NTPC LTD
Unified Shared Service Centre (USSC), Raipur

1	CEG No.	MTP-01
2	Brief description of CEG	Enlistment for Assistance in Vibration analysis and condition monitoring jobs - CAT-1
3	Responsibility Centre	**Vendor Enlistment Cell (VEC)**
4	Brief scope of work	**Scope of Work (SOW) :** **Item 10. Vibration Analysis** **The SOW includes three parts:** i) **10.10 MPDEP00GN621 DEPTT <> MAN DEP-INDIAN EXPRT** **Deployment of Vibration Analyst** for Vibration Analysis and resolving high vibration AND/OR balancing problems of rotating equipment. ii) **10.20 MPCMI00GN979 Cond Monitor Instt (<>) DATA COLLEC.** **Deployment of Data Collector** for Condition Monitoring data collection involving vibration measurement and assistance for Vibration analysis. The data collector has to collect any data related to condition monitoring on instructions of Engineer in charge. iii) **10.30 MPSMD05GN155 SPL.M/P.DEP (MOBILISATION) DATA ANLYS&RE. Vibration Expert for Turbogenerator (TG)** for Vibration Analysis and resolving vibration related problems of Turbo-generator as per Station requirement & a detailed report to be submitted. **Coverage:** The SOW includes Machines in Main Plant (Boiler / Turbogenerator / Transformer Yard), Off sites, CHP-Coal Handling Plant, Ash Handling Plant, DM/PT Plant, CWPH, CT Fans, and other machines inside and outside plant premises of NTPC station. **10.10 MPDEP00GN621 Deployment of Vibration Analyst &** **10.20 Cond Monitor Instt (<>) DATA COLLEC.** **A: Vibration Measurement and Analysis:** 1. The Plant equipment will be categorized as Critical & Non-Critical; accordingly Vibration Data collection Schedule will be prepared by EIC. 2. For each equipment Vibration measurement points will be defined and

		measurement will be done in three directions (H/V/A) to collect Vibration Amplitude-Displacement Pk-Pk, Velocity m/sec. (Pk/RMS) and Acceleration mm/Sec.2, High frequency component for detecting Bearing condition. 3. Vibration data will be collected by data collector through analyzer in frequency Domain (FFT) and Time Domain (Time Wave Form) and stored in Analysis software. Vibration analysts may also be deputed for data collection as per requirement. 4. High Vibration Analysis includes Spectrum Analysis, Cross Phase Analysis through Dual Channel or key phasor imbibed with dual channel. 5. Based upon the Vibration measurement, Vibration analyst will report machine condition as 'Normal' 'Marginal' & 'Critical' as per ISO 10816. **B: In-situ balancing of rotary machines:** 1. Based upon equipment condition vibration analyst should be capable to diagnose unbalance problems and should be able of carrying out in situ balancing of equipment. 2. Balancing may be required in single plane or double plane. 3. Vibration Analyst will specify the Balancing weight and point of addition of the weight. 4. NTPC shall provide the balancing weights and necessary fitters / welders with required tools to carry out balancing services under the supervision of the Vibration Analyst. 5. Mobilization of expert within 72 hrs or less depending upon the criticality of the equipment or as directed by EIC, if site deployed analyst is unable to do required work. 6. The Vibration Analyst job will be deemed to be completed only when the normal vibration level (to the satisfaction of Engineer-In-Charge) is achieved. **C: To maintain vibration level to a normal level** 1) Based on Condition/health of equipment Vibration analyst will submit suitable recommendations for carrying out corrective action for reducing the vibration level to a normal level. 2) As per his recommendation, Maintenance will be carried out and Vibration Analyst must check vibration of equipment to ensure

		Vibration has reduced to normal level as per ISO 10186 and prepare action taken report. 3) The Vibration Analyst job will be deemed to be completed only when the normal vibration level (to the satisfaction of Engineer-In-Charge) is achieved. 4) Data collectors and Vibration Analyst will be required for scheduled data (routine data) collection, generally in day shift and in normal working hours. However, EIC or MTP executives can extend the retention of manning provided up to completion of work as and when required. 5) Unscheduled data collection as per instruction of EIC on holidays, Sundays, beyond normal working time, trial runs during overhauling, turbine rolling. No extra payment will be paid for such work. 6) The contractor must depute the vibration analyst & Data collectors for complete duration of the work and for round-the-clock service. Party must intimate and take acceptance for the persons deputing for the subject work. If for any reason Contractor replaces the person, then the acceptance for the same is to be taken from EIC. **10.30 MPSMD05GN155 SPL.M/P.DEP (MOBILISATION) DATA ANLYS&RE** 1. Turbine Vibration Measurement in triaxial direction using 16 Channel Vibration Analyzer during pre-overhaul/post overhaul survey or in case of requirement as per EIC instruction. 2. The deployed expert should be capable of fetching (Buffer output) data from NTPC installed Turbo-Supervisory system to 16 channel analyzers. 3. Deployed expert must be capable of understanding & analyzing all-important diagnostic plots including trend plot, bode plot, polar plot, full spectrum, Shaft centerline plots, cascade plots etc. 4. He should be aware of TSI parameters, online vibration monitoring system GE 3500, Shinkawa, Infosys, Maggitt VM600 or any other system. **General Technical Requirement:** i. **For 10.10 Deployment of Vibration Analyst (01 NO**.) Graduate Mechanical/Electrical Engineer with Category-II /ISO Level -II

