



An ISO 9001
Company

Bharat Heavy Electricals Limited

(High Pressure Boiler Plant)
Tiruchirappalli – 620014, TAMIL NADU, INDIA
MATERIALS MANAGEMENT

TITLE Online Carbon in ash Analyser System	Phone: +91 431 257 7072 Fax : +91 431 252 0719 Email : gmuru@bheltry.co.in
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	Reference Number: Enquiry 1701701220	Enquiry Date: 07.06.2017	Due date for submission of quotation: 07.07.2017
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You are requested to quote the Enquiry number date and due date in all your correspondences. This is only a request for quotation and not an order

BHEL/Trichy is looking for empanelment of new vendors for supply of " Online Carbon in ash Analyser System"

BHEL commercial terms & conditions and all annexure can be downloaded from BHEL web site <http://www.bhel.com> or from the Government tender website <http://tenders.gov.in> (public sector units) Bharath Heavy Electricals Limited) under enquiry reference "XXXXXXXXXX "

Tenders should reach us before 14:00 hours on the due date
Technical bid will be opened at 14:30 hours on the due date
Tenders would be opened in presence of the tenderers who have submitted their offers and who may like to be present.

Yours faithfully,
For **Bharath Heavy Electricals Limited**


DGM / MM



BHARAT HEAVY ELECTRICALS LIMITED

(A Government of India Undertaking)
HIGH PRESSURE BOILER PLANT
PURCHASE DEPARTMENT - FOSSIL BOILERS
THIRUCHIRAPALLI - 620014
TAMILNADU (INDIA)

PHONE :0431-2574111
GRAMS : BHARATELEC
FAX NO: 0431-2520719
E-mail:
Web:

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Enquiry No	Enquiry Date	Due Date for Quotation
1701701220	07.06.2017	07.07.2017
Please quote Enquiry No, Date and due date in all correspondences. This is only a request for quotation and not an order. Bid should be submitted in two parts. 1.Techno-commercial bid (Part-I) and 2.Price bid(Part-II) in a separate sealed cover and both covers must be placed in a third cover and sealed. Our Enquiry No., Enq. date & Enq. Due date must be written on all three covers.		

Item	Description	Unit	Quantity	Delivery Quantity	Schedule Date
10	A171519708401001 CARBON IN ASH ANALYSER SYSTEM CARBON IN ASH ANALYSER SYSTEM & ACCESSORIES AS PER TECHNICAL SPECIFICATION TDC:TCI:334 REV. 00	SET	3.000	3.00	31.10.17

General Note:

1. This requirement is for NPGCL NABINAGAR 660MW - 1 to 3(1715,1716,1717) projects requirement.

2. SUPPLY OF ONLINE CARBON IN ASH ANALYSER SYSTEM AS PER SPECIFICATION TDC:TCI:334/Rev00.

3. Instruction for Indigenous Vendors:

a). Offer must be on three part basis and needs to be submitted on FOR/ NPGCL NABINAGAR 660MW-1 to 3(1715,1716,1717) projects Site basis inclusive of packing & forwarding, Separate charges for freight shall be indicated clearly. Insurance charges shall be BHEL scope.

b). Charges for freight should be indicated clearly and separately in the offer and Annexure -D compulsorily without fail.Part 1 consists of PQR, Part 2 is technical Bid and Part 3 is Price Bid in separate sealed covers. All three sealed covers shall then be put in a fourth sealed cover. Our Enquiry No, Enquiry date, Enquiry due date must be written on all four covers. (Refer Annexure - C)

c). Indicate clearly all the taxes & duties applicable with exact Percentage.

d). Excise Duty exemption is applicable for this project.

4. Instruction for Foreign Vendors:

a). Offer must be on three part basis for FOB/nearest gateway airport basis inclusive of packing & forwarding. (Schedule - F is attached for gateway airport details)

The offers should reach us 30 minutes before the time of opening of tenders. The offers will be opened at 14.30 hrs on the due date of tender in the presence of tenderers who have submitted their offer and who may like to be present for the tender opening.Late and delayed offers are liable to be rejected.

Yours faithfully,
For BHARAT HEAVY ELECTRICALS LIMITED

G. Murugesan
G. MURUGESAN
MANAGER / PURCHASE
(FOSSIL BOILERS)
Materials Management / BOI
BHEL, TRICHY - 620 014.



429-002/A

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b) Materials are to be despatched to Manager/Matl.services, ROD/BHEL
 ,165, Thambu Chetty Street, Chennai-600001, Tamilnadu, India.

c). It is mandatory to indicate the import portion weight in Kgs for
 actual material weight and material weight along with packing in your
 offer. Part 1 consists of PQR, Part 2 is technical Bid and Part 3 is
 Price Bid in separate sealed covers. All three sealed covers shall then
 be put in a fourth sealed cover. Our Enquiry No, Enquiry date, Enquiry
 due date must be written on all four covers. (Refer Annexure - C)

d). Indicate clearly all the applicable extra Charges such as FOB, P
 &F, Inspection etc. with exact percentage.

5. Common points for all Vendors:

a). Quote should confirm our specifications, enclosed commercial terms
 & conditions along with MSE clause, Loading Criteria
 (Annexure-B). Point wise confirmation are to be submitted along with
 your quote duly signed, stamped to enable BHEL to ensure technical
 suitability. Any deviation should be specified without fail clearly in
 the no deviation format and the failure to
 comply with the same may make your quotation liable for rejection.

b). Vendor to submit their own quality plan for ONLINE CARBON IN ASH
 ANALYSER SYSTEM along with the offer for BHEL/End Customer's approval.
 VQP will be subject to BHEL approval after placement of order.

c). In addition prices for complete erection & Commissioning of
 Online Carbon in Ash Analyser system at site including
 necessary Manpower and Material at site shall be mentioned separately
 and clearly in the offer.

d). Suitable Erection support materials to be supplied by vendor.

e). The enquiry deviation form shall be submitted after filling up all
 the references and deviations if any duly signed and stamped.

f). The BHEL standard enquiry terms and conditions (Annexure - B &
 Annexure - D) shall be duly filled, signed & stamped and sent
 along with the offer.

g). Entire project requirement will be considered as a single package
 for evaluation purpose and L1 finalization. L1 finalization will be done
 based on total cost BHEL
 basis and it includes the supervision of erection and commissioning
 charges, Commissioning spares and Training Charges.

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 BHEL, TRICHY - 620 014.

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h). Inspection shall be carried out by respective BHEL approved third party inspection agency for indigenous vendors and the customer itself as per applicability. Foreign vendors need to submit all the necessary test certificates to obtain BHEL clearance before dispatch.

i) Applicable Testing and Certification charges if any shall be indicated clearly and separately in the quotation. Taxes/duties applicable on the Testing and certification charges should be clearly indicated in the quotation. If the same is found to be missing then it would be taken as inclusive in the quoted amount.

j). Two sets of O & M Manual consisting of approved drawings in PDF format (soft copy) in CDs are to be submitted to the buyer along with dispatch documents. No hard copy is warranted. Please note.

k). The delivery dates indicated above are tentative and the exact delivery date will be indicated in the purchase order.

l). In addition to technical and commercial conditions, vendors should note and follow the following conditions (01 and 02).

Condition - 1 for customer approved vendors who are not in BHEL PMD:

Vendor shall submit the filled in "Supplier Registration Forms" (available in www.bhel.com) along with their offer.

Techno-commercial bid will be opened on the due date as indicated in enquiry. Vendor's offer will only be considered, provided they are registered with permanent code in line with the provisions of SEARP (Supplier Evaluation Approval & Review Procedure), vide ref. AA:SSP:SR:01, Rev.02 dt. 26.09.2016, before price bid opening (as per PP clause no 5.2.1). If vendor is not fulfilling the above criteria, offer will be rejected. (Refer Annexure - C)

Condition - 2 for New Vendors:

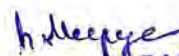
If new vendor is responding to this open tender who is not approved in BHEL PMD as well as not approved by customer, should get qualified by both BHEL as well as customer before price bid opening. If vendor is not fulfilling the above criteria, offer will be rejected. (Refer Annexure -C)

m). Important note for MSE clause:

All vendors are requested to note the Annexure X -Special clauses for Micro and Small Enterprises (MSE) suppliers.

The offers should reach us 30 minutes before the time of opening of tenders. The offers will be opened at 14.30 hrs on the due date of tender in the presence of tenderers who have submitted their offer and who may like to be present for the tender opening. Late and delayed offers are liable to be rejected.

Yours faithfully,
For BHARAT HEAVY ELECTRICALS LIMITED


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MANAGER / PURCHASE
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BHEL, TRICHY - 620 014.



429-002/A

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If L1 vendor is an MSE vendor entire project package will be ordered on L1 vendor. If a Non MSE vendor is coming as L1, then L1 prices will be counteroffered on MSE vendor who is quoting price within the price band L1+15% and if they are agreeing purchase order will be awarded for full/complete supply of total tendered value to MSE. If more than one MSE vendors are available in the L1+15% price band then lowest of the MSE vendor will be selected for counteroffering. If lowest MSE vendor is not accepting it will be counteroffered to the next MSE vendor in the price band and so on. Finally if any of the MSE vendor in the price band is not accepting it will be ordered on L1 non MSE vendor. MSE suppliers can avail the intended benefits only if they submit along with the offer, attested copies of documents as mentioned in the Annexure X. Since the complete enquiry requirement is being considered as a single package for tender evaluation purpose, therefore, MSE clause will not be applicable to those indigenous vendors who are quoting only for a part of the enquiry in partnership with a foreign vendor. MSE clause can be used only by an indigenous vendor who is quoting for the full enquiry requirement on its own. All the MSE related current and valid documents must be provided along with the offer without fail.

n). This tender has been published on BHEL & NIC website http://www.bhel.com/tender/tender_home.php & <http://tenders.gov.in> and also in leading national dailies (All editions of 1. Financial Express, 2. Business Standard (English & Hindi) and 3. Global Tender package of Financial Times, UK) with ref no NIT_xxxxx. All corrigendum will be published on BHEL & NIC websites only, vendors are requested to visit these websites regularly.

o). No representative is allowed to attend tender opening without authorisation letter from competent authority of the firm.

p). VENDOR SHALL SUBMIT UNPRICED BID FORMAT (ANNEXURE - D) & FILLED STANDARD ENQUIRY TERMS & CONDITIONS(ANNEXURE -B) ALONG WITH TECHNO-COMMERCIAL OFFER with duly signed, stamped. IF NOT, THEIR OFFER IS LIABLE FOR REJECTION. Also the filled Annexure - D shall be attached with PRICE BID with duly signed and stamped.

q). If there is any clarifications, you are requested to contact: Sri.G. Murugesan, Engineer/MM/BOI, BHEL, Trichy-620014. Ph.:+91 431 2577072; e-mail: qmuru@bheltry.co.in

All the tenders may be addressed to the following address:

**The Tender Opening Cell / MM
 Room No: 26, Building 24, Ground Floor
 Bharat Heavy Electricals Limited
 TIRUCHIRAPALLI 620014**

The offers should reach us 30 minutes before the time of opening of tenders. The offers will be opened at 14.30 hrs on the due date of tender in the presence of tenderers who have submitted their offer and who may like to be present for the tender opening. Late and delayed offers are liable to be rejected.

Yours faithfully,
 For BHARAT HEAVY ELECTRICALS LIMITED

G. Murugesan
G. MURUGESAN
 MANAGER / PURCHASE
 (FOSSIL BOILERS)
 Materials Management / BOI
 Yours faithfully
 BHEL, TRICHY - 620 014.

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In case personal delivery of the offer, it shall be dropped into the respective box kept in Room No: 26, after duly entering the data in the system.

Offers will be accepted only up to 14.00 Hrs on the due date. Therefore, vendors shall ensure to submit the offers well before this time. All due date extension requirements should be addressed to the respective Purchase mail IDs. All the due date extension requests from vendors will be considered only up to 48 hours before the due date and time.

Vendors are requested to avoid submission of offers through e mail / fax. In case of any unavoidable situation, offers shall be sent through e mail to the following mail ID only
tender_cell@bheltry.co.in.

As tenders are being opened by Common Tender Opening Cell, offer covers should be sealed with tenderer's distinctive seal and super scribed with correct Tender No. item of supply and due date of opening.

The offers will be opened at 14.30 hrs on the due date of the tender in the presence of tenderers who have submitted their offer and who may like to be present for the tender opening. Late and delayed offers are liable to be rejected.

The bidder along with its associate/ collaborators/ sub-contractors/ sub-vendors/ consultants/ service providers shall strictly adhere to BHEL fraud prevention policy displayed on BHEL website <http://www.bhel.com> and shall immediately bring to the notice of BHEL management about any fraud or suspected fraud as soon as it comes to their notice.

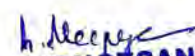
The supplier shall submit EI/EII forms to BHEL time to time as indicated by the BHEL and in case of inordinate delay in issuing EI/EII forms, then BHEL reserves the right to deduct 5% of the value of the supplied items against which EI/EII forms pending to be issued

Enclosures:

- 1) SPECIFICATION: TDC:TCI:334/Rev00.
- 2) Annexure - B for indigenous vendor (Commercial terms and conditions along with MSE clause & Loading Criteria).
- 3) Annexure - B for import vendor (Commercial terms and conditions along with MSE clause & Loading Criteria).
- 4) Annexure - X for MSE clause.
- 5) Annexure - C for Special Terms & Condition (Three part details & SRF formalities).
- 6) No deviation format (Enquiry deviation).
- 7) Schedule F for details of Gateway Airport.

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For BHARAT HEAVY ELECTRICALS LIMITED


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Purchase Department / BOI
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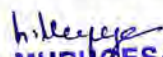
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8) ANNEXURE - D, UNPRICED & PRICED BID FORMAT FOR INDIGENOUS AND IMPORT VENDORS.

"LD clause has to be confirmed without fail."

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MANAGER / PURCHASE
(FOSSIL BOILERS)
Materials Management / BOI
BHEL, TRICHY - 620 014.

BHARAT HEAVY ELECTRICALS LIMITED, TIRUCHIRAPPALLI - 620 014
CONTROLS AND INSTRUMENTATION / FB



STANDARD TECHNICAL SPECIFICATION FOR ONLINE CARBON
IN ASH ANALYSER SYSTEM

SPECIFICATON NUMBER: TDC:TCI:334 / Rev 00

00	14-03-17	Initial Release	 (SK)	 (KV)	 (VA)	 (TK)
REV. NO.	DATE	DESCRIPTION	PREPARED	ENGG	QAC	APPROVED
				REVIEWED		

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1.0 GENERAL INSTRUCTIONS TO VENDORS:

- 1.1 Vendor to check receipt of complete documents referred to in the 'Contents'. In the event of order, the entire specification will form part of purchase order for compliance during execution.
- 1.2 Deviation if any shall be clearly brought out in the "Deviation format". In case of no deviation, 'NIL' statement shall be filled in, authenticated and furnished along with the offer.
- 1.3 Nothing in this specification shall be construed to relieve the vendor from his responsibility. The specification covers briefly the requirement of online carbon in ash analyser System. It is the responsibility of the vendor to take care of other basic and essential requirements for the offered system.

2.0 Pre-Qualification requirement

2.1 The offered system shall be of proven design and shall be in successful operation for a period of 1 year in utility boiler of similar rating and type of fuel.

2.2 Bidder to provide performance certificates / authentication letters in favour of OEM from each end user certifying the same. The manufacturer (OEM) shall be an approved vendor of NTPC Limited.

2.3 Commissioning and service support for the offered system shall be available in India.

The above pre-qualification requirement is mandatory for technical offer evaluation. Pre-Qualification requirement shall be furnished by the vendor during offer submission as per the format given in annexure I.

3.0 SCOPE

3.1 The scope of work includes design, engineering, manufacturing, fabrication, assembly, painting, inspection, Factory Acceptance Test, packing, supply, integrating the system at Project site (along with loose components / modules in case of loose supply of the same) with the supplied system peripherals, Erection, Commissioning (inclusive of Travel fares & accommodation of the engineers/ technicians), Calibration, carrying out Site Acceptance Test and proving the performance of the system. The system shall fully comply with this specification for meeting the entire functional and operational requirement.

3.2 The scope of supply of equipment includes, but not limited to the following:

- a. One no. Carbon in ash analyser system per Steam Generator, along with all accessories for on line continuous monitoring of unburnt carbon in ash based on proven technology shall be provided at Economiser / air heater hopper / ducts (The location shall be finalized during detailed engineering).
- b. Any modifications required for installing vendor's equipment in the existing ducts or hopper to be in vendor's scope.

