



An ISO 9001  
Company

## Bharat Heavy Electricals Limited

(High Pressure Boiler Plant)

Tiruchirappalli – 620014, TAMIL NADU, INDIA

MATERIALS MANAGEMENT

<b>TITLE :</b> <b>THREE DIMENSIONAL THERMO HYDRAULIC</b> <b>DESIGN OF 700 MWe PHWR TYPE</b> <b>STEAM GENERATOR</b>	Phone: +91 431 2577645/2577331 Fax : +91 431 252 07 19 Email : <a href="mailto:balasund@bheltry.co.in">balasund@bheltry.co.in</a> <a href="mailto:srchandran@bheltry.co.in">srchandran@bheltry.co.in</a> Web : <a href="http://www.bhel.com">www.bhel.com</a> , <a href="http://tenders.gov.in">http://tenders.gov.in</a>
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	<b>Reference Number:</b> <b>Enquiry 2650900013</b>	<b>Enquiry Date:</b> <b>27.05.09</b>	<b>Due date for submission of</b> <b>quotation: 15.07.09</b>
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 Agency for Providing Three Dimensional Thermo Hydraulic Analysis 700 MWe Steam Generator, as per the technical specification .

BHEL commercial terms & conditions with Technical specifications can be downloaded from BHEL web site <a href="http://www.bhel.com">http://www.bhel.com</a> or from the Government tender website <a href="http://tenders.gov.in">http://tenders.gov.in</a> (public sector units) Bharath Heavy Electricals Limited) under enquiry reference "2650900013"	
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, <b>For Bharath Heavy Electricals Limited</b>  Manager / Capital Purchase/ Manufacturing



**ENQUIRY**  
(IMPORTS)

# BHARAT HEAVY ELECTRICALS LIMITED

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

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PHONE : 2577645  
GRAMS : BHARATELEC  
FAX NO: 2520719  
E-mail: balasund@bheltry.co.in  
Web:www.bhel.com (or) tenders.gov.in

Enquiry No	Enquiry Date	Due Date for Quotation
2650900013 - 49	27.05.2009	15.07.2009
Please quote Enquiry No, Date and due date in all correspondences. This is only a request for quotation and not an order		

Item	Description	Unit	Quantity	Delivery Quantity	Schedule Date
10	<p>Three dimensional thermo hydraulic design of 700 MWe Steam Generator</p> <p>01) Design analysis work:</p> <p>1.1 Three dimensional thermo hydraulic design analysis using specific code for designing of pressurized heavy water reactor type 700 MWe steam generator (SG) as per the technical specification for performing the analysis is detailed out in the enclosed pdf file(D131-spec-01/00).</p> <p>1.2 The above design analysis shall be performed jointly with BHEL engineers.</p> <p>1.3 The design agency should demonstrate their capability in the form of documents and their experience in handling two phase flow analysis of similar equipments. The design agency shall also give a detailed description about the specific code and its capability that is planned to be used for performing the above analysis.</p> <p>1.4 The three dimensional thermo hydraulic analysis has to be performed using specific code which should have capability of handling primary side fluid with 3-5% boiling and the design output will be jointly evaluated / reviewed by BHEL and BHEL client.</p> <p>1.5 Time period for execution of the entire analysis including documentation and presentation: 6 months (max.).</p> <p>1.6 The final documentation shall contain 4 sets of hard copy and soft copy of the models, meshing, boundary condition and post processed results (numerical values and vectors and contours plots of pressure, velocity, temperature, quality, density, heat transfer coefficients etc.)</p> <p>1.7 The design agency shall have to visit BHEL's client (MPCIL-Mumbai)and the present their</p>	AU	1.000	1.00	02.11.09

The offers should reach us before the time of opening of tenders.  
The offers will be opened at 14:30 hours on the due date in the presence of the tenderers who may like to be present.  
Late tenders are liable to be rejected.

Yours faithfully,  
For **BHARAT HEAVY ELECTRICALS LIMITED**

*S. Balasundaram*  
27/05/09

MANAGER / PURCHASE  
(FOSSIL BOILERS)  
**S. BALASUNDARAM**  
MANAGER / CP / MM / MFG  
Bharat Heavy Electricals Ltd.,  
Thiruchirappalli-620 014



# BHARAT HEAVY ELECTRICALS LIMITED

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2650900013 / 27.05.2009

methodology adopted, code details  
and the salient outputs of the final design.

1.8 The SG is planned to be installed at  
Kakarapar Atomic Power Projects  
3 and 4, Gujarat, India.

02) Single user Software copy including training  
for performing analysis  
at BHEL end for additional cases and for future  
design

General:

The offer shall be submitted in two parts (as  
per annexure enclosed).

Part one of the offer shall contain the technical  
and time period for

execution of analysis work and other  
commercial terms. The details

requested in the para no.: 1.3 is mandatory for  
evaluation of the

capability of the design agency and the same  
shall be submitted in the

part one offer. The vendor who does not  
satisfy this condition will be  
summarily rejected.

Part two of the offer shall contain price details  
(Analysis cost and  
software cost).

The design, drawings, specifications and other  
details furnished to the

design agency by the Purchaser and the  
analysis output generated by the

design agency are to be treated as secret and  
shall not be divulged in

any form to any third party. The design agency,  
therefore, bind himself,

his successor, his executors, administrators,  
employees and the

permitted assignees or such other persons,  
agents directly or indirectly

concerned with the works / supply to the  
secret nature of design,

drawings, specifications and analysis output etc.

Thermo Hydraulic design of

700MWe SG

## General Note:

1...PLEASE SUBMIT YOUR DETAILED OFFER IN TWO PART BID SYSTEM ie.  
PART-I, TECHNICAL AND COMMERCIAL (UNPRICED BID) IN ONE SEALED  
COVER.PART-II,PRICED OFFER IN ANOTHER SEPARATE SEALED COVER.

2. POINT-TO-POINT CONFIRMATION TO BHEL'S SPECIFICATIONS, COMMERCIAL  
TERMS & CONDITIONS IS PROVIDED IN "ANNEXURE-II AND THE SAME SHOULD BE  
FILLED IN ANNEXURE III(indicate all taxes & duties, Packing & forwarding  
charge, freight & insurance charges without price of software) &  
SUBMITTED ALONG WITH PART-I ie. TECHNO-COMMERCIAL BID ELSE YOUR OFFER IS  
LIABLE FOR REJECTION.

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tenderers who may like to be present.  
Late tenders are liable to be rejected.

Yours faithfully,  
For BHARAT HEAVY ELECTRICALS LIMITED

MANAGER / PURCHASE  
(FOSSIL BOILERS)

**S. BALASUNDARAM**  
MANAGER / CP / MM / MFG

Bharat Heavy Electricals Ltd.,  
Thiruchirappalli-620 014



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3...PAYMENT TERMS STRICTLY FOLLOW AS PER OUR PAYMENT TERMS INDICATED IN THE COMMERCIAL TERMS AND CONDITIONS.OTHER PAYMENT TERMS ARE NOT ACCEPTABLE.

