEL
		(j)	STAR DELTA,BHOPAL
		(k)	EMCO
4.0	LT POWER AND CONTROL CABLES	(a)	UCL
		(b)	CCI
		(c)	KEI INDUSTRIES LTD.
		(d)	FINOLEX
		(e)	FORT GLOSTER
		(f)	POLYCAB WIRES PVT LTD.
		(g)	DELTON
		(h)	RALLISON ELECT
		(i)	NICCO
		(j)	PARAMOUNT CABLE CORPN
		(k)	PARAGON CABLE
		(l)	KRISHNA ELECT.INDUSTRIES
		(m)	DASHMESH CABLES
		(n)	INCOM WIRES & CABLES LTD
		(o)	TERACOM LTD

**TECHNICAL SPECIFICATION FOR
DM PLANT
1X660MW BHUSAWAL TPS-UNIT:6
MAHARASHTRA, INDIA.**

<u>SR. NO.</u>	<u>ITEMS</u>		<u>VENDORS</u>
	CONTROL CABLES ONLY	(a)	CORDS
		(b)	THERMO CABLES LTD, HYDERABAD
5.0	HT POWER CABLE (HT cable manufacturers having Triple extrusion Dry cure (ccv) process using Nitrogen only are to be selected.)	(a)	UCL
		(b)	CCI
		(c)	FORT GLOSTER
		(d)	CRYSTEL CABLE INDUSTRIES
		(e)	POLYCAB WIRES PVT LTD.
		(f)	NICCO
		(g)	HINDUSTAN VIDYUT PRODUCTS
		(h)	KEI INDUSTRIES
		(i)	M/s RPG Cable Ltd
6.0	GEARED MOTORS	(a)	POWER BUILD
		(b)	CROMPTON
		(c)	KIRLOSKAR
		(d)	LAXMI HYDRAULICS PVT LTD FOR 415V
7.0	CABLE TRAYS	(a)	VENUS STEEL
		(b)	INDIANA
		(c)	BHARTI EXPORT
		(d)	VATCO
		(e)	RATAN PROJECT & ENGG. LTD, KOLKATA
		(f)	KANADE ANAND UDYOG MUMBAI
		(g)	M/S PATNY SYSTEM (P) LTD, HYD.
		(h)	DOLPHIN

**TECHNICAL SPECIFICATION FOR
DM PLANT
1X660MW BHUSAVAL TPS-UNIT:6
MAHARASHTRA, INDIA.**

<u>SR. NO.</u>	<u>ITEMS</u>		<u>VENDORS</u>
		(i)	M/S INAR PROILES PVT.LTD.,ANKAPALLE
		(j)	INDUSTRIAL PERFORATION (I) PVT. LTD.KOLKATA
		(k)	M/S PREMIER POWER PRODUCTS (CAL) PVT.LTD.,KOLKATA
		(l)	M/S RABI ENGINEERING WORKS PVT.LTD, KOLKATA.
		(m)	M/S UNITECH FABRICATORS AND ENGINEERS PVT. LTD.,KOLKATA
		(n)	M/S ASSOCIATED POWER STRUCTURES PVT. LTD.,GUJRAT
		(o)	M/S JAMNA METAL COMPANY PVT. LTD., DELHI
		(p)	M/S RUKMANI ELECTRICALS & COMPONENTS PVT. LTD., KOLKATA
		(q)	M/S RATAN ENGINEERING CO., KOLKATA
8.0	PROXIMITY SWITCH	(a)	AW
		(b)	JAYASHREE
9.0	VFD (LT MOTORS)	(a)	ABB
		(b)	SIEMENS
		(c)	L & T
		(d)	ALLEN BRADLEY
		(e)	GE FANUC
10.0	SAFETY SWITCHES	(a)	AG
		(b)	JAYASHREE

**TECHNICAL SPECIFICATION FOR
DM PLANT
1X660MW BHUSAWAL TPS-UNIT:6
MAHARASHTRA, INDIA.**

<u>SR. NO.</u>	<u>ITEMS</u>		<u>VENDORS</u>
11.0	ANNUNCIATOR	(a)	PROCON
		(b)	I/C
12.0	HOOTER	(a)	KHERAJ
		(b)	TULLU
		(c)	VAISHNO
13.0	CONTROL PANELS/(Relay Based) LIGHTING PANELS/JBS	(a)	POSITRONICS.
		(b)	CONTROL & SCHEMATIC
		(c)	VIMAC ELECTRIC
		(d)	PRITHVI TECHNOLOGY
		(e)	POWEROL PANEL & CONTROL
		(f)	L & T
		(g)	SIEMENS
		(h)	SCHNEIDER
14.0	LT BUS DUCT	(a)	STAR DRIVE
		(b)	ELEC MECH
		(c)	CONTROL SCHEMATIC
		(d)	REEP
		(e)	JASPER ENGINEERS
		(f)	C & S ELECTRIC LTD.
15.0	BATTERY	(a)	EXIDE
		(b)	AMARA RAJA
		(c)	HBL
		(d)	AMCO
16.0	BATTERY CHARGER	(a)	CHHABI
		(b)	AMARA RAJA

**TECHNICAL SPECIFICATION FOR
DM PLANT
1X660MW BHUSAWAL TPS-UNIT:6
MAHARASHTRA, INDIA.**

<u>SR. NO.</u>	<u>ITEMS</u>		<u>VENDORS</u>
		(c)	HBL
		(d)	MASS- TECH.
		(e)	AMCO
17.0	CIRCUIT BREAKER (LT)	(a)	L & T
		(b)	SIEMENS
		(c)	ABB
		(d)	SCHNEIDER
18.0	POWER CONTACTOR/ AUXILIARY CONTACTOR	(a)	SIEMENS
		(b)	L & T
		(c)	ABB
		(d)	SCHNEIDER/ GE
19.0	NUMERICAL PROTECTION RELAYS FOR LT SWITCHGEAR	(a)	ABB
		(b)	ALSTHOM
		(c)	SCHNEIDER
		(d)	L&T
		(e)	SIEMENS
20.0	AUXILIARY RELAY	(a)	GE
		(b)	SIEMENS
		(c)	L&T
		(d)	ABB
		(e)	SCHNEIDER
21.0	THERMAL O/L RELAYS	(a)	L & T
		(b)	SIEMENS
		(c)	ABB
		(d)	SCHNEIDER

**TECHNICAL SPECIFICATION FOR
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1X660MW BHUSAWAL TPS-UNIT:6
MAHARASHTRA, INDIA.**