- c. Provision for shifting the measurement location (e.g from one hopper to a nearby hopper) shall be feasible and involve only minimum modification.
 - d. Necessary measurement probes, control cabinet, isolation valves, solenoid valves, root valves, piping, Copper-tubing, air filter regulator, instruments, hoses etc. as required shall be provided by the bidder.
 - e. Bidder shall supply all the necessary hardware, cables and connector for the subject package & associated system in their scope. This includes supply of all power cables (for internal distribution), control cables/communication cables to complete the installation.
 - f. Required field and control cabinets.
 - g. All required interconnecting cables, including power cables, from sensor to field cabinet, field cabinet to control cabinet and control cabinet to DCS (4-20mA as well as RS 485). Cable specification as per Annexure-III.
 - h. HMI to provide the required user interface.
 - i. Commissioning Spares required for successful commissioning and handing over of the system shall be included in the offer.
 - j. All items, both hardware and software, as required to make the system complete shall be included.
 - k. It is to be specifically noted by the vendor that the responsibility of proving and fulfilling the functional requirements of the system solely rests with the vendor.
- 3.3 The Vendor shall provide all material, equipment and services so as to make a totally integrated System together with all accessories and associated equipment's ensuring operability, maintainability and reliability. This work shall be consistent with modern power plant practices and shall be in compliance with all applicable codes, standards, guides, statutory regulations and safety requirements in force.
- 3.4 Vendor shall also include in his proposal and shall furnish all equipment, devices and services which may not be specifically stated in the specification but are needed for completeness of the equipment/systems furnished by the Vendor and for meeting the intent and requirements of the specification.
- 3.5 The input power supply source of 230VAC, Single phase, 50 Hz at single point (control cabinet) will be provided. Further distribution of power is in the scope of vendor. The vendor shall indicate the power required in wattage for the system. Other utilities like instrument air, service air etc., if required, shall be provided by purchaser at a single location. Further distribution shall be in the scope of vendor.
- 3.6 Substitutions: Should, in the performance of the work, the Bidder finds it necessary or desirable to make a substitution for either material or function, he shall request permission to make the substitution in writing. No substitution shall be made without the written approval of purchaser (BHEL).

3.7 If any up-gradation of the offered system is envisaged before completion of the job to meet the specified requirements, the same shall be incorporated in the system, with the approval of the Purchaser (BHEL) without any additional cost.

3.8 **Manufacturing clearance:** Vendor shall supply items required as per specification and demonstrate the performance to the customer M/s NTPC. In case the vendor is not able to demonstrate the system performance to the satisfaction of customer, the same shall be taken back by vendor. All required procedures and formalities for taking back the equipment shall be the responsibility of vendor without any cost implication to the purchaser.

4.0 FUNCTIONAL REQUIREMENTS

4.1 Application

One number (01) (per Steam Generator) online carbon in fly ash analyser along with all required accessories for on line continuous monitoring of unburnt carbon in ash based on Proven technology shall be provided at a suitable location. The location shall be finalized during detailed engineering. Further, provision shall be kept for installation of sensor in other location also.

4.2 System requirements

- (a) The system shall utilize microwave technology or other proven technology for online continuous monitoring of the unburnt carbon in fly ash. The number of sensors shall be decided to have complete profile per location.
- (b) The system shall measure unburnt carbon in fly ash at a location where a representative sample can be obtained / measured such as Eco Outlet hoppers/ APH Hoppers/ Flue gas ducts, the location of which will be decided during detail engineering.
- (c) The error in measuring system shall not be more than 0.6% over 0-20% unburnt carbon in fly ash, which shall be demonstrated by comparisons with laboratory measurements.
- (d) The measurement shall be updated atleast once in 15 minutes.
- (e) In order to maximize the reliability the number of moving parts on the sensor shall be minimized.
- (f) The measurement probes shall be suitably designed to meet continuous duty requirements in hot (up to 400 deg. C depending on location) & ash-laden environment and shall be with abrasion resistant material.
- (g) The system shall provide 4 – 20 mA analog output, potential free relay contacts for alarms, faults, etc. and RS485 compatible Modbus/Ethernet serial communication protocol.

- (h) One feeder of 230 Volts +/- 10% at a single point (Vendor's control cabinet) shall be provided. Further distribution board and any other hardware shall be in bidder's scope.
- (i) The control cabinet shall be preferably mounted free standing in the CCR/CER which is 300m away. Necessary cooling arrangement shall be integral to the control cabinets located in field due to distance limitations.
- (j) System shall have provision to collect sample for laboratory analysis.
- (k) Electrical panel specifications refer section 5.0

5.0. CABINETS/ ENCLOSURES/ PANELS

All system modules, power supply components, other control devices (except field mounted sensors/transmitters) which are required for completeness of the system shall be housed in cabinets.

All equipment and dedicated cabinets required for termination and proper interface within the system and also with other systems shall also be provided by the vendor.

The cabinet mounted equipment shall be fully assembled, installed in mounting racks, wired and fully tested as per specification requirements. Vendor shall ensure that the cabinets are complete and ready for installation before dispatch from manufacturing works. The installation work at project site for these cabinets should only involve cable interconnections.

Vendor shall clearly identify in his offer, the Bill of Material, the quantity of all the cabinets along with dimensional details as included in his offer.

The Control system cabinets shall house all types of modules / hardware to achieve all functions of Control System including signal conditioning modules, controller modules, I/O modules, communication controller modules and all other requisite hardware for a complete system. All system cabinets shall be totally enclosed (with front and back doors and side panels as applicable).

All the incoming / outgoing signals shall be grouped as per their origin / destination.

The terminals used for terminating the spare cores/pairs of field cables shall not be employed for terminating the spare channels of I/O modules.

The design of all the cabinets and layout of all equipment, terminal blocks etc. shall be as per purchaser's (BHEL) approval fully keeping in view the convenience of operation and maintenance personnel and shall be subject to approval during detailed engineering.

Field termination cabinets, physically separate from system cabinets, shall be provided for termination of field signals and mounting of field termination

Vendor shall design the cabinet internal arrangement, floor cut-out and cable gland plate such that all the cables entering or leaving the cabinet can be properly glanded in the gland plate. In case, glanding is not possible vendor shall indicate in his proposal his suggested procedure for cable entry and securing the cable in place. If gland plate is not provided, then a suitable plate of 2mm size shall be provided to close bottom entry of panels with proper fixing through screw at number of points for giving rigid support.

Vendor shall furnish the number of cables that can be connected in each cabinet. Vendor shall also provide after the final installation of the cable, a suitable sealing material on the gland plates to ensure absolute sealing of the cabinet bottom, thereby ensuring that no dust ingress takes place from the cable entry zones.

Vendor shall furnish with the proposal detailed drawings giving required information to demonstrate to the BHEL, the internal layouts of cabinets offered, constructional features of cabinets, system of packaging of control modules in racks, wiring and cabling techniques, termination method for field cables, test facilities provided, etc.

The protection class of cabinets and environmental rating shall be IP 55 or better for outdoor location and IP 54 for indoor location. Cooling fan shall be provided as required by the equipment design and shall be sound proof to the maximum feasible extent. Suitable louvers with wire mesh shall be provided on the cabinet.

The cabinets shall be totally enclosed, free standing type and shall be constructed with minimum 2 mm thick steel plate frame and 1.6 mm thick CRCA steel sheet or as per supplier's standard practice for similar applications, height of the cabinet is 2200mm (2315 mm-including base channel & anti-vibration pad) . The cabinets shall be equipped with full height front and rear doors. Depth of the cabinet shall be 800mm. (Applicable for control panels to be located in CER).

The floor mounting arrangement for cabinets shall be furnished by the vendor during detailed engineering.

Cabinet doors shall be SS hinged. Hinges shall be of concealed type, Door latches shall be of three-point type to assure tight closing.

Lifting eye bolts of required size shall be provided at the top of each separately shipped section and all necessary provisions shall be made to facilitate handling without damage.

Doors shall be provided with locking arrangements. If width of a cabinet is 600 mm or above double doors shall be provided.

Two spray coats of inhibitive epoxy primer-surface shall be applied to all exterior and interior surfaces. A minimum of 2 spray coats of final finish color shall be applied to all surfaces. The final finished thickness of paint film on steel shall not be less than 65-75 micron for sheet thickness of 2 mm and 50 microns for sheet thickness of 1.6 mm. As an alternative, single coat of anodic dip coat primer along with single textured powder coating with epoxy polyester meeting the thickness requirement is also acceptable.

The vendor shall furnish sufficient touch-up paint for one complete finish coat on all exterior factory applied painted surface of each item of equipment. The touch up paint shall be of the same type and color as the factory applied paint and shall be carefully packed to avoid damage during shipment.

The finish colors for exterior and interior surfaces shall conform to following shades: Front & Rear-RAL 9002; End panel side- RAL 5012. Internal color shall be same as external colour.

Paint films which show sags, checks or other imperfections shall not be acceptable.

Cabinets shall be designed for a grounded installation on the building structure. Any isolation from the building ground which is required by equipment design shall be provided internal to the cabinet.

All alarm contacts located within cabinets as well as inputs/outputs from other related system shall be suitably terminated in the cabinets.

5.1. Name plates / labels:

Panels shall be provided with clear engraved identification name plate for all the front mounted components. Name plate shall be 3.0 mm thick Non-Hygroscopic material engraved with white lettering. The inscription letter size shall be 15mm for Main name plate (inscribed as "Online Carbon in Ash Analyser system") and 3-5 mm for others. The labels for the components coming inside the panel shall be mounted directly below and shall be designated as per the circuit. Danger labels/ name plates shall be provided wherever necessary. Name plates shall be fixed by means of pan head screws or self-adhesive film.

5.2. Loose supply items:

Foundation bolts, double compression type cable glands for cables, cable lugs shall be supplied along with panel as loose supply items. This shall be listed separately in the packing list.

6.0. Factory Acceptance Test:

Authorization-to-ship-test (ATST) or Factory Acceptance Test (FAT) to be carried out in vendor works shall include all required tests to fully demonstrate to BHEL's and/or owner (NTPC) satisfaction that each equipment/sub-system/system as well as software modules furnished as per this specification fully meets the functional requirements of this specification and NTPC approved drawings/documents/test procedures.

7.0. SPECIAL INSTRUCTIONS

- 7.1 Vendor shall make visits to BHEL / Trichy for detailed engineering/discussion regarding location & mounting of sensors.
- 7.2 Vendor shall attend warranty / defect calls within 48 hours.
- 7.3 Vendor to supply the O & M manual in 'CD-ROM'

8.0. TRAINING

Training on the entire Software and Hardware of the offered Online Carbon in Ash analyser system shall be provided for a period not less than 8 man-days. Vendor shall clearly indicate the Training Schedule and Course contents for the above duration indicated, covering all the special components of the System, Application Software, System Software, Programming, and special care to be taken care during Erection of the system.

9.0. COMMISSIONING

The Complete responsibility of commissioning of the system lies with the vendor. All the commissioning Spares required for successful commissioning is in vendor scope. Vendor shall provide all services related to commissioning of the system supplied. After Commissioning of the system, Vendor's Engineer shall get the Protocols signed by the Owner (NTPC) of the plant and BHEL's site Engineer. After successful completion of Commissioning of the System, Vendor's Engineer shall get the Final Acceptance Protocol format signed by NTPC and BHEL's site Engineer and furnish the signed copies to BHEL Tiruchi. Without this document, Vendor's responsibility for completion of the system and handing it over to Owner (NTPC) is not deemed to have been completed. Charges for vendor's visit to site towards commissioning and handing over of the system shall be included in the price. This shall be valid for the entire period of the contract.

Any spare parts / items required for the system during commissioning shall be provided by the vendor. Vendor's engineer shall bring adequate spares for commissioning of the system and non-availability of any item shall not hold up the progress of commissioning of the system in any way. Vendor shall also furnish list of spares required for successful commissioning of the system.

10.0. DOCUMENTATION

Following document shall be submitted along with the offer in Triplicate:
(The documents shall be neat, legible and in English)

- (a) Filled in datasheet.
- (b) Detailed system description/configuration/arrangement drawing, operational write-up with working principles, bill of materials, drawings, datasheets, information, technical catalogues, test certificates, material

certificate, guarantee certificate, calibration certificate, characteristic curve (if applicable) and other detail as required to fully establish the capability and performance of the equipment and systems offered.

- (c)** Complete BOM for the offered system. The BOM submitted shall contain the make, model number, rating of the item. The import and indigenous content shall clearly brought out in the offer.
- (d)** Any previous factory acceptance test reports for a similar application qualifying the accuracy of the system with respect to laboratory measurement.
- (e)** Power requirements, Air requirements (in Nm³/hr), details of accessories etc. required to establish product quality and scope of supply.
- (f)** Schematic wiring drawing, general arrangement & Internal General Arrangement drawing of control panels.
- (g)** Bill of materials for special cable and cable accessories (if any).
- (h)** Signal exchange scheme with DDCMIS etc.
- (i)** Filled in technical data sheets.
- (j)** The break-up price for each component shall be furnished along with the offer, which shall be valid throughout contract period.
- (k)** Filled in "Deviation format" with reason / justification for the deviations taken.
- (l)** Separate offer for recommended spares for two years Operation and Maintenance which shall be valid throughout the contract period.
- (m)** List of Commissioning Spares required for successful commissioning and handing over of the system to the owner (NTPC).
- (n)** Requirement of electric power for utilities, service/ instrument air etc clearly defining continuous and intermittent requirement.
- (o)** List of reference of similar system already in service.
- (p)** All other documents not specifically mentioned here but required for completion of engineering work and proper coordination shall be unit wise.
- (q)** Procedure for Factory acceptance test and Site acceptance test for purchaser's(BHEL) and owner's (NTPC) approval.
- (r)** List and schedule of documents to be submitted by vendor for purchaser's (BHEL) and owner's (NTPC) approval / information after issue of Letter of intent(LOI).
- (s)** Training schedule and course content.
- (t)** List/description of various types of cable along with unit price.

Offer without the above documents will be considered as incomplete / non-responsive and liable for rejection.

Following documents shall be submitted after award of LOI

- 10.1. Vendor shall furnish a detailed list of documents along with the schedule for submission, after Letter of Intent (LOI) is awarded. This list shall be furnished along with the offer.
- 10.2. System OGA drawing, Bill of materials with make, model nos. and applicable literature/catalogues have to be furnished within 2 weeks from the date of LOI for Purchaser's (BHEL) Approval. All drawings for approval shall be submitted in 3 hard copies in addition to 3 CD ROMs.
- 10.3. All final documents like GA drawing, data sheets of all components, internal arrangement drawings etc., shall be submitted in 3 CD ROMS in addition to 2 sets of hard copies.
- 10.4. After commissioning, if submitted drawings undergo any change, the same shall be revised suitably. The revised drawings referred to as 'AS BUILT' drawings shall be submitted in 3 CD ROMS in addition to 2 sets of hard copies.
- 10.5. All documents including drawings shall be in standard A4 or A3 size only.
- 10.6. All documents shall be in English, legible and neatly printed or typed.
- 10.7. Test report/ Test certificates: Vendor to furnish in 3 Sets
- 10.8. **O&M Manuals:**
 - a. 2 sets of Operation & Maintenance manuals in hardcopy and softcopy (CD-ROM) for each category of equipment shall be submitted within one week from the date of inspection.
 - b. The O&M manuals shall be with sufficient detail to enable the user to maintain, dismantle, reassemble and adjust all parts of the equipment. Step by step procedure for all operations likely to be carried out during the life of the plane/ equipment including erection, testing, commissioning, operation, maintenance, dismantling and repair.
 - c. A collection of the manufacture's standard leaflets will not be acceptable. The O&M manual shall be specifically compiled for this project.
 - d. Each manual shall also include a complete set of approved drawings together with performance/ rating curves of the equipment and test certificates wherever applicable.
 - e. The O&M manual shall contain complete details about the system including the following :
 - (a) Applicable drawings

- (b) Full details and drawings of all equipment furnished the testing, operations and maintenance procedures etc. separately on each equipment.
- (c) Application software listing
- (d) Relevant catalogues of all the modules / components used in the system
- (e) Complete spare parts list, including ordering procedure and complete address(es) of spare part supplier(s)
- (f) Storage instruction of components.
- (g) Do's and Don'ts
- (h) Testing and troubleshooting instructions.
- (i) Programming manuals
- (j) Any other details felt necessary by the Purchaser (BHEL) / owner (NTPC).

11.0. SYSTEM DATA SHEETS

Vendor shall provide data sheets for the major components of the system offered. Vendor shall furnish full and complete technical particulars, specifications, catalogues, dimensional drawings for each component of the system offered for approval.

12.0. CARBON IN ASH ANALYSER SYSTEM SOFTWARE

Applicable Software shall be downloaded in the processors and in the programming / monitoring terminal. Such software shall also be supplied in “CD-ROM’s” in triplicate.

13.0. HMI

The HMI shall consist of an Industrial grade PC (Latest Intel processor i7 or better), 19” Colour monitor, 500 GB hard disk, CD/DVD drive, I/O cards, key board, mouse and printer interfaces. The PC shall have effective protection from malware, virus, etc. by using state-of-art software. The Operating System, Application Software, Anti-virus software etc. shall have a full license and there shall be no recurring costs towards the software for upgrade or repair installations.

Detailed specification of the HMI system shall be furnished along with the offer.

