EXPRESSION OF INTEREST (EOI)

BHARAT HEAVY ELECTRICALS LIMITED (BHEL) is seeking for Expression of Interests (EOI) from reputed and successful firms that can carry out 3D Profile Mapping/Visualisation and Simulation of data and to get the physical details of components being scanned for manufacturing purpose for the suggested list of items attached in line with deliverables mentioned later in this document.

OBJECTIVE

EOIs are being invited from all eligible and interested professional agencies for identifying suitable agencies for future requirements & long term association, to finalize the engagement model and have an estimate of the cost involved.

LOCATIONS

Scanning work is to be done anywhere across India mainly in Thermal/Nuclear/Gas Turbine/Hydro & Industrial Power Plants. Location of scanning shall be PAN India & shall be specified at later stage on case-to-case basis.

EXPERIENCE CRITERIA

Only those agencies that meet the following criteria will be evaluated for further consideration:

1. **Bidders should have experience of 3D scanning and reverse Engineering services, in Thermal/Nuclear/Gas Turbine Power Plant Equipment.**

2. **The firm should have completed 3D scanning with 3D parametric models and 2D drawings for at least three (3) major components from suggested list as per Annexure-I) and at least three (3) contracts in Power Plants in India in last seven (7) years. The desired accuracy level shall be upto 30 microns. For critical components like turbine blade a higher accuracy is desired. Vendor shall provide Certification of accuracy**

3. **The company shall have proven track record in delivering the required service during last seven (7) years of operation. The chosen projects should exhibit the complete scope from scanning, data processing and report generation, which includes 3D visualisation, 3D parametric models and 2D drawings (.dwg format/ compatible with AutoCAD).**

4. **Vendors shall have to submit the credentials for the work done at their own and not for the work done by subletting. Work shall be completed with their own resources.**

DOCUMENTS TO BE SUBMITTED BY FIRM ALONG WITH EOI:

1. **Firm to submit credentials for completed work (Completion certificate from customer, similar other documents etc).**
   Vendors shall have to submit the credentials for the work done at their own and not for the work done by subletting. Work shall be completed with their own resources.

2. **Two (2) Performance feedback from the end user regarding installation of the component after manufacturing through the 3D scanning may be furnished along with the qualifying documents.**

3. **Details of 3D scanning- Scanning Tools/ IT Infrastructure/ Special Technology etc available at Indian offices i.e. Types, Models, its functions, role in reverse engineering, Quality etc.**

4. **Details of the engineering expert and manpower on roll**

5. **Capability available for Metallography with types / options / out feasible etc. may be provided by vendor, if available, as an additional feature.**

6. **Firm registration certificates**

7. **Tax registrations/ Certificates: The agency should submit PAN No. and latest Income Tax, GST, Service Tax registration/Certificate for the financial years 2016-17, 2017-18, & 2018-19 & 2019-20.**

SCOPE OF WORK

Firm/Agency shall depute their representative to the reference site with all equipment required to execute the work in synchronisation with BHEL. Usability, accuracy and necessary data correction shall be the responsibility of firm/agency. BHEL shall not be liable for any fault/deficiency in scanning equipment/executing person. Scanning Equipment/Executing Person competency shall be sole responsibility of firm/agency.

The following will be the scope of work:

a. **3D Scanning:**

3D Scanning technology shall be used for obtaining accurate and objective method for digital documentation of the suggested component/assembly (refer Annexure - I below) under consideration. High quality equipment shall be used for Scanning Work - Details to be provided along with types of scanning done.

The system shall collect data at such a fine resolution that photographic quality images can be produced from the three dimensional data collected to accuracy upto 30 microns. For critical components like turbine blade a higher accuracy is desired. Typically, 10-15 microns accuracy is required for turbine blades.

The data may be captured at an adequate distance to allow an adequate quality of data resolution.

Firm/Agency shall have special arrangement for accessibility of the intricate area to have adequate quality of data resolution. Effect of surrounding vibrations & ambient temperature shall be taken care suitably for accurate scanning information that may be realised later in 3D Modelling & in manufacturing drawings. Effect of wear & tear, scaling, corrosion effect & damage, if any in the component shall be suitably accommodated/simulated in the final deliverables.

b. **3D visualisation and simulation of data/3D Modelling/Printing:**

The data generated from scanning work is to generate 3D visualisation or simulation for further understanding, study and future manufacturing. Deliverables consists of:

i) **Data Cloud Strictly for the Component without noise/disturbance**
ii) **3D Parameteric Model – to be compatible with UGNX 10.0 / CREO 3.0 upwards, i.e., editable & usable (preferred in .prt/.stp/.iges format)**

c. Generation of 2D Editable manufacturing drawings:

Manufacturing drawings (.dwg format/ compatible with AutoCAD) to be generated from the best use of available digital information. Support during manufacturing for any data/geometric/dimensional interpretation is to be provided. Deputation, if required is to be made to BHEL works.

d. Digital Record & Data Integrity

Firm/Agency involved is to provide record of digital information in suitable format to BHEL for any future reference. Data/information collected is solely for BHEL use and shall not be shared with any other party officially/unofficially in the interest of BHEL.

e. Manpower / speed of response required

Firm should have team with sufficient skilled members who can be deployed PAN India within 24 hours from the intimation regarding deputation for services. The engineering / expert manpower on roll as on date may be furnished.

