



**PURCHASE SPECIFICATION OF GRAPHICAL
USER INTERFACE TOOL AND SERVICES
FOR OPERATOR TRAINING SIMULATOR**

PS/418/SSR/INT

Rev01

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**GENERAL SPECIFICATION
GRAPHICAL USER INTERFACE TOOL
AND SERVICES
FOR OPERATOR TRAINING SIMULATOR

(SECTION I)**

REVISION -01

APPROVED

(S SHIVARAM RAO)

Prepared

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Introduction

1.0 ABOUT BHEL

Bharat Heavy Electricals Limited (BHEL) (www.bhel.com), a Government of India undertaking, is a major electrical equipment manufacture for both India and export markets. It is one of the largest engineering and manufacturing and enterprises in India and one of the leading international companies in the power generating equipment

BHEL offers a wide spectrum of products and services for core sectors like Power, Transmission, industry, Transportation, Oil&Gas, Non-conventional energy system, Defence etc. More information about BHEL can be got on our website www.bhel.com

2.0 ABOUT ELECTRONICS DIVISION

The Electronics Division (EDN) (www.bheledn.com) of BHEL was formed in 1976 mainly to establish a strong base in the areas of Automation and Power Electronics to supplement the company's pioneering efforts in the above areas. Most of power plants and industries in the country today are equipped with electronics products and systems which have been manufactured and supplied by BHEL-EDN .BHEL also has a good international reference by way of exports to Europe , Middle–East and South–East Asia markets .EDN has been accredited with ISO 9001.ISO14001,OHSAS18001 and ISO 27001 standard certificates .

Electronics Division (EDN) is located on Mysore road Bangalore. Presently the unit is a manufacturing major for Control Equipment, Traction Electronics, Defence Electronics, Transmission Controls, Semiconductors &Photovoltaic and Space Grade Solar Batteries.

BHEL-EDN'S EXPERIENCE IN Operator Training Simulators (OTS) for THERMAL POWER PLANTS.

BHEL has been a pioneer in developing Operator training Simulators and the first Power Plant Simulators installed in India were developed and Engineered by BHEL through its R&D unit at Hyderabad. BHEL-EDN has started developing, supplying and commissioning replica Operator Training Simulators (OTS) since 2010 with know-how from BHEL- R&D. Since then the following simulators have been supplied to various coal fired power plants in India.

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SI.No	Customer	Project
1	MAHAGENCO	Khaperkheda
2	MAHAGENCO	Bhusawal
3	NTPC	Sipat
4	NTPC	Rihand
6	NTPC	Vindhyachal
7	NTPC	Farakka
8	NTPC	Dadri
9	NTPC	Kahalgaoon
10	INDIABULLS	Amaravathi

Currently the above projects are under execution. In addition to the above installation and commissioning of two 600MW simulators for M/s Avanta Power is in progress.

OTS for Indiabulls and Avantha are based on Graphical User Interface (GUI) tool

A. BHEL is currently executing orders for OTS as below with various GUI tools for which GUI tool vendor is already tied-up.

- 1.LPGCL, Lalitpur STPP, 660MW
2. APPDCL, Krishnapatnam 800MW.
3. BHAVINI Kalpakkam 500MW TG cycle
4. NPTI, Faridabad 800MW

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B. FIRM Orders already with BHEL, where GUI Tool is proposed to be ordered under this FA.

1. NTPC,Darlapalli STPP, 800MW,
2. NTPC,Gadarwara STPP, 800MW
3. APGENCO-Dr.NTTPS Simulator 210/250MW + 500/600 MW (Totally 7 Simulators with different variations)
4. ENNORE SEZ 2 x 660 MW STPS
5. KOTHAGUDEM 800MW STPS OF TSGENCO

The Framework agreement is intended to cover the Projects being currently executed by BHEL as well as future business anticipated by BHEL in this sector

3.0 TECHNOLOGY PARTNERSHIP:

BHEL-EDN proposes to capitalize on the current growth in OTS business segment and will design, manufacture, supply, install and commission

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operator training simulators for thermal power plants of various generation capacities. This tender is published for seeking proposals from Original Equipment Manufacturers (OEMs) of Graphical User Interface (GUI) based Simulators and Simulator tools who are willing to associate with BHEL-EDN to meet the above objective .This association and partnership will be based on Transfer of Technology with BHEL as technical lead agency, and will be governed by the BHEL's purchase policy issued from time-to-time,. Through this tender, BHEL proposes to select the Techno-Commercially and Price wise best associate for working jointly through a Framework Agreement for next 24 months from date of FA.

4.0 COLLABORATIVE APPROACH

BHEL-EDN intends to enter into an agreement with the selected associate wherein BHEL and associate will jointly bid for projects / tenders, execute orders though joint development and Engineering with the purpose of achieving a significant increase in Market Share of BHEL in the OTS Business segment. Through this collaborative approach, BHEL will have access to any developments made independently by the Associate in OTS. Also the Agreement shall enable Associate and BHEL to work together on an exclusive basis and accordingly Associate shall not approach or work with any other organization in area of Operator Training Simulators **for Utility, Captive and Nuclear (Sec.Cycle) Power Plants** In India.. Rev - 01

DURATION OF COLLABORATION/UNDERSTANDING: 24 Months from the date of signing of Agreement. BHEL may exercise the option of extending this association for another 3 months with mutual consent of selected Associate.

5.0 TECHNICAL SPECIFICATIONS

Technical specification of various simulators for Thermal power plant Applications is covered in Section –II. However post-agreement the Technical Specifications of Customer / Employer shall govern. In cases where a new requirement is specified, the Associate and BHEL shall individually and jointly undertake any development necessary to meet this requirement.

6.0. Commercial Terms & Conditions shall be as in Section- III.



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7.0 Typical arrangements

The associate shall transfer technology to BHEL-EDN as per agreed milestones and within the agreed time frame. Agreements reached between BHEL-EDN and associate shall be documented as a Framework agreement for future business partnership.

8.0 Information sharing and Rights

The selected associate shall clearly undertake to provide the following information / know-how and services to BHEL-EDN.

- a. Engineering information and selection criteria components.
- b. Technical documentation for developing the OTS , source code and software and firmware.
- c. Details of special purpose equipment for development and testing, if any.
- d. Training and assistance in system design, development and testing of the equipment and software.
- e. Support for commissioning and training of BHEL-EDN engineers and customer engineers for handling the equipment at site.
- f. Technology upgrades. During the FA period, all upgrades, patches, developments done by Associate on the GUI software tools shall be passed on to BHEL without any commercial and / or cost implications.
- g. Association with BHEL-EDN to address issues of obsolescence, availability of spares and services and long term support..
- h. All correspondence, design documents, approvals, if any, shall be the exclusive property of BHEL
- i. Exclusive rights to be given to BHEL to modify Hardware and/or Software beyond agreement period, on no charge basis.

9.0. Technology Transfer Requirements:

The Associate shall transfer the technology to BHEL-EDN in phased manner with in agreed time-frame for design, software selection and purchase, manufacture, inspection, testing, commissioning, trouble shooting, fine tuning at site, servicing, maintenance, quality assurance methods, etc., for the simulators to meet the market requirement without affecting agreed project schedules & commitments with customers..

S. Shrinika *[Signature]* *[Signature]*



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9.1 Qualifying requirements

Bidder shall meet the Qualifying requirements listed in Section-II. Bidder shall clearly bring out in his proposal how he meets the Qualifying requirements and furnish necessary documents in support of his Qualification

Qualification Requirements Bid (QR Bid) shall be submitted in separate envelope (Part-I) and Techno-Commercial (Part-II) bids of only those Bidders who meet the QR shall be opened.

9.2 Check List of Documents for Evaluations

The information required to be submitted along with Techno-Commercial (Part-II) Bids by the Bidder are mentioned in point No. 6 of clause 17.(Page No.26 of 28) and Annexure A & B in of Section II of Purchase specifications. This information shall be mandatorily submitted in order to facilitate evaluation of Bids.

Techno-Commercial (Part-II) Bids not accompanied by these documents shall be summarily rejected.

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**PURCHASE SPECIFICATION OF
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1. Introduction

BHEL-EDN proposes to capitalize on the current growth in OTS business segment and will design, manufacture, supply, install and commission operator training simulators for thermal power plants of various generation capacities. This tender is published for seeking proposals from Original Equipment Manufacturers (OEMs) of Graphical User Interface (GUI) based Simulators and Simulator tools who are willing to associate with BHEL-EDN to meet the above objective. This association and partnership will be based on Transfer of Technology with BHEL as technical lead agency, and will be governed by the BHEL's purchase policy and other Government regulations & laws issued from time-to-time. Through this tender, BHEL is planning to associate with a Simulator Supplier and a Graphical User Interface (GUI) based simulation modeling tool developer who meets the qualification requirements as under: This association will be valid for 24 months from date of signing of Framework Agreement. BHEL may exercise the option of extending this association for another 3 months with mutual consent of selected Associate.

Qualifying Requirement: In order to be eligible to participate in this Bid,

1.1) Bidder shall be a regular supplier of OTS for Thermal power plants.

AND

1.2) A) Bidder shall owner also be a Graphical User Interface (GUI) based simulation modeling tool developer for coal fired thermal power plants

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OR

B) Bidder shall have exclusive rights for using third party Graphical User Interface (GUI) based simulation modeling tool and should furnish documentary evidence regarding this right, as part of the Bid.

AND

1.3) Bidder should have developed simulation models using the above tool(qualified under 1.2) for coal fired thermal power plants and should be able to establish this with documentary evidence. Rev - 01

1.4) Bidder should have engineered, supplied, erected and commissioned full scope replica training simulator for coal fired station having unit rating of 210MW or above and meet all the following criteria as on date of Techno-commercial bid opening.
The Bidder should have designed, developed, supplied and commissioned

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S. Sharma
Encl
S. Sharma



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1. At least 2 Nos. Full Scope Replica simulator system for 210MW or above capacity thermal power plants (sub-critical plants) in India and shall be in operation for at least 1 year as on date of Bid submission.

2. At least 2 Nos. **Full Scope Replica simulator system** for 660 MW or above capacity thermal power plants for super-critical plants in India/Global and atleast one shall be working for the past 1 year. Documentary evidence of the same is to be furnished. **Rev - 01**

3. The Bidder should have local Establishment in India and should have adequate design & manufacturing capability with minimum 20 Simulation Engineers to deliver the project with BHEL and provide post implementation support as necessary. Details may be furnished.

4 Bidder should have delivered training simulator with Emulated Controls / Virtual DCS controls with training screens replicating the actual plant. The simulator should be operational for 1 year as on date of Bid submission Documentary evidence in form of End User certificate, of the same shall be furnished,.

Annexure A as per format given has to be filled and submitted by Bidder.

2. Financial Criteria:

1) The Bidder's annual average turnover from in the last three financial years (ending March 2014) should be minimum equivalent of INR 1000Lakhs as per the audited balance sheet and Profit & Loss account statement.

3. Scope of Work

As a part of deliverables, BHEL needs runtime and development licenses for various models listed in the document. The quantity of licenses required can be found in subsequent section of the document.

Additionally BHEL will require development license for model development and internal testing.

Based on the above, following are the deliverables.

- 1. Supply of End Customer development license
- 2. Supply of End Customer run-time licence
- 3. Supply of OTS Development licenses for BHEL – To develop the OTS for end customers.

S. Sharma *Encl* *for* *...*



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4. Services as detailed in Clause 13.0

4. Detailed Specification on GUI Based Simulation Software Tool

The **Operator Training Simulation (OTS) Software Tool** shall have capability to build Operator training simulator with the following features:

- Modeling of all the components and realizing all types of control logics & interlocks of the power plant which includes configuration for sub-critical, various configuration of fluidized bed boilers and supercritical mode of operation. Further the simulator should be able to model various fuel configuration which includes coal , fuel gas , fuel oil and various other combustible matters.
- Developing all the features of HMI i.e. display pages, trends and alarms etc for any reference plant
- Interfacing with various DCS makes and specifically to MetsoDNA, maxDNA DCS. Bidder shall list out the various DCS makes supported with direct connect interface availability (controllers in a simulated environment) as a part of Supporting documents for Qualifying Criteria.
- Communicating with other computer based systems which can be either a hardwired panel or any software module which is OPC compliant
- Instructor station features such as Run / Freeze, Snapshot, Malfunctions, External parameters and remote operations etc.
- Evaluating the performance of the trainee (Operator evaluation)
- Connectivity to Microsoft tools such as Excel.
- Licensing configuration for license authentication or validation.

5. Key Software features

1. The GUI Based Simulation software shall contain:

- Dynamic simulation of power plant components and systems.

A library of pre- engineered *mathematical* models of fossil power plant components in addition to basic items as pumps, pipes, super heaters, generators, condensers and other components as required for development of simulator as per specifications in this document, the library should contain control modules such as actuators and PI controllers also.

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The software tool should allow the accurate simulation of steady-state and dynamic behavior with Air, Flue Gas, LDO, HFO, Steam , Coal ,gas and steam/water flow, pressure and temperature profiles calculated to the component level.

The process modeling components such as equipment library and thermodynamic components should be available in one engineering interface developed by Bidder. There shall not be the need for connecting / linking various library functions through file path definitions etc or interfacing / dependence on other third party libraries. This will allow ease of access and operation for modeling and testing.

- Plant and component performance evaluation(startup, safety and various operational analyses)

6. SPECIFICATIONS FOR Simulation software Tool

The simulator modeling software system shall have a pre-packaged object oriented drag and drop style environment. Changes to tuning parameters or addition/deletion of new objects shall not require computer code programming or compiling or shutting down the simulation application. The simulation software will not employ the use of code generators for addition, modification, or updating of model components. Recompiling of the code, automatic or otherwise, will not be performed in order to add or modify a model. No prior programming knowledge should be required for model debugging. All dynamic simulation functionality such as process modeling, instructor functions, field operator functions as well as the ability to distribute the simulation application to run on multiple PC workstations shall be configurable from one easy to use graphical user interface (integrated environment).

The simulator modeling software will be on a Windows operating platform. The simulator software will have the ability to distribute models and applications across multiple computers and operating system platforms. The models and applications will be required to align their internal time clocks during model execution, thus assuring that the models and applications remain synchronized. Also, the ability to connect control system emulations to the process model shall be available in the simulator software without the need for recompilation of the simulator executable.

S. Prasadha *[Signature]* *[Signature]* *[Signature]*

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The bidder shall provide all relevant files for developing, updating, modifying and maintaining the simulation to BHEL. The bidder shall have full provenance of their modeling source code. The above mentioned software requirements are essential for ease of operation and maintenance of the simulator throughout the life of the plant.