4.OFFERS a) DEMANDING ADVANCE PAYMENT, b) WAIVER OF LD CLAUSE, RISK PURCHASE AND PBG c) WITH OFFER VALIDITY OF LESS THAN 4 MONTHS ARE LIABLE FOR REJECTION.

5...ANY CLARIFICATIONS OR PRE-BID MEETING MAY BE SOUGHT BY BIDDER FROM THE UNDERSIGNED WITH DUE WRITTEN REQUESTS AT LEAST FIFTEEN (15) DAYS PRIOR TO TENDER DUE DATE.

6...IF THE DUE DATE OF TENDER OPENING HAPPENS TO BE A HOLIDAY, THOSE TENDERS WILL BE OPENED ON NEXT WORKING DAYS.

## GENERAL NOTE FOR THE ENQ ON REVERSE AUCTION

1. BHEL RESERVES THE RIGHT TO GO FOR A REVERSE AUCTION (RA) INSTEAD OF OPENING THE SUBMITTED SEALED BID, WHICH WILL BE DECIDED AFTER TECHNICAL EVALUATION. INFORMATION AND GENERAL TERMS AND CONDITIONS GOVERNING RA ARE GIVEN IN ANNEXURE-I.

2. REVERSE AUCTION IS DONE THROUGH INTERNET/EMAIL. HENCE VENDORS SHALL MAKE THEMSELVES EQUIPPED WITH EMAIL, FAX AND INTERNET FACILITIES.

3. IN CASE OF GOING FOR REVERSE AUCTION VENDORS WILL BE SUITABLY INFORMED ABOUT THE WORKING PROCEDURES OF REVERSE AUCTION AND BHEL WILL PROVIDE ALL THE RELEVANT DETAILS TO ENABLE THE VENDOR TO PARTICIPATE.

## List of Attachments

### List of Attachments

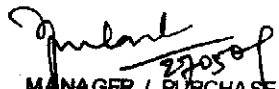
- 1.Reprt no.D131-SPEC-001/00 (13 Pages)
- 2.Annexure-I General terms and conditions of RA-1 Page
- 3.Annexure-II Commercial terms and conditions-7 Pages
- 4.Annexure-III Commercial Confirmations-2 Page

## Enclosures:

"LD clause has to be confirmed without fail."

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Yours faithfully,  
For BHARAT HEAVY ELECTRICALS LIMITED

  
MANAGER / PURCHASE  
S. BALASUNDARAM  
MANAGER / CP / MM / MEG

Bharat Heavy Electricals Ltd.,  
Thiruchirapalli-620 014

**SPECIFICATION FOR CARRYING OUT  
THREE DIMENSIONAL  
THERMO HYDRAULIC DESIGN  
OF  
700 MWe  
PHWR TYPE STEAM GENERATOR**

**Advanced Technology Products  
Bharat Heavy Electricals Limited  
Tiruchirapalli  
Tamil Nadu, India**

## **Thermo Hydraulic Design of 700 MWe Steam Generator**

### **1.0 Introduction:**

Bharat Heavy Electricals limited (BHEL) & Nuclear Power Corporation India Limited (NPCIL) has designed and constructed 540 MWe Steam Generator under the guidance of KWU Germany. Up-rating of the above type SG to higher power generation (700 MWe - 544MWth HX) is under progress by changing the primary side process parameter. Based on the preliminary studies extraction of higher power is feasible from the existing SG heat transfer area and with the following process and geometric changes.

1. The process changes are:

- 1.1 Increase in primary flow rate
- 1.2 Marginal increase in the primary inlet temperature
- 1.3 Primary side fluid state 3-.4% boiling
- 1.4 Increase in the feed water flow rate

2. The geometry changes are:

- 2.1 Increased height of the drum and shroud
- 2.2 Increase of gap between tube sheet and flow distribution plate (FDP)
- 2.3 Increase in FDP opening area
- 2.4 Feed and steam nozzle design changes
- 2.5 Additional number of steam separators.
- 2.6 Higher capacity steam driers (P8X –Peerless Drier or Equivalent)
- 2.7 Changes in the tube end supports

The following sections detailed for performing the three dimensional thermo hydraulic design analysis of 700 MWe SG using specific code. The above steam generator is planned to install at Kakrapar Atomic Power Project - 3&4.

## 2.0 Scope:

Design review/verification of 700MWe Steam Generator (Pressurised Heavy Water Reactor type SG) by performing **three dimensional thermo hydraulic analysis** using **Specific code** with **two-phase capabilities** and suggest changes in the design if necessary. Before performing the 3D thermo hydraulic analysis of 700MWe SG design, validation of the specific code shall be carried out as given below.

The design agency shall also provide write up about the **Specific code** planned to employ for the three dimensional analysis and demonstrate with sample outputs and references. The design agency shall have through knowledge about the parameters and properties that will influence the design.

**Three Dimensional Thermal Hydraulic Design Analysis shall be carried out in two steps**

**Step 1: Validation of the code/design for the provided 540 MWe (434 MWth) data**

The detailed geometry in the form of drawings and process input conditions (such as primary inlet flow pressure & temperature, secondary inlet flow, temperature, level and drum pressure, circulation ratio, thermal load,..) will be provided for the designated power levels of 100 and 50%. Variable boiler pressure program (VBPP) is to be adopted for the 540MWe steam generators. The predicted values from the analysis (circulation ratio, thermal load, pressure, temperature and velocity inside steam generator and the secondary side stability map) shall be compared with the 540MWe data for the acceptance of code/methodology employed. The 540MWe data (Homogeneous and Algebraic slip model output generated using ATHOS code) available with BHEL will be provided for the bench marking purpose after initial analysis runs.

**Step 2: 3D Thermo hydraulic analysis of 700 MWe (544 MWth) design**

The 3D Thermo hydraulic analysis shall be performed for the 700 MWe Steam Generator geometry and the process parameters provided by BHEL. The primary side

input conditions (primary flow, quality, temperature, pressure...) shall be suitably coupled with the code. The 700 MWe Steam generators are to be designed for constant boiler pressure program (CBPP). The code used for the process design shall have the option of algebraic slip models. The primary separator and the drier shall be modelled as point model. The performance details for the separator and drier and its arrangement details will be provided as a reference.

The predicted values (Velocity profile, pressure drop, temperature profile, fluid properties...) inside steam generator for power levels of 100%, xx% (where primary fluid phase change to zero -this power level has to be estimated), 75%, 60%, 50%, 30%, 15%, & 3% will be documented and submitted to BHEL for approval. Run without plugging and fouling shall also be taken in addition runs stipulated above for the secondary side pressure 44 kg/cm<sup>2</sup>(g)

Convergence criteria for the acceptance of solution for the **residuals less than the 1.0e<sup>-6</sup>** for the continuity and energy equations. Residual plots shall be provided along with reports.