<u>SR. NO.</u>	<u>ITEMS</u>		<u>VENDORS</u>
22.0	PUSH BUTTONS/ INDICATING LAMP	(a)	SIEMENS
		(b)	L & T
		(c)	CANDS
		(d)	TEKNIC
		(e)	SCHNEIDER
23.0	ELECTRICAL PANEL METER/ INDICATING INSTRUMENTS (AMMETER/VOLTMETER)	(a)	AE
		(b)	IMP
		(c)	MECO
		(d)	RISHABH
24.0	CT(LT)	(a)	KAPPA
		(b)	SILCON
		(c)	PRAYOG
		(d)	PRAGATI
		(e)	CANDS
		(f)	PRECISE
25.0	PT(LT)	(a)	KAPPA
		(b)	SILCON
		(c)	PRAYOG
		(d)	PRAGATI
		(e)	CANDS
		(f)	PRECISE
26.0	CONTROL TRANSFOR MERS	(a)	KAPPA
		(b)	SILCON
		(c)	POWER PACK
		(d)	PRAGATI

**TECHNICAL SPECIFICATION FOR
DM PLANT
1X660MW BHUSAWAL TPS-UNIT:6
MAHARASHTRA, INDIA.**

<u>SR. NO.</u>	<u>ITEMS</u>		<u>VENDORS</u>
		(e)	CANDS
		(f)	PRECISE
27.0	POWER SWITCH	(a)	SIEMENS
		(b)	L & T
		(c)	GE
		(d)	ABB
		(e)	SCHNEIDER
28.0	SELECTOR SWITCHES AND CONTROL SWITCHES	(a)	KAYCEE
		(b)	SIEMENS
		(c)	L & T
		(d)	RECON
		(e)	SWITRON
29.0	TIMERS	(a)	GE
		(b)	ABB
		(c)	SCHNEIDER
		(d)	L & T
		(e)	EAPL
30.0	FUSES FOR LT	(a)	GEC
		(b)	SIEMENS
		(c)	L & T
		(d)	STANDARD
		(e)	BUSSMANN
31.0	MCCB	(a)	L & T
		(b)	SIEMENS
		(c)	AEG

**TECHNICAL SPECIFICATION FOR
DM PLANT
1X660MW BHUSAWAL TPS-UNIT:6
MAHARASHTRA, INDIA.**

<u>SR. NO.</u>	<u>ITEMS</u>		<u>VENDORS</u>
		(d)	SCHNEIDER
32.0	MCB	(a)	MDS
		(b)	SIEMENS
		(c)	SCHNEIDER
33.0	TERMINAL BLOCK & ACCESSORIES SIDE CLAMP	(a)	ELMEX
		(b)	CONNECT WELL IND
		(c)	WAGO AND CONTROLS
34.0	DOUBLE COMPRESSION CABLE GLAND	(a)	COMET
		(b)	ELECTRO MAG
		(c)	COSMOS
		(d)	POWER ENGG
35.0	CRIMPING LUGS	(a)	DOWELL
36.0	NUMERIC RELAY FOR HT SWITCHGEAR (3.3kV/11kV)	(a)	ABB
		(b)	AREVA
		(c)	SIEMENS
37.0	NUMERIC RELAY FOR GENERATOR, GT, ST AND UT PROTECTIONS	(a)	ABB
		(b)	AREVA
		(c)	SIEMENS
38.0	LIGHTING FIXTURES	(a)	PHILIPS
		(b)	CGL
		(c)	BAJAJ
		(d)	GE
39.0	CONDUIT	(a)	SENCO
		(b)	M. CHANDRA
		(c)	NAGARJUNA

**TECHNICAL SPECIFICATION FOR
DM PLANT
1X660MW BHUSAWAL TPS-UNIT:6
MAHARASHTRA, INDIA.**

<u>SR. NO.</u>	<u>ITEMS</u>		<u>VENDORS</u>
		(d)	K.K. Industries Kolkata
40.0	CABLE LUGS	(a)	DOWEL
		(b)	CROWN
		(c)	NIKO
		(d)	FORWARD ENGG.
41.0	DIESEL GENERATOR	(a)	POWERICA
		(b)	JACKSON
		(c)	KIRLOSKAR
		(d)	AVK SEGC
		(e)	LERUY SOMER
		(f)	GD ANKLESARIA & CO.
42.0	LT MCC	(a)	L & T
		(b)	CONTROL SCHEMATIC
		(c)	SIEMENS
		(d)	ABB
		(e)	GE
		(f)	ALSTOM
		(g)	SCHNEIDER
		(h)	CROMPTON
43.0	H.DG.C.I. Pipe Electrode	(a)	HITESH
		(b)	DHATU UDYOG NGP
44.0	HT HEAT SHRINKABLE END TERMINATION & JOINTING KITS	(a)	RAYCHEM, RPG

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MAHARASHTRA, INDIA.**

<u>SR. NO.</u>	<u>ITEMS</u>		<u>VENDORS</u>
45.0	FIRE STOP MORTAR SEAL&FIRE RETARDANT CABLE COATING SYSTEM	(a)	M/S SIGNAM FIRE PROTECTION (I) PVT. LTD.
		(b)	M/S VIJAY SYSTEMS ENGINEERING PVT. LTD. MUMBAI
46.0	Above Ground Earthing Materials	(a)	M/S INAR PROILES PVT.LTD.,ANKAPALLE
		(b)	INDUSTRIAL PERFORATION (I) PVT. LTD.KOLKATA
		(c)	M/S PREMIER POWER PRODUCTS (CAL) PVT.LTD.,KOLKATA
		(d)	M/S RABI ENGINEERING WORKS PVT.LTD, KOLKATA.
		(e)	M/S UNITECH FABRICATORS AND ENGINEERS PVT. LTD.,KOLKATA
		(f)	M/S ASSOCIATED POWER STRUCTURES PVT. LTD.,GUJRAT
		(g)	M/S RUKMANI ELECTRICALS & COMPONENTS PVT. LTD., KOLKATA
		(h)	M/S RATAN ENGINEERING CO., KOLKATA
		(i)	M/S JAMNA METAL CO. PVT LTD. DELHI
		(j)	M/S PATNY SYSTEMS HYD.
		(k)	RATAN PROJECTS & ENGG. CO. P. LTD.,KOLKATA
		(l)	KANADE ANAND UDYOG, MUMBAI
47.0	SEAL OF BUSHING	(a)	TEXPLAS INDIA PVT. LTD.