6.1 Units of Measure and Tag numbering

The Simulator must be built in line with project specific units of measure (UOM) and Tagging. UOM and Tagging must be configurable within the Simulator and be switchable instantaneously. A simple mechanism should be available to handle UOM and Tagging in any custom calculations configured by the user in the simulation models.

6.2. Cross Referencing

Interfacing between the process simulation and the DCS, Instructor Station and other connected system must be possible from within the process simulation tool. Cross Referencing must be capable of specifying from which control system the connection is made as well as any units conversion, gains, biases, etc that must be applied.

6.3. Reverse Flow Capability

All flow calculation devices should automatically be able to calculate reverse flow (where process conditions allow) without additional configuration of the flow calculators or associated equipment models. The option to calculate stream outlet properties (forward or reverse) should be available in order to reflect 'flashing' or critical flow across a valve.

6.4. Search/Data Review Capability

The Simulator should include the ability to search the model database based on defined text or a mixture of alphanumeric and text values using an internal tool. The displayed results should include every instance of the search, including parameters, flow sheet locations, trends, snapshots, malfunctions, scenarios, trainee performance tool, etc.

S. Prasad



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6.5. Data Collection Tool

Data collected for any trended variable should be available to be viewed from within the Simulator. The trended instances should show variable name, sample time as minimum.

6.6 Monitor Tool

Any Simulator instance should be capable of being monitored in table format in a separate part of the Simulator. Groups of these instances may be savable into grouped files for recall at anytime during the Simulator runtime.

6.7. Intelligent Variable Highlight

Any variable displayed anywhere within the Simulator can be 'highlighted' using a mouse 'point and click' action. Once highlighted, this variable shall be automatically available within any Simulator 'configuration' window (for example, trends, monitor tool, point viewer, etc).

In addition, model variables from within an object model viewer should be able to be added to the above through 'drag and drop' actions.

6.8. Key Points

'Heads Up' display of Key Simulator Variables should be available to the Instructor/Engineer at a minimum. These variables maybe used to monitor process variables as a quick analysis of system 'health' or trainee performance key performance indicators (KPIs) (for example 'Total Daily Production') or for snapshot tracking, load testing, etc.

Rigorous Thermodynamics and Multiple Component Slates

Good thermodynamics is the heart of every process dynamic simulation. The Simulator should calculate rigorous process thermodynamics at each time-step throughout the entire process simulation. The Simulator should also allow multiple component slates to be used in the same flow sheet.

6.9. QA/Comments

The Simulator should allow the user to detail the sources of data and/or to why this data has been changed/updated, etc. These comments or QA statements can be entered for each simulation

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object and should be available for review through the Instructor Station interface.

6.10. Equations

The Simulator should be able to model the majority of normal process simulation functionality using the instances in the model libraries available, or a combination of the model instances within the Simulator tool.

To allow the Simulator to perform special functions or training capabilities, the ability to enter, edit and use equations within the simulator instances or blocks shall be available. Equation syntax will use the 'standard' Boolean terminology and logic statements, for example add (+), subtract (-), divide (/), multiply (*), 'to the power' (^), equals (=), etc and the statements, IF, THEN, SET, etc.

7.0 Modeling Capabilities

1. The user should have a comprehensive library of component and thermodynamic method definition for simulating the power plant system for various configuration and various fuels.
2. Coal as a component should be modeled in detail to account for proximate and ultimate analysis such that the volatile matter composition and ash properties are well defined for meeting the training objectives. This will ensure that the accuracy of coal Heating value predictions are met when the transition is effected from one coal grade to another.
3. The user should be able to define the process interactively by selecting the desired components from the library provided by the vendor using Graphical User Interface (GUI), configure these components as per the reference plant and enter input data. The software tool should be able to generate model for the configured process for delivering an Operator Training/ Design Simulator.
4. The system shall readily provide exhaustive modeling components to enable the user to construct a model in part or full, for Hydel and Thermal power plants including Super critical, CFBC and from the library of these component model for steady state and dynamic process. In addition to the above listed components, any additional components which are required to complete a typical power plant model will also be provided or developed for BHEL by the associate.

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S. Sharma *Engr* *for the* *...*



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5. The system should have provision for the users to develop an object with GUI representing the physical entity of plant such as Valve, Pipe, Motor, etc, in respect of its functionality required for a plant simulation. The GUI will provide all the necessary user interfaces to completely model a component.
6. The system should allow user to enhance an existing component available in the library to a new component by specifying additional specific functionality to the component.
7. The system should allow building a compound component to be developed from a set of individual components, which shall have all the characteristics of individual component.
8. Provision should be made available for interfacing the package with any other software modules which may be available in the form of static / dynamic link libraries (function calls) generated in different environments such as Visual Fortran, Visual C++, VB and .Net)
9. The system should generate the models from the first principles by using appropriate Mass, Energy, Momentum balance, etc in addition to having a facility to build empirical models. It should also be possible to integrate models which utilize techniques such as neural networks developed under different packages such as Neuro solutions etc. Bidder to specify the details of the nature of such support in their system.
10. The models will be able to be developed under different Unit systems (FPS, MKS, SI systems) and system should allow the user to convert from one unit system to the other.
11. During the operation of the Simulator the user shall have the facility to Run or Freeze the model or Single Step of simulation.
12. The minimum possible cycle time of the simulation cycle will be such that the real-time characteristics of the system will be able to be established by the simulation. Vendor to specify the minimum possible cycle time and corresponding hardware requirements, etc.
13. The system shall allow the user to modify the geometrical data of a component and will also provide a facility to summarize all the geometrical data of the components involved in one place, such as export/import options, to enable BHEL to customise the data from one project to another.

S. Sharma *Engr* *for* *...*



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- 14. The system should have smart templates kind of configuration to allow part of the modeling sections to be re-used for various project by exporting it to formats which can be reused later on.
- 15. It should be possible to enter the data information for each of the equipments through excel interface by writing VB Scripts. Further each equipment interface should be easy and friendly for the modeler to input the data information.
- 16. The system shall allow the user to specify convergence criteria to the underlying solver which is required to handle gracefully for any instable conditions, etc.
- 17. The system should have debug tools to identify problems during convergence with advise on possible resolution steps. Vendor to consider the debug tools during the detailed system training.
- 18. The system should allow integrating multiple sub-models into a master simulation models so as to allow various engineers to work on a single power plant configuration.
- 19. The system shall also have smart engineering tools such as case comparison to allow checks and balances for various revisions of the models file. This will ensure minimizing the engineering time required for integration and incorporating changes.
- 20. The system shall have the capability to port the logic from the actual/virtual control system to the simulator directly or through suitable converter software. Vendor to specify, with a detailed write-up, on already available translator/converter software and to include it in the scope of supply.
- 21. Bidder shall confirm or outline the limitations, etc in integrating to third party virtual/actual DCS systems in terms of achieving real-time simulation, snapshots, etc., if any.

Dynamic simulation models used for creating unit specific high fidelity simulator should have the following functionality.

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Furnace Model

- Detailed Model that accounts for furnace geometry, flame radiation, gas radiation and convective heat transfer.
- Multiple heat transfer nodes in the steam and gas side to improve model fidelity.
- Accurate location of heat transfer bundles with effect of view factor and distance from flame / gas node.
- Heat transfer objects that account for drum, water wall (pool boiling and liquid thermal expansion effects for drum swell modeling) and super heated steam bundles (phase transition during startup)
- Heat transfer surface fouling (fouling rate set by instructor) and effect of soot blowers
- Configurable elevations so that user can configure No. of elevations as per the plant requirement

Steam Turbine Model

- Configure stop (throttle) / control (governor) valves, steam chest, turbine first stage, turbine extraction steam headers
- Full arc / partial arc transfer of turbine stop/control valves
- Turbine metal temperature model
- Turbine vibrations, rolling through critical speeds, turbine eccentricity and differential expansion models

Feedwater and Condensate System Model

- Three region feed water heaters configured with heat transfer data for superheated, two phase and sub cooled regions.
- Condenser object configured with vacuum systems and cooling water flows. Dual condensers (with different pressures) can be simulated.

Electrical System Model

- Generator object configured with performance curves such as no load saturation and V-curves from generator manufacturer and an automatic voltage regulator and exciter.

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- Synchroscope for manual or automatic synchronization of generator to the grid as well for syncing buses in the switch yard.
- Model objects for electrical buses, breakers, transformers, disconnects that allow affects such bus voltage droop during large electrical motor starts will be included.

Fuel Handling Systems

- Ability to handle coal as well as oil fuel systems
- Coal feeder objects for coal transport effects from coal hoppers to the pulveriser
- Coal pulveriser accounts for pulveriser coal inventory and its effect on pulveriser air differential pressure & motor amps
- Ability to include effect of time delay in coal transport to the furnace
- Fan models should have the ability to include multiple performance curves from the fan manufacturer and account for effects of blade pitch or inlet guide vane position. Pump model should have the ability to include inter- stage extraction based on manufacturer's performance curve.

8.0 Licensing features

- Vendor shall provide network based/Dongle licensing with soft files for license authentication..
- The offered license for the customer shall be for perpetual duration with runtime and development options.
- It should be possible to lock the entire model with a password.**
- Licenses for internal development shall be capable to be hosted on a corporate network server with multiple machines accessing it similar to a token system. Depending on the machines connecting first to the server the licenses shall be allocated. The software shall be loaded on multiple machines but however the license shall be made available to machines on demand.
- It should also be provided with administrative features to monitor the license usage in terms of machines utilizing currently the license component with a facility to force abort or terminate the licensing session such that other machines requiring the license on priority can avail the same.

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f. Development license shall allow the user to develop/modify the mathematical model of the OTS in addition to minimum features of cut/paste/delete/rename/object editor features, Extensions and User objects , OPC and Excel interface Rev - 01

g. Runtime License shall have minimum of Trends and XY plots, Trainee performance monitoring Scenarios, Malfunctions ,event driven help etc. for running the simulator Rev - 01

9.0 HMI Features

- a. The system shall have the facility to configure all the features, of typical HMI system, such as Plant Schematics, Trends, Plots, Historical data, etc and also to have the ability to integrate with any third party DCS/HMI.
b. The system shall have the capability to port all the pictures of a third party HMI along with necessary IO Tags to the simulator directly or through suitable converter software. Vendor to specify on already available translator/converter software and to include it in the scope of supply.
c. Provide the software interface details along with necessary documentation to integrate to Third Party HMI systems.
d. Vendor to confirm or outline about the limitations, etc in integrating to third party HMI systems in terms of achieving real-time simulation, snapshots, etc., if any
e. Vendor Software should have capability to interface to any third party system through OPC.

10.0 Instructor Station Capabilities

The instructor shall be able to interfere with the model in various ways outlined below. For doing different mode like menu mode, mimic mode, expert mode etc. shall be provided. Major Functions available at Instructor Station shall be as mentioned below.

- Model Selection
• Freeze / Run
• Initial Conditions or Snap Shots
• Back Track

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- Variable Time Scale
- Step function to execute the simulation in instructor defined steps
- Field operations from field operator station (Remote Functions)
- Malfunctions (with event triggers and variable severity)
- Replay
- Pre-programmed Sequences Or Exercises
- Trainee performance logging and scoring
- External Parameters (Instructor controlled parameters)
- Trends in the instructor station / simulation interface

Initial Conditions or Snap Shots shall not require reconciliation for process model changes. A process model change made in one initial condition should automatically be available in the remaining initial conditions. It should be necessary only to restore the remaining conditions to let them line out with the new process model change. The process model change doesn't have to be re-incorporated in the remaining initial conditions.

Equipment malfunctions shall be encoded directly within the coding of the objects such that malfunctions can be invoked by the instructor without code modification. Any addition of a new object, which is defined as the instance of a modeled piece of equipment, to the simulation shall be such that a malfunction of the new object will be immediately available (if applicable), and no coding of the malfunction will be needed after addition of the object to the simulation.

10.1 INITIALIZATION

The instructor shall have the capability of initializing the simulator to any one of the fifty (50) Initial operation conditions. Selection of initialization conditions shall be done by the instructor. Actuation shall cause the necessary plant parameters to change to correspond with the desired initialization conditions. No changes in programming/ software and making new settings shall be necessary to accomplish these changes. Initialization shall automatically remove all conditions and malfunctions present in the previous simulator operation. The instructor shall be able to initialize to any of 50 initialization conditions, 20 pre-selected conditions and 30 snapshot conditions. The simulator shall be capable of having initialization conditions added or deleted at anytime in the future. However, the pre-selected initial conditions shall be password protected. A partial list of some typical initialization points are as follows:

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- Cold start-All equipment is stopped and all process temperatures are at 210deg C. All piping, heaters, hot wells, deaerator storage tank and condensate tank an auxiliary boiler filled or at normal levels. The boiler is drained. Fuel oil is available. Electrical start-up system shall be de-energised.
- Same as above, except with the electrical startup system energized.
- Partial cold start-Auxiliary boiler on, supplying steam seals, vacuum is established, the boiler is fired and all necessary auxiliaries are operating. Process conditions shall be the same as for a cold start except those affected by this level of operation.
- Bypass- The unit is operating with the turbine bypass valve almost fully open and essentially no steam to the turbine. All process conditions are reflected by this level of operation
- Hot start- same as mode 1, except that all process temperatures are at their value for 75percent load. Air compressors service water pumps, and turbine oil pumps are running as required.
- Hot restart after unit trip – The boiler is operating at effectively normal pressure and temperature and the turbine bypass valve is open.
- Cold turbine – Generator Rolling – The unit is just on turning gear and ready for acceleration. Process conditions shall be appropriate for this level of operation.
- Hot Turbine – Generator Rolling – The unit is effectively in same condition as in 7 above except turbine metal and associated equipment is at a higher temperature.
- Half load – Unit is at normal conditions for 50% load.
- Full Load – Unit is at normal conditions for 100% load.
- Cold start – Ignition preparation state.
- Cold start – Condenser vacuum up preparation state.
- Cold start – Turbine start up preparation state
- Cold start – Synchronising preparation state.
- 35 spare initialization points for future expansions and/or special snapshot conditions
- Replay – initiate a replay to any prior simulator dynamic conditions recorded for up to 2 hours (just prior to freeze initialization). Replay of a prior dynamics state should be similar in operation to initializing the simulator in all respects.
- The pre-selected conditions shall meet the above requirement and shall be chosen by the owner during detailed engineering.

