An ISO 9001 Company

Bharat Heavy Electricals Limited

(High Pressure Boiler Plant**)**
Tiruchirappalli – 620014, TAMIL NADU, INDIA
CAPITAL PURCHASE / MATERIALS MANAGEMENT / MANUFACTURING

ENQUIRY	Phone: +91 431 257 79 38 Fax : +91 431 252 07 19 Email : tvenkat@bheltry.co.in Web : www.bhel.com

	Enquiry Number:	**Enquiry Date:**	**Due date for submission of quotation:**
	2620700063	**08.08.2007**	**21.09.2007**
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			

Item	**Description**	**Quantity**	**Delivery (Item required at BHEL on)**
10	Computerised Radiography System – Computed Radioscopy as per the technical specification & commercial conditions applicable (to be downloaded from web site www.bhel.com or http://tenders.gov.in)	1 No.	30.01.2009

BHEL commercial terms & conditions with Price Bid and Bank Guarantee formats along with technical specifications can be downloaded from BHEL web site http://www.bhel.com or from the Government tender website http://tenders.gov.in (public sector units > Bharat Heavy Electricals Limited page) under Enquiry reference "2620700063".

Tenders should reach us before 14:00 hours on the due date Tenders 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 BHARAT HEAVY ELECTRICALS LIMITED Manager / Capital Purchase / MM / Manufacturing

PART A

SECTION – I: QUALIFYING CRITERIA

The BIDDER / VENDOR (OEM) has to meet the following requirements to get qualified for submitting an offer for COMPUTED RADIOSCOPY SYSTEM.

S. No.	REQUIREMENTS	VENDOR's COMMENTS
1	The Bidder / Vendor (OEM) shall have a minimum of TWO Years of Continuous Experience in the field of Design, Manufacture and Supply of COMPUTED RADIOGRAPHY SYSTEM.	
2	Only those vendors (OEMs) should quote, who have supplied and commissioned at least one COMPUTED RADIOGRAPHY SYSTEM in the past Five years (on the date of opening of Tender) and such machine should presently working satisfactorily for more than one year after commissioning (on the date of opening of Tender), However, if such equipment has been supplied to BHEL, then the same must be currently working satisfactorily for not less than six months (as on date of Tender Opening) from the date of commissioning and acceptance.	
2.1	**Performance certificate from the customers regarding satisfactory performance of such equipment supplied to them in attached format should ~~to~~ be enclosed along with technical offer.**	
2.2	BHEL reserves the right to verify the information provided by vendor. In case the information provided by vendor is found to be false/ incorrect, the offer shall be rejected.	

SECTION – II

The BIDDER/ VENDOR (OEM) is requested to furnish the following information:

S. No.	PARTICULARS	VENDOR's RESPONSE
3	Profile of the Company bringing-out the years of Experience of the BIDDER in the field of design, manufacture and supply of 'COMPUTED RADIOGRAPHY SYSTEM' for Steel Weld Inspection in Tubular Products	
4	Number of COMPUTED RADIOGRAPHY SYSTEM supplied, installed and commissioned till date (with details on equipment type / model, configuration, customer and quantity)	
5	Is there any other model launched after the quoted Model? Otherwise, indicate the likely year in which the next model is likely to be launched	
6	Details on International Standards / Design Process Codes followed in Design and Manufacture of the Equipment.	
7	Comprehensive Details on Performance Testing - of the Equipment quoted, to be ensured in presence of BHEL Executives, prior to dispatch from Supplier's Works	
8	Details on SERVICE-AFTER-SALES Set-Up in India including the Addresses of Agents / Service Centers in India. Competency & Experience of the Local Service Agency are to be provided.	
9	Any Additional Data to supplement the manufacturing capability of the BIDDER for the subject equipment.	