**TECHNICAL SPECIFICATION FOR
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1X660MW BHUSAWAL TPS-UNIT:6
MAHARASHTRA, INDIA.**

<u>SR. NO.</u>	<u>ITEMS</u>		<u>VENDORS</u>
48.0	PRESSURE RELIEF VALVES	(a)	ATVUS, KOLKATA
		(b)	SUKRUT UDYOG,PUNE
49.0	HT SWITCHGEAR	(a)	SIEMENS *
		(b)	L&T *
		(c)	ALSTOM*
		(d)	ABB*
		(e)	CROMPTON GREAVES LTD*
		(f)	BHEL
		(g)	AREVA (* Subject to availability of type test certificates and performance certificates for 3 (Three) years along with bid document. HT Switchgear should have been type tested within last 3 years.)
50.0	MLDB	(a)	L&T
		(b)	POSITRONICS
		(c)	CONTROL & SCHEMATICS, HYDERABAD
		(d)	VIMAC
		(e)	PRITHVI TECHNOLOGY
51.0	BUS TRANSFER SCHEME (NUMERICAL)	(a)	AARTECH SOLENIC
52.0	HT MOTORS (3.3 kV/6.6 kV /11 kV)	(a)	ALSTOM
		(b)	BHEL
		(c)	CROMPTON GREAVES LTD
		(d)	KIRLOSKAR ELECTRIC CO. LTD.

**TECHNICAL SPECIFICATION FOR
DM PLANT
1X660MW BHUSAWAL TPS-UNIT:6
MAHARASHTRA, INDIA.**

<u>SR. NO.</u>	<u>ITEMS</u>		<u>VENDORS</u>
		(e)	SIEMENS
		(f)	MARATHON ELECTRIC
		(g)	ABB
		(h)	HHI
53.0	LT MOTORS(415V)	(a)	ALSTOM
		(b)	BHEL
		(c)	CROMPTON GREAVES LTD
		(d)	KIRLOSKAR ELECTRIC CO. LTD
		(e)	SIEMENS
		(f)	MARATHON ELECTRIC
		(g)	ABB
		(h)	BHARAT BIJLEE
		(i)	LAXMI HYDRAULIC LTD
54.0	DC MOTORS	(a)	ALSTOM
		(b)	BHEL
		(c)	CROMPTON GREAVES LTD.
		(d)	KIRLOSKAR ELECTRIC CO. LTD.
		(e)	SIEMENS
55.0	MV BUSDUCT	(a)	BHEL
		(b)	REEP
		(c)	POWER GEAR
		(d)	C & S ELECTRIC LTD.
56.0	RELAY CONTROL PANEL (PCR)	(a)	ABB
		(b)	AREVA
		(c)	BHEL

**TECHNICAL SPECIFICATION FOR
DM PLANT
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MAHARASHTRA, INDIA.**

<u>SR. NO.</u>	<u>ITEMS</u>		<u>VENDORS</u>
		(d)	SIEMENS
57.0	ENERGY METER MEAA METERS AS PER CEA NORMS	(a)	L&T
		(b)	ABB
		(c)	CONZERV
		(d)	SECURE
			(Subject to availability of type test TC)
58.0	RELAY TEST KIT	(a)	MEGGER (JOSTS ENGG CO LTD, PUNE) DOBLE
		(b)	OMICRON ELECTRONICS ASIA LTD, HONGKONG
		(c)	SCOPE PUNE
		(d)	MEGGER(AVO PULSAR)
		(e)	PROGRAMMA ELECTRONIKA, SWEDEN
59.0	AUXILIARY/TRIPPING RELAYS	(a)	ABB
		(b)	AREVA LTD.
		(c)	SIEMENS
60.0	RECORDER	(a)	YOKAGOWA
		(b)	CHINO LAXSONS, EUROTHERM DEL
61.0	TRANSDUCERS	(a)	AUTOMATIC ELECTRIC LTD
		(b)	SOUTHERN TRANSDUCERS, CHENNAI
		(c)	RISHABH,NASIK
		(d)	ABB
		(e)	SITU
		(f)	SECURE

**TECHNICAL SPECIFICATION FOR
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<u>SR. NO.</u>	<u>ITEMS</u>		<u>VENDORS</u>
62.0	HRC FUSES/ SEMICONDUCTOR FUSE/ LINK/FUSE FITTINGS (HT)	(a)	SIEMENS
		(b)	KAYCEE
		(c)	L&T
		(d)	INDO ASIAN FUSE GEAR
		(e)	COPPER BUSSMAN
63.0	TEST LINK BLOCK	(a)	IMP POWERS
		(b)	ENKAY
64.0	CONTROL PANEL /DESK (PCR)	(a)	BHEL BHOPAL
		(b)	PYROTECH CONTROL
		(c)	RITTAL INDIA
65.0	PLUG IN RELAY	(a)	OEN
		(b)	JYOTI RE 300 (WITH DIODE)
		(c)	AREVA
		(d)	ABB
66.0	SOLID STATE METERS/ TRIVECTOR METERS	(a)	ENERCON
		(b)	L&T
		(c)	ABB
		(d)	BHEL
67.0	VACCUM INTERRUPTERS (HT SWGR)	(a)	BEL
		(b)	CGL * Subject to availability of type test certificate along with bid document for HT SWGR type tested within last 3 years
68.0	INSTRUMENT	(a)	SILKAANS

**TECHNICAL SPECIFICATION FOR
DM PLANT
1X660MW BHUSAWAL TPS-UNIT:6
MAHARASHTRA, INDIA.**

<u>SR. NO.</u>	<u>ITEMS</u>		<u>VENDORS</u>
	TRANSFORMERS (HT SWGR) (CT/PT)	(b)	PRAGATI
		(c)	PRAYOG
		(d)	LAXMI ENGINEERING, BHOPAL
69.0	LIMIT SWITCHES/ AUXILIARY SWITCHES	(a)	KAYCEE
		(b)	SIEMENS
70.0	BREAKER CONTROL SWITCHES	(a)	SALZER
		(b)	SETON
		(c)	AREVA
		(d)	KAYCEE
		(e)	RECOM
71.0	DISCREPANCY CONTROL SWITCHES	(a)	ABB
		(b)	CONTROL DYNAMICS
72.0	SWITCH FUSE UNIT (LT)	(a)	SIEMENS
		(b)	L & T
		(c)	ABB
		(d)	ALSTOM
		(e)	GE
73.0	MOTOR (SRING CHARGING)	(a)	RALLIWOLF
		(b)	KULKARNI POWER TOOLS
		(c)	FAL INDUSTRIES
74.0	Zn O SURGE ARRESTOR	(a)	RAYCHEM (GEC)
		(b)	OBLUM
75.0	TR SETS AND PANELS, RAPPER PANELS ETC.	(a)	ADOR POWERTRON, PUNE
		(b)	HIND RECTIFIERS, MUMBAI
76.0	HOPPER HEATERS	(a)	THERMION HEAT TRACERS PVT. LTD., MUMBAI