S. Rishu *Engr* *for* *the* *owner*



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- After any initialization condition is selected the system shall perform a switch check function to ensure that all parameters are at the expected value and only then it shall run either automatically or after instructor's intervention. Facility to override switch check shall be provided as an instructor function.

10.2 BACK TRACK AND REPLAY/RECORD

10.2.1 BACKTRACK

The simulator shall have back-track backward and back track forward capability. The simulator backtracks capability shall meet the following minimum requirements:-

- The backtrack program shall continuously record the initialization data pool in one minute interval on the disk in a wrap round manner for a period of 60 minutes. Thus at any time, 60 minute data set shall be available covering preceding 60 minutes.
- The desired backtrack record shall be directly obtainable by the instructor either selecting the problem time of the record or by having the program automatically step backwards in time either manually or automatically as selected.
- The instructor may initialize the simulator at a specific backtrack time. However, if the backtrack time is not specified, then it shall default to one minute.

10.2.2 REPLAY/RECORD

The record program shall initially store the current status of all parameters at the same rate at which the simulation module of highest interaction rate is running. The reply/record system shall be able to record eight hours of simulator operation. The instructor shall have the ability to replay any recorded tape to review the exercise and while this tape is being played all the parameters are available in the HMI.

10.3 REMOTE FUNCTIONS

Functions (such as operation of manual valves etc.) that is not envisaged to be controlled from the control room and functions (such as tank levels, temperatures, differential pressures, etc.) which shall be varied to change the operational conditions and procedures, are required for simulation fidelity and diversity of operation and shall be designated as remote functions. The instructor's control of these functions should require minimum operations to change a particular function. Certain continuous type functions (such as manual valve positions, throttle valve positions, tank levels, temperatures, differential pressures, etc.) shall be simulated so as to provide the instructor with variable quantities through a specified

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range. This shall, for instance, allow the instructor to vary the rate of increase/decrease of parameter (oil, water etc.) in a tank by throttling the flow of a parameter through a pipe, utilize automatic pump/value control logic by varying input parameters, etc. Even through the method of simulation may take need multiple settings to control one functions, it shall be counted as one remote function only.

10.4 TIME SCALING

- The simulator shall be capable of operating in three modes namely, fast time, real time and slowtime.
- Fast time (also called Real-Time Compression) shall provide the capability to accelerate the dynamic simulation in order to observe slow transients or shorten certain time consuming activities, such as obtaining adequate turbine heat up, boiler heat up, raising of condenser vacuum etc. which are characterized by long time-constant. The fast time interaction rate shall be supplied by the Manufacturer for final review and acceptance by Owner. Real time compression shall be provided at ten (10) times real time simulation.
- Real time simulation shall be the normal simulation mode of operation and shall apply to all systems. All system dynamic models shall have sufficient iteration rate to ensure specified tolerance / fidelity and the real plant response.
- Slow time (also called Real Time simulator expansion) that gives an apparent increase in the time interval shall be provided to slow down dynamic simulation in order to observe fast transients and trip situation, loss of component, accidents etc. that is characterised by short time-constant.

10.5 CRY WOLF ALARM

The instructor shall have the capability to initiate cry wolf alarms. These alarms shall appear to the trainee as real events although no effects on dynamic simulation models shall occur. These alarms shall be clearly distinguished from malfunctions and shall not be included as any part of the number of spare malfunctions required by this specification.

10.6 INSTRUCTOR INTERVENTION

The instructor shall have the capability of overriding any parameter without affecting the corresponding mathematical model computer process variable value. This override shall continue until reset by the instructor or by an exercise program. Override capability shall be provided on all inputs/output alarms and not on just a few, because in real life any instrument or alarm can fail leading to a false alarm.

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10.7 TRAINEE PERFORMANCE PROGRAM

Trainee performance shall be continuously monitored during a training drill. All operators' action shall be retained in memory with the name of the device manipulated, and the time of the actions. At the termination of the drill, the trainee performance program shall generate a summary of relevant data, including trainee's (or trainees') and instructor's names, date, nature of the training drill, name of variable, critical parameters, high and low deviations from reference values, total amount of units generated during exercise, etc. The termination of the drill may be accomplished by the instructor at any time or it may be terminated by a preprogrammed time interval selectable by the instructor.

10.8 TRAINEE EXERCISE PROGRAM

A computerized exercise program shall be provided that shall automatically step the trainee through a series of simulator drills and exercises plus a number of operational problems. This program shall be developed so as to eliminate / minimize manual control manipulations by the instructor. There shall be a minimum of 20 exercises in trainee exercise program. These exercises shall be submitted to the owner for approval.

10.9 SIMULATOR EXERCISE GUIDE

Bidder shall provide a suggested guide that shall contain a series of simulator drills and exercises (minimum 50) arranged in logical sequence and according to difficulty of the task to be learned, subject to acceptance by BHEL. The guide shall also contain a number of operational problems that the trainee shall be required to solve at the simulator. The guide shall assist the instructor by outlining training objectives and specifying the practice sessions required to accomplish performance goals.

10.10 OTHER REQUIRED FUNCTIONS

The instructor shall be able to monitor the following functions:-

- Manipulate external parameters, which are not modeled, but which affect the simulated plant. These include external load, frequency and /voltage, power factor, and inlet temperature of cooling water etc.
- Monitor the actual value of up to 200 specified intermediate calculated variables in the plant models with proper physical units for example, enthalpy, entropy, mass, volume etc.

10.11 FREEZE / RUN

It shall be possible to freeze the dynamic simulations by the instructor. All the parameters & functionalities shall hold the current value / states till the intervention of the instructor. This can be stored to be used for a future initializing point. It shall be possible to continue the programs at that point itself and run the system.

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10.12 SNAPSHOT

A selectable snapshot capability shall be provided to allow the instructor to store the particular conditions that exist at any instant during a training session, for future recall, as an additional initialization condition. This feature shall supplement backtrack feature by allowing the instructor to recreate a particular training condition either within or beyond the periods covered by the backtrack mode. The snapshot feature shall have no effect on other initialization conditions discussed previously. It shall be possible to store the full set of parameters at any instant during simulation by taking a snapshot without freeze. These snapshots also can be used as initialization points in future.

10.13 EVENT DRIVEN HELP / VIDEO

Event Driven Help allows pre-scripted messages to be conditionally popped-up on simulator workstations as a consequence of events encountered throughout the training scenario similar to the Operator Guidance Messages. The simulator shall be capable of showing the messages in the form of text box or files to be referred in case of events such as trips / changeovers etc. Event driven video sequences shall allow actual video clips to be conditionally launched to trainee workstations as a consequence of simulated events encountered throughout the training scenario. The visuals can be selected to show the operator of the actual plant responses to such events.

10.14 PERFORMANCE CALCULATIONS

The simulator shall provide facility to BHEL to incorporate and execute the various performance calculations like Unit Heat Rate (net & gross), Turbine Heat Rate, Boiler efficiency, Heat Exchanger performance, Controllable losses, APH performance, Condenser cleanliness factor, TTD & DCA of FW /Condensate heaters as per the prevailing process parameters. The OTS shall be able to provide the Performance Calculation data in the form of suitable logs / reports. Rev - 01

10.15 INSTRUCTOR-LESS TRAINING

As an extension to the utility as elaborated at Cl. 10.13 above, the simulator shall have the capability to conduct instructor-less training sessions. Accordingly, the simulator shall have the optimum operator interactions programmed for each of the malfunction states listed below, to the nearest stable state.

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10.16 REAL PLANT EVENT RECONSTRUCTION

It shall be possible to reconstruct an event / malfunction as per the historian / log data imported from the real plant.

10.17 MALFUNCTIONS

10.17.1 GENERAL

All malfunctions shall simulate conditions as they would occur in the plant. System must simulate conditions that might be introduced by operator errors during a malfunction. Plant response to the malfunction shall be carried out a reasonable and stable operating condition as determined by Owner, by analysis of the training value of each malfunction. Models of malfunctions must include responses for no corrective action, improper action, and operator recovery cases. An adjustable time delay shall be included in the malfunction software to permit the instructor to insert separate initiation times for selected malfunctions. Any number of malfunctions shall be capable of being initiated simultaneously or within a delay time selected by the instructor. This time delay shall be variable up to 2 hours.

The discernable transient response of certain malfunctions shall be simulated and accurately displayed on HMI. For example, if the inserted malfunction should cause a gradual increase in a pressure, then the concurrent changes in other parameters must be simulated through the level of advance alarm setting and up to the trip setting. If the operator does not take suitable corrective action upon noting the conditions or upon receiving the advance alarm the trip setting shall be reached, and appropriate trip events, including unit trip shall be initiated. All malfunctions shall be simulated to persist until corrected by the operator or terminated by the instructor. It shall be possible to select a degree of degradation in the system (0-100 percent with increments of 1%) for applicable malfunctions. Some pre-selected malfunctions are non-recoverable, that is, those malfunctions where the operator trainee is not expected to bring the plant back to normal operation, for example, a furnace explosion. With each malfunction Bidder shall provide a description of the expected "hand off" response. This description shall include a list of affected displays, showing change in process parameters, and alarm activated. In addition, Bidder shall specify the appropriate operator responses to recoverable malfunctions.

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10.17.2 OPERATION

The instructor shall be able to accomplish the following malfunction operations.

- Time delay malfunctions by setting a problem time for malfunction activation.
- Initiate up to 20 malfunctions at the same time.
- Make a variable malfunction become progressively larger without clearing the malfunction.
- Determine which malfunctions are active.
- Select which component of redundant components is to fail when identified in the malfunction list.
- Select in which manner (high, low or fail) an instrument is to behave when identified in Malfunctions list.
- If a malfunction summary tableau is utilized, a brief malfunction description shall be displayed for each selected malfunction
- Clearing the malfunction.
- Initiation of malfunctions with variable severity shall be varied by numerical quantity rather than percentage, e.g. loss of pump capacity or pump loads shall be given in absolute value rather than a percentage of rated flow.
- Others as finalized during detailed engineering.

10.17.3 LIST OF MALFUNCTIONS

The simulator shall be capable of simulating the malfunctions indicated below with provision to accommodate a total of at least 500 malfunctions. The remaining malfunctions and their method of initiation shall be determined by the Simulator Manufacturer in consultation with Owner.

- a. Run/Freeze/Single Step, Rate of Simulation, Store and Restore Snapshots, Record and Replay, Backtrack, Malfunctions, External Parameters, Remote Operations
- b. The model should have capability to speed up and speed down based on the various situation of the training. Speed factor should vary from 0.1 X Real time to 100 X real time.
- c. Software should have features to introduce faults. Faults minimum in the generic configuration should include transmitters, control valves, pumps, rotating equipments and heat exchangers.

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1. Transmitter malfunctions shall cover drift , noise and failure (high , low and custom value configuration)
2. Control valves malfunctions should allow instructor to specify failure due to actuator, positioned offset, valve stickness , plugging etc.
3. Rotating equipments should provide trip as a minimum malfunction feature.
4. Heat Exchangers should have ability to define tube failure and fouling as minimum malfunction parameters.
5. Additionally it should be possible to customize or configure malfunctions for electrical system , boiler turbine etc.. All the above malfunctions configuration palette / options shall be provided in the software
6. Also it should be possible to combine multiple malfunctions to recorder / scenario features which will allow operator assessment to be performed on multiple malfunction conditions.

d. Snapshot Management and concurrent development

Operator Evaluation

- The system shall have the facility
 - a. to configure different parameters which shall be monitored during any training session for evaluating the performance of operators.
 - b. to record and replay the operator actions in all the OWS for purpose of evaluation
 - c. to configure the start-up curve (behaviour of important plant parameters with reference to time) which will be referred for evaluation of the performance of the operator.

11.0 Hardware and Software support

- The software package shall be computer independent. It should be possible to run it on different selected hardware and selected operating systems - Windows 2003 Server, Windows 2008 Server 64 bit, Windows7 64 bit
- User Account Control support on Wk2k8 Server and Win7

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12.0 Validation

The performance of the simulator model should have been validated extensively by modeling different test facilities and comparing calculation results to a large set of selected transients. The validation cases shall be furnished under the following heads:

- (i) Separate Effects Test – Validation of steam quality, pressure drop, slip in two-phase for etc.
- (ii) Integral Test – Validation of important parameters like temperature, pressure etc. of a typical plant.

In absence of the model being supplied from the Vendor, each vendor shall provide a model template with steam as a system and provide the material and energy stream information for 10-15 critical streams of a typical plant configuration in simulation environment .The stream information file needs to be delivered along with the report carrying the mentioned information on steam properties such as quality, temperature, pressure, enthalpy and specific volume.

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13. License Requirements: Rev - 01

- BHEL requires Runtime + Development License for the projects as listed in Section I Clause 2.0
- **Bidder shall** Quote the License Fees in the below manner:

Sr No	Description	Quantity	Price
1	Simulation software license (runtime) for OTS system as per point g of Clause No. 8	1 (per system)	To be quoted
2	<ul style="list-style-type: none"> • Per additional 1(single) Operator station Runtime license 	1	To be quoted
3	Simulation development license for end user to allow development and maintenance of model with life long validity as per point No. f of clause 8	1 (per system)	To be quoted
4	<ul style="list-style-type: none"> • Per additional 1(single) User Development license 		
5	Supply of network based development license as per point No. f of clause 8 above for 7 seats for BHEL to allow model configuration and instructor feature configuration valid for duration of 20 years	1	To be quoted

- Bidders may please quote for any additional requirement of licenses for instructor station or HMI ,if any for their software system..

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13.0 Training/services:

BHEL needs the training and services as below.

Training is one time requirement in the initial stage of the contract period of two years from the date of signing agreement. BHEL will decide on the date and No. of participants

However in case the End Customer requires training from GUI Software tool developer on GUI Software tool, then Bidder shall provide the same as per Customer's specifications within the Framework agreement.

1) The Bidder shall provide a structured training for 3 weeks at BHEL/EDN Bangalore-India to BHEL engineers on familiarization and usage of the simulation software tool with reference to development of training simulators and shall cover the following areas as a minimum.

- Comprehensive training Operator evaluation package
- Use of the system including interaction between simulator models and controls.
- Trouble shooting and fault analysis
- Details of Simulator
- Simulator software maintenance
- Overview of Simulator
- Starting up and shutdown of Simulator software , if any.
- the simulation software tool with reference to development of training simulators
- connectivity of simulator with third party actual/virtual DCS
- Instructor station features
- Operator evaluation package

2) The Bidder shall also provide a structured training for 2 weeks at BHEL/EDN Bangalore-India to BHEL engineers on demonstration-cum- training and shall cover the following areas as a minimum.