The thermodynamic transport properties of heavy water substance (both heavy water and vapour) approved by the International Association for the properties of steam (IPAS) shall be used for designing of the above steam generators

**The following reports shall be prepared and submitted**

- i) Thermal performance at various loads;
- ii) FDP optimisation
  - Tube hole size diameter 21.5mm
  - FDP location from the tube sheet 275mm
  - With existing 540 MWe FDP cut openings
  - FDP modified cut (with increase in one pitch towards id of the shell)
- iii) Flow restrictor sizing (placed in the down comer path).
- iv) Recirculation ratios at different loads
- v) Three dimensional velocity (axial, radial and circumferential), temperature (primary fluid, tube wall, and secondary fluid), pressure, quality, heat flux



(primary and secondary), secondary side fluid mixture density, resident mass quality, void fraction, heat transfer coefficient and enthalpy distribution within 700MWe SG. The above output shall be presented in the form of contour plots, vector plots and numerical output at different elevation and sections.

- vi) Inventory (primary and secondary) under various operating conditions
- vii) Pressure drop at various section of the Steam generator
- viii) Maximum tube-gap velocities normal to tubes (required for flow induced vibration analysis).
- ix) Slip ratio numbers in Y\_Z plane
- x) Zones low flow in FDP region
- xi) Zones voiding in Y-Z planes
- xii) Recommended water levels in the steam generator (similar to that of 540 MWe SG
- xiii) The result shall have the geometry, process conditions, mesh, contours and vectors of pressure, velocity, temperature, quality and density.
- xiv) Design improvements over the geometry and process parameters if any.
- xv) Complete model, meshing file and boundary condition shall be documented and submitted along with the above outputs

#### **Comment on the following properties and parameters**

- Design adequacy checks
- Drum volume,
- Void expansion/shrinkage effects during power raise/lower
- Droplet size/range and distribution of secondary side fluid at the inlet to the primary separator for various load conditions
- Impact of two phase flow/condensation on primary side of the SG
- Checks to verify the design with respect to possible instabilities
- Check should ensure safe and stable operation.
- The process design should also confirm that no where inside the shroud of the SG quality of steam is more than 50% during full power and part power conditions
- Seven Hole Venturi type steam outlet nozzle employed in 700 MWe SG
- Dimension of feed water nozzle and blow down nozzles

- Location of level tap nozzles
- Any other Code-compliance checks if any

**Write up on Steam Generator:**

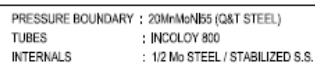
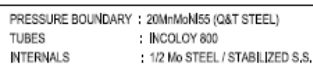
The reactor unit consist of four number of Steam generator's which would supply approximately  $3.874 \times 10^6$  kg/hr (269 kg/sec per SG) of saturated steam with pressure 44 kg/cm<sup>2</sup>(g) at full power. The Steam Generator (SG) is a vertical, natural recirculation type heat exchangers, consists of inverted U-tubes housed in an annular shell. Top section of the heat exchanger is provided with steam drum containing separators and steam driers for supply of 99.75% quality steam through the SG outlet nozzle. Figure - 1 shows prominent features of the SG.

SG comprises a primary portion and a secondary portion. The primary portion consists of the tube sheet, the tube bundle and the hemispherical head below the tube sheet. The secondary portion consists of the cylindrical shell housing the tube bundle, and internals for steam-water separation. The primary head is designed as a hemisphere and is subdivided by a partition plate to form inlet and outlet chambers for the primary coolant. Hot primary coolant (Heavy water D<sub>2</sub>O) from the reactor outlet header enters the inlet chamber of the SG via two nozzles, passes through the tube bundle and exit the SG through a one outlet nozzle and return to the system. The feed water enters the steam generator through nozzle (one nozzle in case of 540 MWe and two nozzles in case of 700 MWe with goose neck arrangement) provided in the steam drum zone. The feed nozzle is connected to a ring header having J-tubes for uniform distribution of feed water. The feed water mixes with the recirculating water and flows downwards through the annular section (down comer) between the shroud and pressure boundary shell and enter the tube bundle through the flow distribution plate (FDP) above the tube sheet. The feed water mixture passes through a FDP placed in the down comer path to control flow oscillation in the SG. The flow continues upward through the tube bundle where a portion of water is converted into steam and enters into steam separators mounted on the deck plate. The separators carry out the coarse separation of the steam-water mixture passing through them. Further separation is done by driers.

The geometrical data and part load parameters for 540 and 700 MWe have been given in Table 01 to 05.

700 MWe parameter enclosed in the table-1 is after considering the **5% plugging and secondary side fouling**.

Run without plugging and fouling shall also be taken in addition runs stipulated in the scope for the secondary side pressure  $44 \text{ kg/cm}^2(\text{g})$



**Table-1: Input Parameters for 540 & 700 MWe Steam Generator**

Description	unit	540 MWe	700 MWe
<b>Primary side properties</b>			
Thermal power per SG	MW/th	434	544
Primary fluid		D <sup>2</sup> O(heavy Water)	
Primary mass flow per heat exchanger	kg/s	1953.6	2115.0
Primary inlet temperature at 100% load	deg.C	304.0	309.4
Primary outlet temperature at 100% load	deg.C	260.0	266.0
Primary inlet pressure	kg/sq.cm(g)	102.0	100.0
Primary fluid Inlet quality		0.000	3.0
<b>Secondary Side properties Initial values ***</b>			
Secondary fluid		(Water/Steam)	
Secondary mass flow per heat exchanger	kg/s	213.6	269.0
Secondary drum pressure	kg/sq.cm(a)	42.1842	45.0332
Recirculation ratio		4.3	4.3
Feed inlet temperature at 100% load	deg.C	180.0	180.0
<b>Steam Generator Construction details</b>			
Tube outer diameter	mm	19.0	19.0
Tube inside diameter	mm	16.8	16.8
Tube pitch	mm	26.0	26.0
Tube lane length	mm	182.0	182.0
Shroud-Tube bundle spacing -Gap1	mm	80.5	80.5
Shell-Shroud spacing -Gap2	mm	112.5	112.5
Number of tubes.	nos	2489.0	2489.0
Number of tube rows	nos	72.0	72.0
Tube_plug-%		5.0	5.0
Number of tie-rods.	nos	30.0	30.0
Ht.of FDP above tube sheet	mm	225.0	275***
Tube bundle diameter	mm	2036.0	2036.0
Number of separators	nos	23.0	29.0
Inner diameter of separator	meter	0.232	0.232
Height of the tube bundle above tube sheet	meter	11.872	11.872
Height of deck plate above tube sheet	meter	12.67	15.67
Thickness of the shroud	mm	18.0	18.0
Thickness of the shell	mm	56.0	56.0
Steam drum id	mm	3350.0	3350.0
Height of the cone	mm	1505.0	1505.0
Height of the lower shell	mm	10394.0	10394.0
Upper shell ID	mm	3350.0	3350.0
Upper shell thickness	mm	70.0	70.0
Fouling factor	hr-m <sup>2</sup> -°C	0.000015	0.000015
Level of water in the drum above tube sheet	meter	13.400	16.400