SECTION – III

The BIDDER/ VENDOR (OEM) to note the following:

S.No.	REQUIREMENTS	VENDOR's COMPLIANCE
10	The BIDDER / VENDOR (OEM) shall submit the offer in TWO PARTS -Technical **[with PART A & PART B]** & Commercial and Price Bid.	
11	The Technical Offer shall be supported by Product Catalogues & description.	
12	The Offer shall contain a comparative statement of Technical Specifications given by BHEL and the Offer Details submitted by the Bidder, against each clause. A mere 'CONFIRMED' or 'COMPLIES' or 'YES' or 'NO-DEVIATION' or similar words in the technical comparative statement against clauses where details have been sought may lead to disqualification of the Technical Offer.	
13	The Commercial Offer (given with the Technical Offer) shall contain the Scope of Supply and the Un-Priced Part of the Price-Bid, for confirmation of the inclusion of all the accessories, toolings, attachments, auxiliary parts, spares, consumables, etc. with the main and basic equipment, to meet the technical specification requirements.	
14	BIDDER / VENDOR (OEM) has to indicate the Country of Origin for the supply of equipment.	

PERFORMANCE CERTIFICATE

(On Customer's Letter Head)

1. Supplier of the machine :

2. Make & Model of the Equipment :

3. Month & Year of Commissioning :

4. Application :

5. Jobs Performed in the machine :

   Model and Year of Make :

6. Performance of the Machine : Best in the market /
   (Strike off whichever is not applicable) Satisfactory /
   Good /
   Average /
   Not Satisfactory

7. Any other remarks:

Date:

Signature & Seal of the Authority
Issuing the Performance Certificate

Part B-TECHNICAL SPECIFICATION for COMPUTED RADIOGRAPHY SYSTEM

S.No.	PARTICULARS	BHEL SPECIFICATIONS	BIDDER's OFFER [withComplete Technical Details]
1.0.	Description of the CR system	Computed Radiography system consists of a Flexible Phosphor Imaging Plate (IP) which is the Radiography detector and CR scanner for scanning the IP with laser in order to obtain the digital Image, and an Acquisition and Review System with Computer and Software. The out put of the over all system shall be Digital Radioscopic Images meeting the sensitivity as well as other requirements, as outlined subsequently in this technical specification.	
2.0.	Area of Application	Radiography of Weldments in boiler components. Steel thickness Ranging from 4mm to 200mm using Radiation Sources – 15 to 450kV X-Rays, Ir-192 &Co-60 Isotopes and Linear Accelerators (4 MeV / 6 MeV)	
3.0.	Principle of Operation	The Radiography based on Photo stimulable Luminescence (PSL) method. Imaging Plate is a Flexible Polymer support coated with sensitive layer, used in much the same way as X-Ray film and wrapped around the job for exposure to ionizing radiation (X-Ray / Gamma Ray) during Radiographic Testing. The latent invisible image is created by Photo Stimulated Luminescence process, when the IP is exposed to ionizing radiation .The conversion of latent image to digital image is obtained by scanning of IP by LASER Scanner, during which the release of electrons emit energy in the form of blue light that is detected by a Photo multiplier tube and then converted to a digital image. **A complete system consists of a Storage Phosphor Imaging Plate (IP), A Corresponding read out unit (Scanner) and Software, which converts the information of IP into a digital image.**	
4.0.	Radiographic Technique	Single Wall Single Image and Double wall Double Image techniques to obtain 2% Penetrameter sensitivity.	
5.0.	System Configuration	The minimum desired features of the system has been enlisted below. The system shall include- a) Storage Phosphor Imaging Plate (SPIP) b) Scanner(Read out unit) c) CR work station(Computer with necessary Software) d) Accessories and Consumables	