3) Developing cold start model from full load steady state model of coal fired thermal power plant Developing full load model from cold start to full load ,hot start up , warm start up and safe shut down

Additional Project related Services :

Bidder shall also include the following project related services

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14.0 Deliverables: Rev - 01

1. GUI based simulation software tool with licenses and comprehensive training as mentioned above.

- Vendor should Supply Standard Power Plant Simulation Models developed using this simulation software tool for the following configurations. (Vendor can deliver the simulation packages within three months from the date of supply of simulation software tool, if it is not immediately available)
 - Supercritical thermal plant (660MW,800MW)
 - Subcritical thermal plant (500MW,250MW)

Sr. No.	Item Description	Price (INR)
1	Training Services to BHEL team as per EOI: a) 3 weeks Training b) 2 weeks Training	Quote
2	Services for Projects within India	
	Additional Services as below per OTS project: 1) 2 Weeks support at BHEL - EDN per project during Engineering spread over 2 visits. 2) 1 visit for 1 week support at EDN Bangalore during FAT per project. 3) 2 weeks support at site during commissioning spread over 3 visits 4) 2 weeks support at site during SAT per project spread over two visits.	Quote
3	Services for Projects out of India	
	1) support at site during commissioning / SAT on per manweek basis including 1 visit	Quote
	2) Extended Support at site for subsequent manweek during same Visit	Quote
4	Training Services to End Customer / End User on GUI Tool on per manday basis at BHEL-EDN.	Quote

Note : The Price for the above mentioned Standard Models should be separately Quoted by Bidders.

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13.Price:

Vendor should provide breakup of the price for each item mentioned in

NOTE: Evaluation of LOWEST BIDDER will be based on the calculations as mentioned in annexure C .

14. Warranty: Vendor to provide warranty for a period of 2years from the date of handing over of the project to customer .

15.Submission of the bids.

Bidders shall submit the offer in three (03) parts in sealed covers as mentioned below.

- 1. Part 1 of the Bid: Qualifying requirement**
- 2. Part 2 of the Bid: Technical Bid**
- 3.Part 3 of the Bid: Price Bid**

16.Validity of the agreement: BHEL/EDN will have agreement with the successful vendor for supply of GUI tool and services as mentioned in this document for next two years from the date of signing the Framework Agreement..

17. General:

- 1. All expenses towards Travel and Living in India during training/support for engineering/FAT/SAT/Commissioning have to be borne by Vendor.
- 2. Offer shall contain price for each item
- 3. Offered tool shall meet all the specifications as mentioned above.
- 4. Any deviation will result in rejection of the bids.
- 5. No deviation certificate shall be submitted along with the offers.
- 6. The tool which is being offered should have all the features mentioned in the specifications.(Vendor to provide compliance matrix for all the features mentioned in the specifications clearly indicating compliance, present status, constraints if any, licensing policy, futures plans and additional price for incorporating a specific feature, if any etc)
- 7. Technically qualified bidders to demonstrate features of GUI tool and instructor station as listed above at EDN Bangalore before opening the pricebid. This is also basis for further technical evaluation.All expenses towards Travel and Living for this demo have to be borne by Vendor
- 8. No extension in last date for submission of tenders is entertained.

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Annexure A

Confirmation /Data in support of Qualifying Requirement

SL. NO	CUSTOMER NAME, ORDER REFERENCE & DATE	POWER PLANT DESCRIPTION	QTY	CUSTOMER'S CONTACT DETAILS NAME DESIGNATION PHONE NO. FAX NO. EMAIL ID	DATE OF SUPPLY/ COMMISSIONING	PERFORMANCE CERTIFICATE FROM CUSTOMER REGARDING SATISFACTORY PERFORMANCE
--------	---------------------------------------	-------------------------	-----	--	-------------------------------	--

S. Prishantha

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Annexure B

Point wise confirmation to the specifications to be given alongwith response to this tender. Deviations if any shall be indicated in the format as given below.

SL.NO	POINT NO.	CONFIRMATION/DEVIATION	IF DEVIATION, DETAILS	REMARKS, IF ANY

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Annexure C

A. PRICING OF DELIVERABLES (LICENCE) Rev - 01

Sr No	Description	Quantity	Price
1	Simulation software license (runtime) for OTS system as per point f of Clause No. 7	1 (per system)	To be quoted
2	<ul style="list-style-type: none"> Per additional 1(single) Operator station Runtime license 	1	To be quoted
3	Simulation development license for end user to allow development and maintenance of model with life long validity as per point No. e of clause 7	1 (per system)	To be quoted
4	<ul style="list-style-type: none"> Per additional 1(single) User Development license 		
5	Supply of network based development license for 7 seats for BHEL to allow model configuration and instructor feature configuration valid for duration of 20 years	1	To be quoted
6	800 MW supercritical simulator Model developed for Indian conditions	1	
7	660 MW supercritical simulator Model developed for Indian conditions	1	
8	500 MW subcritical simulator Model developed for Indian conditions	1	
9	250 MW subcritical simulator Model developed for Indian conditions	1	
10	TAXES& Duties AS APPLICABLE (List Individually)		
11	TOTAL		

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B. Pricing of Services Rev - 01

Sr. No.	Item Description	Price (INR)
1	Training Services to BHEL team as per EOI: a) 3 weeks Training b) 2 weeks Training	Quote
2	Services for Projects within India	
	Additional Services as below per OTS project: 1) 2 Weeks support at BHEL - EDN per project during Engineering spread over 2 visits. 2) 1 visit for 1 week support at EDN Bangalore during FAT per project. 3) 2 weeks support at site during commissioning spread over 3 visits 4) 2 weeks support at site during SAT per project spread over two visits.	Quote
3	Services for Projects out of India	
	1) support at site during commissioning / SAT on per manweek basis including 1 visit	Quote
	2) Extended Support at site for subsequent manweek during same Visit	Quote
4	Training Services to End Customer / End User on GUI Tool on per manday basis at BHEL-EDN. (including to & fro Travel, Boarding, Lodging & Local Conveyance)	Quote
5	TAXES & Duties AS APPLICABLE (List Individually)	
6	Total	

Basis of Price Evaluation: Rev - 01

All Prices shall be quoted in Indian Rupees (INR).

Quoted prices shall include all Import / Custom duties / Other input Taxes & Duties applicable for Bidders inputs / raw materials & components.

Services Prices shall include cost of to & fro travel, Boarding, Lodging and Local conveyance wither in India or abroad.

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The Total Supply Price(A) and Total Services Price (B) shall be calculated considering 1 No. / set of each Item of supply & Service multiplied by Unit Price quoted by Bidder. The declared applicable Taxes & Duties shall be added to the above Price(A) and (B) as per rates of Taxes & Duties declared. No other taxes & Duties other than declared by Bidder shall be admissible during evaluation.

Lowest bid (L1) shall be lowest of sum of totals of A and B.

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(SECTION III)

**INSTRUCTION TO BIDDERS &
COMMERCIAL TERMS AND CONDITIONS:**

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REVISION -00

APPROVED

Prepared Checked

Issued

Date

31/10/14



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INSTRUCTION TO BIDDERS &

COMMERCIAL TERMS AND CONDITIONS:

Tender for Selecting Associate for Graphical User Interface software tool and services for Operator Training Simulator.

1. Bharat Heavy Electricals Ltd – Electronics Division, Mysore Road, Bangalore,560026 (BHEL-EDN) having its head office at BHEL House, Siri Fort, New Delhi – 110049, invites Bids from Qualified GUI tool developers and Simulator suppliers for selecting associate for complete High fidelity Operator Training Simulator systems. BHEL-EDN and selected Associate will execute Framework Agreement for a term of 24 months from the date of execution and jointly bid for projects / tenders, execute orders for complete High fidelity Operator Training Simulator system through joint development , Engineering, installation & commissioning.

“The Bidder who desires to be BHEL-EDN’s associate should meet the Qualification requirement as stipulated in Section II of this Purchase Specifications

2. The Association is proposed to be operated on Technology-Transfer basis with successful Bidder. It shall also be binding on the Associate to adhere to Commercial terms & Conditions of End Customer which shall be furnished to Associate during Bidding.
3. **This Association is for the purpose of Joint Business Development and Joint Execution of OTS projects.** During the term of this association, **selected** Associate shall not participate either individually or in Association with others in Tenders for Operator Training Simulators **for Utility, Captive, Nuclear (Sec. Cycle) Power plants in India.** Even in cases where Business lead or enquiry is received by Associate directly from probable customer in India, the proposal and further process for securing order shall be taken up jointly by BHEL and Associate. Associate and BHEL shall jointly be responsible for Business development and generation of Business enquiries.

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4. Vendors who desire to participate in this tender shall submit their proposal on or before **1 pm IST on 31-10-2014 (Thirty first October 2014)** along with "NO DEVIATION" declaration for both technical specifications and these Terms & Conditions. Proposals not conforming to above shall not be considered for evaluation
5. Proposals sent by **fax or email** shall not be considered as Valid and shall be rejected. BHEL – EDN is not responsible for any delay in receipt of proposal sent by vendor through post or courier.
6. All clarifications sought by Bidders shall reach BHEL on or before **1pm on 20-10-2014**. No clarifications shall be entertained after this date. Also no clarifications shall be included by Bidder in Bids. Replies / clarifications from BHEL shall be uploaded on website
7. Bids shall be accompanied by Earnest Money Deposit in separate envelope, either in form of DD or Banker's cheque for an Amount of Rs.20,00,000 (Rupees Twenty Lakhs only). **DD / BC shall be drawn in favour of Bharat Heavy Electricals Ltd., Electronics Division, Bangalore and payable at Bangalore.** Proposal shall be submitted in (3) Three parts in separate sealed envelopes: **(Envelope Identification)** **Rev - 01**
Part I: a) Earnest Money Deposit + b) Qualification Requirements (QR) with supporting Documents in two separate envelopes
Part-II: a) declaration of "No Deviation" in separate envelope
b) Techno-commercial proposal
Part III: Priced proposal
8. The Date and Time of Bid Opening shall be intimated on BHEL's website. Bidders who wish to participate in the Bid opening shall inform names and designation of authorised persons at least three days in advance of Date of Bid Opening.
9. On Date of Bid Opening, first the EMD envelope shall be opened and verified. Those Bids accompanied by Valid EMD shall be accepted for opening of Part-I (Qualifying requirements) Bid. The Part-I Bids shall be opened in front of all bidders. Bids which do not meet the Qualifying requirements or bids which do not include sufficient documents in support of Qualification shall be rejected and such Bidders' Part-II and Part-III Bids shall be returned alongwith the EMD.

S. Prishtha



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- 10. The Part-II (techno-commercial proposal) of only Bidders who meet the Qualification requirements shall be opened. Techno-Commercial Bids which do not include the No Deviation declaration in separate envelope shall be summarily rejected.
- 11. Part-II (techno-commercial proposal) shall be evaluated vis-à-vis' BHEL's Technical specifications, and commercial terms and conditions. If it is found during evaluation that Qualification requirements are not met or the supporting documents are not valid, the Bid shall be rejected and Bidder shall be barred from participating in any tenders of BHEL in future. Bidders may be invited for Techno-Commercial discussions if required for sake of clarifications etc.
- 12. In case there is any scope of specification change, All Bidders who meet the QR shall be informed of the same through notification on website, and requested to submit a sealed Supplementary Price Bid indicating only the Impact due to the declared scope / specification change. This Supplementary Price Bid shall be read in conjunction with the Original Price Bid. (Part-III).
- 13. Price Bids opened along with supplementary Price Bids, if any, shall be evaluated to decide the Lowest Price Bid (L1 Bidder). Total cost to BHEL including freight and insurance and applicable statutory taxes & duties and any other levies, shall form the basis for arriving at the lowest quoted price (L1). Bidder shall therefore demarcate prices for supply and services and clearly mention applicable taxes and duties and levies with applicable rates on quoted prices.
- 14. It shall not be binding on BHEL-EDN to accept Lowest bidder's proposal and It shall also be BHEL-EDN's prerogative to cancel the tender or re-tender if the tender requirements are not met as per BHEL's purchase policy and objectives of the tender are not met..
- 15. The Bidder whose Bid is evaluated as lowest shall be invited for discussions regarding the Framework agreement. Further negotiations may also be held, if found necessary, in which Lowest Bidder shall participate. The selected Bidder shall thereafter enter into a Framework Agreement (FA) with BHEL-EDN and will be called as BHEL's Associate for Graphical User Interface software tool and services for Operator Training Simulator for 24 months from date of FA.

S. Sharma *Engr* *S. Singh* *Engr*



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16. The Framework Agreement shall be binding on Associate and associate shall not participate in any tender for Operator Training Simulator for Utility, Captive, Nuclear (Sec. Cycle) Power plants in India, either individually or with any other Associate or Bidder within India. **Rev - 01**
17. Upon signing of Framework Agreement, the Associate shall furnish a FA performance guarantee in the form of a Bank Guarantee valid for 36 months from Date of signing of Framework Agreement equivalent to sum of INR 50,00,000 (Rupees Fifty Lakhs only). Format for this BG for FA performance Guarantee is enclosed as **Attachment-I.** After signing of FA, the EMD of successful bidder and all other Bidders, who have not forfeited their EMD for any reason whatsoever, shall be returned.
18. In case during the period of FA, it is desired by BHEL-EDN that prices have to be reviewed due to nature of any particular tender, the Associate shall participate in discussions and negotiations with BHEL-EDN regarding Prices to be considered for Associate's scope of supply & Services for that particular tender. In case BHEL-EDN accepts an order from Customer after negotiations with reduction or discount on original Bid Price, then the reduction or discount shall be proportionately passed on to Associate also for their share of price for supply & work. These discounts shall be operated on agreed FA prices.
19. During the execution of contracts with end customer by BHEL-EDN for OTS, within the FA Validity period, a separate order shall be placed on Associate for their software and services. For each such order placed on Associate, the Associate shall furnish a Performance Guarantee in the form of Bank Guarantee for 10% of the Order Value placed on Associate and valid for entire duration of Contract including extensions in Contract period if any. Format for Bank guarantee for Performance guarantee is enclosed as **Attachment-II.**
20. All Bank guarantees shall be irrevocable and unconditional and furnished to BHEL-EDN as per Formats Enclosed and from either Nationalised or Scheduled Banks. A List of Banks from whom Bank Guarantees shall be acceptable is enclosed as **Attachment-III.**

21.