14.0. QUALITY ASSURANCE PROGRAM, INSPECTION AND TESTING

14.1. Quality Plan:

- 14.1.1 The vendor shall submit the quality plan in NTPC's format which is enclosed. Quality plan shall cover all major items in the System. Vendor shall indicate all checks done right from the raw material stage through bought out item, in process assembly, testing and final inspection of these items. For each characteristic, vendor should indicate the appropriate reference documents like national standards, international standards, drawing, etc. and a copy of vendor quality plan shall be submitted along with the offer for review. The functional tests shall be described in detail as "Factory Acceptance Test procedure" and shall be indicated under reference documents.
- 14.1.2 Vendor shall submit the above QP for BHEL & NTPC's approval and the manufacture can start only after the QP is approved by BHEL & NTPC.
- 14.1.3 Where CHP (Customer Hold Point) is indicated in the approved QP, the vendor has to offer such item at that stage for inspection by BHEL & NTPC. The vendor can proceed further only when written clearance is obtained for that stage of CHP.

14.2. Type Test Requirements For Solid State Equipment

- i) Surge Withstand Capability (SWC) for Solid State Equipments/ Systems. All solid state systems/ equipments shall be able to withstand the electrical noise and surges as encountered in actual service conditions and inherent in a power plant. All the solid state systems/ equipments shall be provided with all required protections that needs the surge withstand capability as defined in ANSI / IEEE C37.90.1 -2012. Hence, all front end cards which receive external signals like Analog input & output modules, Binary input & output modules etc. including power supply, data highway, data links shall be provided with protections that meets the surge withstand capability as defined in ANSI / IEEE C37.90.1 -2012. Complete details of the features incorporated in electronics systems to meet this requirement, the relevant tests carried out, the test certificates etc. shall be submitted along with the proposal. As an alternative to above, suitable class of EN 61000-4-12 which is equivalent to ANSI / IEEE C37.90.1 -2012 may also be adopted for SWC test.
- ii) Dry Heat test as per IEC-60068-2-2 or equivalent.
- iii) Damp Heat test as per IEC-60068-2-30 or equivalent.
- iv) Vibration test as per IEC-60068-2-6 or equivalent.
- v) Electrostatic discharge tests as per EN 61000-4-2 or equivalent.
- vi) Radio frequency immunity test as per EN 61000-4-6 or equivalent.
- vii) Electromagnetic Field immunity as per EN 61000-4-3 or equivalent.

Type test certificates shall be submitted for BHEL & NTPC review & approval.

14.3 Inspection:

1. The complete system has to be offered for inspection by BHEL & NTPC (wherever applicable) and the vendor shall give 30 days advance notice for arranging the inspection after the system is fully tested and ready.
2. After Inspection, the equipment can be despatched only after obtaining the MDCC (Material Despatch Clearance Certificate) from NTPC. No material shall be despatched without MDCC.

15.0 PACKING:

The system should be packed with sea worthy packing.

Vendor shall be solely responsible for packing and marking of CARGO with respect to handling, transport, and storage at plant site. VENDOR shall be fully liable for proper, sufficient and adequate packing, completeness of contents, protection of contents for a storage time of minimum 2 years, and correct preparation of the packing list. All damage and costs whatsoever resulting from inadequate or insufficient packing shall be fully charged to vendor.

Packing and conservation of goods shall be sufficient to protect them from damage during transit from point of manufacturer and storage at job SITE under conditions which may involve multiple handling, extended storage, exposure to moisture and the possibility of pilferage.

16.0. LIST OF ANNEXURES

- 16.1 Annexure I -Pre-Qualification requirement Format
- 16.2 Annexure II -Quality Plan Format
- 16.3 Annexure III - Power & Instrumentation Cable Specification.

ANNEXURE I

Pre-Qualification
requirement Format

PRE QUALIFICATION REQUIREMENT

Item Description	ONLINE CARBON IN ASH ANALYSER SYSTEM
-------------------------	---

Plant No.

- | | | |
|-------|---|--------|
| (i) | Make/Model/Version | |
| (ii) | Client Name & Address | |
| (iii) | Name of Industry (Power plant) | |
| (iv) | Number of measurement system | |
| (v) | Whether above offered system has at-least One (1) year satisfactory operation as on date of techno-commercial bid opening in large industrial set up viz power plant. | yes/no |
| (vi) | Client's certificate Attached | yes/no |

Date : (Signature).....

Place : (Printed Name).....

(Designation).....

(Common seal).....

Signature of authorized signatory.....

ANNEXURE II

Quality Plan Format

[illegible]

ANNEXURE III

Power & Instrumentation Cable Specification

SUB-SECTION-III:E3

LT POWER CABLES

MOUDA STPP-II (2x660MW) / SOLAPUR STPP (2 x 660MW) /
NABINAGAR STPP (3x 660MW) / MEJA TPP-I (2 x 660MW) /
RAGHUNATHPUR TPP PHASE-II (2 x 660MW)
STEAM GENERATOR PACKAGE

TECHNICAL SPECIFICATION
SECTION-VI
BID DOC NO.: CS-9575/ 9571/ 0370/ 0360/ 9586-102(R)-2

CLAUSE NO.	TECHNICAL REQUIREMENTS			एन टी पी सी NTPC
	LT POWER CABLES			
1.00.00	CODES & STANDARDS			
1.01.00	All standards, specifications and codes of practice referred to herein shall be the latest editions including all applicable official amendments and revisions as on date of opening of bid. In case of conflict between this specification and those (IS : codes, standards, etc.) referred to herein, the former shall prevail. All the cables shall conform to the requirements of the following standards and codes: IS :1554 - I PVC insulated (heavy duty) electric cables for working voltages upto and including 1100V. IS : 3961 Recommended current ratings for cables IS : 3975 Low carbon galvanised steel wires, formed wires and tapes for armouring of cables. IS : 4905 Methods for random sampling. IS : 5831 PVC insulation and sheath of electrical cables. IS:7098(Part-I) Cross linked polyethylene insulated PVC sheathed cables for working voltages upto and including 1100V. IS : 8130 Conductors for insulated electrical cables and flexible cords. IS : 10418 Specification for drums for electric cables. IS : 10810 Methods of tests for cables. ASTM-D-2843 Standard test method for density of smoke from the burning or decomposition of plastics. IEC-754(Part-I) Test on gases evolved during combustion of electric cables. IEC -332 Tests on Electric cables under fire conditions. Part-3 : Tests on bunched wires or cables (category -B)			
2.00.00	TECHNICAL REQUIREMENTS			
2.01.00	The cables shall be suitable for laying on racks, in ducts, trenches, conduits and under ground buried installation with chances of flooding by water.			
2.02.00	Cables shall be flame retardant, low smoke (FRLS) type designed to withstand all mechanical, electrical and thermal stresses develop under steady state and transient operating conditions as specified elsewhere in this specification.			
2.03.00	Aluminum conductor used in power cables shall have tensile strength of more than 100 N/ sq.mm. Conductors shall be multi stranded.			
2.04.00	XLPE insulation shall be suitable for a continuous conductor temperature of 90 deg. C and short circuit conductor temperature of 250 deg.C. PVC insulation shall be suitable for continuous conductor temperature of 70 deg C and short circuit conductor temperature of 160 deg.C.			
MOUDA STPP-II (2x660MW) / SOLAPUR STPP (2 x 660MW) / NABINAGAR STPP (3x 660MW) / MEJA TPP-I (2 x 660MW) / RAGHUNATHPUR TPP PHASE-II (2 x660MW) STEAM GENERATOR PACKAGE		TECHNICAL SPECIFICATION SECTION-VI BID DOC NO.: CS-9575/ 9571/ 0370/ 0360/ 9586-102(R)-2		PART-B SUB SECTION-III:E3 (LT POWER CABLES)
PAGE 1 OF 6				

CLAUSE NO.	TECHNICAL REQUIREMENTS		एन टी पी सी NTPC	
2.05.00	The cable cores shall be laid up with fillers between the cores wherever necessary. It shall not stick to insulation and inner sheath. All the cables, other than single core unarmoured cables, shall have distinct extruded PVC inner sheath of black color as per IS : 5831.			
2.06.00	For single core armoured cables, armouring shall be of aluminum wires/formed wires. For multicore armoured cables armouring shall be of galvanised steel as follows : -			
	Calculated nominal dia of cable under armour		Size and Type of armour	
	i)	Upto 13 mm	1.4mm dia GS wire	
	ii)	Above 13 & upto 25mm	0.8 mm thick GS formed wire / 1.6 mm dia GS wire	
	iii)	Above 25 & upto 40 mm	0.8 mm thick GS formed wire / 2.0 mm dia GS wire	
	iv)	Above 40 & upto 55mm	1.4 mm thick GS formed wire / 2.5 mm dia GS wire	
	v)	Above 55 & upto 70 mm	1.4 mm thick GS formed wire / 3.15 mm dia GS wire	
	vi)	Above 70mm	1.4 mm thick GS formed wire / 4.0 mm dia GS wire	
2.06.01	The aluminum used for armouring shall be of H4 grade as per IS:8130 with maximum resistivity of .028264 ohms mm² per meter at 20 deg C. Aluminum armouring shall be same as indicated above for galvanized steel.			
2.06.02	The gap between armour wires / formed wires shall not exceed one armour wire / formed wire space and there shall be no cross over / over-riding of armour wire / formed wire. The minimum area of coverage of armouring shall be 90%. The breaking load of armour joint shall not be less than 95% of that of armour wire / formed wire. Zinc rich paint shall be applied on armour joint surface, of GS wire/formed wire.			
2.07.00	Outer sheath shall be of PVC(of suitable grade) & black in colour. In addition to meeting all the requirements of Indian standards referred to, outer sheath of all the cables shall have the following FRLS properties.			
	(a)	Oxygen index of min. 29 (As per IS:10810(Part-58))		
	(b)	Acid gas emission of max. 20% (As per IEC-754-I).		
	(c)	Smoke density rating shall not be more than 60% during Smoke Density Test as per ASTMD-2843.		
2.08.00	Cores of the cables shall be identified by colouring of insulation. Following colour scheme shall be adopted:			
	1 core	-	Red, Black, Yellow or Blue	
	2 core	-	Red & Black	
	3 core	-	Red, Yellow & Blue	
MOUDA STPP-II (2x660MW) / SOLAPUR STPP (2 x 660MW) / NABINAGAR STPP (3x 660MW) / MEJA TPP-I (2 x 660MW) / RAGHUNATHPUR TPP PHASE-II (2 x660MW) STEAM GENERATOR PACKAGE		TECHNICAL SPECIFICATION SECTION-VI BID DOC NO.: CS-9575/ 9571/ 0370/ 0360/ 9586-102(R)-2		PART-B SUB SECTION-III:E3 (LT POWER CABLES)
PAGE 2 OF 6				

CLAUSE NO.	TECHNICAL REQUIREMENTS			
	4 core	-	Red, Yellow, Blue and Black	
2.09.00	For reduced neutral conductors the core shall be black.			
2.10.00	In addition to manufacturer's identification on cables as per IS, following marking shall also be provided over outer sheath.			
	(a)	Cable size and voltage grade - To be embossed		
	(b)	Word 'FRLS' at every 5 meter - To be embossed		
	(c)	Sequential marking of length of the cable in meters at every one meter-To be embossed / printed.		
		The embossing shall be progressive, automatic, in line and marking shall be legible and indelible.		
2.11.00	All cables shall meet the fire resistance requirement as per Category-B of IEC 332 Part -3.			
2.12.00	Allowable tolerances on the overall diameter of the cables shall be $\pm$ 2mm maximum over the declared value in the technical data sheets.			
2.13.00	In plant repairs to the cables shall not be accepted. Pimples, fish eye, blow holes etc.are not acceptable.			
2.14.00	Cable selection & sizing			
2.14.01	Cables shall be sized based on the following considerations:			
	(a)	Rated current of the equipment		
	(b)	The voltage drop in the cable, during motor starting condition, shall be limited to 10% and during full load running condition, shall be limited to 3% of the rated voltage		
	(c)	Short circuit withstand capability		
		This will depend on the feeder type. For a fuse protected circuit, cable should be sized to withstand the let-out energy of the fuse. For breaker controlled feeder, cable shall be capable of withstanding the system fault current level for total breaker tripping time inclusive of relay pickup time.		
	(d)	The minimum conductor size shall be 6 sq.mm for Al conductor cables & 2.5 sq.mm for copper conductor cables. The constructional details of copper conductor cables shall be same as indicated for copper control cables.		
2.14.02	Derating Factors			
	Derating factors for various conditions of installations including the following shall be considered while selecting the cable sizes:			
	a)	Variation in ambient temperature for cables laid in air		
	b)	Grouping of cables		
	c)	Variation in ground temperature and soil resistivity for buried cables.		
MOUDA STPP-II (2x660MW) / SOLAPUR STPP (2 x 660MW) / NABINAGAR STPP (3x 660MW) / MEJA TPP-I (2 x 660MW) / RAGHUNATHPUR TPP PHASE-II (2 x660MW) STEAM GENERATOR PACKAGE		TECHNICAL SPECIFICATION SECTION-VI BID DOC NO.: CS-9575/ 9571/ 0370/ 0360/ 9586-102(R)-2		PART-B SUB SECTION-III:E3 (LT POWER CABLES)
PAGE 3 OF 6				

CLAUSE NO.	TECHNICAL REQUIREMENTS	एनटीपीसी NTPC	
2.14.03	Cable lengths shall be considered in such a way that straight through cable joints are avoided.		
2.14.04	Cables shall be armoured type if laid in switchyard area, coal handling area or directly buried.		
2.14.05	All LT power cables of sizes more than 120 sq.mm. shall be XLPE insulated and preferable sizes are 1Cx150, 1Cx300, 1Cx630, 3Cx150 & 3Cx240 sq.mm.		
3.00.00	CONSTRUCTIONAL FEATURES		
3.01.00	1.1 KV Grade Power Cables		
	(a) 1.1KV grade XLPE power cables shall have compacted aluminum conductor, XLPE insulated, PVC inner-sheathed (as applicable), armoured/ unarmoured, PVC outer-sheathed conforming to IS:7098. (Part-I).		
	(b) 1.1KV grade PVC power cables shall have aluminum conductor(compact type for sizes above 10 sq.mm), PVC Insulated, PVC inner sheathed (as applicable) armoured/ unarmoured, PVC outer-sheathed conforming to IS:1554 (Part-I).		
	(c) 1.1KV grade Trailing cables shall have tinned copper(class 5)conductor, insulated with heat resistant elastomeric compound based on Ethylene Propylene Rubber (EPR) suitable for withstanding 90 deg.C continuous conductor temperature and 250 deg.C during short circuit, inner-sheathed with heat resistant elastomeric compound, nylon cord reinforced, outer-sheathed with heat resistant, oil resistant and flame retardant heavy duty elastomeric compound conforming to IS 9968		
3.02.00	Cable Drums		
	(a) Cables shall be supplied in non returnable wooden or steel drums of heavy construction. The surface of the drum and the outer most cable layer shall be covered with water proof cover. Both the ends of the cables shall be properly sealed with heat shrinkable PVC/ rubber caps secured by 'U' nails so as to eliminate ingress of water during transportation, storage and erection. Wood preservative anti-termite treatment shall be applied to the entire drum. Wooden drums shall comply with IS : 10418.		
	(b) Each drum shall carry manufacturer's name, purchaser's name, address and contract number, item number and type, size and length of cable and net gross weight stencilled on both sides of the drum. A tag containing same information shall be attached to the leading end of the cable. An arrow and suitable accompanying wording shall be marked on one end of the reel indicating the direction in which it should be rolled.		
4.00.00	TESTS		
4.01.00	GENERAL		
	(a) All equipment to be supplied shall be of type tested design. During detailed engineering, the contractor shall submit for Employer's approval the reports of all the type tests as listed in this specification and carried out within last ten years from the date of bid opening. These reports should be for the test conducted on the equipment similar to those proposed to be supplied under this contract and the test(s) should have been either conducted at an independent laboratory or should have been witnessed by a client..		
MOUDA STPP-II (2x660MW) / SOLAPUR STPP (2 x 660MW) / NABINAGAR STPP (3x 660MW) / MEJA TPP-I (2 x 660MW) / RAGHUNATHPUR TPP PHASE-II (2 x660MW) STEAM GENERATOR PACKAGE		TECHNICAL SPECIFICATION SECTION-VI BID DOC NO.: CS-9575/ 9571/ 0370/ 0360/ 9586-102(R)-2	PART-B SUB SECTION-III:E3 (LT POWER CABLES)
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CLAUSE NO.	TECHNICAL REQUIREMENTS		एन टी पी सी NTPC
	(b) However if the contractor is not able to submit report of the type test(s) conducted within last ten years from the date of bid opening, or in the case of type test report(s) are not found to be meeting the specification requirements, the contractor shall conduct all such tests under this contract at no additional cost to the Employer either at third party lab or in presence of client/Employers representative and submit the reports for approval. (c) All acceptance and routine tests as per the specification and relevant standards shall be carried out. Charges for these shall be deemed to be included in the equipment price. (d) The type test reports once approved for any projects shall be treated as reference. For subsequent projects of NTPC, an endorsement sheet will be furnished by the manufacturer confirming similarity and “No design Change”. Minor changes if any shall be highlighted on the endorsement sheet.		
4.02.00	Type Tests :		
4.02.01	The reports for the following type tests shall be submitted on one size each of PVC/XLPE LT Power cables of each make:		
	S.No.	Type Tests	Remarks
	a)	For Conductor	
	1.	Resistance test	
	b)	For Armour Wires/ Formed Wires	
	2.	Measurement of Dimensions	
	3.	Tensile Test	
	4.	Elongation test	
	5.	Torsion test	For round wires only
	6.	Winding test	For Formed wires only
	7.	Resistance test	
	8.	a) Zinc Coating test	For G.S. Formed wires /wires only.
		b) Wrapping test	For aluminum wires/formed wires only.
	c)	For PVC/XLPE insulation & PVC Sheath	
	9.	Test for thickness	
	10.	Tensile strength & elongation tests before ageing and after ageing	
	11.	Ageing in air oven	
MOUDA STPP-II (2x660MW) / SOLAPUR STPP (2 x 660MW) / NABINAGAR STPP (3x 660MW) / MEJA TPP-I (2 x 660MW) / RAGHUNATHPUR TPP PHASE-II (2 x660MW) STEAM GENERATOR PACKAGE TECHNICAL SPECIFICATION SECTION-VI BID DOC NO.: CS-9575/ 9571/ 0370/ 0360/ 9586-102(R)-2 PART-B SUB SECTION-III:E3 (LT POWER CABLES) PAGE 5 OF 6			