**Note: Change in the geometric parameters are to be suggested after performing analysis**

**Table-2: PART LOAD PARAMETERS FOR 540 MWe SG**

PARAMETER	% OF FULL LOAD				
	100	70	50	30	15
Heat load MW (Th)	434	303.8	217.2	130.2	65.1
<b>PRIMARY SIDE :</b>					
Flow Rate (Te./hr.)	7,033				
Inlet Temperature °C	304	297.4	293	288.6	282.5
Outlet Temperature °C	260	266.5	271	275.3	275.9
<b>SECONDARY SIDE : FEED WATER</b>					
Inlet Temp °C	180	166	150	129	120
Recirculation Ratio	4.33	6.34	8.52	12.75	21.15
<b>SECONDARY SIDE : STEAM</b>					
Pressure at drum Kg/cm <sup>2</sup> (g)	42.03	48.12	52.56	57.29	58.37
Steam Flow rate (T./hr.)	768	522.9	362.6	209	102.8

Note: 100% and 50% load parameters are to be confirmed independently. The 540 MWe steam generator was designed for **variable pressure boiler program**.

**Table-3: PART LOAD PARAMETERS FOR 700 MWe SG**

PARAMETER	% OF FULL LOAD						
	100	86.8@	75	60	30	15	3
Heat load MW (Th)	544	473.6	408	326.4	163.2	81.6	16.32
PRIMARY SIDE :							
Flow Rate (Tons./hr.)	7,615						
Inlet Temperature <sup>0</sup> C	309.4	to be evaluated					
Outlet Temperature <sup>0</sup> C	266.3	to be evaluated					
Primary side fluid quality in %	3	0	0	0	0	0	0
SECONDARY SIDE : FEED WATER							
Inlet Temp <sup>0</sup> C	180	174.4	168.7	160	127.9	120.0	120.0
Recirculation Ratio	4.3	to be evaluated					
SECONDARY SIDE : STEAM							
Pressure at drum Kg/cm <sup>2</sup> (g)	45.0332	45.0332*	45.0332*	45.0332*	45.0332*	45.0332*	45.0332*
Steam Flow rate (T./hr.)	968.4	to be evaluated					

Note : The 700 MWe steam generator is to be designed for **constant pressure boiler program.**

@ Load corresponds to primary quality changes to zero

All the parameters are prepared based 1D code and it has to be corrected after 3D analysis

**Table-4:Water Level in the Steam Generator -540 MWe**

Sl.No.	Description	Process requirement / Safety action	Level in Meters
01	Top Level Tap		16.300
02	Absolute max. Level	Flooding level (corresponds to 4% flooding)	14.300
03	High Level	a) Turbine trip b) Carry over to be within 0.5 -2.0% at all power levels	14.000
04	SG flooding		14.070
05	Normal Operating Level at full power	Optimum from Separator effectiveness	13.620
06	Separator recirculation cylinder bottom	High carry under value for separators at less than this level	12.970
07	Top separator deck plate		12.670
08	Normal operating at hot standby condition & normal water level at 0% FP	Sub cooling in the down comer region	12.600
09	Tube bundle top		11.870
10	Low level	Step back to 65% Full Power	10.500
11	Middle Level Taps		9.146
12	Very Low level	Reactor trip on SG level very low	7.850
13	Bottom Level Taps		0.400
14	Top Of Tube Sheet	reference Zero Level	0.000

Note: Constant Steam Pressure between 0 to 25 % FP and Variable Steam Pressure Program from 25 to 75% power is applied in the 540 MWe SG design



**Table-5: Water Level in the Steam Generator -700 MWe**

Sl.No.	Description	Process requirement / Safety action	Level in Meters
01	Top Level Tap		19.300
02	Absolute max. Level	Flooding level (corresponds to 4% flooding)	17.300
03	High Level	a) Turbine trip b) Carry over to be within 0.5 -2.0% at all power levels	16.780
04	SG flooding		16.850
05	Normal Operating Level at full power	Optimum from Separator effectiveness	16.400
06	Separator recirculation cylinder bottom	High carry under value for separators at less than this level	15.750
07	Top separator deck plate		15.450
08	Normal operating at hot standby condition & normal water level at 0% FP	Sub cooling in the down comer region	15.380
09	Tube bundle top		11.870
10	Low level	Step back to 65% Full Power	10.500
11	Middle Level Taps		9.146
12	Very Low level	Reactor trip on SG level very low	7.850
13	Bottom Level Taps		1.300
14	Top Of Tube Sheet	reference Zero Level	0.000

Note: Water level mentioned in the above table is indicative. Actual values are to be arrived out from the analysis

**GENERAL TERMS AND CONDITIONS OF REVERSE AUCTION**

Against this enquiry for the subject item/system with detailed scope of supply as per enquiry specifications, BHEL may resort to “**REVERSE AUCTION PROCEDURE**” i.e., **ON LINE BIDDING ON INTERNET**.

1. For the proposed reverse auction, technically and commercially acceptable bidders only shall be eligible to participate.
2. BHEL will engage the services of a service provider who will provide all necessary training and assistance before commencement of on line bidding on internet.
3. BHEL will inform the vendor in writing in case of reverse auction, the details of Service Provider to enable them to contact & get trained.
4. Business rules like event date, time, Start price, bid decrement, extensions etc. also will be communicated through service provider for compliance.
5. Vendors have to fax the Compliance form in the prescribed format (provided by Service provider) before start of Reverse auction. Without this, the vendor will not be eligible to Participate in the event.
6. BHEL will provide the calculation sheet (e.g., EXCEL sheet) which will help to arrive at “Total Cost to BHEL” like Packing & forwarding charges, Taxes and Duties, Freight charges, Insurance, Service Tax for Services and loading factors (for non-compliance to BHEL standard Commercial terms & conditions) for each of the vendor to enable them to fill-in the price and keep it ready for keying in during the Auction.
7. Reverse auction will be conducted on scheduled date & time.
8. At the end of Reverse Auction event, the lowest bidder value will be known on the network.
9. The lowest bidder has to Fax the duly signed Filled-in prescribed format as provided on case-to-case basis to BHEL through Service provider within 24 hours of Auction without fail.
10. Any variation between the on-line bid value and the signed document will be considered as sabotaging the tender process and will invite disqualification of vendor to conduct business with BHEL as per prevailing procedure.
11. In case BHEL decides not to go for Reverse Auction procedure for this tender enquiry, the Price bids and price impacts, if any, already submitted and available with BHEL shall be opened as per BHEL’s standard practice.