S. Prishtha



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- No changes to formats shall be acceptable to BHEL-EDN. All applicable bank charges shall be borne by the Bidder / Associate.
22. BHEL-EDN shall have the right to invoke any or all of the above Bank Guarantees in the event of any default or breach of contract or agreement and Bidder / Associate shall forfeit the Amount of the Bank Guarantee.
 23. Wherever the Customers' Tender or Contract stipulates Deed of Joint undertaking to be submitted, the same shall be submitted by Associate jointly with BHEL-EDN as per Format prescribed by Customer. Any DJU securities and / or contract performance Bank guarantees required as per customer Bid specifications shall be furnished individually by Associate and BHEL as per provisions of Customer's Tender documents / contract. Also any Bank Guarantees / documents which need to be furnished by Associate to fulfill conditions stipulated by Customer for contract signing shall be immediately furnished by Associate without waiting for LOI / Purchase order from BHEL. Bidder / Associate shall bear all expenses toward furnishing of BGs / DJUs. **Rev - 01**
 24. Apart from the Technical Specifications included in this tender, if any special requirement is stipulated by any customer in any Tender for OTS in which BHEL-EDN is participating, Associate shall be bound to comply with these new Technical requirements and shall undertake any new developments / additional engineering which may be required at no cost to BHEL-EDN.
 25. Apart from the Commercial Terms & Conditions listed herein, if there is any special requirement stipulated by the customer in any Tender for OTS where BHEL-EDN is participating, the Associate shall be bound to comply with this requirement within the agreed Prices.
 26. Selected Associate shall be bound by the Contractual Completion Schedules of the Contracts and Technical Performance Guarantees agreed by BHEL-EDN. Associate shall be jointly liable for any Liquidated damages / Penalty levied by Customer due to non-compliance of Contractual terms or delay against Completion schedules or Technical Performance guarantees. **Rev - 01**

S. Sharma *[Signature]* *[Signature]* *[Signature]*



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27. **Payments terms.** The payment terms of BHEL-EDN shall be as follows:

Supply portion :

50% of P.O supply price component shall be paid within 45 days of date of acceptance of supplies by BHEL-EDN.

10% of P.O supply price component shall be paid within 30 days of Completion of FAT at BHEL-EDN Works

10% of P.O supply price component shall be paid within 30 days of Completion of Commissioning at Project Site

15% of P.O supply price component shall be paid within 30 days of Completion of SAT at Project Site

15% of P.O supply price component shall be paid within 30 days of Completion of Warranty Period

Services portion

50% of P.O services price component shall be paid within 30 days of Completion of FAT at BHEL- EDN works.

20% of P.O services price component shall be paid within 30 days of Completion of Commissioning at Project Site.

20% of P.O services price component shall be paid within 30 days of Completion of SAT at Project Site

10% of P.O services price component shall be paid within 30 days of Completion of Warranty Period

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S. Ramesha *[Signature]* *[Signature]* *[Signature]*



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28. **Price Basis:** Prices shall be quoted on FOR, BHEL EDN, works basis excluding all applicable taxes and Duties **and including transit Freight & Insurance in Indian Rupees (INR)**. Foreign Bidders shall also quote on FOR BHEL-EDN basis through their local Indian Counterpart / Indian establishment. **Rev - 01**

Transit Freight and Transit Insurance Charges upto BHEL-EDN works shall be shown separately but included in the quoted FOR Prices.

In case of Foreign Bidders, the Services portion of contract shall be necessarily be carried out by Indian Counterpart / establishment and hence only Prices in INR shall be acceptable.

During the FA Period, **in** case the Associate has to engage services of Expert / Foreign principal / Collaborator's engineer / personnel during Engineering / Modelling/ Trouble shooting/ Commissioning / SAT or for rendering any other services to BHEL or end user, this shall be at the expense of Associate and shall not be reimbursed by BHEL. **Rev - 01**

29. **FIRM Prices:** Prices quoted shall remain FIRM for entire duration of Frame work Agreement. No escalation or variation shall be allowed.
30. **Imports:** Bidder should clearly bring out the Import content included in his supplies on CIF basis. Where the Price Bid do not mention any CIF, the same shall be considered as Zero. Where unit Prices for supply are quoted in foreign currency, the Exchange Rate 7 days prior to Date of Bid Opening shall be considered for evaluation. Prices for Freight & Insurance and Services shall be in Indian Rupees only.
31. **Taxes and Duties:** Applicable Taxes and Duties shall be included for Evaluation of Price Bid to arrive at lowest bidder and calculating the Cost to BHEL-EDN. It is therefore mandatory that **all** bidders explicitly specify applicable Taxes and Duties and applicable rates of T&D on the Prices quoted. No other Taxes and Duties shall be admissible after opening of PriceBids. Only those taxes and Duties explicitly brought out in Bids shall be reimbursed by BHEL-EDN.

S. Prasadha [Signature]



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- 32. All other Taxes and Duties shall be deemed to be included in the quoted Price. In case TDS is applicable in Bidder's country the same shall be included in Associates price and BHEL shall not reimburse the same in any way. Bidder's PAN shall be mentioned in Bids.
- 33. **Liquidated Damages / Penalty:** **The LD / Penalty clauses as stipulated by Customer will be applicable to both BHEL and Associate on back-to-back basis in proportion to value of share in the contract.** Associate shall be jointly liable for any Liquidated Damages Penalties that are levied by customer on account of non-performance of contract or on account of **not** meeting Technical Performance Guarantees. All such LDs / penalties shall be proportionately deducted from Payments due to **the** Associate depending on Associate's share in Contract. **Rev - 01**
- 34. **BHEL reserves the right to go for "on-line bidding (Reverse Auction)".** Terms & Conditions for RA is enclosed as **Annexure-IV**
- 35. **Compliance to Commercial Terms & Conditions:** Bidder shall include a signed copy of these terms and conditions as an unconditional acceptance of the same in .pdf format in separate envelope along with the Part-II Bid. Bids without the signed copy in separate envelope shall not be considered for evaluation.

S. Sharma



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36. Address for communication and submission of Tenders:

Sealed Bid documents may be addressed to

**Shri. S R JAYAKUMAR
The Additional General Manager
Materials Management
Control equipment
New Engineering Building, 2nd Floor
Electronics Division,
Bharat Heavy Electricals Ltd.
Mysore Road, Bangalore 560026
Tel.No. 080-26998449, +919945530257**

**All Bids and associated envelopes shall be Legibly Marked,
numbered and superscribed with the This tender No. as in
website and Title**

**“Tender for selecting Associate for
GUISOFTWARE TOOLAND SERVICES
for
OPERATOR TRAINING SIMULATOR**

S. R. Jayakumar

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Other General Terms & Conditions (OTGC):

Bidder shall also consider the following Other General Terms & Conditions while submitting Bids and signed Document of Terms & Conditions. These OTGC shall be mutually discussed with successful Bidder before **execution of the Framework Agreement**. Given here is only a List of these terms & condition which need to be adhered.

1. LIMITATION OF LIABILITY **Rev - 01**

THE AGGREGATE LIABILITY OF ASSOCIATE RELATED TO THE PROJECT ORDER WILL IN NO CASE EXCEED THE VALUE OF THE PURCHASE ORDER PLACED FOR THAT PROJECT ON THE ASSOCIATE IF SUCH LIMITATION REGARDING LIABILITY IS AVAILABLE FOR BHEL UNDER THE CONTRACT WITH CUSTOMER.

THIS LIMITATION WILL NOT APPLY IF LIABILITY ARISES FROM BREACH OF CONTRACT, INDEMNITY, WARRANTY, TORT (INCLUDING NEGLIGENCE), OPERATION OF LAW, OR OTHERWISE.

2. ARBITRATION / DISPUTE RESOLUTION **Rev - 01**

THIS CONTRACT WILL BE GOVERNED BY THE LAWS OF INDIA. ANY DISPUTE ARISING OUT OF OR RELATING TO THIS WILL BE FINALLY RESOLVED BY ARBITRATION IN ACCORDANCE WITH THE INDIAN ARBITRATION AND CONCILIATION ACT 1996 AND ITS SUBSEQUENT AMENDMENTS THEREOF. THE PLACE OF ARBITRATION WILL BE AT BANGALORE. THE LANGUAGE OF THE ARBITRATION WILL BE ENGLISH. **ANY VALUE OF AWARD PAYABLE WILL BE IN INDIAN RUPEES** ARBITRATION WILL BE CONDUCTED BY BHEL APPOINTED SOLE ARBITRATOR. PARTIES WILL BEAR THEIR OWN COSTS OF ARBITRATION. NOT WITHSTANDING THE FOREGOING, EITHER PARTY MAY APPLY TO ANY COURT OF COMPETENT JURISDICTION AT BANGALORE FOR INJUNCTIVE RELIEF WITHOUT BREACH OF THIS ARBITRATION PROVISION.

3. INVENTIONS AND INTELLECTUAL PROPERTY **Rev - 01**

3.1 NO RIGHT, TITLE OR INTEREST WHICH EXISTED PRIOR TO THE FRAMEWORK AGREEMENT, IN ASSOCIATE'S INTELLECTUAL PROPERTY WILL BE TRANSFERRED TO BHEL, EXCEPT AS MAY BE GRANTED IN THE FRAMEWORK AGREEMENT.

4. TERMINATION FOR DEFAULT **Rev - 01**

4.1 BHEL WITH PRIOR WRITTEN NOTICE ("NOTICE OF TERMINATION") MAY TERMINATE THE AGREEMENT/PURCHASE ORDER OR ANY OUTSTANDING PURCHASE ORDER FOR DEFAULT OF THE -ASSOCIATE IF HE HAS MATERIALLY BREACHED ANY OF ITS OBLIGATIONS UNDER THE RELEVANT PURCHASE ORDER /AGREEMENT AND HAS NOT CURED THE BREACH WITHIN THIRTY (30) DAYS OF RECEIPT OF A NOTICE FROM BHEL.

S. Prishtha *[Signature]* *[Signature]* *[Signature]*

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4.2 **TERMINATION OF A PURCHASE ORDER/AGREEMENT BY BHEL FOR DEFAULT OF OTHER PARTY SHALL NOT AFFECT CONTINUING PERFORMANCE BY THE PARTIES OF THEIR RESPECTIVE OBLIGATIONS UNDER A DIFFERENT PURCHASE ORDER/AGREEMENT, UNLESS OTHERWISE AGREED UPON BY THE PARTIES.**

S. Prasadha *S. Prasadha* *S. Prasadha* *S. Prasadha*

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ATTACHMENT-I
Contract Performance Guarantee Form

(To be stamped in accordance with Stamp Act
if any, of the Country of the Issuing Bank)

Bank Guarantee No.....
Date.....

To,
Bharat Heavy Electricals Ltd.
Electronics Division
Post Box No. 2606, Mysore Road
Bangalore-560026

Dear Sirs,

In consideration of the **Bharat Heavy Electricals Ltd.** (hereinafter referred to as the 'Employer' which expression shall unless repugnant to the context or meaning thereof, include its successors, administrators and assigns) having awarded to M/s _____ with its Registered /Head Office at _____ (hereinafter referred to as the 'Associate', which expression shall unless repugnant to the context or meaning thereof, include its successors administrators, executors and assigns), a Contract by issue of Employer's Framework Agreement _____ dated _____ and the same having been unequivocally accepted by the contractor and valued at _____ for _____ and the Contractor having agreed to provide a Contract Performance Guarantee for the faithful performance of the entire Contract equivalent to _____ (*) _____ % (_____ percent) of the said value of the Contract to the Employer.

We _____ [Name & Address of the Bank] having its Head Office at _____ (hereinafter referred to as the 'Bank', which expression shall, unless repugnant to the context or meaning thereof, include its successors, administrators, executors and assigns) do hereby guarantee and undertake to pay the Employer, on demand and all monies payable by the Contractor to the extent of _____ (*) _____ as aforesaid at any time upto _____ (@) _____ [days/month/year] without any demur, reservation, contest, recourse or protest and/or without any reference to the Contractor. Any such demand made by the Employer on the Bank shall be conclusive and binding notwithstanding any difference between the Employer and the Contractor or any dispute pending before any Court, Tribunal, Arbitrator or any other authority. The Bank undertakes not to revoke this guarantee during its currency without previous consent of the Employer and further agrees that the guarantee herein contained shall be enforceable till ninety (90) days after expiry of its validity.

The Employer shall have the fullest liberty, without affecting in any way the liability of the Bank under this guarantee, from time to time to extend the time for performance of the Contract by the Contractor. The Employer shall have the fullest liberty, without affecting this guarantee, to postpone from time to time the exercise of any powers vested in them or of any right which they might have against the Contractor, and to exercise the same at any time in any manner, and either to enforce or to forbear to enforce any covenants, contained or implied, in the Contract between the Employer and the Contractor or any other course or

S. Ramesha *[Signature]* *[Signature]* *[Signature]*

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remedy or security available to the Employer. The Bank shall not be released of its obligations under these presents by any exercise by the Employer of its liberty with reference to the matters aforesaid or any of them or by reason of any other actor forbearance or other acts of omission or commission on the part of the Employer or any other indulgence shown by the Employer or by any other matter or thing whatsoever which under law would, but for this provision, have the effect of relieving the Bank.

The Bank also agrees that the Employer at its option shall be entitled to enforce this Guarantee against the Bank as a principal debtor, in the first instance without proceeding against the Contractor and notwithstanding any security or other guarantee that the Employer may have in relation to the Contractor's liabilities.

Notwithstanding anything contained hereinabove our liability under this guarantee is restricted to(*)..... and it shall remain in force upto and including.....(@)..... and shall be extended from time to time for such period (not exceeding one year), as may be desired by M/s (Associate) on whose behalf this guarantee has been given.

Dated this _____ day of _____ at _____.

WITNESS :

.....
(Signature).....

(Signature)
.....

(Name).....

(Name)
.....

.....
(Official Address)
Stamp)

(Designation with Bank

Attorney as per
Power
of Attorney
No.....
Dated.....
.....



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Notes :

1.(*)This sum shall be ten percent (10%) of the Contract Price. (@)This date will be ninety (90) days beyond the Defects liability period as specified in the Contract.

2. The stamp papers of appropriate value shall be purchased in the name of guarantee issuing Bank or the Party on whose behalf for BG is being issued. The Bank Guarantee shall be issued on a stamp paper of value as applicable in the State of India from where Bank Guarantee is issued or the State of Karnataka or the State of India from where the BG shall be operated, whichever is higher.