CLAUSE NO.	TECHNICAL REQUIREMENTS		एनटीपीसी NTPC	
	12.	Loss of mass test	For PVC insulation and sheath only	
	13.	Hot deformation test	For PVC insulation and sheath only	
	14.	Heat shock test	For PVC insulation and sheath only	
	15.	Shrinkage test		
	16.	Thermal stability test	For PVC insulation and sheath only	
	17.	Hot set test	For XLPE insulation only	
	18.	Water absorption test	For XLPE insulation only	
	19.	Oxygen index test	For outer sheath only	
	20.	Smoke density test	For outer sheath only	
	21.	Acid gas generation test	For outer sheath only	
	d)	For completed cables		
	22.	Insulation resistance test (Volume resistivity method)		
	23.	High voltage test		
	24.	Flammability test as per IEC - 332 Part-3 (Category -B)		
4.03.00	Acceptance Tests: As per QA table			
4.04.00	Routine Tests : As per QA table			
MOUDA STPP-II (2x660MW) / SOLAPUR STPP (2 x 660MW) / NABINAGAR STPP (3x 660MW) / MEJA TPP-I (2 x 660MW) / RAGHUNATHPUR TPP PHASE-II (2 x660MW) STEAM GENERATOR PACKAGE		TECHNICAL SPECIFICATION SECTION-VI BID DOC NO.: CS-9575/ 9571/ 0370/ 0360/ 9586-102(R)-2		PART-B SUB SECTION-III:E3 (LT POWER CABLES)
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SUB-SECTION-III:E4

LT CONTROL CABLES

MOUDA STPP-II (2x660MW) / SOLAPUR STPP (2 x 660MW) /
NABINAGAR STPP (3x 660MW) / MEJA TPP-I (2 x 660MW) /
RAGHUNATHPUR TPP PHASE-II (2 x 660MW)
STEAM GENERATOR PACKAGE

TECHNICAL SPECIFICATION
SECTION-VI
BID DOC NO.: CS-9575/ 9571/ 0370/ 0360/ 9586-102(R)-2

CLAUSE NO.	TECHNICAL REQUIREMENTS एनटीपीसी NTPC
	LT CONTROL CABLES 1.00.00 CODES & STANDARDS 1.01.00 All standards, specifications and codes of practice referred to herein shall be the latest editions including all applicable official amendments and revisions as on date of opening of bid. In case of conflict between this specification and those (IS : codes, standards, etc.) referred to herein, the former shall prevail. All the cables shall conform to the requirements of the following standards and codes : IS :1554 - I PVC insulated (heavy duty) electric cables for working voltages upto and including 1100V. IS : 3961 Recommended current ratings for cables IS : 3975 Low carbon galvanised steel wires, formed wires and tapes for armouring of cables. IS : 4905 Methods for random sampling. IS : 5831 PVC insulation and sheath of electrical cables. IS : 8130 Conductors for insulated electrical cables and flexible cords. IS : 10418 Specification for drums for electric cables. IS : 10810 Methods of tests for cables. ASTM-D-2843 Standard test method for density of smoke from the burning or decomposition of plastics. IEC-754 (Part-I) Test on gases evolved during combustion of electric cables. IEC -332 Tests on Electric cables under fire conditions Part-3 : Tests on bunched wires or cables (category -B) 2.00.00 TECHNICAL REQUIREMENTS 2.01.00 The cables shall be suitable for laying on racks, in ducts, trenches, conduits and under ground buried installation with chances of flooding by water. 2.02.00 Cables shall be flame retardant, low smoke (FRLS) type designed to withstand all mechanical, electrical and thermal stresses develop under steady state and transient operating conditions as specified elsewhere in this specification. 2.03.00 Conductor of control cables shall be made of multi stranded, plain annealed copper. 2.04.00 PVC insulation shall be suitable for continuous conductor temperature of 70 deg C and short circuit conductor temperature of 160 deg. C. 2.05.00 The cable cores shall be laid up with fillers between the cores wherever necessary. It shall not stick to insulation and inner sheath. All the cables, other than single core unarmoured cables, shall have distinct extruded PVC inner sheath of black color as per IS : 5831.
MOUDA STPP-II (2x660MW) / SOLAPUR STPP (2 x 660MW) / NABINAGAR STPP (3x 660MW) / MEJA TPP-I (2 x 660MW) / RAGHUNATHPUR TPP PHASE-II (2 x660MW) STEAM GENERATOR PACKAGE	TECHNICAL SPECIFICATION SECTION-VI BID DOC NO.: CS-9575/ 9571/ 0370/ 0360/ 9586-102(R)-2 PART-B SUB SECTION-III:E4 (LT CONTROL CABLES) PAGE 1 OF 6

CLAUSE NO.	TECHNICAL REQUIREMENTS		एनटीपीसी NTPC	
2.06.00	For multicore armoured cables, the armouring shall be of galvanised steel as follows:-			
	Calculated nominal dia of cable under armour	Size and Type of armour		
	1) Upto 13 mm	1.4mm dia GS wire		
	2) Above 13 upto 25 mm	0.8 mm thick GS formed wire / 1.6 mm dia GS wire		
	3) Above 25 upto 40 mm	0.8mm thick GS formed wire / 2.0mm dia GS wire		
	4) Above 40 upto 55mm	1.4 mm thick GS formed wire/ 2.5mm dia GS wire		
	5) Above 55 upto 70 mm	1.4mm thick GS formed wire / 3.15mm dia GS wire		
	6) Above 70mm	1.4 mm thick GS formed wire / 4.0 mm dia GS wire		
	The gap between armour wire / formed wire shall not exceed one armour wire / formed wire space and there shall be no cross over / over-riding of armour wire / formed wire. The minimum area of coverage of armouring shall be 90%. The breaking load of armour joint shall not be less than 95% of that of armour wire / formed wire. Zinc rich paint shall be applied on armour joint surface.			
2.07.00	Outer sheath shall be of PVC(grade as applicable) and grey in colour . In addition to meeting all the requirements of Indian standards referred to, outer sheath of all the cables shall have the following FRLS properties.			
	(a) Oxygen index of min. 29 (As per IS:10810(Part-58))			
	(b) Acid gas emission of max. 20% (As per IEC-754-I).			
	(c) Smoke density rating shall not be more than 60% during Smoke Density Test as per ASTMD-2843.			
2.08.00	Cores of the cables of upto 5 cores shall be identified by coloring of insulation. Following color scheme shall be adopted.			
	1 core	-	Red, Black, Yellow or Blue	
	2 core	-	Red & Black	
	3 core	-	Red, Yellow & Blue	
	4 core	-	Red, Yellow, Blue and Black	
	5 core	-	Red, Yellow, Blue, Black and Grey	
2.09.00	For cables having more than 5 cores, core identification shall be done by numbering the insulation of cores sequentially, starting by number 1 in the inner layer (e.g. say for 10 core cable, core numbering shall be from 1 to 10). The number shall be printed in Hindu-Arabic numerals on the outer surfaces of the cores. All the numbers shall be of the same colour, which shall contrast with the color of insulation. The color of insulation for all the cores shall			
MOUDA STPP-II (2x660MW) / SOLAPUR STPP (2 x 660MW) / NABINAGAR STPP (3x 660MW) / MEJA TPP-I (2 x 660MW) / RAGHUNATHPUR TPP PHASE-II (2 x660MW) STEAM GENERATOR PACKAGE		TECHNICAL SPECIFICATION SECTION-VI BID DOC NO.: CS-9575/ 9571/ 0370/ 0360/ 9586-102(R)-2		PART-B SUB SECTION-III:E4 (LT CONTROL CABLES)
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CLAUSE NO.	TECHNICAL REQUIREMENTS 
2.10.00 2.11.00 2.12.00 2.13.00 2.14.00 2.14.01 2.14.02	be grey only. The numerals shall be legible and indelible. The numbers shall be repeated at regular intervals along the core, consecutive numbers being inverted in relation to each other. When the number is a single numeral, a dash shall be placed underneath it. If the number consists of two numerals, these shall be disposed one below the other and a dash placed below the lower numeral. The spacing between consecutive numbers shall not exceed 50 mm. In addition to manufacturer's identification on cables as per IS, following marking shall also be provided over outer sheath : (a) Cable size and voltage grade - To be embossed (b) Word 'FRLS' at every 5 meter - To be embossed (c) Sequential marking of length of the cable in meters at every one meter. - To be embossed / printed. The embossing / printing shall be progressive, automatic, in line and marking shall be legible and indelible. All cables shall meet the fire resistance requirement as per Category-B of IEC 332 Part -3. Allowable tolerances on the overall diameter of the cables shall be ± 2 mm maximum over the declared value in the technical data sheets. In plant repairs to the cables shall not be accepted. Pimples, fish eye, blow holes etc. are not acceptable. Cable selection & sizing (a) Rated current of the equipment (b) The voltage drop in the cable, during motor starting condition, shall be limited to 10% and during full load running condition, shall be limited to 3% of the rated voltage (c) Short circuit withstand capability This will depend on the feeder type. For a fuse protected circuit, cable should be sized to withstand the letout energy of the fuse. For breaker controlled feeder, cable shall be capable of withstanding the system fault current level for total breaker tripping time inclusive of relay pickup time. (d) The minimum size of conductor shall be 1.5 sq.mm. Derating Factors Derating factors for various conditions of installations including the following shall be considered while selecting the cable sizes: a) Variation in ambient temperature for cables laid in air b) Grouping of cables c) Variation in ground temperature and soil resistivity for buried cables. Cable lengths shall be considered in such a way that straight through cable joints are avoided.
MOUDA STPP-II (2x660MW) / SOLAPUR STPP (2 x 660MW) / NABINAGAR STPP (3x 660MW) / MEJA TPP-I (2 x 660MW) / RAGHUNATHPUR TPP PHASE-II (2 x 660MW) STEAM GENERATOR PACKAGE	TECHNICAL SPECIFICATION SECTION-VI BID DOC NO.: CS-9575/ 9571/ 0370/ 0360/ 9586-102(R)-2 PART-B SUB SECTION-III:E4 (LT CONTROL CABLES) PAGE 3 OF 6

CLAUSE NO.	TECHNICAL REQUIREMENTS एनटीपीसी NTPC
2.14.03	Cables shall be armoured type if laid in switchyard area, coal handling area or directly buried.
3.00.00	CONSTRUCTIONAL FEATURES
3.01.00	1.1 KV Grade Control Cables Control Cables shall have stranded copper conductor multicore PVC insulated, PVC inner-sheathed ,armoured / unarmoured, PVC outer-sheathed conforming to IS:1554. (Part-I).
3.02.00	Cable Drums (a) Cables shall be supplied in non returnable wooden or steel drums of heavy construction. The surface of the drum and the outer most cable layer shall be covered with water proof cover. Both the ends of the cables shall be properly sealed with heat shrinkable PVC/ rubber caps secured by 'U' nails so as to eliminate ingress of water during transportation, storage and erection. Wood preservative anti-termite treatment shall be applied to the entire drum. Wooden drums shall comply with IS : 10418. (b) Each drum shall carry manufacturer's name, purchaser's name, address and contract number, item number and type, size and length of cable and net gross weight stencilled on both the sides of the drum. A tag containing same information shall be attached to the leading end of the cable. An arrow and suitable accompanying wording shall be marked on one end of the reel indicating the direction in which it should be rolled.
4.00.00	TESTS
4.01.00	GENERAL (a) All equipment to be supplied shall be of type tested design. During detailed engineering, the contractor shall submit for Employer's approval the reports of all the type tests as listed in this specification and carried out within last ten years from the date of bid opening. These reports should be for the test conducted on the equipment similar to those proposed to be supplied under this contract and the test(s) should have been either conducted at an independent laboratory or should have been witnessed by a client. (b) However if the contractor is not able to submit report of the type test(s) conducted within last ten years from the date of bid opening, or in the case of type test report(s) are not found to be meeting the specification requirements, the contractor shall conduct all such tests under this contract at no additional cost to the Employer either at third party lab or in presence of client/Employers representative and submit the reports for approval. (c) All acceptance and routine tests as per the specification and relevant standards shall be carried out. Charges for these shall be deemed to be included in the equipment price. (d) The type test reports once approved for any projects shall be treated as reference. For subsequent projects of NTPC, an endorsement sheet will be furnished by the manufacturer confirming similarity and "No design Change". Minor changes if any shall be highlighted on the endorsement sheet.
MOUDA STPP-II (2x660MW) / SOLAPUR STPP (2 x 660MW) / NABINAGAR STPP (3x 660MW) / MEJA TPP-I (2 x 660MW) / RAGHUNATHPUR TPP PHASE-II (2 x660MW) STEAM GENERATOR PACKAGE	
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PART-B SUB SECTION-III:E4 (LT CONTROL CABLES)	
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CLAUSE NO.	TECHNICAL REQUIREMENTS		एनटीपीसी NTPC	
4.02.00	Type Tests:			
4.02.01	The Type tests reports for the following shall be submitted for one size each of LT control cable of each make :			
	S. No.	Type Test	Remarks	
	a)	For Conductor		
	1.	Resistance test		
	b)	For Armour Wires / Formed Wires		
	2.	Measurement of Dimensions		
	3.	Tensile Test		
	4.	Elongation test		
	5.	Torsion test	For round wire only	
	6.	Winding test	For Formed wires only	
	7.	Resistance test		
	8.	Zinc Coating test	For G.S. conductors only.	
	c)	For PVC insulation & PVC Sheath		
	9.	Test for thickness		
	10.	Tensile strength and elongation test before ageing and after ageing		
	11.	Ageing in air oven		
	12.	Loss of mass test	For PVC insulation and sheath only	
	13.	Hot deformation test	For PVC insulation and sheath only	
	14.	Heat shock test	For PVC insulation and sheath only	
	15.	Shrinkage test		
	16.	Thermal stability test	For PVC insulation and sheath only	
	17.	Oxygen index test	For outer sheath only	
	18.	Smoke density test	For outer sheath only	
	19.	Acid gas generation test	For outer sheath only	
MOUDA STPP-II (2x660MW) / SOLAPUR STPP (2 x 660MW) / NABINAGAR STPP (3x 660MW) / MEJA TPP-I (2 x 660MW) / RAGHUNATHPUR TPP PHASE-II (2 x660MW) STEAM GENERATOR PACKAGE		TECHNICAL SPECIFICATION SECTION-VI BID DOC NO.: CS-9575/ 9571/ 0370/ 0360/ 9586-102(R)-2		PART-B SUB SECTION-III:E4 (LT CONTROL CABLES)
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CLAUSE NO.	TECHNICAL REQUIREMENTS			
4.03.00 4.04.00	d) For completed cables 20. Insulation resistance test (Volume resistivity method) 21. High voltage test 22. Flammability test as per IEC - 332 Part-3 (Category-B) Acceptance Tests: As per QA Table Routine Tests :As per QA Table			
MOUDA STPP-II (2x660MW) / SOLAPUR STPP (2 x 660MW) / NABINAGAR STPP (3x 660MW) / MEJA TPP-I (2 x 660MW) / RAGHUNATHPUR TPP PHASE-II (2 x660MW) STEAM GENERATOR PACKAGE	TECHNICAL SPECIFICATION SECTION-VI BID DOC NO.: CS-9575/ 9571/ 0370/ 0360/ 9586-102(R)-2	PART-B SUB SECTION-III:E4 (LT CONTROL CABLES)	PAGE 6 OF 6	

SUB-SECTION-IV: I7

INSTRUMENTATION AND POWER SUPPLY CABLE

MOUDA STPP-II (2x660MW) / SOLAPUR STPP (2 x 660MW) /
NABINAGAR STPP (3x 660MW) / MEJA TPP-I (2 x 660MW) /
RAGHUNATHPUR TPP PHASE-II (2 x660MW)
STEAM GENERATOR PACKAGE

TECHNICAL SPECIFICATION
SECTION-VI
BID DOC NO.: CS-9575/ 9571/ 0370/ 0360/ 9586-102(R)-2

CLAUSE NO.	TECHNICAL REQUIREMENTS				
2.02.00	5.	Marking to read 'FRLS'	To be provided at every 5 meters on outer sheath except for Type-C cable.		
	6.	Allowable Tolerance on overall diameter	+/- 2 mm (maximum) over the declared value in data sheet		
	7.	Variation in diameter	Not more than 1.0 mm throughout the length of cable.		
	8.	Ovality at any cross-section	Not more than 1.0 mm		
	9.	Others	a) Durable marking at intervals not exceeding 625 mm shall include manufacturer's name, insulation material, conductor's size, number of pairs, voltage rating, type of cable, year of manufacturer to be provided.		
			b) Cables shall be suitable for laying in conduits, ducts, trenches, racks and underground-buried installation		
			c) Repaired cables shall not be acceptable.		