**CAPITAL PURCHASE, BHARAT HEAVY ELECTRICALS LIMITED, TIRUCHIRAPPALLI**  
**COMMERCIAL TERMS AND CONDITIONS**

**Tender No: 2650900013 dt: 27/05/09**

**Tender Due Date: 15/07/09**

## **1.0 QUOTATIONS**

The Bidders shall submit the offer in **TWO INNER ENVELOPES** as indicated below which shall be sealed in one outer envelope.

**Envelope I :** This sealed envelope should contain all the copies of technical bid together with un-priced commercial bid. This envelope should be clearly marked **"Part I - Technical and commercial bid"**, indicating Enquiry No., Due Date and Address & Reference of the Bidder.

**Envelope II :** This sealed envelope should contain **price details**. This envelope should be clearly marked **"Part II - Price bid"**, indicating Enquiry No., Due Date and Address & Reference of the Bidder.

All the two envelopes ( Part I & II) shall be put in one cover, duly sealed, super scribing as Part I and Part II with Enquiry No., due date of opening and the address and reference of the Bidder.

The above offer should reach this office on or before the due date by 14.00 Hrs (IST). Late offers will not be considered.

Tender should not be addressed to any Individual's name but only by designation to:

**MANAGER / CAPITAL PURCHASE / MFG  
BHARAT HEAVY ELECTRICALS LIMITED  
HIGH PRESSURE BOILER PLANT  
TIRUCHIRAPALLI - 620 014  
TAMIL NADU, INDIA**

Tenders should be free from **CORRECTION AND ERASURES**, Corrections if any, must be attested. All amount shall be indicated both in words as well as in figures. Where there is difference between amount quoted in words and figures, amount quoted in words shall prevail.

Offers should be in **ENGLISH** and accompanied by detailed technical literature, catalogue and detailed dimensional drawings in **ENGLISH** or otherwise, the offers will not be considered.

## **2.0 PART I (TECHNICAL & COMMERCIAL BID)**

### **2.1 Technical**

This part shall include / indicate the following :

- 2.1.1. Offer should contain complete scope of supply with all technical details, specifications, capability for performing 3D analysis, delivery schedule and other commercial terms and conditions.
- 2.1.2. The offers shall be in accordance with Terms and Conditions and Technical Specifications enclosed. Deviations, if any, shall be clearly indicated. Bids not in conformity with the Terms and Conditions and Technical Specifications and/or are not in the prescribed format will not be considered and are liable to be rejected. Bids with **unacceptable** deviations are also liable to be rejected.
- 2.1.3. List of customers to whom same or similar services/**software** have been supplied along with performance certificates to be enclosed.
- 2.1.4. Relevant catalogues /documents to be attached
- 2.1.5. Incase of foreign bidder offer, the Principal's technical offer should be enclosed.

### **2.2 Commercial**

This part shall include / indicate the following :

- 2.2.1. Terms of payment-In line with our payment terms
- 2.2.2. Taxes & duties applicable.
- 2.2.3. Delivery Schedule
- 2.2.4. Offer validity-not less than 120 days from the date of opening.
- 2.2.5. Country of origin
- 2.2.6. Percentage of agency commission if any along with a copy of Agency agreement.
- 2.2.7. A copy of "Un-Priced Part II" i.e., a copy of the Price Bid **without the price details** to be enclosed.

## **3.0 PART II (PRICE- BID)**

This part should contain the schedule of price particulars and to be co-related to the technical details provided in Part I. i.e The sperate price for Design analysis and single user software with training as stated in the enquiry.

## **4.0 OPENING OF TENDERS**

The Part I- Technical & commercial bid would be opened on the Tender opening date. The sealed tenders will be received by the undersigned at his office at Capital Purchase (24 bldg 3rd) up to 14.00 hrs on the tender due date. The techno Commercial Bid (i.e., Part-I of the offer) will be opened on **15/07/09** at 14.30.hrs in presence of the Bidders or their authorized representatives who choose to be present.

**CAPITAL PURCHASE, BHARAT HEAVY ELECTRICALS LIMITED, TIRUCHIRAPPALLI**  
**COMMERCIAL TERMS AND CONDITIONS**

**Tender No: 2650900013 dt: 27/05/09**

**Tender Due Date: 15/07/09**

**GENERAL**

- 5.1. Incomplete offers will not be considered.
- 5.2. **Fixed price:** Prices quoted by the bidder shall be fixed and not subject to any escalation whatsoever during the period of bid validity and execution of the Purchase Order. A bid submitted with an adjustable price will be treated as non - responsive and rejected. Prices shall be written in words and figures. In the event of difference, the price in words shall be valid and binding. Unit prices shall be considered correct in the event of any discrepancy with regard to total price.
- 5.3. **Bid currency:** Bid currency: Indian bidders should submit the prices only in Indian Rupees. Foreign bidders may submit their bid in their home currency.
- 5.4. **Terms of Delivery:** Terms of Delivery: Bidders are required to quote their best delivery period in terms of completion of entire analysis as stated in the technical specifications. Delivery shall be counted from the date of Letter of Indent.
- 5.5. **Taxes and Duties:** All Taxes and Duties payable as extra to the quoted price should be specifically stated in offers along with CST & TNGST No / Tariff No. etc., failing which the purchaser will not be liable for payment of such Taxes and Duties. Our T.N.G.S.T No. 356005 Dt. 04-04-1995, C.S.T. No. 239383 dt. 11-06-1991 and TIN NO.33243560005..
- 5.6. **Validity:** The offers for main equipment and spares shall be kept open for acceptance for 120 days (one hundred and twenty days) from the date of opening of the tender (Part I).
- 5.7. The Bidders shall bear all costs associated with the preparation and submission of the bid. BHEL shall in no case be liable for these costs regardless of the conduct or outcome of the process.
- 5.8. Any clarifications or pre-bid meeting may be sought by Bidder from the undersigned with due written requests at least fifteen (15) days prior to Tender Due Date.
- 5.9. During the course of finalization of Tender and Award of Contract, the Bidder shall promptly and completely respond to all clarifications sought by the undersigned and attend any meeting on the date and time called by the undersigned with written intimation to the Bidder.
- 5.10. At any time prior to the Tender due date, BHEL may, at its sole discretion or in response to a clarification sought by a Bidder, modify the bidding documents. For compliance of the requirements by the Bidder owing to the change, BHEL may, at its sole discretion change the Tender due date.
- 5.11. **DUNS** number (allotted by **M/s DUN & Bradstreet**) shall be mentioned in foreign vendors offer.
- 5.12. **Liquidated damages:** It is clearly understood among the parties to the contract the "Time is the essence of the contract". Therefore, the completion of entire 3D thermo hydraulic analysis specified in the purchase order should be made within the time prescribed. Penalty @ 0.5% per week or part thereof, subject to a maximum of 15% of the order value, shall be levied for the late delivery/ execution of the job as per certification of the BHEL Project Leader.
- 5.13. The penalty shall be evaluated only at the time of final delivery and not during the stages of individual milestones, if any.
- 5.14. **Risk purchase:** Alternatively the purchaser at his option 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 dispatch within the time stipulated as aforesaid or if the same were not available, the best and the nearest available substitute therefore. The supplier shall be liable for any loss, which the Purchaser may sustain by reason of such risk purchases.
- 5.15. **Indian Agency commission:** In case of Foreign Bidders, agency commission if any, payable to their Indian Agents, shall shown separately in the Offer. This will be paid by us in India, in Indian Rupees, on satisfactory completion of the Contract. Copies of current Agency Agreement / Authorization Letter in respect of Agency Commission shall be furnished along with offer. For calculation of Rupee equivalent of Agency Commission, exchange rate as prevailing on the date of offer will be taken.
- 5.16. **Operating manuals and documentaion for this software:** The Bidders shall clearly mention in their offer, that Operating Manuals, etc., as called for in the Technical Specification, in the required number of copies will be provided at no extra cost.
- 5.17. **Cenvat credit/Modvat Credit (for Indian Bidders only) :** If any Excise Duty is payable, the chapter head / sub-head reference and the rate of the duty should be quoted. If the tenderer is availing CENVAT credit for his input materials, the effect of proforma credit should be passed on to the purchaser..
- 5.18. **Packing and marking:** The Supplier shall arrange for securely protecting and packing the stores to avoid loss or damages during transit.(Software and documents)
- 5.19. Purchase preference will be given to **CPSUs** (Central Public Sector Undertaking) as per Government guidelines.
- 5.20. BHEL shall be at liberty to reject or accept any tender, part or in full, at their own discretion and any such action is not liable for any question or claim against BHEL.
- 5.21. BHEL reserves its right to reject an tender due to unsatisfactory incomplete document evidence in the execution of a contract.