3. The Bank Guarantee shall be from a Bank as per list provided in the Section III of Bidding documents

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Format for Performance Guarantee to be issued by the Associate against each order placed on Associate.

**PROFORMA OF PERFORMANCE BANK GUARANTEE
(FOR FOREIGN PURCHASE ORDERS)**

ANNEXURE-II

BANK NAME AND ADDRESS

Electronic Division
Bharat Heavy Electricals Limited, (B.H.E.L.)
Mysore Road, P.B. No. 2606
BANGALORE - 560 026

Dear Sir,

Ref : CONTRACT PERFORMANCE GUARANTEE.

WHEREAS you have entered into a contract reference No & PO
NO. _____

Date _____ with M/s _____ having its
registered office
at _____ for the supply of _____

as detailed in your
purchase order No. _____ which is hereinafter referred to as
"the said contract"

and WHEREAS M/s _____ has undertaken to
produce a Bank
Guarantee for 10% (Tern Percent) of the contract price amounting to

(_____) to secure its obligatios to
Electronics Division, BHEL having its registered office at New Delhi for the
performance of the contract including the warranty of the equipment
supplied, We _____

Bank, _____ hereby expressly, irrevocably
and unreservedly undertake and guarantee as principal obligors on behalf of
M/s _____ that in the even Bharat Heavy Electricals
Ltd. (B.H.E.L.) declares to us in writing that

M/s _____ has not fulfilled any obligation
according to the contractual obligation of the said contract, to pay you on
demand and without demur to Bharat Heavy Electricals Ltd., Electronics
Division, Mysore Road, P.B.No. 2606, Bangalore - 560 026.,
India an amount of

_____ (in words

_____)

subject to as may be determined below :

S. Shrinika *[Signature]* *[Signature]* *[Signature]*

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ANNEXURE-II

**PROFORMA OF PERFORMANCE BANK GUARANTEE
(FOR FOREIGN PURCHASE ORDERS)**

1) Notwithstanding any right M/s. _____ may have directly against you or any disputes raised by M/s _____

_____, Your written demand shall be conclusive evidence to us that repayment is due under the terms of the said contract and shall be binding on us.

2) We shall not be discharged or released from this undertaking and Guarantee by any arrangements, variations made between you and M/s.

with or without our consent and Knowledge or by any alteration in the obligations of M/s. _____ by any forbearance whether as to payment, time, performance or otherwise.

3) This guarantee shall remain valid until the end of six months after the close of the warranty period or until the same is reported by BHEL to us whichever is earlier.

4) We agree and undertake not to revoke this guarantee during its validity unless discharged in writing by you subject to the provision of clause (7) below :

5) This guarantee shall be a continuing guarantee subject to the foregoing and shall not be discharged by any change in the constitution of the Bank or M/s.

6) This guarantee shall be governed by and constructed in accordance with the Laws of India.

7) At any time _____ Bank may render this guarantee null and void by paying to Bharat Heavy Electricals Ltd. the full amount being _____ (in words

For and on behalf of Bank
by its Authorised Signatory

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S. Praveen Kumar



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ATTACHMENT-III

**LIST OF BANKS AUTHORISED TO ISSUE BANK GUARANTEES
(LIST OF CONSORTIUM BANKS)**

Sl.No.	Bank	Sl.No.	Bank
	Nationalized Banks		Foreign Banks
1	Allahabad Bank	21	CITI Bank N.A
2	Andhra Bank	22	Deutsche Bank AG
3	Bank of Baroda	23	The Hong Kong and Shanghai Banking Corporation Ltd. (HSBC)
4	Canara Bank	24	Standard Chartered Bank
5	Corporation Bank	25	The Royal Bank of Scotland N.V.
6	Central Bank	26	J P Morgan
7	Indian Bank		Private Banks
8	Indian Overseas Bank	27	Axis Bank
9	Oriental Bank of Commerce	28	The Federal Bank Limited
10	Punjab National Bank	29	HDFC Bank
11	Punjab & Sindh Bank	30	Kotak Mahindra Bank Ltd
12	State Bank of India	31	ICICI Bank
13	State Bank of Hyderabad	32	IndusInd Bank
14	Syndicate Bank	33	Yes Bank
15	State Bank of Travancore		
16	UCO Bank		
17	Union Bank of India		
18	United Bank of India		
19	Vijaya Bank		
	Public Sector Banks		
20	IDBI		

Note:

- BG should be addressed to BHEL by the issuing Bank along with covering letter.
- All BGs must be issued from any of BHEL consortium banks listed above.
- BHEL may accept BG from other Public Sector Banks also which are not listed above.
- BG will not be accepted from Scheduled Banks and Co-operative Banks (other than listed above).
- In case BG is issued from a bank located outside Indian Territory and is issued in foreign currency, theBG must be routed through and confirmed by any one of the above mentioned consortium banks.
- This list is subject to changes. Hence vendors are requested to check this list every time beforeissuing BGs.

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S. Prishtha



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ATTACHMENT-IV

GUIDELINES FOR REVERSE AUCTION PROCEDURE

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 (THROUGH A SERVICE PROVIDER). The philosophy followed for reverse auction shall be English Reverse (No ties).

1. For the proposed reverse auction, technically and commercially acceptable bidders only shall be eligible to participate.
2. Those bidders who have given their acceptance for Reverse Auction (quoted against this tender enquiry) will have to necessarily submit "online sealed bid" in the Reverse Auction. Non-submission of "online sealed bid" by the bidder for any of the eligible items for which techno-commercially qualified, will be considered as tampering of the tender process and will invite action by BHEL as per extant guidelines in vogue.
3. 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.
4. In case of reverse auction, BHEL will inform the bidders the details of Service Provider to enable them to contact & get trained.
5. Business rules like event date, time, bid decrement, extension etc. also will be communicated through service provider for compliance.
6. Bidders have to fax the Compliance form before start of Reverse auction. Without this, the bidder will not be eligible to participate in the event.
7. In line with the NIT terms, 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 bidder to enable them to fill-in the price and keep it ready for keying in during the Auction.
8. Reverse auction will be conducted on scheduled date & time.
9. At the end of Reverse Auction event, the lowest bidder value will be known on auction portal.
10. The lowest bidder has to fax/e-mail the duly signed and filled-in prescribed format for price breakup including that of line items, if required, as provided on case-to-case basis to Service provider within two working days of Auction without fail.
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.
12. Bidders shall be required to read the "Terms and Conditions" section of the auctions site of Service provider, using the Login IDs and passwords given to them by the service provider before reverse auction event. Bidders should acquaint themselves of the "Business Rules of Reverse Auction", which will be communicated before the Reverse Auction.
13. If the Bidder or any of his representatives are found to be involved in Price manipulation/ cartel formation of any kind, directly or indirectly by communicating with other bidders, action as per extant BHEL guidelines, shall be initiated by BHEL and the results of the RA scrapped/ aborted.

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14. The Bidder shall not divulge either his Bids or any other exclusive details of BHEL to any other party.

15. In case BHEL decides to go for reverse auction, the H1 bidder (whose quote is highest in online sealed bid) may not be allowed to participate in further RA process.

Business Rules for Reverse Auction

This has reference to tender no {tender number....date...}. BHEL shall finalize the Rates for the supply of {item name} through Reverse Auction mode. BHEL has made arrangement with M/s. {Service provider}, who shall be BHEL's authorized service provider for the same. Bidders should please go through the guidelines given below and submit acceptance of the same. The technical & commercial terms are as per (a) BHEL Tender Enq. No. {...} dated {...}, (b) Bidders' technical & commercial bid (in case of two part bid) and (c) subsequent correspondences between BHEL and the bidders, if any.

1. Schedule for reverse auction: The Reverse Auction is tentatively scheduled on {date}:

- **Online Sealed Bid:-**

☐ {Start Time:

☐ Close Time: }

- **Online Reverse Auction:-**

☐ {Start Time:

☐ Close Time:}

2. Auction extension time: If a bidder places a bid in the last {...} minutes of closing of the Reverse Auction and if that bid gets accepted, then the auction's duration shall get extended automatically for another {...} minutes, for the entire auction (i.e. for all the items in the auction), from the time that bid comes in. Please note that the auto extension will take place only if a bid comes in those last {...} minutes and if that bid gets accepted as the lowest bid. If the bid does not get accepted as the lowest bid, the auto-extension will not take place even if that bid might have come in the last {...} minutes. In case, there is no bid in the last {...} minutes of closing of Reverse Auction, the auction shall get closed automatically without any extension. However, bidders are advised not to wait till the last minute or last few seconds to enter their bid during the auto-extension period to avoid complications related with internet connectivity, network problems, system crash down, power failure, etc.

The above process will continue till completion of Reverse Auction.

Complaints/ Grievances, if any, regarding denial of service or any related issue should be given in writing thru e-mail/fax to M/s. {Service provider} with a copy to BHEL within 15 minutes from the initial closing time of Online Reverse Auction.

3. Bid price: The Bidder has to quote the F.O.R. destination Price inclusive of Packing & Forwarding charges, all the routine & type tests as per tender scope, ED + cess, CST against C-form, Freight (bidder to provide original Freight paid receipt), insurance charges, etc. including loading (if indicated by BHEL due to deviations in commercial terms) for the Items specified. Details are as shown in Excel Sheet for calculation of Landed cost.

Note: For the consideration of L1 bidder, the bid value shall be reduced by loading amount, if applicable.

S. Sharma *_____* *_____* *_____*

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4. Bidding currency and unit of measurement: Bidding will be conducted in {*Indian Rupees per Unit*} of the material as per the specifications {...}

In case of foreign currency bids, exchange rate (TT selling rate of State Bank of India) as on scheduled date of tender opening (Part-I bid in case of two part bid) shall be considered for conversion in Indian Rupees.

5. Validity of bids: Price shall be valid for {... *days*} from the date of reverse auction. These shall not be subjected to any change whatsoever.

6. Lowest bid of a bidder: In case the bidder submits more than one bid, the lowest bid at the end of Online Reverse Auction will be considered as the bidder's final offer to execute the work.

7. Post auction procedure: BHEL will proceed with the Lowest Bid in the Reverse Auction for further processing.

8. Procedure of Reverse Auctioning :

i. **Online Sealed Bid:** This duration of online sealed bid will be {...} minutes. All bidders to submit their online sealed bids during this period.

ii. **Online Reverse Auction:** The „opening price“ i.e. start price for RA and „bid decrement“ will be decided by BHEL.

iii. If BHEL decides the lowest online sealed bid as the starting price, then the lowest bidder in online sealed bid shall be shown as current L1 automatically by the system and no acceptance of that price is required. System shall have the provision to indicate this bid as current L1.

iv. Bidders by offering a minimum bid decrement or the multiples thereof can displace a standing lowest bid and become “L1” and this continues as an iterative process.

v. After the completion of the online reverse auction, the Closing Price (CP) shall be available for further processing.

9. If no bid is received in the auction system/ website within the specified time duration of the online RA, then BHEL will scrap the online reverse auction process and proceed with the conventional mode of tendering (opening of the envelope sealed bids earlier submitted by the bidders).

In cases where no bidder accepts the start price, the RA may be treated as failed and sealed envelope price bids of all the techno-commercially qualified bidders shall be opened and the tender processed accordingly. Wherever the techno-commercially acceptable bidder(s) had agreed to participate in the RA and had failed to submit the online sealed bid, the envelope sealed bids of such bidder(s) shall not be entertained.

Wherever, the evaluation is done for individual items of the package, and no bid is received for some of the item(s), RA will be considered as failed for these item(s), re-reverse auction/ retendering will be conducted for these items.

10. Only those bidders who have submitted the „online sealed bid“ within the scheduled time shall be eligible to participate further in RA process. However, the H1 bidder (whose quote is highest in online sealed bid) may not be allowed to participate in further RA process.

11. Any commercial/ technical loading shall be intimated to bidders prior to RA. The excel sheet provided in this regard shall cover all these aspects. Commercial/ technical loading if any, shall be added by the respective bidder in its price during online sealed bid & Online Reverse Auction. Modalities of loading & de-loading shall be separately intimated to the bidders.

S. Sharma *[Signature]* *[Signature]* *[Signature]*



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12. Computerized reverse auction shall be conducted by BHEL (through M/s {Service Provider}), on pre-specified date, while the bidders shall be quoting from their own offices/ place of their choice. Internet connectivity shall have to be ensured by bidders themselves. During the RA if a bidder is not able to bid and requests for extension of time by fax/ e-mail/ phone then time extension of additional 15 minutes will be given by the service provider provided such requests come before 5 minutes of auction closing time. However, only one such request per bidder can be entertained. Despite this extension if bidder fails to upload his prices due to extreme case of failure of Internet connectivity, (due to any reason whatsoever may be) it is the bidders" responsibility/ decision to send fax communication immediately to M/s. {Service provider}, furnishing the price

the bidder wants to bid online with a request to the service provider to upload the faxed price on line so that the service provider will up load that price on line on behalf of the Bidder. It shall be noted clearly that the concerned bidder communicating this price to service provider has to solely ensure that the fax message is received by the service provider in a readable/ legible form and also the Bidder should simultaneously check up with service provider about the clear receipt of the price faxed.

It shall also be clearly understood that the bidder shall be at liberty to send such fax communications of prices to be up loaded by the service provider only within the closure of Bid time and under no circumstance it shall be allowed beyond the closure of Bid time /reverse auction. It shall also be noted that the service provider should be given a reasonable required time by the bidders, to upload such prices online and if such required time is not available at the disposal of the Service provider at the time of receipt of the fax message from the bidders, the service provider will not be uploading the prices and either BHEL or the service provider are not responsible for this unforeseen circumstances. In order to ward-off such contingent situation bidders are requested to make all the necessary arrangements/ alternatives whatever required so that they are able to circumvent such situation and still be able to participate in the reverse auction successfully. Failure of power or loss of connectivity at the premises of bidders during the Reverse auction cannot be the cause for not participating in the reverse auction. On account of this, the time for the auction cannot be extended and neither BHEL nor M/s. {Service provider} is responsible for such eventualities.

13. Proxy bids: Proxy bidding feature is a pro-bidder feature to safe guard the bidder"s interest of any internet failure or to avoid last minute rush. The proxy feature allows bidders to place an automated bid in the system directly in an auction and bid without having to enter a new amount each time a competing bidder submits a new offer. The bid amount that a bidder enters is the minimum that the bidder is willing to offer. Here the software bids on behalf of the bidder. This obviates the need for the bidder participating in the bidding process until the proxy bid amount is decrementally reached by other bidders. When proxy bid amount is reached, the bidder (who has submitted the proxy bid) has an option to start participating in the bidding process. The proxy amount is the minimum amount that the bidder is willing to offer. During the course of bidding, the bidder cannot delete or change the amount of a proxy bid.