	Specific Requirements				

	Specification Requirements	Type-A cable	Type-B cable	Type F & G cable	Type-C cable

	A. Conductors				
	Cross section area	(Same as T/C)		0.5 sq. mm	0.5 sq. mm.
	Conductor material	ANSI type KX	ANSI type SX	High conductivity Annealed bare copper	ANSI type KX
	Colour code	Yellow-Red	Black-Red	As per VDE-815	Yellow-Red
	Conductor Grade	As per ANSI MC 96.1		Electrolytic	As per ANSI MC 96.1
	No & dia of strands	7x0.3 mm (nom)			
	No. of Pairs	2	2	2,4,8,12,16,24,48	2
	Max. conductor resistance per Km (in ohm) at 20 deg. C	As per ANSI MC 96.1		73.4 (loop)	As per ANSI MC 96.1
MOUDA STPP-II (2x660MW) / SOLAPUR STPP (2 x 660MW) / NABINAGAR STPP (3x 660MW) / MEJA TPP-I (2 x 660MW) / RAGHUNATHPUR TPP PHASE-II (2 x660MW) STEAM GENERATOR PACKAGE		TECHNICAL SPECIFICATION SECTION-VI BID DOC NO.: CS-9575/ 9571/ 0370/ 0360/ 9586-102(R)-2		PART - B SUB-SECTION-IV: I7 (INSTR. AND POWER SUPPLY CABLE)	PAGE 2 OF 14

CLAUSE NO.	 TECHNICAL REQUIREMENTS			
	Reference Standard As per ANSI MC 96.1 VDE 0815 As per ANSI MC 96.1 B. Insulation Material PVC type YI 3 Teflon (i.e. extruded FEP) Thickness in mm (Min/Nom/Max) 0.25/0.3/0.35 0.4/0.50 Volume Resistivity (Min) in ohm-cm 1 x 10¹⁴ at 20 deg. C & 1x10¹¹ at 70 deg. C. --- Voltage Rating 225 V peak operating voltage Reference Standard VDE 0207 Part 4 VDE 0207 Part 6 & ASTM D 2116. Core diameter above insulation Suitable for cage clamp connector C. Pairing & Twisting Max. lay of pairs (mm) 50 Single layer of polyester numbered tape on each pair provided Yes Unit formation of four pairs with printing of no. of Unit provided N.A. Yes N.A. Conductor /pair identification as per VDE0815 N.A. To be provided (color coding attached). N.A. D. Shielding Type of shielding ←----- Al-Mylar tape -----→ Individual pair shielding No To be provided for F-type cable No Minimum thickness of Individual pair shielding No 28 micron No			
MOUDA STPP-II (2x660MW) / SOLAPUR STPP (2 x 660MW) / NABINAGAR STPP (3x 660MW) / MEJA TPP-I (2 x 660MW) / RAGHUNATHPUR TPP PHASE-II (2 x660MW) STEAM GENERATOR PACKAGE		TECHNICAL SPECIFICATION SECTION-VI BID DOC NO.: CS-9575/ 9571/ 0370/ 0360/ 9586-102(R)-2	PART - B SUB-SECTION-IV: I7 (INSTR. AND POWER SUPPLY CABLE)	PAGE 3 OF 14

CLAUSE NO.	TECHNICAL REQUIREMENTS				एनटीपीसी NTPC
	Overall cable assembly shielding	To be provided			
	Minimum thickness of Overall cable assembly shielding	55 micron			
	Shielding coverage	100% with at least 20% overlap			
	Drain wire provided for individual shield	N.A.	Yes (for F-type) 7-strand 20 AWG (0.51 mm2) annealed Tin coated copper	N.A.	
	Drain wire provided for overall shield	Yes. 7-strand 20 AWG (0.51 mm2) annealed Tin coated copper			
	E. FILLERS				
	Non-hygroscopic, flame retardant	To be provided			
	F. Outer Sheath				
	Material	←--- Extruded PVC compound YM1 with---→ FRLS properties		Teflon (i.e. extruded FRP)	
	Minimum Thickness at any point	1.8 mm		0.4 mm	
	Nominal Thickness at any point	>1.8 mm		0.5 mm	
	Color	Blue			
	Resistant to water, fungus, termite & rodent attack	Required			
	Oxygen index as per ASTMD-2863	not less than 29%		N.A.	
	Temperature index as per ASTMD-2863	not less than 250 deg.C		N.A.	
	Acid gas generation by weight as per IEC-60754-1	Maximum 20%		N.A.	
	MOUDA STPP-II (2x660MW) / SOLAPUR STPP (2 x 660MW) / NABINAGAR STPP (3x 660MW) / MEJA TPP-I (2 x 660MW) / RAGHUNATHPUR TPP PHASE-II (2 x660MW) STEAM GENERATOR PACKAGE		TECHNICAL SPECIFICATION SECTION-VI BID DOC NO.: CS-9575/ 9571/ 0370/ 0360/ 9586-102(R)-2		PART - B SUB-SECTION-IV: I7 (INSTR. AND POWER SUPPLY CABLE)

CLAUSE NO.	 TECHNICAL REQUIREMENTS			
	Smoke Density Rating as per ASTMD-2843 Maximum 60% (defined as the average area under the curve when the results of smoke density test plotted on a curve indicating light absorption vs. time as per ASTMD-2843) N.A. Reference standard VDE207 Part 5 VDE207 Part 6 & ASTM D2116 G. Electrical Parameters Mutual Capacitance Between Conductors At 0.8 Khz (Max.) 200 nF/km 120 nF/km for F type 100 nF/km for G-type 200 nF/km Insulation Resistance (Min.) 100 M Ohm/Km Cross Talk Figure (Min.) At 0.8 Khz 60 dB 60 dB N.A. Characteristic Impedance (Max) At 1 Khz N.A. 320 OHM FOR F-TYPE 340 OHM FOR G-TYPE N.A. Attenuation Figure at 1 Khz (Max) N.A. 1.2 db/km N.A. H. Complete Cable Complete Cable assembly Shall pass Swedish Chimney test as per SEN-SS 4241475 class F3. N.A. Flammability Shall pass flammability as per IEEE-383 read in conjunction to this specification N.A. I. Accessories Cable accessories of flame retardant quality. Yes. (Accessories such as harnessing components, markers, bedding, cable jointer, binding tape etc.) J. Tests Routine & Acceptance tests Refer sub-section IIIE			
MOUDA STPP-II (2x660MW) / SOLAPUR STPP (2 x 660MW) / NABINAGAR STPP (3x 660MW) / MEJA TPP-I (2 x 660MW) / RAGHUNATHPUR TPP PHASE-II (2 x660MW) STEAM GENERATOR PACKAGE		TECHNICAL SPECIFICATION SECTION-VI BID DOC NO.: CS-9575/ 9571/ 0370/ 0360/ 9586-102(R)-2	PART - B SUB-SECTION-IV: I7 (INSTR. AND POWER SUPPLY CABLE)	PAGE 5 OF 14

CLAUSE NO.	TECHNICAL REQUIREMENTS			
	Type tests Submission of type test results and certificate shall be acceptable provided the test has been conducted within last 5 years from the date of bid opening. In case the test is not conducted within last 5 years or spec requirements are not met, the same shall be conducted by contractor free of cost to Employer. Also, refer sub-section-IV:19 TYPE TEST REQUIREMENTS FOR C&I. K Cable Drum Type Non-returnable wooden drum (wooden drum to be constructed from seasoned wood free from defects with wood preservative applied to the entire drum) or steel drum. Outermost layer covered with waterproof paper Yes Painting Entire surface to be painted Length 1000 m + 5% for up to & including 12 pairs 500 m + 5% for above 12 pairs			
3.00.00	SPECIFICATION OF OPTICAL FIBER CABLES (OFC)			
3.01.00	Optic Fiber cable shall be 4/8/12 core, galvanised corrugated steel taped armoured, fully water blocked with dielectric central member for outdoor/indoor application so as to prevent any physical damage. The cable shall have multiple single-mode or multi mode fibers on as required basis so as to avoid the usage of any repeaters. The core and cladding diameter shall be 9 +/- 1 micrometer and 125 +/- 1 micrometer respectively. The outer sheath shall have Flame Retardant, UV resistant properties and are to be identified with the manufacturer's name, year of manufacturer, progressive automatic sequential on-line marking of length in meters at every meter on outer sheath.			
3.02.00	The cable core shall have suitable characteristics and strengthening for prevention of damage during pulling viz. Steel central member, Loose buffer tube design, 4 fibers per buffer tube (minimum), Interstices and buffer tubes duly filled with Thixotropic jelly etc. The cable shall be suitable for a maximum tensile force of 2000 N during installation, and once installed, a tensile force of 1000 N minimum. The compressive strength of cable shall be 3000 N minimum & crush resistance 4000 N minimum. The operating temperature shall be - 20 deg. C to 70 deg. C			
3.03.00	All testing of the fiber optic cable being supplied shall be as per the relevant IEC, EIA and other international standards.			
3.04.00	Bidder to ensure that minimum 100% cores are kept as spares in all types of optical fibre cables.			
3.05.00	Cables shall be suitable for laying in conduits, ducts, trenches, racks and under ground buried installation.			
3.06.00	Spliced / Repaired cables are not acceptable.			
3.07.00	Penetration of water resistance and impact resistance shall be as per IEC standard.			
MOUDA STPP-II (2x660MW) / SOLAPUR STPP (2 x 660MW) / NABINAGAR STPP (3x 660MW) / MEJA TPP-I (2 x 660MW) / RAGHUNATHPUR TPP PHASE-II (2 x 660MW) STEAM GENERATOR PACKAGE		TECHNICAL SPECIFICATION SECTION-VI BID DOC NO.: CS-9575/ 9571/ 0370/ 0360/ 9586-102(R)-2	PART - B SUB-SECTION-IV: 17 (INSTR. AND POWER SUPPLY CABLE)	PAGE 6 OF 14

CLAUSE NO.	TECHNICAL REQUIREMENTS																																																															
4.00.00	SPECIFICATION OF POWER SUPPLY CABLES For technical specification, testing requirements etc, refer relevant subsections of this specification.																																																															
5.00.00	INSTRUMENTATION CABLE INTERCONNECTION AND TERMINATION PHILOSOPHY The cable interconnection philosophy to be adopted shall be such that extensive grouping of signals by large scale use of field mounted Group Junction Boxes (JBs) at strategic locations (where large concentration of signals are available, e.g. valves limit & torque switches, switchgear) is done and consequently cable with higher number of pairs are extensively used. The details of termination to be followed are mentioned in the given Table A. TABLE A: CABLE TERMINATION TO BE FOLLOWED <table><tr><th colspan="2">Application</th><th colspan="2">Type Of Termination</th><th>Type Of</th><th rowspan="2">Cable</th></tr><tr><th>FROM (A)</th><th>TO (B)</th><th>END A</th><th>END B</th><th></th></tr><tr><td>Valves/dampers drives (Integral Junction box)</td><td>Marshalling cubicle/ Marshalling cum termination Cubicle/local group JB</td><td>Plug in connector</td><td>Posts mount cage clamp type.</td><td></td><td>G</td></tr><tr><td>Transmitters, Process Actuated switches mounted in LIE/LIR</td><td>Integral Junction box of LIE/LIR</td><td>Plug in connector</td><td>Cage clamp (Rail mount) type.</td><td></td><td>F,G</td></tr><tr><td>RTD heads</td><td>Local junction box</td><td>Plug in connector</td><td>Cage clamp (Rail mount) type.</td><td></td><td>F</td></tr><tr><td>Thermocouple</td><td>CJC Box (if applicable)</td><td>Plug in connector</td><td>Cage clamp (Rail mount) type.</td><td></td><td>A,B,C*</td></tr><tr><td>Other Field Mounted Instrument</td><td>Local JB/Group JB</td><td>Plug in connector</td><td>Screw, Cage clamp (Rail mount) type</td><td></td><td>F,G</td></tr><tr><td>RTD</td><td>Temperature transmitter</td><td>Plug in connector</td><td>Screw, Cage clamp type</td><td></td><td>F</td></tr><tr><td>Thermocouple</td><td>Temperature transmitter</td><td>Plug in connector</td><td>Screw, Cage clamp type</td><td></td><td>A,B,C*</td></tr><tr><td>Local Junction box, Temperature Transmitter, Int. Junction box of LIE/ LIR/Group JB/ MCC/SWGR</td><td>Group JB</td><td>Cage clamp (Rail mount) type.</td><td>Cage clamp (Rail mount) type.</td><td></td><td>F,G</td></tr></table>					Application		Type Of Termination		Type Of	Cable	FROM (A)	TO (B)	END A	END B		Valves/dampers drives (Integral Junction box)	Marshalling cubicle/ Marshalling cum termination Cubicle/local group JB	Plug in connector	Posts mount cage clamp type.		G	Transmitters, Process Actuated switches mounted in LIE/LIR	Integral Junction box of LIE/LIR	Plug in connector	Cage clamp (Rail mount) type.		F,G	RTD heads	Local junction box	Plug in connector	Cage clamp (Rail mount) type.		F	Thermocouple	CJC Box (if applicable)	Plug in connector	Cage clamp (Rail mount) type.		A,B,C*	Other Field Mounted Instrument	Local JB/Group JB	Plug in connector	Screw, Cage clamp (Rail mount) type		F,G	RTD	Temperature transmitter	Plug in connector	Screw, Cage clamp type		F	Thermocouple	Temperature transmitter	Plug in connector	Screw, Cage clamp type		A,B,C*	Local Junction box, Temperature Transmitter, Int. Junction box of LIE/ LIR/Group JB/ MCC/SWGR	Group JB	Cage clamp (Rail mount) type.	Cage clamp (Rail mount) type.		F,G
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CLAUSE NO.	TECHNICAL REQUIREMENTS																																		
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	Notes 1. Normally 10% spare cores shall be provided when the numbers of pairs of cables are more than four pairs except for pre-fabricated cables which shall be as per manufacturer's standard. 2. For analog signals, individual pair shielding & overall shielding & for Binary signals, only overall shielding of instrumentation cables shall be provided. 3. Also refer Drg. 0000-101/102-POI-A-021. 4. *For high temperature applications only. 5. Instrument Cabling for instruments/equipments covered under subsection-IV:I3 (MAIN EQP INST SYS) shall be as per manufacturer's standard .																																		
6.00.00	TERMINAL BLOCKS																																		
6.01.00	All terminal blocks shall be rail mounted/post mounted, cage clamp type with high quality non-flammable insulating material of melamine suitable for working temperature of 105 deg.C. The terminal blocks in field mounted junction boxes, temperature transmitters, instrument enclosures/racks, etc., shall be suitable for cage clamp connections. The terminal blocks in Control Equipment Room logic/termination/marshalling cubicles shall be suitable for post mounted cage clamp connection at the field input end. The terminal blocks for DDCMIS input/output connections from/to SWGR/MCC, Actuators with Integral Starter (for coupling																																		
MOUDA STPP-II (2x660MW) / SOLAPUR STPP (2 x 660MW) / NABINAGAR STPP (3x 660MW) / MEJA TPP-I (2 x 660MW) / RAGHUNATHPUR TPP PHASE-II (2 x660MW) STEAM GENERATOR PACKAGE		TECHNICAL SPECIFICATION SECTION-VI BID DOC NO.: CS-9575/ 9571/ 0370/ 0360/ 9586-102(R)-2		PART - B SUB-SECTION-IV: I7 (INSTR. AND POWER SUPPLY CABLE)	PAGE 8 OF 14																														