**TECHNICAL SPECIFICATION FOR
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MAHARASHTRA, INDIA.**

<u>SR. NO.</u>	<u>ITEMS</u>		<u>VENDORS</u>
		(b)	HTD HEAT TRACE, HYDRABAD/USA
77.0	INSULATION HEATERS	(a)	ESCORT, FARIDABAD.
		(b)	SANDVIK ASIA LTD., HOSUR
78.0	DISCHARGE/ EMITTING ELECTRODE	(a)	AIR SYSTEM LIMITED, CHENNAI
		(b)	THE UNITED ENGINEERS, KOLKATA
79.0	STREET LIGHT POLES	(a)	BAJAJ
		(b)	K.L. IND.
		(c)	BOMBAY TUBE POLES
		(d)	RIDDHI POLES
80.0	ENERGY SAVING PANEL	(a)	PRITHVI TECHNOLOGY
		(b)	INSTRUMENT UNIVERSAL
81.0	SWITCHES FOR LIGHTING	(a)	ANCHOR/ELORA
82.0	SWITCHES FOR DECORATIVE NON INDUSTRIAL TYPE 5/15 AMPS 240V RECEPTACLES	(a)	ANCHOR/ELORA
83.0	INDUSTRIAL TYPE 15 AMPS & 63 AMPS (WELDING) RECEPTACLES	(a)	BCH
		(b)	BEST & CROMPTON
		(c)	AJMERA
		(d)	HANSU
84.0	HIGH MAST	(a)	BAJAJ
85.0	LIGHTING TRANSFORMER	(a)	POWER PACK
		(b)	PRECISE

**TECHNICAL SPECIFICATION FOR
DM PLANT
1X660MW BHUSAWAL TPS-UNIT:6
MAHARASHTRA, INDIA.**

<u>SR. NO.</u>	<u>ITEMS</u>		<u>VENDORS</u>
		(c)	PRITHVI TECHNOLOGY
		(d)	VOLTAMP
86.0	ELECTRICAL HEAT TRACING SYSTEM (FOR FUEL OIL SYSTEM)	(a)	THERMON HEAT TRACERS PVT. LTD
		(b)	XICON INTERNATIONAL LTD.

NOTE:

For new vendors, bidder shall submit the credentials of such vendors to owner for approval of vendor.

**TECHNICAL SPECIFICATION FOR
DM PLANT
1X660MW BHUSAVAL TPS-UNIT:6
MAHARASHTRA, INDIA.**

4.0 LIST OF APPROVED VENDORS – CONTROL & INSTRUMENTATION

<u>SR. NO.</u>	<u>NAME OF EQUIPMENT / ITEM</u>	<u>APPROVED VENDORS</u>
1.0	<u>FIELD / PRIMARY INSTRUMENTS:</u>	
1.1	RTD & THERMOCOUPLES	(a) PYRO ELECTRIC INSTRUMENTS GOA PVT. LTD.
		(b) GENERAL INSTRUMENTS CONSORTIUM, MUMBAI
		(c) DETRIVE, MUMBAI
		(d) TEMSENS INSTRUMENTS(I) PVT. LTD, UDAIPUR
1.2	SMART ELECTRONIC TRANSMITTERS (PRESSURE, DIFF. PRESSURE)	(a) EMERSON PROCESS MANAGEMENT (I) LTD
		(b) FUJI, JAPAN
		(c) YOKOGAWA, JAPAN/ YOKOGAWA INDIA
		(d) ABB, GERMANY / FARIDABAD
		(e) HONEYWELL, USA / PUNE
1.3	DISPLACER TYPE LEVEL TRANSMITTER	(a) CHEMTROL MIL
		(b) DRESSER, COIMBATORE
		(c) V-AUTOMAT, DELHI
		(d) ECKARDT, GERMANY
1.4	LEVEL TRANSMITTERS (DISPLACEMENT TYPE)	(a) DRESSER MASONIELAN, FRANCE (DRESSER VALVES INDIA LTD. COIMBATORE)
		(b) CHEMTROLS, MUMBAI (ECKARDT, GERMANY)
		(c) ECKARDT, GERMANY

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<u>SR. NO.</u>	<u>NAME OF EQUIPMENT / ITEM</u>		<u>APPROVED VENDORS</u>
1.5	LEVEL TRANSMITTERS (ULTRASONIC TYPE)	(d)	ENDRESS+HAUSER, GERMANY/INDIA
		(e)	KROHNE, FRANCE
		(f)	PEPPERL+FUCHS, GERMANY/INDIA
		(g)	VEGA, GERMANY
		(h)	KAB INSTRUMENTS LTD.
1.6	RADAR TYPE LEVEL TRANSMITTERS	(a)	SIEMENS MILLTRONICS
		(b)	ENDRESS & HAUSER
		(c)	SBEM
		(d)	EMERSON
		(e)	AMETEKEDREXELBRROK (CHEMTROLS)
1.7	TEMPERATURE TRANSMITTERS	(a)	EMERSON PROCESS (FORMERLY FISHER ROSEMOUNT), USA/DAMAN
		(b)	ABB, GERMANY / FARIDABAD
		(c)	FUJI, JAPAN
		(d)	HONEYWELL, USA / PUNE
		(e)	YOKOGAWA, JAPAN/ YOKOGAWA INDIA
		(f)	MOORE, USA
1.8	MAGNETIC LEVEL SWITCHES	(a)	LEVCON INSTRUMENTS PVT. LTD., KOLKATA
		(b)	V.AUTOMAT, NEW DELHI
		(c)	ASIAN INDUSTRIAL VALVES, CHENNAI
1.9	LEVEL SWITCHES CONDUCTIVITY TYPE	(a)	BHARAT HEAVY ELECTRICALS LTD.
		(b)	YARWAY, USA

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<u>SR. NO.</u>	<u>NAME OF EQUIPMENT / ITEM</u>		<u>APPROVED VENDORS</u>
		(c)	LEVELSTATE, UK
		(d)	SOLARTON, UK (PRESENTLY CALLED AS MOBREY)
		(e)	CHEMTROL
		(f)	LEVEL STATE (HITECH SYSTEMS)
		(g)	MOBREY
1.10	FLOW SWITCHES	(a)	SWITZER, CHENNAI
		(b)	KRONHE MARSHALL
		(c)	GENERAL INSTRUMENTS MUMBAI
		(d)	CHEMTROL
1.11	BYPASS ROTAMETER	(a)	IEPL, HYDERABAD
		(b)	PLACKA INSTRUMENTS INDIA PVT. LTD., CHENNAI
		(c)	TRAC, HYDERABAD
		(d)	EUREKA, PUNE
1.12	ROTAMETER	(a)	INSTRUMENTATION ENGINEERS PVT. LTD.
		(b)	SIGMA INSTRUMENTS CO.
		(c)	EUREKA INDUSTRIAL EQPT. PVT. LTD.
		(d)	TELACE EQUIPMENT PVT. LTD.
1.13	FLOW INTEGRATOR (ELECTRONIC TYPE)	(a)	ABB, GERMANY / FARIDABAD
		(b)	MASIBUS, GANDHINAGAR
		(c)	YOKOGAWA, JAPAN/ YOKOGAWA INDIA
		(d)	LEKKTROTEK, PUNE
		(e)	EMERSON