S. Sharma *[Signature]* *[Signature]* *[Signature]*



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Bids are submitted in decrements (decreasing bid amounts). The application automates proxy bidding by processing proxy bids automatically, according to the decrement that the auction originator originally established when creating the auction, submitting offers to the next bid decrement each time a competing bidder bids, regardless of the fact whether the competing bids are submitted as proxy or standard bids. However, it may please be noted that if a manual bid and proxy bid are submitted at the same instant manual bid will be recognized as the L1 at that instant.

In case of more than one proxy bid, the system shall bid till it crosses the threshold value of „each lowest proxy bid“ and thereafter allow the competition to decide the final L1 price. Proxy bids are fed into the system directly by the respective bidders. As such this information is privy only to the respective bidder(s).

14. Bidders are advised to get fully trained and clear all their doubts such as refreshing of Screen, quantity being auctioned, tender value being auctioned etc.

15. M/s. {Service provider}, shall arrange to demonstrate/ train the bidder or bidder"s nominated person(s), without any cost to bidders. M/s. {Service provider}, shall also explain the bidders, all the rules related to the Reverse Auction/ Business Rules Document to be adopted along with bid manual. Bidders are required to give their compliance on it before start of bid process.

16. Successful bidder shall be required to submit the final prices, quoted during the Online Reverse Auction in Annexure - VII after the completion of auction to M/s. Service provider besides BHEL, duly signed and stamped as token of acceptance without any new condition other than those already agreed to before start of auction.

17. Any variation between the final bid value and that in the confirmatory signed price breakup document will be considered as tampering the tender process and will invite action by BHEL as per extant guidelines in vogue.

18. Bidders" bid will be taken as an offer to execute the work/ supplies the item as per enquiry no. {...} dt. {...}. Bids once made by the bidder, cannot be cancelled/ withdrawn and bidder shall be bound to execute the work as mentioned above at bidder"s final bid price. Should bidder back out and not execute the contract as per the rates quoted, BHEL shall take action as per extant guidelines in vogue.

19. Bidders shall be assigned a **Unique User Name & Password** by BHEL or M/s. {Service provider}. Bidders are advised to change the Password and edit the information in the Registration Page after the receipt of initial Password from BHEL/ M/s. {Service provider} to ensure confidentiality. All bids made from the Login ID given to the bidders will be deemed to have been made by the bidders/ bidders" company.

S. Sharma *[Signature]* *[Signature]* *[Signature]*



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20. Bidders shall be able to view the following on their screen along with the necessary fields during Online Reverse Auction:

- a. Leading (Running Lowest) Bid in the Auction (only total price of package)
- b. Bid Placed by the bidder
- c. Start Price
- d. Decrement value

21. After receipt of the system report from the Service Provider after completion of the Online Reverse Auction, BHEL will decide upon the winner. BHEL's decision on award of contract shall be final and binding on all the Bidders.

22. BHEL reserves the right to cancel the Reverse Auction process/ tender at any time, before ordering, without assigning any reason.

23. BHEL shall not have any liability to bidders for any interruption or delay in access to the site irrespective of the cause. In such cases, the decision of BHEL shall be binding on the bidders.

24. Other terms and conditions shall be as per bidder's techno-commercial offers and other correspondences, if any, till date.

25. Bidders are required to submit their acceptance to the terms/ conditions/ modalities before participating in the Reverse Auction in the process compliance Form included herein

26. BHEL can decide to extend, reschedule or cancel any Auction with prior intimation to all bidders.

27. If there is any clash between this business document and the FAQ available, if any, in the web site of M/s. {Service provider} the terms & conditions given in this business document will supercede the information contained in the FAQs. Any changes made by BHEL/ service provider (due to unforeseen contingencies) after the first posting shall be deemed to have been accepted if the bidder continues to access the portal after that time.

S. Prasadha   



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Process Compliance Form

(The bidders are required to print this on their company's letterhead and sign, stamp before faxing)

To

- M/s. {Service provider}
- Postal address}

Sub: Agreement to the Process related Terms and Conditions

Dear Sir,

This has reference to the Terms & Conditions for the Reverse Auction mentioned in the RFQ document for {Items}

against BHEL enquiry/ RFQ no.{.....} dt. {.....}

This letter is to confirm that:

- 1) The undersigned is authorized official/ representative of the company to participate in RA and to sign the related documents.
 - 2) We have studied the Reverse Auction Terms & Conditions and the Business rules governing the Reverse Auction as mentioned in your letter and confirm our agreement to them.
 - 3) We also confirm that we have taken the training on the auction tool and have understood the functionality of the same thoroughly.
 - 4) We also confirm that, in case we become L1 bidder, we will email/ fax the price confirmation & break up of our quoted price (including that of line items) as per pg.7 of Annexure- V within **two** working days (of BHEL) after completion of RA event, besides sending the same by registered post/ courier both to M/s. BHEL and M/s. {Service provider.}
- We, hereby confirm that we will honor the Bids placed by us during the auction process.

With regards

Signature with company seal

Name –

Company / Organization

Designation within Company / Organization

Address of Company / Organization

- Sign this document and Fax it to M/s {Service provider} at {.....} prior to start of the Event.

- Attach a signed copy of the RFQ document along with the Agreement Form/ Process

Compliance form and

d/s {Service provider}

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S. Shrinika [Signature]



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RA price confirmation and breakup

To

- **M/s. Service provider**

- *Postal address*

CC: M/s BHEL

{Unit-
Address-}

Sub: **Final price quoted during Reverse Auction and price breakup**

Dear Sir,

We confirm that we have quoted.

Rs. {_____} for item covered under tender enquiry No. {...} dt. {...}

Total price of the items covered under above cited enquiries is inclusive of {Packing & forwarding,

E.D., C.S.T., freight and insurance charges upto {.....} District, {.....} State and Type Test

Charges etc., (exclusive of service tax), other as per NIT} as our final landed prices as quoted during

the Reverse Auction conducted today {date} which will be valid for a period of {_____} days.

The price break-up including that of line items is as given below.

Total - Rs.

Thanking you and looking forward to the valuable order from BHEL.

Yours sincerely,

For _____

Name:

Company:

Date:

Seal:

CLARIFICATIONS - BIDDER A

Sr no	Page no	Section and clause no	Description	Pre-bid query - response sought from BHEL-EDN	BHEL's Reply
1	Section I, page 2-3 of 6	Section I, clause no 2	<p>Since then the following simulators have been supplied to various coal fired power plants in India:</p> <p><Table></p> <p>Currently the above projects are under execution....</p> <p>BHEL is currently executing orders for OTS as below....</p> <p>The Framework agreement is intended to cover the Projects being currently executed by BHEL....</p>	<p>Associate requests BHEL-EDN to revert with the list of projects which are already won by BHEL-EDN, and which will fall into this Framework Agreement (FA).</p> <p>Further, Associate understands that, apart from this list, the FA shall cover other projects which BHEL shall win during the period of FA. Request BHEL-EDN to share the list of target jobs for next 2 years.</p>	<p>Noted. Refer to purchase specifications PS/418/SSR/INT Rev-01</p>
2	Section I, page 4 of 6	Section I, clause no 4	<p>BHEL EDN intends to....Associate shall not approach or work with any other organization in area of Operator Training Simulator in India.</p>	<p>1) Associate would like to clarify that current proposals submitted by Associate to the Indian customers before the FA sign off, shall not be part of this FA.</p> <p>2) Associate would also like to clarify that captive power utilities of other verticals than Power (like Refinery, O&G, MMM, Chemicals, Petrochemicals etc.), shall also not be part of this FA.</p> <p>3) Also, for Projects of Nuclear Power Plant Simulators shall be treated separately, as Honeywell need to take required approvals to support Nuclear Power Plant Simulator projects.</p> <p>4) This FA shall not be applicable for tenders of Station C&I package where Simulator is a part of the bigger tender. Request BHEL-EDN to confirm to the same.</p>	<p>1) Noted.</p> <p>2)FA shall be limited to thermal power plants, Utility, CPPs and Secondary cycle of nuclear power plants.</p> <p>3) Noted. FA shall be limited to thermal power plants, Utility, CPPs and Secondary cycle of nuclear power plants.</p> <p>4)Station C&I which is part of Thermal Power plants also shall be included under FA as clarified in 2 and 3 above.</p>

3	Section I, page 4 of 6	Section I, clause no 8, b	Technical documentation for developing the OTS, source code and software and firmware.	Associate shall support BHEL with models, documentation, and/or any information. However, Source code and firmware are intellectual property, and cannot be shared with BHEL-EDN. Request BHEL-EDN to confirm to the same.	Noted. Referring to the discussions held on 31-10-2014 at BHEL-EDN, Supplied GUI Tool should cover all the components required for OTS modeling for Thermal power plants, Utility, Captive and secondary cycle of Nuclear power plants. Tool should have the capabilities of building a new component .
4	Section I, page 5 of 6	Section I, clause no 8, i	Exclusive rights to be given to BHEL to modify Hardware and/or Software beyond agreement period, on no charge basis.	Within the guidelines Software & Hardware of Honeywell OTS, BHEL can modify Hardware / Model as per client's requirement. However, any modifications to Honeywell's IP should not be violated in terms of any Software code modifications etc. Request BHEL-EDN to confirm to the same.	Noted. Refer to purchase specifications PS/418/SSR/INT Rev-01
5	Section I, page 5 of 6	Section I, clause no 9	Technology transfer requirements	Associate would like to clarify that technology transfer shall be limited to training and Associate's support services as defined in the Tender. This shall not include transfer Title or of any kind of IP transfer to BHEL. Request BHEL-EDN to confirm to the same.	Noted.

6	Section II, page 22 of 28	Section II, clause no 11	hardware and software support	Associate would like to clarify that Windows operating system compatibility to the latest shall be provided. Windows Xp is no more supported by Microsoft & hence by Honeywell as well. Request BHEL-EDN to confirm to the same.	Noted. Rev 01
7	Section II, page 23 of 28	Section II, clause no 13, bullet point 2	The projects already under execution by BHEL & future anticipated orders form the basis for BHEL to enter into such agreement	BHEL-EDN's response under Sr no 1 above shall hold good for this clause as well.	Noted.
8	Section II, page 24 of 28	Section II, clause no 13	End customer Training on GUI software tool	Associate request BHEL to provide the separate line item in Price schedule for this as well. Because there is a Commercial impact for this activity.	Noted. Refer to purchase specifications PS/418/SSR/INT Rev-01 Specifications requirements will prevail.
9	Section II, page 25 of 28	Section II, clause no 14	Table of services	BHEL-EDN's response under Sr no 1 above shall hold good for this clause as well, as regards sites where additional services need to be provided. Associate requests BHEL-EDN to as well provide the list of projects out of India, which are likely to come under the FA.	Noted. Refer to purchase specifications PS/418/SSR/INT Rev-01, The list of projects anticipated cannot be ascertained at this stage.
10	Section II, page 25 of 28	Section II, clause no 14	Table of services - visits for site support during commissioning	Associate opines that the clauses under India and overseas projects should be "2 weeks support at site during commissioning spread over <u>2</u> visits" instead of '3' visits. BHEL-EDN to confirm.	Specifications requirements will prevail.

11	Section II, page 26 of 28	Section II, clause no 17, point no 1	Travel and living	Associate would like to know if travel and living expenses for projects outside India shall be borne by BHEL-EDN. Request BHEL-EDN to confirm to the same.	Travel and Living expenses shall be included in Lumpsum quote.
12	Section III, page 2 of 22	Section III, point no 3	During the term of this association...	<p>1. Associate would like to clarify that current proposals submitted by Associate till the FA Agreement sign off date, shall not be part of this FA.</p> <p>2. Associate would also like to clarify that captive power utilities of other verticals than Power (like Refinery, O&G, MMM, Chemicals, Petrochemicals etc.), shall also not be part of this FA.</p> <p>3. Also, for Projects of Nuclear Power Plants shall be treated separately, as Honeywell need to take required approvals to support Nuclear Power Plant Simulator projects. Request BHEL-EDN to confirm to the same.</p>	<p>1. Noted</p> <p>2. Please refer point no 2 above</p> <p>3. Please refer point no 2 above</p>
13	Section III, page 3 of 22	Section III, point no 7	Bids shall be accompanied by...DD or banker's cheque....	Associate requests submission of EMD amount in the form of BG. If so, also request BHEL-EDN to kindly provide the format of the same. Request BHEL-EDN to confirm on the same.	Specification requirements will prevail.

14	Section III, page 4 of 22	Section III, point no 13	Price bids....L1 bidder....	Associate requests BHEL-EDN to provide a clear price schedule with all the lined items to be submitted as a part of the same. Associate also requests BHEL-EDN to let know the procedure for evaluating the L1 bidder , and the scope items that shall be considered for L1 evaluation.	Noted. Refer to purchase specifications PS/418/SSR/INT Rev-01
15	Section III, page 5 of 22	Section III, point no 16	The framework agreement...	BHEL-EDN's response under Sr no 2 above shall hold good for this clause as well, as regards opportunities to be pursued under this framework	Refer BHEL's Reply against Point No.2
16	Section III, page 5 of 22	Section III, point no 18	Incase during the period...reviewed due to nature of any particular tender...reduction or discount....passed on to Associate.....agreed FA prices.	Associate would like to clarify that any upside variations shall have corresponding implications on mutual agreement. Request BHEL-EDN to confirm to the same.	Specification requirement will prevail.
17	Section III, page 6 of 22	Section III, point no 23	Apart from technical....special requirement....at no cost to BHEL EDN.	Associate would like to clarify that technical variations shall be additional scope with corresponding commercial implications. The same shall be discussed & mutually agreed upon during that specific case.	This shall apply to any new features / developments / upgrades that may come up in OTS Software during the FA Period. Please Refer to purchase specifications PS/418/SSR/INT Rev-01
18	Section III, page 6 of 22	Section III, point no 24	Apart from the commercial....special requirement....within the agreed prices.	As above, Associate would like to clarify that special requirements shall be additional scope with corresponding commercial implications. The same can be mutually discussed & agreed upon.	Specification requirement will prevail.