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	relays and check back signals of 11 kV and 3.3 kV auxiliaries, LT drives/valves & dampers/solenoids, CT & VT, etc.) shall be provided with built in test and disconnect facilities complete with plug, slide clamp, test socket etc. The exact type of terminal blocks to be provided by the Bidder and the technical details of the same including width etc. shall be subject to Employer's approval.			
6.02.00	All the terminal blocks shall be provided complete with all required accessories including assembly rail, locking pin and section, end brackets, partitions, small partitions, test plug bolts and test plug (as specified above for SWGR connections) transparent covers, support brackets, distance sleeves, warning label, marking, etc.			
6.03.00	The marking on terminal strips shall correspond to the terminal numbering on wiring diagrams. At least 20% spare unused terminals shall be provided everywhere including local junction boxes, instrument racks/enclosures, termination/marshalling cabinets, etc. All terminal blocks shall be numbered for identification and grouped according to the function. Engraved labels shall be provided on the terminal blocks.			
6.04.00	For terminating each process actuated switches, drive actuators, control valves, Thermocouple, RTD, etc. in Local Junction Boxes, etc, refer Drg no. 0000-999-POI-A-065.			
6.05.00	The terminal blocks shall be arranged with at least 100 mm clearance between two sets of terminal blocks and between terminal blocks and junction box walls.			
6.06.00	For ensuring proper connections, Bidder shall provide suitable accessories, along with insulation sleeves. The exact connecting accessory shall be finalized as per application during detail engineering stage subject to Employer's approval without any cost repercussions.			
6.07.00	Internal wiring in factory pre-wired electronic equipment cabinets may be installed according to the Bidder's standard as to wire size and method of termination or internal equipment. Terminal blocks for connection of external circuits into factory prewired electronic equipment cabinets shall meet all the requirements as specified above.			
7.00.00	INTERNAL PANELS/ SYSTEM CABINETS WIRING			
7.01.00	Internal panel/cabinet wiring shall be of multi-stranded copper conductor with FRLS PVC insulation without shield and outer sheath meeting the requirements of VDE 0815.			
7.02.00	Wiring to door mounted devices shall be done by 19 strand copper wire provided with adequate loop lengths of hinge wire so that multiple door opening shall not cause fatigue breaking of the conductor.			
7.03.00	All internal wires shall be provided with tag and identification nos. etched on tightly fitted ferules at both ends in Employer's approved format. All wires directly connected to trip devices shall be distinguished by one additional red color ferrule.			
7.04.00	All external connection shall be made with one wire per termination point. Wires shall not be tapped or spliced between terminal points.			
7.05.00	All floor slots of desk/panels/cabinets used for cable entrance shall be provided with removable gasketed gland plates and sealing material. Split type grommets shall be used for prefabricated cables.			
7.06.00	All the special tools as may be required for solder less connections shall be provided by Bidder.			
MOUDA STPP-II (2x660MW) / SOLAPUR STPP (2 x 660MW) / NABINAGAR STPP (3x 660MW) / MEJA TPP-I (2 x 660MW) / RAGHUNATHPUR TPP PHASE-II (2 x660MW) STEAM GENERATOR PACKAGE		TECHNICAL SPECIFICATION SECTION-VI BID DOC NO.: CS-9575/ 9571/ 0370/ 0360/ 9586-102(R)-2		PART - B SUB-SECTION-IV: 17 (INSTR. AND POWER SUPPLY CABLE)
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7.07.00	Wire sizes to be utilized for internal wiring.			
	(i)	Current (4-20 mA), low voltage signals (48V); Ammeter/Voltmeter circuit, control switches etc. for electrical system.	0.5 Sq.mm.	
	(ii)	Power supply and internal illumination.	2.5Sq.mm. minimum (shall be as per load requirement.)	
8.00.00	INSTRUMENTATION CABLE INSTALLATION AND ROUTING			
8.01.00	All cables assigned to a particular duct/conduit shall be grouped and pulled in simultaneously using cable grips and suitable lubricants. Cables removed from one duct/conduit shall not be reused without approval of Employer.			
8.02.00	Cables shall be segregated as per IEEE Std.-422. In vertically stacked trays, the higher voltage cable shall be in higher position and instrumentation cable shall be in bottom tier of the tray stack. The distance between instrumentation cables and those of other system shall be as follows:			
	From 11 kV/6.6 kV/3.3 kV tray system	-	914 mm	
	From 415V tray system	-	610 mm	
	From control cable tray system	-	305 mm	
8.03.00	Cables shall terminate in the enclosure through cable glands. All cable glands shall be properly gasketed. Fire proof sealing (to prevent ingress of dust entry and propagation of fire) shall be provided for all floor slots used for cable entrance. Compression cable glands (double for armoured and single for other cables) shall be provided.			
8.04.00	All cables shall be identified by tag. Nos. provided in Employer's approved format at both the ends as well as at an interval of 5 meters.			
8.05.00	Line voltage drop due to high resistance splices, terminal contacts, insulation resistance at terminal block, very long transmission line etc. shall be reduced as far as practicable.			
8.06.00	The cables emanating from redundant equipment/devices shall be routed through different paths. The above segregation of cables & wiring for redundant equipments/devices shall be in accordance with IEEE-Std-422.			
9.00.00	CABLE LAYING AND ACCESSORIES			
9.01.00	CABLE LAYING			
	1	Cables shall be laid strictly in line with cable schedule.		
	2	Identification tags for cables.		
		Indelible tags to be provided at all terminations, on both sides of wall or floor crossing, on each conduit/duct/pipe entry/exit, and at every 20 m in cable trench/tray.		
MOUDA STPP-II (2x660MW) / SOLAPUR STPP (2 x 660MW) / NABINAGAR STPP (3x 660MW) / MEJA TPP-I (2 x 660MW) / RAGHUNATHPUR TPP PHASE-II (2 x660MW) STEAM GENERATOR PACKAGE		TECHNICAL SPECIFICATION SECTION-VI BID DOC NO.: CS-9575/ 9571/ 0370/ 0360/ 9586-102(R)-2		PART - B SUB-SECTION-IV: I7 (INSTR. AND POWER SUPPLY CABLE)
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9.02.00	3	Cable tray numbering and marking.		
		To be provided at every 10m and at each end of cable way & branch connection.		
	4	Joints for less than 250 Meters run of cable shall not be permitted.		
	5	Buried cable protection		
		With concrete slabs; Route markers at every 20 Meters along the route & at every bend.		
	6	Road Crossings		
		Cables to pass through buried high density PE pipes encased in PCC. At least 300 mm clearance shall be provided between		
		- HT power & LT power cables,		
		- LT power & LT control cables		
		- LT control & instrumentation cables,		
	Spacing between cables of same voltage grade shall be in accordance with the de-rating criteria adopted for cable sizing.			
	7	Segregation (physical isolation to prevent fire jumping)		
	a	All cable associated with the unit shall be segregated from cables of other Units.		
	b	Interplant cables of station auxiliaries and unit critical drives shall be segregated in such a way that not more than half of the drives are lost in case of single incident of fire.		
	8	Cable clamping		
		All cables laid on trays shall be neatly dressed up & suitably clamped/tied to the tray. For cables in trefoil formation, trefoil clamps shall be provided.		
	9	Optical fiber cables inside conduit shall be laid on cable trays wherever available and feasible. In areas where the same are required to be buried, the same shall be buried in separate trench approx.1.6 meter depth, to be laid in 2" GI/rodent proof HDPE conduits covered with sand, brick and soil along the pipe line route;		
		While crossing roads - to be laid in GI/rodent proof HDPE conduits with sand filling at bottom and sand, soil filling at top with cement concrete;		
		While crossing canals/river- to be laid in GI/rodent proof HDPE conduits within hume pipe.		
	Bidder shall supply and install all cable accessories and fittings like Light Interface Units, Surge suppressors, Opto isolators, Interface Converters, Fibre Optic Card Cage, Fibre Optic Line Driver, Repeater / Modem (for Optical Fibre Cables), cable glands, grommets, lugs, termination kits etc. on as required basis.			
MOUDA STPP-II (2x660MW) / SOLAPUR STPP (2 x 660MW) / NABINAGAR STPP (3x 660MW) / MEJA TPP-I (2 x 660MW) / RAGHUNATHPUR TPP PHASE-II (2 x660MW) STEAM GENERATOR PACKAGE		TECHNICAL SPECIFICATION SECTION-VI BID DOC NO.: CS-9575/ 9571/ 0370/ 0360/ 9586-102(R)-2	PART - B SUB-SECTION-IV: 17 (INSTR. AND POWER SUPPLY CABLE)	PAGE 11 OF 14

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9.03.00	Bidder shall furnish two completely new sets of cable termination kits like Crimping tools, etc., which are required for maintenance of the system as per the type of termination used.				
9.04.00	Cables, which terminate in cabinets of draw out sections shall have sufficient cable coiled in the bottom of the cabinet to permit full withdrawal of draw out sections without disconnecting the cables. When prefabricated cables with factory connectors on both ends are longer than required, the excess cable shall be coiled in the bottom of one or both termination cabinets.				
9.05.00	No splices shall be made in conductors for instrument and control circuits except where required at connections to devices equipped with factory installed pigtails. Such splices shall be made only in approved splicing boxes of fitting with removable cover. The splices shall be made with sufficient slack left in the wires to permit withdrawal of the splice from the splicing box for ease of future disconnection of the splices. All exposed conductor or connector surfaces shall be covered with a minimum of three half-lapped layers of all weather vinyl plastic electrical tape. Taping shall extend a minimum of two cable diameters over the cable jacket and a similar distance over the other insulation or connections requiring insulation.				
9.06.00	The Bidder shall be responsible for proper grounding of all equipment under C&I package. Further, proper termination of cable shields shall be verified and the grounding of the same shall be coordinated so as to achieve grounding of all instrumentation cable shields at same potential. This shall be completed prior to system tests. All the cables etc. required for grounding of all equipments supplied under this package are to be supplied by the Bidder.				
9.07.00	The Contractor shall take full care while laying / installing cables as recommended by cable manufacturers regarding pulling tensions and cable bends. Cables damaged in any way during installation shall be replaced at the expense of the Contractor.				
10.00.00	FIELD MOUNTED LOCAL JUNCTION BOXES				
	(i)	No. of ways	12/24/36/48/64/72/96/128 with 20% spares terminals.		
	(ii)	Material and Thickness	4mm thick Fiberglass Reinforced Polyester (FRP).		
	(iii)	Type	Door gasket shall be of synthetic rubber.		
	(iv)	Mounting clamps and accessories	Suitable for mounting on walls, columns, structures etc. The brackets, bolts, nuts, screws, glands and lugs required for erection shall be of brass, included in Bidders scope of supply.		
	(v)	Type of terminal blocks	Rail mounted cage-clamp type suitable for conductor size upto 2.5 mm ² . A M6 earthing stud shall be provided.		
	(vi)	Protection Class	IP: 55 minimum for indoor & IP-65 minimum for outdoor applications.		
	(vii)	Grounding	To be provided.		
	(viii)	Color	To be decided during detailed engineering & subject to Employer's approval.		
MOUDA STPP-II (2x660MW) / SOLAPUR STPP (2 x 660MW) / NABINAGAR STPP (3x 660MW) / MEJA TPP-I (2 x 660MW) / RAGHUNATHPUR TPP PHASE-II (2 x660MW) STEAM GENERATOR PACKAGE		TECHNICAL SPECIFICATION SECTION-VI BID DOC NO.: CS-9575/ 9571/ 0370/ 0360/ 9586-102(R)-2		PART - B SUB-SECTION-IV: I7 (INSTR. AND POWER SUPPLY CABLE)	PAGE 12 OF 14

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11.00.00	CONDUITS			
11.01.00	Conduits shall be generally used for interconnecting cables from field instruments to Local JB's. All rigid conduits, couplings and elbows shall be hot dipped galvanized rigid mild steel in accordance with IS: 9537 Part-I (1980) and Part-II (1981). The conduit interior and exterior surfaces shall have continuous zinc coating with an overcoat of transparent enamel lacker or zinc chromate. Flexible conduit shall be heat resistant lead coated steel, The temperature rating of flexible conduit shall be suitable for the following areas: (i) Mills (ii) Drum (iii) Main steam, RH steam (iv) Air Heaters (v) Furnace, BFPDTs For the remaining applications, water leak, fire and rust proof flexible GI conduits shall be provided.			
11.02.00	The Bidder shall install conduits according to the general routing as approved by Employer and shall coordinate conduit locations with other works.			
11.03.00	All grounding bushings within all enclosures shall be wired together and connected internally to the enclosure grounding lug or grounding bus with 8 AWG bare copper conductor. Conduit runs to individually mounted equipment shall be grounded to the Employer's cable tray grounding conductor with 12 AEG bare copper conductor. All grounding bushings, clamps and connectors shall be subject to approval of the Employer.			
11.04.00	All rigid conduit fittings shall conform to the requirements of IS: 2667, 1976. Galvanized steel fitting shall be used with steel conduit. All flexible conduit fittings shall be liquid tight, galvanized steel. The end fittings shall be compatible with the flexible conduit supplied.			
11.05.00	All individually mounted equipment and devices shall be connected to the supply conduit, using not more than one meter of flexible conduit adjacent to the equipment or device. Flexible conduit shall be installed in all conduit runs, which are supported by both building steel and structures subject to vibration or thermal expansion. This shall include locations where conduit supported by building steel enters or becomes supported by the turbine generator foundation and where conduit supported by building steel or foundation becomes supported by steam generator framing.			
11.06.00	Special areas, such as control rooms in which external noise is to be minimized, shall have flexible conduit in conduit runs where the runs cross from the main building framing to the control room framing.			
11.07.00	Conduit supports shall be furnished and installed in accordance with these specifications. Support material shall comply with the following requirements. i) Hanger rods shall be 12 mm diameter galvanized threaded steel rods. ii) Single conduit supports shall be one-hole cast metal straps and clamp backs unless other types are acceptable to the Employer. Multiple conduit bank supports shall be constructed of special galvanized support channels with associated conduit clips.			
11.08.00	Conduit sealing, explosion proof, dust proof and other types of special fittings shall be provided as required by these specifications and shall be consistent with the area and equipment with which they are installed. Fittings installed outdoors and in damp locations			
MOUDA STPP-II (2x660MW) / SOLAPUR STPP (2 x 660MW) / NABINAGAR STPP (3x 660MW) / MEJA TPP-I (2 x 660MW) / RAGHUNATHPUR TPP PHASE-II (2 x660MW) STEAM GENERATOR PACKAGE		TECHNICAL SPECIFICATION SECTION-VI BID DOC NO.: CS-9575/ 9571/ 0370/ 0360/ 9586-102(R)-2	PART - B SUB-SECTION-IV: 17 (INSTR. AND POWER SUPPLY CABLE)	PAGE 13 OF 14

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	shall be sealed and gasketed. Hazardous area fittings and conduits sealing shall conform to NEC requirements for the area classification.			
11.09.00	Contractor shall provide double locknuts on all conduit terminations not provided with threaded hubs and couplings. Water tight conduit unions and rain tight conduit hubs shall be utilized for all the application which shall be exposed to weather. Moisture pockets shall be eliminated from conduits.			
11.10.00	Conduits shall be securely fastened to all boxes and cabinets.			
12.00.00	CABLE SUB-TRAY & SUPPORT			
12.01.00	The cable sub-trays and the supporting system, to be generally used between Local/Group JBs and the main cable trays and the same shall be furnished and installed by the Contractor. It is the assembly of sections and associated fittings forming a rigid structural system used to support the cable from the equipment or instrument enclosure upto the main cable trays (trunk route).			
12.02.00	The covers on the cable sub-trays shall be used for protection of cables in areas where damage may occur from falling objects, welding spark, corrosive environment, etc. & shall be electrically continuous and solidly grounded. The cable trays shall not have sharp edges, burrs or projections injurious to the insulation or outer sheath of the cables.			
12.03.00	The supporting arrangement of cable tray system shall be able to withstand the weight of the cable and cable tray system. The supporting interval shall not be more than the recommended span for the above loading for the type of cable tray selected. The tray shall not overhang by more than one meter from the support at the dead end. As far as practicable the cable sub-tray system shall be supported from one side only, in order to facilitate installation and maintenance of cables.			
12.04.00	The Bidder shall furnish and install the estimated quantities and sizes of sub trays/troughs including all required fittings and adaptors on as required basis.			
MOUDA STPP-II (2x660MW) / SOLAPUR STPP (2 x 660MW) / NABINAGAR STPP (3x 660MW) / MEJA TPP-I (2 x 660MW) / RAGHUNATHPUR TPP PHASE-II (2 x660MW) STEAM GENERATOR PACKAGE		TECHNICAL SPECIFICATION SECTION-VI BID DOC NO.: CS-9575/ 9571/ 0370/ 0360/ 9586-102(R)-2	PART - B SUB-SECTION-IV: I7 (INSTR. AND POWER SUPPLY CABLE)	PAGE 14 OF 14



429-024

PURCHASE / MM / FB
SUB DELIVERY - ENQUIRY - DEVIATION

Page

OF

SCHEDULE OF DEVIATION TO
SUB - DELIVERY ENQUIRY No.

DATE

DESCRIPTION			
SPECIFICATION		DRG. No.	
QUALITY PLAN			
DOCUMENT REFERENCE	BHEL ENQ. CALLED FOR	FIRM'S ALTERNATE OFFER	

CERTIFIED THAT OTHER THAN THE ABOVE DEVIATIONS, WE ARE ACCEPTING ALL THE OTHER SPECIFICATIONS AND REQUIREMENTS IN FULL TO YOUR ENQUIRY

STATION :

DATE :

SIGNATURE OF FIRM'S REPRESENTATIVE

FIRM SEAL

- NOTE: 1. Deviations should be taken only in the extreme case.
2. If necessary, use additional sheets with page control number.