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<u>SR. NO.</u>	<u>NAME OF EQUIPMENT / ITEM</u>		<u>APPROVED VENDORS</u>
		(f)	ENDRESS & HAUSER
		(g)	FORBES MARSHALL
1.14	GAUGES (PRESSURE, DIFF. PRESSURE)	(a)	A N INSTRUMENTS PVT. LTD., KOLKATA
		(b)	GENERAL INSTRUMENTS CONSORTIUM, GOA/ MUMBAI
		(c)	GOA THERMOSTATIC INSTRUMENTS, GOA
		(d)	FORBES MARSHALL LTD., HYDERABAD
		(e)	WAAREE INDUSTRIES, MUMBAI
		(f)	H.GURU INSTRUMENTS (SOUTH INDIA), BANGALORE
		(g)	WIKA INSTRUMENTS INDIA PVT. LTD., PUNE
		(h)	GOA INSTRUMENTS PVT. LTD.,
		(i)	MONOMETER, MUMBAI
		(j)	BELLS CONTROLS LTD., KOLKATA
		(k)	SWITZER INSTRUMENTS LTD., CHENNAI
		(l)	WIKA ALEXANDER WIEGAND GMBH&CO., GERMANY
		(m)	BUDENBURG GUAGE CO. LTD
		(n)	INSTRUMENTATION PVT. LTD., BANGALORE
		(o)	INDOSONIC INSTRUMENT, MUMBAI
		(p)	PRECISION
		(q)	ASHCROFT

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<u>SR. NO.</u>	<u>NAME OF EQUIPMENT / ITEM</u>		<u>APPROVED VENDORS</u>
1.15	TEMPERATURE GAUGE	(a)	GOA THERMOSTATIC INSTRUMENTS, GOA
		(b)	GENERAL INSTRUMENTS CONSORTIUM,
		(c)	A.N. INSTRUMENTS PVT. LTD., KOLKATA
		(d)	H. GURU INSTRUMENTS (SOUTH INDIA), BANGALORE
		(e)	FORBES MARSHALL, HYDERABAD
		(f)	WIKA INSTRUMENTS INDIA PVT. LTD., PUNE
		(g)	WAREE, DADRA GOA INSTRUMENTS PVT. LTD.,
		(h)	BELLS CONTROLS LTD., KOLKATA
		(i)	SWITZER INSTRUMENTS LTD., CHENNAI
		(j)	WIKA ALEXANDER WIEGAND GMBH&CO., GERMANY
		(k)	BUDENBURG GUAGE CO. LTD.
1.16	SWITCHES (PRESSURE, DIFF. PRESSURE)	(l)	INDOSONIC INSTRUMENT, MUMBAI
		(a)	INDFOSS INDUSTRIES LTD., GHAZIABAD
		(b)	SWITZER INSTRUMENTS COMPANY, CHENNAI
		(c)	SOR INC., USA
		(d)	PYROELECTRIC, GOA
		(e)	DRESSER INDUSTRIES INC, USA
		(f)	REGULATEURS GEORGIN, FRANCE

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<u>SR. NO.</u>	<u>NAME OF EQUIPMENT / ITEM</u>		<u>APPROVED VENDORS</u>
		(g)	DELTA CONTROLS LTD., U.K.
		(h)	KDG INSTRUMENTS LTD. U.K.
		(i)	ASHCROFT
		(j)	DWAYER, USA
		(k)	GENERAL INSTRUMENTS CONSORTIUM
1.17	TEMPERATURE SWITCH	(a)	INDFOSS INDUSTRIES LTD., GHAZIABAD
		(b)	SWITZER INSTRUMENTS COMPANY, CHENNAI
		(c)	GENERAL INSTRUMENTS CONSORTIUM, MUMBAI
		(d)	SOR INC., USA
		(e)	PYROELECTRIC, GOA DRESSER INDUSTRIES INC, USA
		(f)	REGULATEURS GEORGIN, FRANCE
		(g)	DELTA CONTROLS LTD., U.K.
		(h)	KDG INSTRUMENTS LTD. U.K.
1.18	AIR FILTER REGULATOR	(a)	PLACKA, CHENNAI
		(b)	SHAVO NORGREN, INDIA
1.19	MASS FLOW METER (CORROLIOUS PRINCIPLE)	(a)	EMERSON PROCESS MANAGEMENT (I) LTD
		(b)	ABB
		(c)	YOKOGAWA
		(d)	ENDRESS+ HAUESER
		(e)	GE SENSING & INSPECTION TECHNOLOGIES
		(f)	FORBES MARSHALL

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1X660MW BHUSAWAL TPS-UNIT:6
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<u>SR. NO.</u>	<u>NAME OF EQUIPMENT / ITEM</u>		<u>APPROVED VENDORS</u>
1.20	I/P CONVERTER	(a)	ECKHARDT, GERMANY
		(b)	MTL, CHENNAI
		(c)	ABB
		(d)	WATSON SMITH (PRESENTLY NORGREN)
		(e)	EMERSON PROCESS MGMT ASIA PACIFIC LTD.
		(f)	MOORE CONTROLS
1.21	FLOW ELEMENTS	(a)	INSTRUMENTATION LTD.
		(b)	MICRO PRECISION PRODUCTS
		(c)	ENGINEERING SPECIALITIES PVT. LTD.
		(d)	GENERAL INSTRUMENTS
1.22	LEVEL GAUGES (FLOAT TYPE)	(a)	SB ELECTRO
		(b)	SIGMA
		(c)	V AUTOMAT
		(d)	LEVCON
		(e)	CHEMTROLS
		(f)	ASIAN INDUSTRIAL VALVES
1.23	ORP TRANSMITTERS	(a)	FORBES MARSHALL
1.24	DENSITY METER (NUCLEONIC TYPE)	(a)	ENDRESS + HAUSER
		(b)	THERMO MEASURE TECH.
		(c)	CHEMTROL (THERMO FISHER)
1.25	DENSITY METER (NON-NUCLEONIC TYPE)	(a)	ENDRESS + HAUSER
		(b)	THERMO MEASURE TECH.
		(c)	CHEMTROL (THERMO FISHER)

