

NTPC LTD
CORPORATE OPERATION SERVICES, EOC, NOIDA
VENDOR ENLISTMENT FOR O&M WORKS PACKAGE ON PAN NTPC BASIS

1	CEG No.	BMD-19
2	Brief description of CEG	CFD MODELLING AND IMPLEMENTATION OF TEST RESULTS FOR BOILER, GAS DUCTS & ESP IN NTPC THERMAL POWER PLANTS.
3	Responsibility Centre	CC
4	Brief scope of work	ATTACHED BELOW. *
5	Technical Qualifying requirements	<p>(i) The Vendor should have executed job of CFD modelling test for Boiler or Boiler outlet gas ducts or ESP of at least one Thermal Power plant unit.</p> <p>(ii) The Vendor should have experience of implementing the CFD modelling test results in at least one Thermal Power plant unit.</p> <p>The experience of implementation of CFD test result can be either through direct execution of such job or through supervision of such job by another agency.</p> <p>(iii) The Vendor should have facility for design & manufacturing of diverter plates or any other components required for implementation of CFD test results or should have tie-up with another manufacturer for such components.</p> <p>(iv) Vendor should own valid licensed commercial CFD Software.</p>
	Document to be submitted by Vendor in support of meeting QR	<p>QR 1 – Purchase Order / Work Order for CFD Modelling test job in a thermal power plant along with related execution proof.</p> <p>QR. 2- Purchase Order / Work Order for CFD Modelling test job in a thermal power plant along with related execution proof. This Order must have the implementation part also as described in the QR.</p> <p>QR.3 – Self declaration from the Vendor regarding availability of manufacturing the mentioned items along with list of machinery / workshop equipment, photographs / any other proofs evidencing the same.</p> <p>Or</p> <p>Self declaration from the Vendor regarding tie-up with another manufacturer/ fabricator for manufacturing the mentioned items along with list of machinery / workshop equipment, photographs / any other proofs evidencing the equipment available with them.</p> <p>QR.4 :- Documents to prove availability of valid licensed commercial CFD Software like procurement proofs & software license details etc.</p>

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6	Additional Documents to be submitted	<p>Following documents are also required to be submitted by the applicants applying for enlistment (in addition to the documents/ credentials in support of the Qualifying Requirements) :-</p> <ol style="list-style-type: none"> 1. Three POs with BOQ of the highest executed values of similar work during previous five years from the date of application and Copy of Completion Certificate /RA Bill/ final deviation statement from the concerned client in support of execution of job against each of the POs to be submitted. 2. Audited balance sheet including profit and loss statement for the previous three completed financial years reckoned from the date of application. <p>In case the audited results for the preceding financial year is not available, certification of financial statements from a practicing chartered account may be submitted. In case, Applicant is not able to submit the certificate from practicing chartered Account certifying its financial parameters, the audited results of three consecutive financial years preceding the last financial year will be considered for evaluating the financial parameters. Further, a Certificate would be required from the CEO/CFO as per the format enclosed in the application format documents stating that the financial results of the company are under audit as on the date of Application and the Certificate from the practicing Chartered Accountant certifying the financial parameters is not available.</p> <ol style="list-style-type: none"> 3. PF & GST registration certificate. 4. Any other documents in addition to the above which the applicant wants to submit.
7	NOTES:	<p>1.0 Similar work means: <i>Similar works means: CFD modelling test / analysis & jobs related to CFD analysis in Power plants / Steel / Cement/ Petro-chemicals / Other industries</i></p> <p>2.0 The executed value means basic value of quantity of similar works executed / supplied against the reference PO (also applicable to partly executed POs as on the date of application). Where PO value is composite (i.e., including taxes etc.) the applicant to give item-wise break up of composite PO mentioning basic value, taxes etc.</p>

SCOPE OF WORK-

NAME OF WORK-BMD-19 CFD modelling and implementation of test results for Boiler, Gas Ducts & ESP in NTPC thermal Power Plants

The objectives of the project are:

- Preparation of 3D model of the Flue Gas Ducts & ESP.
- Meshing the model.
- Analyzing the flow through Ducts ducting in "AS IS" condition, i.e. without any flow modifiers / correctors.
- To analyze flow distribution through existing/modified ducting's to reduce the erosion problem and swirling flow pattern inside Ducts.
- Preparing manufacturing drawings for the recommended flow modifiers.
- All the iterations, final results & drawings of flow modifiers shall be submitted in soft format.
- Supply of Divertors plates designed as per CFD analysis (Matl. IS :2062) per Ton basis
- Supply of chemically bounded material per Ton basis
- Application of chemically bounded material per Ton basis
- Erection of Diverter plates in duct per Ton basis

Scope of Work:

CFD Analysis

Computer Model of Ducts, Study-Analysis of Flow & Recommendations:

Based on data collected (APH Outlet to ESP Inlet, ESP Outlet to ID Fan Inlet & ESP, a computer model of ducts would be built to simulate the existing flow conditions. The detail study & analysis of flow would be undertaken to locate flow disturbances like turbulence, high localized velocities, uneven flow in branching ducts, non-uniform velocities etc. At and around flow disturbed areas and other strategic locations, various modifications / alternatives would be tried out on model to achieve desired / improved flow. The same shall be communicated in the form of reports, graphic presentations drawings and recommendations.