ANNEXURE-B (For Indigenous vendor)

ACCEPTANCE OF TECHNO - COMMERCIAL TERMS AND CONDITIONS BY THE BIDDERS

Description of the Equipment:		Online Carbon in Ash Analyser System
BHEL Tender No. & Date		
SI No.	Terms and conditions	Vendor's confirmation
1	Technical : Supply of Field mounted Online Carbon in Ash Analyser System as per specification: TDC:TCI:334/00 Compliance to PQR (Annexure – 1) to be furnished with the offer along with the supporting document Vendor shall submit their own Quality Plan for BHEL approval	
2	Firm Price: The quoted / finalised rates shall be Firm till execution of the supplies. Offer with PVC clause will not be considered.	
3	FOR Basis: The quote shall be on NPGCL Nabinagar 660MW – 1 to 3 (1715 to 1717) project basis as indicated in enquiry, inclusive of Packing and forwarding charges. Freight charges shall be vendor's scope.	
3 (a)	Freight charges: To be quoted as extra and not inclusive in the basic price (Mandatory to quote the same value in Annexure - D)	
3 (b)	Insurance charges: BHEL Scope (Offer will be loaded 0.1064% of (basic material value + ED + forwarding & packing + freight charge).	
4 (a)	<u>Payment terms:</u> The payment for items supplied for the first unit will be processed by BHEL only after proving the system at site and on acceptance of the system by M/s NTPC. In case of dissatisfaction, the bills for the system for the first unit will not be processed for payment. <u>General payment Term:</u> 15.1) 85% of the basic value (excluding E&C charges) will be direct payment after 45 days from the date of dispatch against site acknowledgement. 15.2) 15% of basic value (retention money), (excluding E&C charges) will be paid with 15 days credit from the date of completion of E&C along with E&C charges against supplementary invoice with proof of completion of E&C. Income Tax on E&C is to vendor's account. Hence, all the required documents will be furnished to BHEL by vendor. Income Tax on E&C will not be paid to vendor by BHEL. The quoted lump sum charges for E&C is inclusive of To & Fro Fare, Boarding, Lodging, Local Conveyance, etc.	
		Page 01 of 04

4 (b)	1.Loading Criteria for Payment Terms: Any deviation in the above BHEL payment terms as indicated in 4.a will attract loading as per below. “Base rate of SBI (As applicable on the date of bid opening. Techno-commercial bid opening in case of two part bids) + 6% shall be considered for loading for the period of relaxation sought by bidders”. 2. For option 4.a- option 2, a loading of 2% on the 90% of the offered value shall be made. 3. Payment through bank is not preferred. In this case, loading will be 3% on the offered value. In case of Direct to site, only 90% through bank will be considered. LC/advance payment will not be operated for Indigenous vendors. Offers with payment terms as LC from indigenous vendors will be rejected.	
5 (a)	Liquidated damages: Delivery of the goods specified in the purchase order should be made within the time prescribed. Failure to dispatch the materials in the time as per the delivery quoted in our Purchase Order would make the supplier liable to an un-conditional LD at the rate of ½% of the total order value per week or part thereof subject to maximum of 10% of the total order value. For staggered delivery schedule, LD shall be 0.5% of the undelivered portion per week of the delay or part thereof, subject to a maximum of 10% of the total order value.	
5 (b)	Loading Criteria LD / Penalty: Any deviation of the above LD/Penalty clause, loading will be applied to the extent to which it is not agreed by the bidder (at offered value).	
6 (a)	Guarantee / Warranty Period Guarantee clause 18months from the date of supply or 12 months from the date of actual put in use, whichever is earlier.	
6 (b)	Loading Criteria Guarantee / Warranty Period: No Deviation is permitted. If still vendor offered any deviation on the Guarantee / warranty period it may leads to rejection of offer.	
7 (a)	Performance Bank guarantee: 10% of material value as PBG shall be offered.	
7 (b)	Loading Criteria Performance Bank guarantee: No Deviation is permitted and the deviated offers are liable for rejection.	
8	Taxes & Duties: All Taxes, Duties, Service Taxes etc. payable as extra to the quoted price should be specifically stated in offers along with CST & TIN No / Tariff No. etc., failing which the purchaser will not be liable for payment of such Taxes and Duties.	
8 (a)	ED with cess Indicate the applicable %	
8 (b)	CST /VAT Indicate the applicable %	
		Page 02 of 04

9	Risk purchase: If the supplier fails to deliver the goods within the delivery specified in the Purchase Order, BHEL will be entitled to terminate the contract and to Purchase elsewhere at the risk and cost of the seller either the whole of the goods or any part which the supplier has failed to deliver or despatch within the delivery period mentioned in the Purchase Order.	
10	DELIVERY PERIOD: Our delivery term shall be 8 weeks from the date of data sheet approval.	
11	Validity: 120 days from Technical Bid opening. Non-compliance of the same will result in offer being liable for rejection	
12	GENERAL CONDITION: Kindly submit the 'no deviation format' with clear indication of data sheet no / specification ref, drawing, and quality plan.	
13	Reverse Auction: Reverse Auction is not applicable for this tender.	
14	BHEL will consider the ranking after the loading is applied as referred above wherever deviations are observed.	
15	DOCUMENT SUBMISSION In case of PO, documents (drawings, data sheets and quality plan in triplicate) shall be submitted within 15 days from the date of receipt of po and the revised documents shall be submitted within 1 week from the date of receipt of engineering / quality comments	
16	QUANTITY OF TENDERED QTY BHEL reserves the right to increase or decrease the tendered quantity	
17	PRE QUALIFICATION REQUIREMENT - The offered system shall be of proven design and shall be in successful operation for a period of 1 year in utility boiler of similar rating and type of fuel. - Bidder to provide performance certificates / authentication letters in favour of OEM from each end user certifying the same. The manufacturer (OEM) shall be an approved vendor of NTPC Limited. - Commissioning and service support for the offered system shall be available in India. The above pre-qualification requirement is mandatory for technical offer evaluation. Pre-Qualification requirement shall be furnished by the vendor during offer submission as per the format given in annexure I. Offers qualifying on the above requirement will only be considered for further processing. Offers without above PRE QUALIFICATION REQUIREMENT & COMPLIANCE will be treated as incomplete and shall be liable for rejection	
		Page 03 of 04

18	MSE Clause: All vendors are requested to note the Annexure X –Special clauses for Micro and Small Enterprises (MSE) suppliers. If L1 vendor is an MSE vendor entire project package will be ordered on L1 vendor. If a Non MSE vendor is coming as L1, then L1 prices will be counteroffered on MSE vendor who is quoting price within the price band L1+15% and if they are agreeing purchase order will be awarded for full/complete supply of total tendered value to MSE. If more than one MSE vendors are available in the L1+15% price band then lowest of the MSE vendor will be selected for counteroffering. If lowest MSE vendor is not accepting it will be counteroffered to the next MSE vendor in the price band and so on. Finally if any of the MSE vendor in the price band is not accepting it will be ordered on L1 non MSE vendor. MSE suppliers can avail the intended benefits only if they submit along with the offer, attested copies of documents as mentioned in the Annexure X. Vendor to confirm. The MSE clause will only be applicable to the Indian vendors who are quoting for the complete NIT requirement on their own in INR. Quotations should not be in collaboration with any foreign vendor i.e. part quotation in INR and part quotation in foreign currency if the vendor want to avail MSE clause.	
19	Erection and Commissioning support Charges: Lump sum charges of Erection and Commissioning support with exact Man days for the system with applicable extra Taxes (Service Tax) and Duties etc. in detail should be quoted separately. (Mandatory to quote the same value in Annexure - D) Non-compliance of the same will result in offer being liable for rejection.	
20	Service charges for Erection and Commissioning support Charges: Indicate the applicable service charges in percentage (If applicable)	
21	ANNEXURE – D Vendor shall submit unpriced bid in the Annexure - D along with techno-commercial offer. if not, their offer is liable for rejection. Also the filled Annexure - D shall be attached with PRICE BID with duly signed and stamped.	
22	NPGCL Nabinagar 660MW – 1 to 3 (1715 to 1717) project are coming under ED EXEMPTED project category, hence payment of excise duty is exempted for supplies made to this projects site. If supplies made to BHEL/Trichy stores ED is applicable.	
23	Fraud prevention policy The bidder along with its associate / collaborators / sub-contractors / sub-vendors / consultants / service providers shall strictly adhere to BHEL fraud prevention policy displayed on BHEL website http://www.bhel.com and shall immediately bring to the notice of BHEL management about any fraud or suspected fraud as soon as it comes to their notice.	



An ISO 9001
Company

Bharat Heavy Electricals Limited
(High Pressure Boiler Plant)
Tiruchirappalli-620 014, Tamil Nadu, India
Dept: MATERIALS MANAGEMENT/BOI

ANNEXURE - B (For Foreign vendors)

ACCEPTANCE OF TECHNO - COMMERCIAL TERMS AND CONDITIONS BY THE BIDDERS

Description of the Equipment:		Online Carbon in Ash Analyser System
BHEL Tender No. & Date		
SI N	Terms and conditions	Vendor's confirmation
1	Technical : This requirement is for NPGCL Nabinagar 660MW – 1 to 3 (1715 to 1717) project. Supply of Field mounted Online Carbon in Ash Analyser System as per specification: TDC:TCI:334/00 Compliance to PQR (Annexure – 1) to be furnished with the offer along with the supporting document Vendor shall submit their own Quality Plan for BHEL approval	
2	Firm Price: The quoted / finalised rates shall be Firm till execution of the supplies. Offer with PVC clause will not be considered.	
3	The quotes shall be on FOB/Nearest GATE WAY Airport basis. (Schedule – F attached)	
4 (a)	<u>Payment Terms:</u> The payment for items supplied for the first unit will be processed by BHEL only after proving the system at site and on acceptance of the system by M/s NTPC. In case of dissatisfaction, the bills for the system for the first unit will not be processed for payment. In case of failure of the system for the first unit, vendor will reimburse the customs duty (if applicable) paid by BHEL while importing the item. <u>General payment Term:</u> 15.1) 85% of the basic value (excluding E&C charges) will be paid on CAD Basis after 45 days from the date of receipt of complete set of documents, at BHEL Bank. 15.2) 15% of basic value (retention money), (excluding E&C charges) will be paid with 15 days credit from the date of completion of E&C along with E&C charges against supplementary invoice with proof of completion of E&C. All bank charges outside India to beneficiary's account. Income Tax on E&C is to vendor's account. Hence, all the required documents will be furnished to BHEL by vendor. Income Tax on E&C will not be paid to vendor by BHEL. The quoted lump sum charges for E&C is inclusive of To & Fro Fare, Boarding, Lodging, Local Conveyance, etc.	
		Page 01 of 04

4 (b)	1.Loading Criteria for Payment Terms: Any deviation in the above payment term will attract loading as mentioned below. "Base rate of SBI (as applicable on the date of bid opening. Techno-commercial bid opening in case of two part bids) + 6% shall be considered for loading for the period of relaxation sought by bidders.	
4 (c)	1. In the case of Usage LCs the loading will be considered @ 1.5% on the offered Value. 2. For LC at sight the loading will be considered @ 3.5% on the offered Value. 3. Normally CAD at sight and Confirmed LCs are liable for rejection.	
5 (a)	Liquidated damages: Delivery of the goods specified in the purchase order should be made within the time prescribed. Failure to dispatch the materials in the time as per the delivery quoted in our Purchase Order would make the supplier liable to an un-conditional LD at the rate of ½% of the total order value per week or part thereof subject to maximum of 10% of the total order value. For staggered delivery schedule, LD shall be 0.5% of the undelivered portion per week of the delay or part thereof, subject to a maximum of 10% of the total order value.	
5 (b)	Loading Criteria LD / Penalty: Any deviation of the above LD/Penalty clause, loading will be applied to the extent to which it is not agreed by the bidder (at offered value).	
6 (a)	Guarantee / Warranty Period Guarantee clause 18months from the date of supply or 12 months from the date of actual put in use, whichever is earlier.	
6 (b)	Loading Criteria Guarantee / Warranty Period: No Deviation is permitted. If still vendor offered any deviation on the Guarantee / warranty period it may leads to rejection of offer.	
7(a)	Performance Bank guarantee: 10% of material value as PBG shall be offered.	
7(b)	Loading Criteria Performance Bank guarantee: No Deviation is permitted and the deviated offers are liable for rejection.	
8	Taxes & Duties: All Taxes, Duties, Service Taxes etc. payable as extra to the quoted price should be specifically stated in offers along with CST & TIN No / Tariff No. etc., failing which the purchaser will not be liable for payment of such Taxes and Duties.	
9	Risk purchase: If the supplier fails to deliver the goods within the delivery specified in the Purchase Order, BHEL will be entitled to terminate the contract and to Purchase elsewhere at the risk and cost of the seller either the whole of the goods or any part which the supplier has failed to deliver or despatch within the delivery period mentioned in the Purchase Order.	
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10	Delivery Period: Our delivery term shall be 8 weeks from the date of Data Sheet approval.	
11	Validity: 120 days from Technical Bid opening. Non-compliance of the same will result in offer being liable for rejection.	
12	General Condition: Kindly submit the 'No deviation format' with clear indication of Data Sheet No / Specification ref, Drawing, and Quality plan.	
13	Reverse Auction: Reverse Auction is not applicable for this tender.	
14	BHEL will consider the ranking after the loading is applied as referred above wherever deviations are observed.	
15	DOCUMENT SUBMISSION In case of PO, documents (drawings, data sheets and quality plan in triplicate) shall be submitted within 15 days from the date of receipt of po and the revised documents shall be submitted within 1 week from the date of receipt of engineering / quality comments	
16	QUANTITY OF TENDERED QTY BHEL reserves the right to increase or decrease the tendered quantity	
17	PRE QUALIFICATION REQUIREMENT - The offered system shall be of proven design and shall be in successful operation for a period of 1 year in utility boiler of similar rating and type of fuel. - Bidder to provide performance certificates / authentication letters in favour of OEM from each end user certifying the same. The manufacturer (OEM) shall be an approved vendor of NTPC Limited. - Commissioning and service support for the offered system shall be available in India. The above pre-qualification requirement is mandatory for technical offer evaluation. Pre-Qualification requirement shall be furnished by the vendor during offer submission as per the format given in annexure I. Offers qualifying on the above requirement will only be considered for further processing. Offers without above PRE QUALIFICATION REQUIREMENT & COMPLIANCE will be treated as incomplete and shall be liable for rejection	
		Page 03 of 04

18	MSE Clause: All vendors are requested to note the Annexure X –Special clauses for Micro and Small Enterprises (MSE) suppliers. If L1 vendor is an MSE vendor entire project package will be ordered on L1 vendor. If a Non MSE vendor is coming as L1, then L1 prices will be counteroffered on MSE vendor who is quoting price within the price band L1+15% and if they are agreeing purchase order will be awarded for full/complete supply of total tendered value to MSE. If more than one MSE vendors are available in the L1+15% price band then lowest of the MSE vendor will be selected for counteroffering. If lowest MSE vendor is not accepting it will be counteroffered to the next MSE vendor in the price band and so on. Finally if any of the MSE vendor in the price band is not accepting it will be ordered on L1 non MSE vendor. MSE suppliers can avail the intended benefits only if they submit along with the offer, attested copies of documents as mentioned in the Annexure X. Vendor to confirm. The MSE clause will only be applicable to the Indian vendors who are quoting for the complete NIT requirement on their own in INR. Quotations should not be in collaboration with any foreign vendor i.e. part quotation in INR and part quotation in foreign currency if the vendor want to avail MSE clause.							
19	Erection and Commissioning support Charges: Lump sum charges of Erection and Commissioning support with exact Man days for the system with applicable extra Taxes and Duties etc. in detail, To & Fro charges, Boarding and Lodging should be quoted separately in ANNEXURE – D Non-compliance of the same will result in offer being liable for rejection..							
20	Weight of the components: a) Component Net Weight b) Component weight with packing							
21	ANNEXURE – D Vendor shall submit unpriced bid in the Annexure - B along with techno-commercial offer. if not, their offer is liable for rejection. Also the filled Annexure - D shall be attached with PRICE BID with duly signed and stamped.							
22	Fraud prevention policy The bidder along with its associate / collaborators / sub-contractors / sub-vendors / consultants / service providers shall strictly adhere to BHEL fraud prevention policy displayed on BHEL website http://www.bhel.com and shall immediately bring to the notice of BHEL management about any fraud or suspected fraud as soon as it comes to their notice.							
23	COST EVALUATION Evaluation shall be on the basis of delivered cost (i.e. “total cost to BHEL”). For evaluation, the exchange rate (TT selling rate of SBI) shall be taken as under: <table><tr><td>Single part bids</td><td>Date of tender opening</td></tr><tr><td>Two/three part bids</td><td>Date of Part-I bid opening</td></tr><tr><td>Reverse Auction</td><td>Date of Part-I bid opening</td></tr></table> If the relevant day happens to be a bank holiday, then the forex rate as on the previous bank (SBI) working day shall be taken.	Single part bids	Date of tender opening	Two/three part bids	Date of Part-I bid opening	Reverse Auction	Date of Part-I bid opening	
Single part bids	Date of tender opening							
Two/three part bids	Date of Part-I bid opening							
Reverse Auction	Date of Part-I bid opening							
		Page 04 of 04						

Annexure – C

MM/BOI/BHEL TRICHY

SPECIAL TERMS AND CONDITIONS

1. This tender is for the supply of **Online Carbon in Ash Analyser System** as per specs, size and quantities mentioned in the attached enquiry.
2. The vendor shall have adequate experience in manufacturing and supply similar type of equipment.
3. The tender is in three parts as follows:

A) Part – I Pre-Qualification requirement:

- a) The offered system shall be of proven design and shall be in successful operation for a period of 1 year in utility boiler of similar rating and type of fuel.
- b) Bidder to provide performance certificates / authentication letters in favour of OEM from each end user certifying the same. The manufacturer (OEM) shall be an approved vendor of NTPC Limited.
- c) Commissioning and service support for the offered system shall be available in India.