BUDGETARY QUOTE/PRICE MODELS

Vendor may note that jobs involved in power plant are intrinsic in nature. Hence, to arrive at common rate evaluation, price model/budgetary quote may be furnished in suitable format, i.e.,

1. **Per day rate**
2. **Rate as per job shape & size**
3. **Rate Contract etc.**

The above rates to be given with breakup price for 3D scanning, 3D parametric modelling & 2D manufacturing drawings.

The above price model is to be furnished considering the list as per Annexure-A.

Annexure-I

Typical List of Components from Thermal Power Plants

S No	Item Description	Time / man days reqd	UoM (if not in man days)	Qty	Unit Rate (INR)	Net Unit Rate (INR)	Price (INR)
Lumpsum basis							
1	Complete Turbine of 200MW or above when open during Capital over hauling						
2	Complete boiler Non-pressure part when open during Overhauling						
3	Complete Air pre heater uring O/H						
4	Complete ID/FD/PA Fan during O/H						
Turbine							
5	HP & IP Diaphragms						
6	HP ,IP , LP Blades – Stage						
7	Blades – Individual						
8	Hydrodynamic Journal / Tilting Pad Bearing						
9	Bladed Rotors						
10	HP/LP Shaft Seal Casing						
11	Shaft Seal Rings						
12	U-/ I- Seal Rings						
13	Threaded Rings						
14	Oil Guard Rings						
Governing System for Sub-Critical Sets							
15	HP Stop Valve-Valve Seat						
16	HP Stop Valve-Valve Cone						
17	HP Governor Valve-Valve Seat						
18	HP Governor Valve-Valve Cone						
19	IP Stop Valve-Valve Seat						
20	IP Stop Valve-Valve Cone						

21	IP Governor Valve-Valve Seat						
22	IP Governor Valve-Valve Cone						
Deaerator							
23	Spray Valve						
24	Trays						
Boiler Component							
26	Bends						
27	Coal / oil Nozzles						
28	Burner						
29	Valve Spares						
Boiler Auxiliary							
30	ESP Emitting / collecting electrode						
31	Fan Impeller						
32	Fan Blade						
Generator Components							
33	Winding Bar						
34	Bearings						
35	Water Supply Hoses						
36	Rotor blade						
37	Air guide cover						
Condensate Extraction Pump							
38	Restriction Bush for Stuffing Box						
39	Impeller First Stage Assembly						
40	Intermediate Stage Impeller Assembly						
41	Impeller Wearing Ring Inter Stages						
42	Nut Thrust Collar EN6J40/500						
43	First Stage Sleeve Top						
44	First Stage Sleeve Bottom						
45	Intermediate Sleeves for CEP						
46	Third Stage Sleeve for CEP						
47	Last Stage Sleeve for CEP						
48	Sleeve Besides Last Stage Sleeve						

49	Stuffing Box Sleeve						
50	Nut Muff Coupling						
51	Nut Shaft Var no 05						
52	Muff Coupling						
53	Key 8X7X25 (Seal Sleeve)-EN6J40/500						
54	Key for Connecting Coupling						
55	Shaft Sleeve – Int Brg-Bottom Shaft CEP						
56	Suction Bell Mouth						
57	Wear Ring-Bell Mouth Assembly						
58	1st Stage Casing Assembly						
59	Wearing Ring First Stage						
60	Restriction Bush for 1st Stage Casing						
61	Shear Ring Split (Muff Coupling) – EN6J40/500						
62	Inter Stage Casing Assembly						
63	Wearing Ring Delivery Casing						
64	Restriction Bush for Delivery Casing						
65	Delivery Casing						
CW Pump							
66	Impeller Key						
67	Lock Washer for Impeller Nut						
68	Pump Casing Wear Ring						
69	Muff Coupling						
70	Coupling Support						
71	Abutment Ring						
72	Muff Coupling Key						
73	Impeller Shaft Assembly						
74	Intermediate Shaft Assembly						
75	Head Shaft						
76	Drive Shaft Assembly						

77	Stuffing Box Sleeve						
78	Spacer Ring						
79	Lock Nut for Thrust Collar Nut						
80	Bearing Sleeve						
81	Thrust Collar Nut						
82	Bearing Ring						
83	External Thread Taper Pin						
84	Flexible Coupling Key						
85	Coupling Spacer						