## **6. INSTRUCTIONS**

- 6.0 Confirmation of compliance to all terms & conditions; (iii) technical offer in detail for the entire scope of work as given in the Technical Specification; and (iv) Price schedule (without prices). The technical proposal shall cover, but not be limited to, the following: a) Clear understanding of complete scope of work and deliverables with respect 3D analysis and the software capability.
- 6.1 Proposed work schedule for the 3D analysis with duration so that total duration of the project does not exceed specified delivery period.
- 6.2 Assumptions / deviations with respect to the technical specs, if any, and expected technical inputs from BHEL team during the project execution.
- 6.3 Bidder shall fill up all the schedules and furnish all the required information as per the instructions given in various sections of the tender specification. Each and every page of the Tender Specification shall be SIGNED, STAMPED AND SUBMITTED ALONGWITH THE OFFER by the Bidder in token of complete acceptance thereof. The information furnished shall be complete in itself.
- 6.4 All entries in the tender shall either be typed or be written in ink. Erasures and overwriting are not permitted and may render such tenders liable to rejection. The Bidder shall duly attest all cancellations and insertions.
- 6.5 Conditional and unsigned tenders, tenders containing absurd or unworkable rates and amounts, tenders which are incomplete or otherwise considered defective and tenders not in accordance with the tender conditions, specifications, etc., are liable to be rejected.
- 6.6 Tenders shall be signed by persons duly authorized / empowered to do so. Certified copies of such authority and relevant documents shall be submitted along with the tenders. The Declaration (see **ANNEXURE-A**) shall be signed by the duly authorized person.
- 6.7 In the event of the Bidder merging with or getting acquired by another company, all obligations under the contract shall automatically get transferred to the acquiring company till the end of the period, including the guarantee period and AMC with reference to software, if opted for. Bidder shall intimate BHEL if there is any change in their legal status, within fifteen days of such change. BHEL shall review the implications and take necessary action.
- 6.8 Bidders are required to comply with the provisions of all existing Acts, Statutes, Rules, Notifications and Regulations of both Central and State governments as the case may be. If necessary, Bidders shall get themselves duly registered in compliance with such Acts, Statutes, Rules, etc., before Price Bid opening.
- 6.9 Should a Bidder or, in the case of a Firm or Company, its Partner(s) / major Shareholder(s)/ Director(s) have relation(s) employed in BHEL, the authority inviting tender shall be informed of the fact along with the offer. Otherwise, BHEL may, at its sole discretion, reject the tender or cancel the contract at any stage of the contract.
- 6.10 Any attempt by a Bidder to exert influence on BHEL during the process of bid evaluation or award of the contract, would make their bid liable for rejection.

## **7. Pre-Bid Clarifications**

- 7.1 The Bidder shall closely peruse all the clauses, specifications and drawings indicated in the Tender Documents before submission of their bid. Any clarifications on the tender specifications can be sought from the authority inviting the tender, up to 15 (Fifteen) days before the last date of submission of the tender.

## **8. Validity of Offer and Evaluation**

- 8.1 The offer shall be kept open for acceptance for a period of 120 days from the date of opening of Techno Commercial Bid. Only the Techno Commercial Bid will be opened on the due date mentioned in the enquiry.
- 8.2 Bidders shall not be permitted to make changes in their Technical or Price bids after bid submission, unless asked to do so by BHEL. Unsolicited clarifications are liable to be rejected.
- 8.3 In case of minor changes in scope and/ or technical specifications or commercial terms, having price implications, technically accepted Bidders shall be asked to submit their revised Price Bids in line with the revised scope and terms & conditions.
- 8.4 Price Bids of only the qualified and technically acceptable Bidders will be opened.
- 8.5 In case BHEL calls for negotiations, such negotiations shall not amount to cancellation or withdrawal of the original offer, which shall be binding, on the Bidder. All expenses for attending such negotiations are to be borne by the Bidder.
- 8.6 The total price for entire scope of work, together with taxes and duties (not including Service Tax), and AMC for software (if opted for) will be considered for bid evaluation purposes.

- 8.7 The entire work covered in this Tender shall be entrusted to a single Bidder. The successful Bidder is not permitted to off load part or whole of the work to a sub vendor, without the prior written consent of BHEL.
- 8.8 The successful Bidder shall attend the office of the Official as mentioned in the Notice Inviting Tender on the date fixed by the Official through a written intimation. The Bidder shall forthwith accept award of the contract and complete the execution of the agreement by signing all documents connected therewith.

#### **9. Intellectual Property Rights**

- 9.1 Bidder shall treat all information that is generated in connection with this assignment as absolutely confidential. All information, analysis, reports and recommendations, both in the form of hard copy or on electronic media, will be the property of BHEL and is prohibited from being used by the Bidder for any purpose other than this assignment. All Bidders are required to sign non-disclosure agreement with BHEL. On award of the contract, all employees, associates and affiliates of the Bidder assigned to and working on the development work are required to sign BHEL's '3rd Party Non-Disclosure Agreement' as given in **Annexure-C**.