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<u>SR. NO.</u>	<u>NAME OF EQUIPMENT / ITEM</u>		<u>APPROVED VENDORS</u>
1.26	SOLID MASS FLOW METER	(a)	SIEMENS MILLTRONICS
		(b)	CHEMTROL (THERMO FISHER)
		(c)	SIEMENS INSTRUMENTS, CANADA
1.27	PULL CORD SWITCH	(a)	JAYASHREE ELECTRODEVICES PVT. LTD.
		(b)	A.G. SYSTEM CONTROLS, MUMBAI
1.28	BELT SWAY SWITCH	(a)	JAYASHREE ELECTRODEVICES PVT. LTD.
		(b)	A.G. SYSTEM CONTROLS, MUMBAI
1.29	ZERO SPEED SWITCH	(a)	A.G. ELECTRONICS
		(b)	JAYASHREE ELECTRODEVICES PVT. LTD.
1.30	PROXIMITY SWITCH	(a)	AW
		(b)	JAYASHREE ELECTRODEVICES PVT. LTD.
1.31	LEVEL SWITCH (RF TYPE)	(a)	EIP ENVIRO LEVEL CONTROLS
2.0	<u>DCS, HMI, MONITORING AND PLC SYSTEMS:</u>		
2.1	DDCMIS	(a)	ABB.
		(b)	YOKOGAWA
		(c)	SIEMENS.
		(d)	BHEL
		(e)	EMERSON PROCESS MANAGEMENT
		(f)	MHI
2.2	PLC	(a)	ALLEN BRADLEY.
		(b)	SCHNEIDER
		(c)	ROCKWELL

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<u>SR. NO.</u>	<u>NAME OF EQUIPMENT / ITEM</u>		<u>APPROVED VENDORS</u>
		(d)	GE FANUC
2.3	MASTER SLAVE CLOCK	(a)	SYMMETRICOM INC., USA
		(b)	HOPF, GERMANY
		(c)	HATHWAY, USA
		(d)	SERTEL ELECTRONICS, CHENNAI
		(e)	ADVANCE MICRONIC
2.4	DOT MATRIX PRINTER	(a)	HP / EPSON / WIPRO / TVS / SAMSUNG
2.5	LASER & COLOUR INKJET PRINTERS	(b)	HP / EPSON / CANON / IBM / XEROX / SAMSUNG
2.6	COMPUTERS FOR OPERATOR / ENGINEER / HISTORY STATION, SHIFT SUPERVISOR, STORIAN, SOFT LINK STATION FOR INTERFACING WITH OTHER SYSTEMS, PERFORMANCE CALCULATION AND SER STATION	(a)	IBM
		(b)	DELL
		(c)	HP/COMPAQ
2.7	TFT MONITOR	(a)	LG / SAMSUNG / HP / COMPAQ / IBM / DELL
2.8	VIBRATION MONITORING SYSTEM & TURBO-SUPERVISORY INSTRUMENTS	(a)	ROCKWELL AUTOMATION, USA
		(b)	BENTLEY NEVADA, USA / INDIA
		(c)	SHINKAWA, JAPAN / FORBES MARSHALL,
		(d)	VIBROMETER, SWITZERLAND
2.9	LARGE VIDEO SCREENS	(a)	BARCO BELGIUM / BARCO, INDIA
		(b)	PLANAR, USA / PYROTECH, INDIA
		(c)	CHRISTIE, USA / CHRISTIE, INDIA

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<u>SR. NO.</u>	<u>NAME OF EQUIPMENT / ITEM</u>		<u>APPROVED VENDORS</u>
		(d)	SYNELEC
		(e)	DELTA, THAILAND / DELTA POWER SYSTEMS, INDIA
2.10	HART COMMUNICATOR	(a)	HONEYWELL, USA/PUNE
		(b)	EMERSON PROCESS (FORMERLY FISHER ROSEMOUNT), USA / DAMAN
		(c)	YOKOGAWA, JAPAN / YOKOGAWA, INDIA
		(d)	MERIAM, USA / CHEMTROLS, MUMBAI
		(e)	ABB, GERMANY / INDIA
		(f)	FUJI, JAPAN
2.11	HART MANAGEMENT SYSTEM	(a)	PEPPERL+FUCKS, GERMANY / INDIA
		(b)	MTL, UK / INDIA
		(c)	EMERSON PROCESS, USA / DAMAN
2.12	ALARM ANNUNCIATION SYSTEM	(a)	PROCON, CHENNAI
		(b)	I I C, HYDERABAD
		(c)	MINILEC, PUNE
		(d)	IIC, MUMBAI
		(e)	PIRIE, MUMBAI
		(f)	PECON, VADODARA
		(g)	POSITRONICS
2.13	RCMS (ROTATING MACHINE CONDITION MONITORING SYSTEM)	(a)	VIBROTECH (M/S MEGITT INDIA PVT. LTD.)
		(b)	M/S SKF INDIA LTD.
2.14	ACOUSTIC PYROMETER	(a)	BONNENBERG + DRESCHER GMBH, GERMANY

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<u>SR. NO.</u>	<u>NAME OF EQUIPMENT / ITEM</u>		<u>APPROVED VENDORS</u>
2.15	ACOUSTIC STEAM LEAK DETECTION SYSTEM (ASLD)	(a)	HI-TECH SYSTEM & SERVICES LTD, NEW DELHI (AMI MAKE)
		(b)	SARTECH INTL, CHENNAI (INSTROTECH MAKE INSPECTA FFT
2.16	EPABX SYSTEM	(a)	SIEMENS
		(b)	BPL
2.17	FURNACE TV CAMERA SYSTEM	(c)	HITECH SYSTEM & SERVICES LTD. (M/S LENOX INSTRUMENT COMPANY INC., USA
3.0	<u>ELECTRICAL & SECONDARY INSTRUMENTS:</u>		
3.1	DIGITAL INDICATOR	(a)	ABB, GERMANY / FARIDABAD
		(b)	MASSIBUS, GANDHINAGAR PYROTECH, UDAIPUR
		(c)	LEKTROTEK, PUNE
		(d)	GOSEN / CAMILLE BAUER / METRAWATT YOKOGAWA, JAPAN / INDIA
		(e)	SIEMENS
3.2	BARGRAPH INDICATORS	(a)	ABB, GERMANY / FARIDABAD
		(b)	MASSIBUS, GANDHINAGAR
		(c)	PYROTECH, UDAIPUR
		(d)	LEKTROTEK, PUNE
		(e)	GOSEN / CAMILLE BAUER / METRAWATT
		(f)	M-SYSTEM, JAPAN (CHINO LAXSONS DAMAN)
		(g)	SIEMENS