CFD Analysis of Flue Gas Duct from APH Outlet to ESP Inlet, ESP Outlet to ID Fan Inlet & ESP:

1. All the available data will be provided including drawings of Flue Gas Duct & ESP to Vendor by **NTPC LTD.**
2. Vendor shall interact with NTPC LTD. regarding the parameters and erosion pattern of Flue Gas Ducts, so that their requirement can be met before start of work. Preferably, Vendor shall submit in advance the type of data required by them.
3. A computer model of ducts would be built to simulate the existing

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flow conditions. The detailed study and analysis of flow would be undertaken to locate flow disturbances like turbulence, high localized velocities, and uneven flow in branching ducts, non-uniform velocities, and localized erosions in duct etc.

4. Various modifications /alternatives would be tried out on model to achieve desired/ improved flow in flow disturbed areas. The same shall be communicated in the form of reports, graphic presentations, engineering drawings and recommendations (in both soft and hard mode).
5. The area Considered for the CFD analysis is the flue Gas ducts from APH Outlet to ESP Inlet, ESP Outlet to ID Fan Inlet & ESP.
6. Design, Location and Curvature of diverters Plates are to be validated as per CFD software to achieve as far as possible near equal flow in all passes of the duct.
7. A final report which includes analysis, recommended flow control with G.A drawing, location and details of diverters etc shall be submitted after completion of work.

TEAM:

- Project Leader from Vendor
- One (1) CFD Engineers from Vendor
- Project Coordinator from **NTPC LTD.**

Benefits of implementation of CFO Analysis:

1. Reduced pressure drop across ducting.
2. Increased ID fan margin.
3. Improved flow regime would improve mass flow distribution in all passes and reduce ID Fan current consumption.
4. Reduction in high velocity and turbulence will reduce erosion of ducts.
5. Nearly Equal Flow Distribution inside Duct and achieving equal mass flow distribution as per IGCI norms in all passes of ESP.

Software Facilities

Modeling, Meshing , CFD simulations to be arrange by Vendor for analysis purpose.

Done

Time schedules:

For CFD analysis:

- The analysis will be completed in the period of 40 days after the Confirmation of model by **NTPC LTD.**

Requisites:

- **For CFD:** Detailed drawings of all the flue gas ducts preferably in **AutoCAD** format.
- **Design & Operating Parameters**

Deliverables:

Project report to the client includes:

- Technical Information
- Stream Line Plots
- Graphics and Animations
- Contour plots and vector plots at various locations.

Project Management Approach

The procedures are as follows:

- Status reports would be prepared by project team members and submitted to the respective project leader.
- Project leader will summarize and distribute to management as appropriate (include updated project work plan if appropriate).
- **Supply & erection of Diverters in duct as per result of CFD analysis (Per ton basis, rate to separately quote for supply and erection part.)**
- **Supply & application of chemically bounded refractory in duct as per result of CFD analysis**
 - (Per ton basis ,rate to separately quote for supply and application part.).

- 1) **Erection / Testing/ Site Fabrication:** The utilities like power, workshop facility, material handling equipment's, air, water to be provided by you free of cost near the work area in plant to complete to fabrication and erection within specified time frame. Free accommodations at your guest house and local conveyance to be arranged by you. Scaffolding materials to be provided by you on free of

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cost and returnable basis. Wherever required Lighting and Opening of equipment to be arranged by you wherever required for testing or erection. Space for fabrication to be provided by you.

- 2) **Mobilization and Idling Charges:** party must mobilize the team to carry out the work within one week of intimation. If after our intimation vendor team reports at site and then made to sit idle, extra charges on lump sum. per day will be given after 24 hours. Vendor should quote separately for that.
- 3) **Services:** For services like trial, commissioning, supervision etc., all should be included in scope of work.
- 4) **Data and Drawings:** For CFO analysis, CAVT, testing certain data and drawing are reqd. Vendors should clearly mention in the enquiry, so that these can be arranged, if available with NTPC.
- 5) **Guarantee:** All the materials supplied and/or installed are guaranteed for 12 months from the date of installation or 18 months from the date of supplies, **whichever is earlier.**

h. C. S.