#### **10 The project should be completed within 6 months from the date of start.**

The project shall be completed in all respects and all the deliverables specified handed over within the time specified above

- 10.1 The Bidder shall complete the entire scope of work as agreed in the confirmation to the Technical Spec and to be strictly adherence to the time schedule prescribed during award of the contract.
- 10.2 The Bidder shall use all reasonable care and skill in providing the services and shall be responsible for the quality of workmanship and accuracy of the deliverables to the satisfaction of BHEL. Bidder shall implement in-house quality control and shall carry out 100% quality checks prior to submitting to BHEL for acceptance.
- 10.3 The Contract shall be considered successfully completed upon acceptance by BHEL after meeting the deliverables as specified in the contract.
- 10.4 The obligation stipulated in this specification can only be suspended in the case of any particular item of work, in the event of Force Majeure or as the result of an agreement between the parties. In the event of Force Majeure, neither of the parties may be considered in default of its obligations under the terms of this tender. Force Majeure is hereby defined as any cause which is beyond the control of the Bidder or BHEL, as the case may be, which they could not foresee or with a reasonable amount of diligence could not have foreseen and which substantially affect the performance of the contract, such as:
- \* Natural phenomena including, but not limited to, floods, droughts, earthquakes and epidemics;
  - \* Acts of any government, domestic or foreign, including, but not limited to, war, declared or undeclared, priorities, quarantines, embargoes; provided either party shall within fifteen (15) days from the occurrence of such a cause notify the other in writing of such cause.
- 10.5 BHEL has the right to terminate the contract after due notice and recover the loss sustained in getting the balance work done through other agencies in addition to liquidated damages/ penalty in the event of:
- (a) Bidder's continued poor progress.
  - (b) Withdrawal from or abandonment of the work before completion of the work.
  - (c) Corrupt act of the bidder.
  - (d) Insolvency of the bidder.
  - (e) Persistent disregard of the instructions of BHEL.
  - (f) Assignment, transfer, subletting of the contract work without BHEL's written permission.
  - (g) Non-fulfillment of any contractual obligations.

#### **12. Guarantee Period & Annual Maintenance Charges (in case of software)**

The developed software shall be guaranteed for trouble-free operation for a period of twelve (12) months from its installation and acceptance at BHEL. In case of any defects observed during the operation of this module during this period, the Bidder shall render their services without any additional cost for repair / rectification of the same within the time as prescribed by BHEL.

- 12.1 **Performance Bank Guarantee (in case of supply of software)(PBG):** The Bidder, in the event of an order, should furnish a bank Guarantee from an Indian Bank approved by BHEL, at no extra cost in a proforma prescribed by BHEL, alongwith the order, for an amount equivalent to **10% (Ten percent)** of the value of the contract. The PBG shall be valid for period of 18 months from the date of despatch or **12 months** from the date of acceptance / commissioning of the **Software** at BHEL, Tiruchi which ever is more, with a claim period of two months.

**CAPITAL PURCHASE, BHARAT HEAVY ELECTRICALS LIMITED, TIRUCHIRAPPALLI**  
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The Performance Bank Guarantee shall be obtained from any one of the following banks who is a member bank in our consortium of banks.

State Bank of India, 2) State Bank of Hyderabad, 3) State Bank of Travancore, 4) State Bank of Mysore, 5) Canara Bank, 6) Bank of Baroda, 7) Punjab National Bank, 8) Deutsche Bank, 9) HDFC Bank, 10) Standard Chartered Bank, 11) Citi Bank, 12) Standard Chartered Grindlays Bank, & 13) Bank of America or any other Nationalised Bank.

- 12.2** During the warranty period any software modification required for operational reasons shall be done at BHEL site at no extra cost.

**13 Terms of Payment**

13.1 No Advance Payments will be made.

13.2 Payment shall be made after certification issued by BHEL Project Leader regarding the satisfactory completion of scope of work as per the payment schedule enumerated hereunder. However, lump-sum payment at the completion of the contract can also be considered if the Bidder so desires.

**13.3 100% payment will be made within 45 to 90 days after receipt and acceptance / commissioning of goods/software at BHEL against submission of PBG for 10% of Order value with required validity.**

**14. Common to both Indian & Foreign Bidders**

14.1 Payments to Bidders will be subject to deduction of taxes at source as per prevailing laws.

14.2 Bidders shall continue to have full liability to meet the complete requirements and rectify any defects till the completion of the contract, notwithstanding any part payments that may have been made for any part of the work.

14.3 Service Tax, if any, shall be payable extra as applicable from time to time. It shall be claimed separately to enable BHEL to avail CENVAT credit.

14.4 In case the government (Centre/ State) imposes any new taxes/ duties on the output services/ work after the award of contract, the same shall be reimbursed by BHEL at actuals. All necessary documents as required by BHEL shall have to be provided by the Bidder. However, in the event of delay in work execution attributable to the Bidder, the new taxes/ duties imposed during the delay period shall not be reimbursed to the Bidder. BHEL's decision in this regard shall be final.

14.5 In case any taxes/ levies are imposed after submission of Bidder's offer, the Bidder shall convey its impact on the price, duly substantiated by documentary evidence, before opening the Price Bid. Claim for any such impact after opening the Price Bid will not be considered by BHEL for reimbursement of tax or reassessment of offer.

**15. Arbitration and Jurisdiction:**

15.1 In the event of any question of dispute or difference arising or in connection with the terms of the contract, the same shall, after a written notice to the other party, be referred to the sole arbitration of \_BHEL Tiruchirappalli . The Arbitration shall be conducted and governed in accordance with the provisions of the current version of Indian Arbitration and Conciliation Act 1996 or rules framed there under. The award of the arbitrator shall be final and binding on both the parties to the contract.

15.2 The venue of arbitration shall be at BHEL, Tiruchirappalli and courts at Tiruchirappalli shall have jurisdiction.

15.3 The contract shall be governed by the Laws of India

**16 BHEL reserves the right to go for a Reverse Auction (RA) instead of Opening the submitted sealed bid, which will be decided after technical evaluation. Information and general terms and conditions governing RA are given in Annxure-1**

**For any queries / clarifications the bidders may contact us through our FAX NO. +91 431 2520719 or through e-mail [balasund@bheltry.co.in](mailto:balasund@bheltry.co.in) and <[srchandran@bheltry.co.in](mailto:srchandran@bheltry.co.in)>**

**CAPITAL PURCHASE, BHARAT HEAVY ELECTRICALS LIMITED, TIRUCHIRAPPALLI**  
**COMMERCIAL TERMS AND CONDITIONS**

**Tender No: 2650900013 dt: 27/05/09**

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**ANNEXURE-A**

**DECLARATION**

I/We, \_\_\_\_\_ hereby certify that, all the information and data furnished by me with regard to this Tender Notification ..... dated ..... are true and complete to the best of my knowledge. I have gone through the specification, conditions and stipulations in detail and agree to comply with the requirements and intent of specification.