The above pre-qualification requirement is mandatory for technical offer evaluation. Pre-Qualification requirement shall be furnished by the vendor during offer submission as per the format given in annexure I.

Offers qualifying on the above requirement will only be considered for further processing.

B) Part – II Techno-commercial bid:

Techno commercial bid will be consisting technical offer with complete set of supporting documents and commercial bid without indicating the price.

Offers found suitable on technical and commercial grounds only, will be considered for further processing.

C) Part - III – Price Bid:

It will be consisting of price details:

All three bids are to be submitted in separate sealed covers, duly indicating the type of bid and enquiry number in each cover. These three envelopes will be sent in single cover duly super scribing the Enquiry Number.

In addition to the above mentioned three parts bid, vendors who qualify on Pre-Qualification Requirement and Techno-commercially and are not registered vendor of BHEL-Trichy has to submit the filled in "Supplier Registration Forms" (available at www.bheltry.co.in - Online Supplier Registration – Material Management or <http://vis.bheltry.co.in/olsa/>) before Price –Bid opening. Price bid of such vendors will be opened only after the receipt of all documents and registration with BHEL-Trichy.

Part – I Pre-qualification bid will be opened on due date:

The techno-commercial bid of the qualified vendors will be opened on a suitable date with due intimation. Based on the acceptance of techno-commercial bid and vendor evaluation, the price bid of the qualified vendors will be opened on a suitable date with due intimation.

Annexure – C
MM/BOI/BHEL TRICHY
SPECIAL TERMS AND CONDITIONS

4. Following will be the criteria for vendors to qualify:

- a. Vendor should have been approved by BHEL Trichy for this items under Permanent category and should have been approved by customer.
- b. Vendor should submit the following documents for considering them as an approved vendor:
 - i. Duly filled-in Supplier Registration Forms.
 - ii. Availability of minimum manufacturing, handling, testing and measuring facilities as detailed in the Supplier Registration Form.
 - iii. BHEL will have the right for spot assessment of the facilities for assessment.
 - iv. Qualifying to our techno commercial requirements of the Enquiry.

Supplier Registration Form (SRF) has to be duly filled up online and send one copy with all the documents as mentioned in SRF & if vendors have already submitted SRF & hard copy is sent to BHEL, can mention SRF Number (Application Number).

URL for online Registration form is as below

<http://vis.bheltry.co.in/olsa/>

For any help regarding filling of SRF, you may contact following

Mrs. Nalini Subramanian (Purchase Officer- Supplier Development Cell)
Ph:0431/2577301
Email ID: nalini@bheltry.co.in

Mr. Ebinesan (Sr. Manager- Supplier Development Cell)
Ph:0431/2577448
Email ID: ebi@bheltry.co.in

Systems / BHEL /TRICHY
Ph:System SDC:0431/2577121,ljp@bheltry.co.in

Ph:System ERP:0431/2577522,erpsubcon@bheltry.co.in

For any queries regarding tender you may contact

1) Mr. G MURUGESAN
Engineer/MM/BOI
BHEL Trichy
0431-2577072
gmuru@bheltry.co.in

2) Mrs.P.L. Pramila
DGM/MM/BOI
BHEL Trichy
0431-2574737
pramila@bheltry.co.in

Annexure – C
MM/BOI/BHEL TRICHY
SPECIAL TERMS AND CONDITIONS

5. BHEL reserves the right to increase or decrease the tendered quantity and split the tendered quantity among more than one tenderer and place orders accordingly in any proportion based on commitment, requirement and supplier's capability in terms of delivery and quality as assessed by BHEL.
6. BHEL reserves the right to negotiate the L1 rate.
7. BHEL reserves the right to re-float the tender opened, if L1 price is not the lowest acceptable price to BHEL inter-alia other reasons.
8. BHEL reserves the right to order on more than one vendor at the lowest acceptable price to BHEL.
9. Vendors have to confirm to the Commercial Terms and Special Terms & Conditions attached.
10. BHEL standard LD condition is **½% of the total order value per week or part thereof subject to maximum of 10% of the total order value**
12. Please indicate the exact location of WORKS / FACTORY.
13. The vendor who are not registered in BHEL PMD as permanent vendors must ensure that they complete the supplier registration formalities and get registered with BHEL Trichy as permanent PMD vendors before the price bid opening is done. The offers of the vendors who fail to so will be liable for rejection.
14. Vendor who are not approved by customer already, they shall get approved by customer before price bid opening. If customer regrets to approve before price bid opening of this tender, the offer submitted by the vendor shall not be considered further for this tender and hence their offer is liable for rejection.
15. If new vendor is responding to this open tender who is not approved in BHEL PMD as well as not approved by customer, should get qualified by both BHEL as well as customer before price bid opening. If vendor is not fulfilling the above criteria, offer will be rejected.
16. Vendor shall submit the filled in "Supplier Registration Forms" (available in www.bhel.com) along with their offer as mentioned in point No 04 this annexure - C.
17. Techno-commercial bid will be opened on the due date as indicated in enquiry. Vendor's offer will only be considered, provided they are registered with permanent code in line with the provisions of SEARP (Supplier Evaluation Approval & Review Procedure), vide ref. AA: SSP:SR:01, Rev.02 dt. 26.09.2016 and shall be approved by customer, before price bid opening (as per PP clause no 5.2.1). If vendor is not fulfilling the above criteria, offer will be rejected.

ANNEXURE - D (FOR INDIGENOUS VENDORS)												
PRICE BID FORMAT												
VENDOR SHALL SUBMIT UNPRICED BID IN THIS FORMAT ALONG WITH TECHNO-COMMERCIAL OFFER. ALSO THE FILLED ANNEXURE - B SHALL BE ATTACHED WITH PRICE BID PART WITH DULY SIGNED AND STAMPED. IF NOT, THEIR OFFER IS LIABLE FOR REJECTION												
ENQUIRY NO.: 1701701220			ENQUIRY DATE: 07.06.2017				PROJECT: NPGCL Nabinagar 660MW - 1 to 3 (1715 to 1717)					
ENQ. SL. NO.	MATERIAL CODE	MATERIAL DESCRIPTION	QTY	UNIT	BASIC UNIT PRICE INCLUSIVE OF PACKING & FORWARDING		TOTAL PRICE (UNIT PRICE x QTY.)	EXCISE DUTY IN %	SALES TAX IN %			OTHER COST IF ANY IN %
									VAT %	CST WITH C FORM %	CST WITHOUT C FORM %	
10	A171519708401001	Carbon in Ash Analyser System	3	Set								
OTHER CHARGES		DESCRIPTION	Lumpsum charges for Boiler - 1 (1715)	Lumpsum charges for Boiler - 2 (1716)	Lumpsum charges for Boiler - 3 (1717)	Total charges for all 3 boilers	Total Man Days required/Boiler	SERVICE TAX IN %				
Erection and Commissioning support Charges		Lump sum charges of Erection and Commissioning support with exact Man days for the system with applicable extra Taxes (Service Tax) and Duties etc.										
Freight charges in Rs. Up to site		To be quoted as extra and not inclusive in the basic price										
Insurance charges		BHEL Scope	BHEL Scope									
VENDOR NAME:		VENDOR WORKS ADDRESS:					SIGN AND SEAL OF AUTHORIZED PERSON					

ANNEXURE - D (FOR IMPORT VENDORS)									
PRICE BID FORMAT									
VENDOR SHALL SUBMIT UNPRICED BID IN THIS FORMAT ALONG WITH TECHNO-COMMERCIAL OFFER. ALSO THE FILLED ANNEXURE - B SHALL BE ATTACHED WITH PRICE BID PART WITH DULY SIGNED AND STAMPED. IF NOT, THEIR OFFER IS LIABLE FOR REJECTION									
ENQUIRY NO.: 1701701220				ENQUIRY DATE: 07.06.2017				PROJECT: NPGCL Nabinagar 660MW - 1 to 3 (1715 to 1717)	
ENQ. SL. NO.	MATERIAL CODE	MATERIAL DESCRIPTION	QTY	UNIT	BASIC UNIT PRICE INCLUSIVE OF PACKING & FORWARDING		TOTAL PRICE (UNIT PRICE x QTY.)		OTHER COST IF ANY IN %
10	A171519708401001	Carbon in Ash Analyser System	3	Set					
OTHER CHARGES		DESCRIPTION	Lumpsum charges for Boiler - 1 (1715)		Lumpsum charges for Boiler - 2 (1716)	Lumpsum charges for Boiler - 3 (1717)	Total charges for all 3 boilers	Total Man Days required/Boiler	Other charges like Testing etc.
Erection and Commissioning support Charges		Lump sum charges of Erection and Commissioning support with exact Man days for the system with applicable extra Taxes and Duties etc. (Including To & Pro Air charges, Boarding & Loading)							
Weight of the components		Component Net Weight in Kgs.(Approx.)							
		Component weight with packing in Kgs. (Approx.)							
VENDOR NAME		VENDOR WORKS ADDRESS	GATE WAY AIRPORT NAME				SIGN AND SEAL OF AUTHORIZED PERSON		

Details of Gateway Airport with applicable Foreign Currency and Airlines for FSC payment **Schedule F**

Sch. No.	Country	CUR Code	Gateway Airport/s	Airlines with its Code For FSC Payment will be made	
D01	UK	GBP	London (Heathrow)	Air India	AI
D02	UK	GBP	New Castle	British Airways	BA
D03	UK	GBP	Oxford, Chellam	British Airways	BA
D04	UK	GBP	Bristol, Wellingborough	British Airways	BA
D05	UK	GBP	Birmingham	British Airways	BA
D06	UK	GBP	East Midlands	British Airways	BA
D07	UK	GBP	Manchester	British Airways	BA
D08	UK	GBP	Leeds	British Airways	BA
D09	UK	GBP	Glasgow	British Airways	BA
D10	France	EURO	Paris (Roissy) & Lyon	Air India	AI
D11	Sweden	EURO	Stockholm	Emirates	EK
D12	Sweden	EURO	Gothenberg & Malmo	Emirates	EK
D13	Italy	EURO	Rome, Milan	Carrier Used	Carrier Used
D14	Italy	EURO	Turin, Bologna, Florence	Carrier Used	Carrier Used
D15	Netherlands	EURO	Amsterdam, Rotterdam	Klm Airlines	KLM
D16	Austria	EURO	Vienna, Linz, Graz	Lufthansa	LH
D17	Belgium	EURO	Antwerp, Brussels	Singapore Airlines	SQ
D18	Denmark	DKK	Copenhagen	Cathay Pacific	CX
D19	Japan	JPY	Tokyo, Osaka	Air India	AI
D20	Singapore	SGD	Singapore	Air India	AI
D21	Canada	CAD	Toronto	Carrier Used	Carrier Used
D22	Canada	CAD	Montreal	Carrier Used	Carrier Used
D23	USA	USD	New York, Boston	Air India	AI
D24	USA	USD	Chicago	Carrier Used	Carrier Used
D25	USA	USD	San Francisco, Los Angeles	Carrier Used	Carrier Used
D26	USA	USD	Atlanta, Houston	Carrier Used	Carrier Used
D27	Germany	EURO	Munich, Koln, Dusseldorf, Hannover, Hamburg, Stuttgart, Darmstadt, Manihem, Nurnberg	Lufthansa	LH
D28	Germany	EURO	Frankfurt	Lufthansa	LH
D29	Germany	EURO	Berlin	Lufthansa	LH
D30	Switzerland	SFR	Basle, Zurich, Geneva	Swiss World Cargo	LX
D31	Spain	EURO	Barcelona	Emirates	EK
D32	Australia	AUD	Sydney	Qantas Airlines	QF
D33	Australia	AUD	Melbourne	Qantas Airlines	QF
D34	Australia	AUD	Perth	Qantas Airlines	QF
D35	Czech	EURO	Prague	Lufthansa	LH
D36	Hong Kong	HKD	Hong Kong	Air India	AI
D37	New Zeland	NZD	Auckland	Carrier Used	Carrier Used
D38	Russia	USD	Moscow	Carrier Used	Carrier Used
D39	South Korea	USD	Kimpo International, Incheon	Air India	AI
D40	Finland	EURO	Helsinki	Finnair Cargo	AY
D41	Romania	EURO	Bucharest	Carrier Used	Carrier Used
D42	Norway	EURO	Oslo	Carrier Used	Carrier Used
D43	Ireland	EURO	Dublin	Carrier Used	Carrier Used
D44	Israel	USD	Tel Aviv	El Al Israel	LY
D45	UAE	USD	Dubai	Air India	AI
D46	Oman	USD	Muscat	Air India	AI
D47	Egypt	USD	Cairo	Carrier Used	Carrier Used
D48	Taiwan	USD	Taipei	Carrier Used	Carrier Used
D49	Ukraine	USD	Kiev	Lufthansa	Carrier Used
D50	China	USD	Shanghai, Shenzhen	Carrier Used	Carrier Used
D51	Philippines	USD	Manila	Carrier Used	Carrier Used
D52	Malaysia	USD	Kualalumpur, Pe Nang	Malaysia Airlines	Carrier Used
D53	Cyprus	USD	Larnaca	Carrier Used	Carrier Used
D54	South Africa	USD	Johannesberg, Durban	Carrier Used	Carrier Used
D55	Slovakia	EURO	Bartislova	Lufthansa	LH
D56	Saudi Arabia	SAR	Riyadh	Saudi Arabia Airlines	SV
D57	Turkey	EURO	Istanbul	Turkish Airlines	TK
D58	Thailand	USD	Bangkok	Thai Airways	TG
D59	Brazil	USD	Sao Paulo, Rio De Janeiro	Emirates	EK

ANNEXURE X
Micro Small and Medium Enterprises (MSE) – Clause for NIT

In line with Gazette notification issued by Ministry of Micro Small and medium enterprises on MSE suppliers, the following special provisions shall be applicable.

20% of the tendered quantity is earmarked for MSE suppliers in this tender.

Out of the 20% tendered quantity reserved for MSE suppliers, 4% shall be earmarked for procurement from MSE owned by SC / ST entrepreneurs.

In case MSE vendor participating in the tender quotes within the price band of LI + 15%, they will be allowed to supply the portion of the requirement subject to acceptance of LI price by MSE vendor. In case of more than one such MSE, the supply shall be shared proportionately.

In case of tender items is not-splitable or non-dividable etc., MSE quoting price within the price band L1+15% may be awarded for full/complete supply of total tendered value to MSE

MSE suppliers can avail the intended benefits only if they submit along with the offer, attested copies of either

1. EM II certificate having deemed validity (two years from the date of issue of acknowledgement in EM II) **or**
2. Valid NSIC certificate or EM II certificate along with CA certificate (Format enclosed) applicable for the year, certifying quantum of investment in plant and machinery within the permissible limits as per the act for relevant status (MICRO or SMALL) where the deemed validity of EM II is over.

Date to be reckoned for determining the deemed validity will be the last date of technical bid submission (Part 1 in case of two part bid).

Non submission of such documents will lead to consideration of their bid at par with other bidders and MSE status of such suppliers shall be shifted to NON MSE suppliers till the supplier submit this documents.

Documents should be notarized or attested by a Gazetted officer.

Definitions of MSEs owned by SC/ST is under:

- ***In case of proprietorship firm, proprietor must be SC/ST.***
- ***In case of partnership firm, the SC/ST partners must be holding at least 51% shares in the unit.***
- ***In case of private limited companies, at least 51% share must be held by SC/ST promoters.***

Authorised Offices to Issue SC/ST certificate.

The caste/Tribe/Community certificate issued by the following authorities in the prescribed form for SCs/STs can be considered.

- District Magistrate/Additional District Magistrate/Collector/Deputy commissioner/Additional Deputy commissioner/Deputy collector/1st class stipendary magistrate/Sub divisional Magistrate/Taulka Magistrate/Executive magistrate/Extra Assistant commissioner.
- Chief Presidency magistrate/Additional chief presidency magistrate/Presidency magistrate.
- Revenue Officer not below the rank of thasildar.
- Sub-Divisional officer of the area where the individual and / or his family normally resides.

To avail the benefits of MSE under SC/ST category, the related documents as stated above should be submitted along with tender documents.