			certified, Vibration Analyst with minimum 3 years' experience in vibration analysis will be stationed at site. ii. **For 10.20 Vibration data collector** (HSW/SSW/USW)**:** (*Site may specify, no. of data collectors, skill required, qualification & experience*) Ex: A Diploma Engineer (Mechanical/Electrical) with minimum Two years' experience in Vibration data collection on field will be stationed at site iii. **For 10.30 Turbo-Generator Vibration Analysis (01 no**.) Graduate Mechanical/Electrical Engineer with Category-III /ISO Level -III certified Vibration Analyst with minimum 05 Year experience in Turbine Vibration Analysis. iv. Deputed persons should be able to communicate in English or Hindi to site persons. v. Contractor has to provide two numbers of calibrated Dual Channel Vibration Analyzers having route-based data collection capability to collect vibration data in Time domain and Frequency domain. The Contractor should mobilize more than two Dual Channel Vibration Analyzer as per work requirement/EIC instructions at no extra cost. vi. The Dual Analyzer should have- a. at least 16-bit A/D converter with Dynamic range greater than 90dB, b. Spectral resolution with selectable number of FFT lines with the highest no. of lines not less than 12800 and should be capable of selecting linear and logarithmic scales for amplitude and frequency. The Dual channel to be used for data collection and analysis should be acceptable to Engineer In Charge. vii. The calibration certificate of Dual Channel Analyzer should be valid and traceable to National Accredited Lab. viii. Contractor should provide Computer System/Laptop of minimum specification to support analysis software of vibration analyzer for analysis and report preparation. The Analysis software should be capable of producing trend of collected data. It should be able to store two years data-Spectrum and Amplitude for each equipment at each measurement location in triaxial direction.

		ix. The availability of Vibration analyst is be ensured in line with instructions of EIC. In the event of absence of deputed Engineer from site alternate engineer shall be deputed during the period of such absence with the acceptance of EIC. x. For Turbo-Generator Vibration Analysis, Contractor should provide 16 channel Vibration Analyzer, capable of fetching (Buffer output) data from NTPC installed Turbo-Supervisory system to 16 channel analyzer. The Vibration Expert must be capable of understanding & analyzing all-important diagnostic plots including trend plot, bode plot, polar plot, full spectrum, Shaft centerline plots, cascade plots etc xi. Payment for the Turbo-Generator Vibration Analysis expert (ITEM NO: 10.30) shall be on Lumpsum basis. "To and fro" journey/ Conveyance accommodation charges are in contractor's scope. NTPC guest house may be provided subject to availability on chargeable basis.
5	Technical Qualifying requirements	**Technical Criteria:** The applicant should have executed the works of " Vibration analysis/Balancing" of Turbine/Turbogenerator in a Thermal Power generating unit of capacity 195MW or above during the preceding five (5) years from the last date of submission of application.
6	Document to be submitted by Vendor in support of meeting QR	Relevant and legible PO copies with detailed scope of work, terms and conditions, BOQ POs (executed within last Five (5) years reckoned as on the last date of submission of application in support of award and copy of Client's Completion certificate/RA Bill/ final deviation statement from the concerned client /copies of invoice to establish successful execution as per QR. *NTPC may ask for shortfall documents if felt necessary.*
7	Additional Documents to be submitted	In addition to the documents required in support of meeting technical requirements as stated above, following documents are required to be submitted by the applicants applying for enlistment: 1. Three POs with BOQ of the highest executed values of similar work during previous five years from the last date of submission of application and Copy of Completion Certificate /RA Bill/Final Deviation Statement from the concerned client in support of successful execution of jobs against each of the POs to be submitted. 2. Audited balance sheet including Profit & Loss statement for the previous three completed financial years reckoned from the date of application. In case the audited documents are not ready / available /applicable, then certified copy by a registered practicing Charteredaccountant may be submitted.

		3. UDYAM Registration / NSIC / SSI / MSME registration certificate if applicable. 4. PF and GST registration certificate 5. Any other documents in addition to the above which the applicantwants to submit. *NTPC may ask more documents if felt necessary. Also, all documents/facilities can be verified/ assessed if required.*
8	Notes	1. Similar work means 'the works including Vibration analysis/condition monitoring jobs and in situ dynamic balancing jobs for Rotary machines/Turbine/Turbogenerator in Thermal/Hydro/Nuclear Power Plant within the preceding five years from the last date of submission of application. 2.Value means basic value of the PO. Where PO value is composite (i.e. including taxes etc.), the applicant has to give break-up of composite PO value mentioning basic value, taxes etc. Any separate reimbursement/ escalation will not be considered. 3. The word "Executed" mentioned above means that the applicant should have achieved the criteria specified above, even if the total contract is started earlier and/or is not completed/closed. 4. All other terms & conditions of enlistment are as per the Special terms & conditions (STC) available at VDC portal vdc.ntpc.co.in "*https://vdc.ntpc.co.in/Uploaded Files/Documents/STC.pdf*"