5.1	Operating Parameters	Radiation Source: **Energy** >1MeV- Co-60 Isotope, LINAC 4 MeV / 6 MeV **Energy** <1MeV- Ir 192 Isotope, X-Ray 15 to 450kV **Environmental condition**: Temperature: Max 40^0 C, RH maximum 85% Mains supply 100-250VAC, 50-60 Hz fuse 2A	
5.2.	Imaging Plate	The following are the specifications of the Imaging Plate 1) Type of IP-Supplier to specify for the above applications. 2) IP Size-15 x 40 cm, Supplier to specify other standard sizes available for weld applications 3) Pixel sizes - Shall be between 10 µm to 150 µm 4) Basic spatial Resolution- Maximum 60 µm 4) Dynamic Range - 1n Gy to 1 Gy 5) Grain size- Shall be between 3 to 5 micron 6) Thickness-200 to 500 micron``	
5.3	Image Reader (Laser Scanner)	Scanner Details are listed below: a) Laser spot size-50µm or smaller b) Laser type-Class EN60825.1 or Equivalent b) Scanning pixel pitch-50 to 100 µm c) Bit depth-16 d) Weight-22kg or lesser e) Dimensions-Preferably smaller than 46x71x52 cm f)Noise Level-<50dB(A) ***Image Reader shall meet the functional requirements:*** 1) Various Image processing protocols available for the respective regions of the job 2) IP processing rate –Supplier to specify	
5.3.1	Scanner eraser	Preferably built-in eraser. Erasing Surface area-Supplier to specify	
5.4	CR Work station	**The CR work station should perform the functions of- Image Acquisition, Review, Archival and retrieval**	

		System configuration (Computer, software and data interface cables) and functional requirements a) Accept Images from CR reader without any loss of data b) Acquisition software -With graphical user interface. The software shall include a sequenced, graphical user interface to guide the operator through system initialization, calibration and validation, plus selection of each part. c) Review Software-For Image processing of the incoming raw data from the CR unit. It shall be compatible with NIMA DICOM3.0 standard and with ASTM DINCODE standard for image format and functionality. It shall have the facility to make the image automatically available in BMP, JPEG and TIFF image file format for use in standard applications. d) The system shall have sufficient disk space for temporary storage of atleast 1000 full frame digital radiographs e) Should include minimum1280x1024 pixel &0.25mm(maximum) pitch antiglare flicker free TFT/LCD color monitor, key board and optical mouse f) Hard Drive-Over 2GHz Processor, with Industrial Rack mount chassis, min 1GB RAM, min 80GB hard disc capacity with suitable Additional Graphics Card, DVD/CD Reader/writer, 100Base T network interface with RJ-45 socket g) Display: preferably, Automatic Gray scaling (16 to 8 bit conversion) for monitor display (supplier to specify) h) Image Processing functions: The software should be capable of performing the following functions - Noise reduction through integration. - Contrast enhancement - Edge enhancement - 16 bit filter capability, with different Kernel sizes. - Law pass filter, high Pass filter, median, crisping, pseudo 3D etc. - 8-bit type predefined filters for all type of image processing. - Automatic Window/Level setting - Manual “black-border” collimation - Sensitory mapping - Also to supply user with a Basic QC-Viewer for basic image correction	
6	Dose Overload	Supplier to specify	

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<td>7</td>
<td>Performance Parameters of the CR system</td>
<td>a) Spatial system Resolution-