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<u>SR. NO.</u>	<u>NAME OF EQUIPMENT / ITEM</u>		<u>APPROVED VENDORS</u>
3.3	PEN, POINT AND CHARTLESS RECORDERS	(a)	EUROTHERM, UK
		(b)	TATA HONEYWELL
		(c)	YOKOGAWA, JAPAN (YOKOGAWA, INDIA)
		(d)	CHINO (LAXSON), JAPAN
		(e)	ABB, UK / GERMANY
		(f)	FUJI ELECTRIC, JAPAN
3.4	TRANSDUCERS	(a)	SEIMENS
		(b)	AUTOMATIC ELECTRIC LTD., MUMBAI
		(c)	PYROTECH, UDAIPUR
		(d)	SOUTHERN TRANSDUCERS, CHENNAI
		(e)	ACCORD, PUNE MECO, MUMBAI
		(f)	ABB
		(g)	SITU, MUMBAI
		(h)	RISHABH
		(i)	ADEPT, PUNE
3.5	ELECTRICAL ANALOG (PANEL) METERS	(a)	AUTOMATIC ELECTRIC LTD., MUMBAI
		(b)	MECO, MUMBAI
		(c)	RISHAB, NASIK
3.6	SELECTOR SWITCHES AND CONTROL SWITCHES	(a)	KAYCEE
		(b)	ALSTOM
		(c)	L & T
		(d)	SIEMENS

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<u>SR. NO.</u>	<u>NAME OF EQUIPMENT / ITEM</u>		<u>APPROVED VENDORS</u>
3.7	MOSAIC ANALOG (MOVING COIL) INDICATORS	(a)	GOSSEN, GERMANY
		(b)	WEIGEL, GERMANY
3.8	MOSAIC DIGITAL INDICATORS	(a)	GOSSEN, GERMANY
		(b)	WEIGEL, GERMANY
3.9	INTERPOSING RELAYS FOR COMMAND OUTPUT TO MCC	(a)	JYOTI
		(b)	H&B
		(c)	ALSTOM
		(d)	ELASTA
		(e)	OEN SIEMENS
		(f)	ABB
3.10	RELAYS / AUX. CONTACTORS	(a)	TELEMECANIQUE & CTRLS
		(b)	ABB
		(c)	SIEMENS
		(d)	GEC – ALSTOM
		(e)	L & T
3.11	LIMIT SWITCHES	(a)	BHARTIYA CUTLER & HAMMER, FARIDABAD
3.12	MINIATURIZED PUSH BUTTONS / ILPB (24X48MM) MOSAIC GRID COMPATIBLE	(a)	SIEMENS
		(b)	TEW, GERMANY (OLD NAME SUBKLEW)
4.0	<u>CONTROL DESKS & PANELS:</u>		
4.1	UNIT CONTROL PANELS (UCP)/ ELECTRICAL CONTROL PANEL (ECP)/ CONTROL DESK (MOSAIC GRID BASED)	(a)	BHEL EDN
		(b)	PYRO TECH, UDAIPUR
		(c)	INSTRUMENTATION LTD. KOTA
		(d)	KHODAY CONTROL SYSTEMS, BANGALORE

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<u>SR. NO.</u>	<u>NAME OF EQUIPMENT / ITEM</u>		<u>APPROVED VENDORS</u>
		(e)	CHEMIN CONTROLS, PONDICHERRY
4.2	CRT DESK / OPERATOR DESK	(a)	PYRO TECH, UDAIPUR
		(b)	INSTRUMENTATION LTD. KOTA
		(c)	KHODAY CONTROL SYSTEMS, BANGALORE
		(d)	CHEMIN CONTROLS, PONDICHERRY
4.3	MOSAIC GRID/ MOSAIC TILES & OTHER MOSAIC ITEMS	(a)	SYMO, SWITZERLAND
		(b)	TEW, GERMANY (OLD NAME SUBKLEW)
		(c)	PYROTECH
4.4	LOCAL PANELS / DISTRIBUTION BOARDS	(a)	CONTROL & SCHEMATICS
		(b)	PYROTECH
		(c)	RITTAL
		(d)	L&T
4.5	TERMINAL BLOCKS	(e)	ELMEX
		(f)	PHOENIX
		(g)	WAGO
5.0	<u>ANALYSERS:</u>		
5.1	SWAS ANALYSERS	(a)	POLYMETRON / ZELLWEGGER – ANALYTICALS
		(b)	ABB
		(c)	ORION, USA
		(d)	ROSEMOUNT ANALYTICAL- CHEMPURE,
		(e)	HACH ULTRA FRANCE,
		(f)	HACH USA

**TECHNICAL SPECIFICATION FOR
DM PLANT
1X660MW BHUSAWAL TPS-UNIT:6
MAHARASHTRA, INDIA.**

<u>SR. NO.</u>	<u>NAME OF EQUIPMENT / ITEM</u>		<u>APPROVED VENDORS</u>
		(g)	YOKOGAWA
		(h)	AMETECH
		(i)	FORBES MARSHALL
		(j)	EMERSON
5.2	SWAS (STEAM AND WATER ANALYSIS SYSTEM) PANELS	(a)	ABB KENT, U.K.
		(b)	ABB LTD. FARIDABAD
		(c)	FORBES MARSHAL
		(d)	EMERSON PROCESS MANAGEMENT INSTRUMENTATION LTD., KOTA
		(e)	YOKOGAWA
5.3	CO ANALYSER (IN SITU TYPE)	(a)	AMETEK, USA / SINGAPORE
		(b)	CODEL INTERNATIONAL LTD. UK
		(c)	LAND COMBUSTION UK
5.4	OXYGEN IN FLUE GAS ANALYSER (ZIRCONIA PROBE TYPE)	(a)	AMETEK, USA / SINGAPORE
		(b)	LAND INSTRUMENTS, UK
		(c)	EMERSON PROCESS MANAGEMENT (I) LTD
		(d)	YOKOGAWA, JAPAN
		(e)	ENOTECH, GERMANY
		(f)	ABB, UK
		(g)	TELEDYNE, USA
		(h)	FUJI (AIC)
5.5	SMOKE DENSITY ANALYSER / PARTICULATE EMISSION ANALYSER / OPACITY ANALYSER	(a)	DURAG, GERMANY
		(b)	CODEL, UK
		(c)	LAND COMBUSTION UK