I/We, further certify that I am / we are the duly authorized representative(s) of the under mentioned tenderer and a valid power of attorney to this effect is also enclosed.

I/We, hereby declare that I/We shall treat the tender documents, drawings, specifications and other records connected with the work as secret/confidential and shall not communicate information / derived there from to any persons other than a person to whom I/We am/are authorized to communicate the same or use the information in any manner prejudicial to the safety of the same.

Bidder's Name & Address

Name & Signature      of the Bidder (Seal)



**ANNEXURE-C**

**THIRD PARTY NON-DISCLOSURE AGREEMENT**

I, , on behalf of the

(Name of Company), acknowledge that the information received or generated, directly or indirectly, while working with BHEL on contract is confidential and that the nature of the business of the BHEL is such that the following conditions are reasonable, and therefore:

I warrant and agree as follows:

I, or any other personnel employed or engaged by our company, agree not to disclose, directly or indirectly, any information related to the BHEL. Without restricting the generality of the foregoing, it is agreed that we will not disclose such information consisting but not necessarily limited to:

- Technical information: Methods, drawings, processes, formulae, compositions, systems, techniques, inventions, computer programs/data/configuration and research projects.

- Business information: Customer lists, project schedules, pricing data, estimates, financial or marketing data, On conclusion of contract, I, or any other personnel employed or engaged by our company shall return to BHEL all documents and property of BHEL, including but not necessarily limited to: drawings, blueprints, reports, manuals, computer Programs/data/configuration, and all other materials and all copies thereof relating in any way to BHEL' s business, or in any way obtained by me during the course of contract. I further agree that I, or any others employed or engaged by our company shall not retain copies, notes or abstracts of the foregoing. This obligation of confidence shall continue after the conclusion of the contract also.

I acknowledge that the aforesaid restrictions are necessary and fundamental to the business of the BHEL, and are reasonable given the nature of the business carried on by the BHEL. I agree that this agreement shall be governed by and construed in accordance with the laws of country.

I enter into this agreement totally voluntarily, with full knowledge of its meaning, and without duress.

Dated at \_\_\_\_\_, this \_\_\_\_\_ day of \_\_\_\_\_, 20 \_\_\_\_ .

**NAME    SIGNATURE    DATE    SEAL OF COMPANY**

**Bharat Heavy Electricals Limited, Trichirapalli – 620 014****MM : CAPITAL PURCHASE****(To be filled and submitted along with offer )**

<b>BHEL Commercial Terms and Conditions for Indigenous/Foreign Supplies</b>	<b>Vendor's Confirmation / Comments</b>
Technical confirmation to BHEL's Specification as called for in BHEL Format shall be furnished. If needed additional sheets shall be used.	
An <b>unpriced</b> copy shall be submitted along with technical bid where in the applicable Taxes and Duties Shall be clearly specified	
<b>Validity of offer</b> shall be for a minimum period of 120 days from the date of Tender opening	
<b>Delivery period</b> (for supply portion) from the date of Letter of Intent / Purchase order shall be clearly mentioned in the offer.	
<b>Period for completion of the work</b> at BHEL shall be clearly specified in the offer	
<b>Liquidated damages</b> @ ½% per week subject to a maximum of 15% of the order value shall be applicable for delay in deliveries.	
<b>Following Risk Purchase clause</b> shall be applicable: The purchaser at his option 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 dispatch within the time stipulated or if the same were not available, the best and the nearest available substitute therefore. The supplier shall be liable for any loss which the Purchaser may sustain by reason of such risk purchases.	
<b>Submission of Performance Bank Guarantee (PBG):</b> Vendor should provide a performance bank guarantee(PBG) for 10% of the total Purchase order value (software) valid for a period of 12 months from the date of commissioning (or) 18 months from the date of dispatch whichever is later with an additional claim period of 2 months. This PBG shall form one of the documents for effecting payment. The PBG shall be submitted in non-judicial stamp paper value of not less than Rs.80/- issued by any one of the following banks who is a member bank in our consortium of banks. <b>1) State Bank of India, 2) State Bank of Hyderabad, 3) State Bank of Travancore, 4) State Bank of Mysore, 5) Canara bank, 6) Bank of Baroda, 7) Punjab National bank, 8) Deutsche Bank, 9) HDFC Bank, 10) Standard Chartered Bank, 11) Citi Bank, 12) Standard Chartered Grindlays Bank 13) Bank of America and 14) Any one of the Nationalised banks.</b>	
<b>Payment terms for Indian/Foreign Bidders:</b>  * <b>100%</b> payment will be made within 45 to 90 days after receipt and acceptance / commissioning of goods at BHEL. against submission of PBG for 10% of Order value for software with required validity.	
<b>For Indian Bidders</b> All applicable duties and taxes (sales tax & service taxes) shall be clearly indicated in the offer	
<b>Confirmation for acceptance of Payment terms for Indian Agent is available in the offer:</b> Indian Agency commission, if any, shall be clearly specified in the offer and the same will be paid in Indian Rupees against acceptance / commissioning of the equipment.	
The Software shall be guaranteed for a period of 12 months from the date of commissioning.	
Software will be inspected and proved at vendor's works prior to dispatch. However final inspection and acceptance of equipment will be after installation at BHEL,Trichy.	
All softwares / Services including concern Personal for carrying out the installatio and commissioning of the Equipment shall be arranged by the vendor. If any Services is availed from BHEL, it is only on chargeable basis unless otherwise specified.	

Confirmation that any warranty replacement during warranty period shall be supplied free of charge on FOR BHEL, Tiruchirappalli basis is available in the offer.		
The vendor shall provide necessary drawings and Operating Manuals etc., as called for in the Technical Specification, in the required number of copies at no extra cost.		
Any warranty replacement during warranty period shall be supplied free of charge on FOR BHEL, Trichy basis.		
<b>Offers should be submitted only in sealed cover super-scribing clearly the Enquiry reference and due date.</b>		
<b><i>DETAILS FOR CONDUCTING REVERSE AUCTION</i></b>		
As per Clause 5.19 of Commercial terms and conditions acceptance for participation in Reverse auction (RA).		Yes/No to be indicated
Name of the person for participating reverse auction.		
Land Line Number		
Fax Number		
Mobile Number		
E-mail ID		

**NOTE:-**

- a) It is confirmed that all the terms and conditions stipulated in the Enquiry have been fully understood by us and all clarifications & details have been obtained.
- b) Your specific acceptance to our Payment terms, LD, Risk Purchase Clause & Submission of PBG for 10% of the order value are essential for consideration of your offer. Other wise your offer is liable for rejection.

Signature &amp; Office Seal of the vendor