<table>
<tr><th>Steel Wall thickness(mm)</th><th>Duplex wire IQI, number EN 462-5</th></tr>
<tr><td>4 to 12(with X-Ray sorce)</td><td>13TH wire pair to be resolved</td></tr>
<tr><td>12 to 50(with X Rays source)</td><td>11th wire pair to be resolved</td></tr>
<tr><td>Above 50(with X-Ray source)</td><td>9th wire pair to be resolved</td></tr>
<tr><td>10 to 40(With Ir-192 Isotope)</td><td>9th wire pair to be resolved</td></tr>
<tr><td>Above 40(With Ir-192 Isotope)</td><td>8th wire pair to be resolved</td></tr>
<tr><td>Above 50mm(Co-60 Isotope,and Linac)</td><td>6th wire pair to be resolved</td></tr>
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b) Gain/amplification-Supplier to specify
c) Signal to Noise Ratio-(Should meet the requirements of ASTM E 2446-Supplier to specify
d) Speed- (CEN ISO speed S_{Ipx} of 200)-Supplier to specify
e) Laser Beam Jitter-No jitter should occur.
f) Scanner slippage-The slipping of the IP scanner transport system resulting in fluctuation of intensity of horizontal image lines should not occur-Supplier to specify
g) Image Fading-For long term applications the exposed image shall have an Intensity between 70%-90% of the maximum possible intensity of the CR reader at the lowest gain and under linearised condition.-Supplier to specify
h) Blooming-No blooming should occur through out the operation range of the Radiation source
The CR system shall meet the requirements of EN 14784-1 and ASTM E 2667, at a minimum exposure dose of 5.2 mGy And CEN,ISO speed of 200 at a pixel size of 20 µm.</td>
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<td>8</td>
<td>Calibration</td>
<td>Factory Calibration</td>
<td></td>
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<td>9</td>
<td>Accessories</td>
<td>BIDDER to list down (with UNIT RATE) the various ACCESSORIES to be procured with the EQUIPMENT to enhance the Operating Efficiency and Features of the OFFERED EQUIPMENT, over and above those mentioned in the SPECIFICATIONS.</td>
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10	Scope of supply	Following shall be supplied compulsorily with the Equipment: a) Phosphor Imaging Plate as per specifications-15 x 40 cm-10 numbers, b) Laser scanner(Image Reader) system as per specifications c)CR Work station(Computer &Image Acquisition and Review Software system)as per specifications d) Contrast Sensitivity Quality indicator (As per ASTM E 1647,Stainless Steel with thickness 6.3 mm, having a contrast area for 1,2,3,4,% wall thickness contrast sensitivity). -1No e) Duplex Wire Quality indicator(As per ASTM E2002) -1No f)Converging Line pair Quality indicator(Consisting 5 converging line pair strips of Lead0.03mm thickness) -1No g)Linearity Quality indicators-1No h) Necessary Accessories and consumables i) Necessary Standard / Certificates traceable to National / International Standards.	
11	Consumables for Main Equipment& Accessories	BIDDER has to list down the CONSUMABLES to be used in the Operation of the System and QUOTE with UNIT RATE for all the listed consumables, to be procured with the system	
12	Spares for Main Equipment& Accessories	BIDDER has to list down the SPARES (Printed Circuit Boards – PCBs, etc.) Coming under the Category of Mechanical, Electrical & Electronic Spares for the main system as well as for the essential and optional desirable Accessories. To be replaced with actual spares and accessories. BIDDER to QUOTE with UNIT RATE for all the listed SPARES, to be procured with the equipment.	
13	Inspection	The over all system and accessories shall be offered for Inspection by BHEL Engineers for Performance Prove out.	

14	Performance Prove-Out at BHEL	The Supplier's Service Engineer has to conduct demonstration of the following in accordance with ASME Boiler & Pressure vessel code section 5 Article 2,Appendix 2 Resolution of the CR system - shall be better than 3 line pair /mm. 3numbers of test reports for the above resolution verified with X-ray unit shall be submitted prior to BHEL dispatch. Contrast sensitivity: Supplier to demonstrate 2% using steel wedge Demonstration of IQI sensitivity placing ASTM Hole type IQI on Source side for single wall thickness	
15	Installation and commissioning	The over all CR system and accessories is to be installed & commissioned at BHEL Works, FREE OF COST, by the Service Engineer of the SUPPLIER.	
16	Documentation in ENGLISH Language	3 Copies (In English) of the Operation & Maintenance Manuals containing Electric Schematics, Circuit Diagrams, PCB Drawings, Trouble Shooting Charts, Mechanical Sub-Assemblies, Rating of Bought-Out Items, etc. shall be supplied, at the time of inspection by BHEL Engineers. In addition, one SOFT COPY in CD to be supplied.	
17	Performance Guarantee	The over all CR system and accessories are to be guaranteed for its performance for a minimum period of two years from the date of performance acceptance at BHEL Works.	
18	Service and Spares Support Requirements	Vendor shall ensure after the guarantee period, through trained service personnel in India for next 5 years as and when need arise. Spares to be made available with in 1 week.	
19	Training on Operation & Maintenance	Complete Training for BHEL Engineers is to be given on Operation & Maintenance of the OFFERED Training has to be provided at Suppliers works / at BHEL , after the successful commissioning of the Equipment & Accessories.	
20	Annual Maintenance Contract - AMC	The BIDDER has to QUOTE for AMC with detailed scope of work.	
21	Safety and Quality Standards	Supplier to ensure that Safety and Quality of Computed Radiography System shall conform to International Standards. Conformance certificate to be along with the equipment.	