**TECHNICAL SPECIFICATION FOR
DM PLANT
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MAHARASHTRA, INDIA.**

<u>SR. NO.</u>	<u>NAME OF EQUIPMENT / ITEM</u>		<u>APPROVED VENDORS</u>
		(d)	EMERSON
		(e)	ABB
		(f)	FUJI (AIC)
5.6	NOX / SO2 ANALYSER (IN SITU)	(a)	CODEL, UK
		(b)	FORBES MARSHALL
		(c)	LAND COMBUSTION, UK
5.7	OZONE ANALYSER	(a)	BMT MESSTECHNIK, GMBH
5.8	RESIDUAL OZONE ANALYSER	(a)	ECO SENSORS / KAUFFMANN UMWITTECHNIK .EK
5.9	OZONE LEAK DETECTOR	(a)	OTTPL
6.0	<u>CONTROL VALVES / ACTUATORS / SOLENOID VALVES:</u>		
6.1	ELECTRICAL ACTUATORS FOR REGULATING & OPEN / CLOSE VALVES	(a)	ROTORK CONTROL (INDIA) LTD.,
		(b)	AUMA (INDIA) LTD.,
		(c)	LIMITORQUE INDIA LTD.
6.2	PNEUMATIC ACTUATORS-REGULATING & OPEN / CLOSE	(d)	INSTRUMENTATION LTD., PALGHAT
		(e)	KELTRON CONTROLS, KERALA
6.3	SH/RH SPRAY CONTROL VALVES	(a)	MIL CONTROLS LTD.
	SH/RH SPRAY BLOCK VALVES	(b)	INSTRUMENTATION LTD. PALGHAT
	FEED CONTROL VALVES	(c)	FISHER SANMAR LTD.
		(d)	CONTROL COMPONENT INC., USA
		(e)	HORA (HOLTER REGELARMATUREN GMBH & CO.)
6.4	LFO/HFO CONTROL, AND TRIP VALVES, FLOW CONTROL, PRESSURE	(a)	MIL CONTROLS LTD.
		(b)	INSTRUMENTATION LTD. PALGHAT

**TECHNICAL SPECIFICATION FOR
DM PLANT
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MAHARASHTRA, INDIA.**

<u>SR. NO.</u>	<u>NAME OF EQUIPMENT / ITEM</u>		<u>APPROVED VENDORS</u>
	CONTROL, TEMP. CONTROL, AND BURNER TRIP VALVES, BALL VALVES	(c)	FOURESS ENGG (I) LTD, BANGALORE
		(d)	SAMSON CONTROLS , PUNE
6.5	SOOT BLOWER PRESSURE REDUCING VALVE	(a)	MIL CONTROLS LTD.
		(b)	INSTRUMENTATION LTD., PALGHAT
		(c)	FISHER SANMAR LTD.
		(d)	CONTROL COMPONENT INC., USA
		(e)	HORA (HOLTER REGELARMATUREN GMBH & CO.)
6.6	APRDS CONTROL VALVES	(a)	INSTRUMENTATION LTD.
		(b)	CONTROL COMPONENT INC., USA
		(c)	HORA (HOLTER REGELARMATUREN GMBH & CO.)
6.7	CONTROL VALVES- NON CRITICAL	(a)	DEZURIK COPES VULCAN LTD., U.K.
		(b)	CONTROL COMPONENT INC., USA
		(c)	FISHER SANMAR LIMITED
		(d)	INSTRUMENTATION LTD
		(e)	MIL CONTROL LTD.
		(f)	FISHER XOMOS SANMAR LTD.
		(g)	HORA (HOLTER REGELARMATUREN GMBH & CO.)
6.8	SOLENOID VALVE	(a)	ASCO, CHENNAI
		(b)	ROTEX AUTOMATION LTD., GUJRAT
		(c)	AVCON CONTROLS, MUMBAI
6.9	HP/LP BYPASS VALVES	(a)	BOPP & REUTHER SR GMBH CONTROL COMPONENTS INC (CCI)

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<u>SR. NO.</u>	<u>NAME OF EQUIPMENT / ITEM</u>		<u>APPROVED VENDORS</u>
6.10	ELECTRO-HYDRAULIC ACTUATOR	(a)	LEONARDO AUTOMATION (INDIA) PVT. LTD.
7.0	<u>ERECTION HARDWARES:</u>		
7.1	LOCAL INSTRUMENT RACK (LIR) AND LOCAL INSTRUMENT ENCLOSURES (LIE)	(a)	PYROTECH, UDAIPUR
		(b)	INSTRUMENTATION LTD., KOTA
		(c)	ELECTRONICS CORPORATION OF INDIA LTD., HYDERABAD
		(d)	CHEMIN CONTROLS, PONDICHERRY
		(e)	PRAMMEN INDUSTRIES
7.2	INSTRUMENT VALVES	(a)	EXCEL HYDRO PNEUMATICS PVT. LTD., MUMBAI
		(b)	BHEL
		(c)	METPRESS ENGINEERING WORKS, KOLKATA
		(d)	BALDOTA VALVE & FITTING CO. PVT. LTD., MUMBAI
		(e)	AURA INC., NEW DELHI
		(f)	INSTRUMENTATION LTD. PALGHAT
		(g)	PRECISION ENGG. INDUSTRIES, MUMBAI
		(h)	VIKAS INDUSTRIAL PRODUCTS, NEW DELHI
7.3	VALVE MANIFOLDS	(a)	EXCEL HYDRO PNEUMATICS PVT. LTD., MUMBAI
		(b)	METPRESS ENGINEERING WORKS, KOLKATA

**TECHNICAL SPECIFICATION FOR
DM PLANT
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<u>SR. NO.</u>	<u>NAME OF EQUIPMENT / ITEM</u>		<u>APPROVED VENDORS</u>
		(c)	BALDOTA VALVE & FITTING CO. PVT. LTD., MUMBAI
		(d)	AURA INC., NEW DELHI
		(e)	PRECISSION ENGG. INDUSTRIES, MUMBAI
		(f)	HP VALVES AND FITTINGS, CHENNAI
7.4	COMPRESSION FITTINGS / SOCKET WELD FITTINGS	(a)	SWAGELOCK, USA
		(b)	ASTEC VALVES & FITTINGS PVT. LTD.
		(c)	MET-LOK HYDRO PNEUMATICS PVT. LTD.
7.5	CONDENSATE POTS	(a)	EXCEL HYDRO-PNEUMATICS PVT. LTD., MUMBAI
		(b)	MICROPRECISION, FARIDABAD
		(c)	INSTRUMENTATION LTD. PALGHAT
		(d)	METPRESS ENGINEERING WORKS, KOLKATA
		(e)	BALDOTA VALVES & FITTINGS CO. PVT. LTD., MUMBAI
		(f)	PRECISSION ENGG. INDUSTRIES, MUMBAI
7.6	IMPULSE & SAMPLE PIPINGS	(a)	TPS TECHNITUBE ROHREN WERKE GMBH, GERMANY
		(b)	MAHARASHTRA SEAMLESS LTD.
		(c)	BHEL
		(d)	CHOKSI TUBE COMPANY LTD., INDIA
		(e)	INDIAN SEAMLESS METAL TUBES LTD., INDIA
		(f)	MANNESMANN AG, GERMANY