19	Section III, page 6 of 22	Section III, point no 25	Selected associate shall be bound...jointly liable for liquidated damages....	Associate would like to clarify on sharing the liquidated damages only if the reasons are attributable to the Associate. The liquidated damages shall be applicable on a project-to-project basis, as a percent of the project value awarded to the Associate. Request BHEL-EDN to confirm to the same.	Specification requirement will prevail.
20	Section III, page 7 of 22	Section III, point no 26	Payment terms	Associate would like to propose the following payment terms for each project: Supply - 90% within 30 days of receipt of license at BHEL-EDN 10% within 30 days of completion of SAT Services: Pro-rata basis within 30 days on completion of each service milestone	Specification requirement will prevail.
21	Section III, page 8 of 22	Section III, point no 28	Firm prices	As clarified above, implications on account of scope variation for projects falling under the FA shall be additional. BHEL-EDN to confirm to the same.	Specification requirement are amply clear
22	Section III, page 9 of 22	Section III, point no 31	Liquidated damages	BHEL-EDN's response under Sr no 21 above shall hold good for this clause as well	Specification requirement will prevail.
23			General	The contractual terms and conditions governing the FA shall be mutually discussed and agreed between BHEL-EDN and selected Associate.	Refer to purchase specifications PS/418/SSR/INT Rev-01.Specification requirements shall prevail.
24	Multiple	Multiple	Development licenses	Associate would like to clarify that the validity of development licenses shall be for the FA period. BHEL-EDN to confirm the same.	Refer to purchase specifications PS/418/SSR/INT Rev-01. Specification requirements shall prevail.
25			General	Associate request BHEL to respond on how the contract will be re-looked / renewed at the end of FA period which is currently 24 months.	This will be reviewed at end of FA period.

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CLARIFICATIONS - BIDDER B

Section No	Section Description	Schneider Electric Clarification	Clarification Given By BHEL
Section I	General Specification		
3.0	Technology partnership	This clause mentions that a framework agreement (FA) will be signed which will be governed by BHEL's purchase policy. Schneider Electric will need to review this policy and ensure that the terms are acceptable.	Please refer to purchase policy of BHEL available in BHEL (website www.bhel.in).
4.0	Collaborative Approach	This section talks about working with BHEL on an exclusive basis. This clause requires discussion with BHEL to understand and discuss terms of exclusivity.	Refer to purchase specifications PS/418/SSR/INT Rev-01
8.0 Item b	Information and Sharing rights	This item talks about providing software source code and firmware. Schneider Electric OTS software uses an object oriented approach to simulation modeling. As a result, source code modifications or firmware changes are not performed as part of OTS application configuration. Schneider Electric will provide simulation software licenses required by BHEL to configure OTS applications. Such licenses will be the same ones used by Schneider Electric OTS application engineers configure and deliver OTS applications.	Refer to purchase specifications PS/418/SSR/INT Rev-01
8.0 Item i	Information and Sharing rights	This item talks about rights to modify the software and hardware. Schneider Electric OTS systems use workstation hardware from commercial PC manufacturers like HP or Dell. No modifications are performed to such hardware by Schneider Electric OTS engineers. As mentioned in the comment on Section 8.0, item b, Schneider Electric OTS application engineers do not make changes to the OTS software (through changes to its associated code). As a result, rights to making software or hardware changes are not necessary as part of OTS application delivery.	Refer to purchase specifications PS/418/SSR/INT Rev-01

Section No	Section Description	Schneider Electric Clarification	Clarification Given By BHEL
Section II	Purchase Specification		
4.	Detailed specification of GUI based simulation software tool	<p>This section two separate requirements. One requirement is to develop HMI features (applicable to emulated OTS) and another is to interface with various DCS solutions (applicable to virtual controller based OTS).</p> <ol style="list-style-type: none"> 1. Development of HMI features will be required for an emulated solution and will be provided by the use of Schneider Electric WonderwareInTouch HMI software. Software licensing for InTouch is based on number of workstations in the OTS using InTouch HMI software. 2. Interfacing to DCS solutions will be required for a virtual controller (virtual DPU for MetsomaxDNA) and will be provided using Schneider Electric engine links to the respective virtual controller. Software licensing for engine link is based on number of instances of OTS application (process model) to be run at any given time (number of concurrent training sessions). In a virtual controller solution, HMI features will be available in the respective DCS engineering software (maxVUE and maxTOOLS for MetsomaxDNA). In such a case, Schneider Electric scope of supply does NOT include such DCS software. These DCS software including the respective virtual controllers are expected to be purchased by BHEL directly from the respective DCS vendor. 	Specification requirement will prevail.
7.0 Item 4	Modeling Capabilities	This item makes references to BEHEL and HEHEL. Please clarify what these are. Are these meant to say BHEL?	Refer to purchase specifications PS/418/SSR/INT Rev-01
7.0 Item 9	Modeling Capabilities	This item mentions ability to link to packages with neural network models. Please clarify the application that uses neural network based models. These are typically used for Advanced Process Control (APC) applications. Schneider Electric dynamic simulation software will typically interface with APC applications through OPC engine link. If Schneider Electric APC software is used, an APC engine link is available for this interface.	Specification requirement will prevail.

Section No	Section Description	Schneider Electric Clarification	Clarification Given By BHEL
7.0 Item 20	Modeling capabilities	This item asks the vendor to describe control configuration automatic translation tools for creating an emulated OTS. Schneider Electric simulation software uses automatic translation tools only when virtual control solutions are unavailable. This usually applies to control systems that are no longer being delivered by the original DCS manufacturer (Honeywell TDC3000, for example). For DCS where virtual controllers are available on the market (like MetsomaxDNA), Schneider Electric doesn't develop or recommend developing automatic translation tools for the purpose of control emulation.	Specification requirement will prevail.
7.0 Item 21	Modeling capabilities	This item asks the bidder to outline limitations of the virtual control solutions from DCS vendors. This will depend on the DCS provider. For example, the virtual DPU solution provided by maxDNA has issues in running faster than real time where the timers in the controls may still run at real time. Also, control configuration changes made in one simulation snapshot may not automatically be transmitted to other previously saved snapshots. This will require re-creating snapshots when any control configuration changes are made in the OTS.	Specification requirement will prevail.
8. Item b	Licensing features	Schneider Electric simulation dynamic simulation software licenses are typically provided with a one-time license fee and a 20 year license term. Annual software maintenance will provide access to new software versions (including patches) as well as software product technical support. First year of software maintenance is included in the license fee. Additional years of software maintenance can be purchased separately.	Specification requirement are amply clear and will prevail.
8. Item c	Licensing features	This item talks about locking either a section of the model or the entire model with a password. The entire model can be locked from modifications by delivering runtime licenses. Schneider Electric interprets the requirement to lock model sections as a capability to protect intellectual property information for certain plant equipment. This can be done through User Added Models (UAM) which will be configured in software code (which can be developed and owned by BHEL) and linked to the model through a dynamic linked library	Refer to purchase specifications PS/418/SSR/INT Rev-01

Section No	Section Description	Schneider Electric Clarification	Clarification Given By BHEL
		(dll).	
9.0	HMI Features	As mentioned in comments earlier, HMI features will be different for emulated and virtual controller based OTS. An emulated OTS will allow include HMI functions that can be configured using Schneider Electric software. A virtual controller based OTS will require the use of the respective DCS engineering software. Automatic HMI translation software is not used by Schneider Electric for emulated OTS. HMI emulation is performed through the use of screenshots and scripting functions configured in Schneider Electric WonderwareInTouch HMI software.	Specification requirement are amply clear and will prevail.
10.0	Instructor Station capabilities	Services to configure the instructor functions described in this section will assumed to be performed by BHEL personnel using the technology transfer provided as part of this proposal. Application configuration services for OTS models referenced in this requirement (other than the example models) are not included in this proposal.	Specification requirement are amply clear and will prevail.
10.4	Time scaling	As noted earlier, certain virtual controller solutions may not function properly when run faster than real time.	Specification requirement are amply clear and will prevail.
10.13	Event driven help / video	In the case of emulated OTS applications, Schneider Electric InTouch software is configured to provide the emulated operator trainee interface. In such a case, operator guidance messages can be provided directly to the operator interface. In the case of virtual controller solutions, respective DCS workstation software is used. As a result, the ability to provide such messages will depend on the respective DCS software capabilities and configuration of such messages will have to be done by personnel familiar with the respective DCS software.	Specification requirement are amply clear and will prevail.
10.14	Performance calculations	Such performance calculations are not available in dynamic simulation software as pre-configured templates. However, they can be configured by BHEL using the thermodynamic calculations as well as the equation functionality available in DYNOSIM.	Specification requirement are amply clear and will prevail.

Section No	Section Description	Schneider Electric Clarification	Clarification Given By BHEL
10.16	Real plant event reconstruction	<p>The following are the expected steps that the instructor will follow to use the plant history data to re-create a plant state in the simulator.</p> <ol style="list-style-type: none"> 1. The instructor looks at the historian data and selects the closest appropriate initial condition already existing in the OTS 2. The instructor restores this initial condition in the OTS and runs the simulator. 3. The instructor modifies the operating conditions in the OTS to suit the required plant state, like changing set points or bypassing equipment etc. 4. The instructor saves a new initial condition in the OTS to represent the required plant state. 5. The instructor briefs the operator trainee about the plant situation that is being trained on and restores the saved new initial condition in the OTS. 6. The instructor introduces any appropriate malfunctions or instructor functions to simulate plant events in the expected state to conduct the training exercise. 	Specification requirement are amply clear and will prevail.
10.17.3 Item b	List of malfunctions	DYNSIM has the ability to set the simulation speed from single time step to 99 times real time. However, actual simulation speed will vary depending on model configuration, workstation configuration and well as type of DCS solution selected in the OTS.	Specification requirement are amply clear and will prevail.
11.0	Hardware and Software support	Windows XP is no longer officially supported by Microsoft. As a result, Schneider Electric doesn't use this version of the Microsoft operating system anymore. Microsoft Windows Server 2003 SP2 is supported currently in addition to Microsoft Windows 7 and Windows Server 2008.	Refer to purchase specifications PS/418/SSR/INT Rev-01

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CLARIFICATIONS - BIDDER C

		Commercial Section		
Section	SL	Abstracts from the Tender Document	STEAG`s Comments and Clarification Requested	BHEL's Reply
Commercial	1	<p>Section – III of the Tender Document, Instruction to Bidders , page 2 of 22, clause no 3</p> <p>During the term of this association, Associate and BHEL shall not participate either individually or in Association with others in Tenders for Power Plant Operator Training Simulators in India Even in cases where Business lead or enquiry is received by Associate directly from probable customer in India, the proposal and further process for securing order shall be taken up jointly by BHEL and Associate. Associate and BHEL, shall jointly be responsible for Business development and generation of Business enquiries</p>	<p>1. STEAG will not participate either individually or in association with others in Power plant simulator where BHEL would be participated/quoted in India. This information should be written intimation by BHEL.</p> <p>2. If BHEL does not participate in any Tender at any location then STEAG may free to participate with other prospective bidder.</p>	<p>1.Refer to purchase specifications PS/418/SSR/INT Rev-01</p> <p>Specification requirements are amply clear.</p> <p>2. Specification requirements are amply clear.</p>

Commercial	2	<p>Section – III of the Tender Document, Instruction to Bidders , page 4 of 22, clause no 11</p> <p>Part-II (techno-commercial proposal) shall be evaluated vis-a-vis' BHEL's Technical specifications, and commercial terms and conditions. If it is found during evaluation that Qualification requirements are not met or the supporting documents are not valid, the said shall be rejected and Bidder shall be barred from participating in any tenders of BHEL in future. Bidders may be invited for Techno- Commercial discussions if required for sake of clarifications etc</p>	<p>Steag will participate in the proposal based on their credential, assessment of their capability, experience of development of Simulator and their own perception on RFP document. If any disconnect in meeting the QR then STEAG should allow to resolve it.</p> <p>This clause should be deleted.</p>	<p>Specification requirement will prevail.</p>
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Technical Section				
Section	Sr.No.	Abstracts from the Tender Document	STEAG`s Comments and Clarification Requested	BHEL's Reply
Technical Section-I	1	<p>4.0 Collaborative Approach –page no 4 of 6 ; Section -I</p> <p><i>Associate shall not approach or work with any other organization in area of Operator Training Simulators in India</i></p>	Associate will not approach or work with any other organization in area of operator training simulator where BHEL is quoting and working in the simulator projects.	Specification requirements are amply clear.
Technical Section-I	2	<p>5.0 Technical specifications-Page no 4 of 6; Section-I</p> <p><i>In cases where a new requirement is specified, the Associate and BHEL shall individually and jointly undertake any development necessary to meet this requirement.</i></p>	Additional scope, acceptance with the client should first agree between associate and BHEL	Specification requirement will prevail.
Technical Section-I	3	<p>8.0 Information sharing and rights, point no I; page 5 of 6; section -I</p> <p><i>Exclusive rights to be given to BHEL to modify Hardware and/or Software beyond agreement period, on no charge basis.</i></p>	Exclusive right only on the software and hardware which is developed by the associate (STEAG) for the BHEL simulators. Third party software / hardware rights will be as per licensing agreement of third party.	Specification requirement will prevail.
Technical Section-I	4	<p>Point no 9 Technology Transfer requirements: page 5 of 6 of section-I</p> <p><i>The Associate shall transfer the technology to BHEL-EDN in phased manner with in agreed time-frame for design, software selection and design, purchase, manufacture, inspection, testing, commissioning, trouble shooting, fine tuning at site, servicing, maintenance, quality assurance methods, etc., for the simulators to meet the market requirement.</i></p>	Associate (STEAG) will transfer the technology which is related to the simulator and developed for the BHEL Simulator project. STEAG will not transfer technology which is of other company but used in the simulator, as this is proprietary of other company.	Specification requirement will prevail.

Technical Section-II	5	<p>Point no 1. Introduction; Page 2 of 28; Section-II</p> <p><i>Bidder shall also be a Graphical User Interface (GUI) based simulation modeling tool developer for coal fired thermal power plants</i></p>	<p>TRAX is (GUI) based modeling Tool developer for coal fired thermal power plants and STEAG is its exclusive Business Partner in India and that STEAG using TRAX tool has supplied Operators Training Simulators for thermal power plants in India.</p> <p>STEAG has developed few modules to be used in the Trax which extend the functionality of the Trax simulator.</p> <p><i>Kindly clarify under these scenario will STEAG`s offer be considered.</i></p>	<p>Refer to purchase specifications PS/418/SSR/INT Rev-01</p>
Technical Section-II	6	<p>Point no 4. Details specification on GUI Based simulation Software Tool; Page 4 of 28</p> <p><i>Licensing configuration for license authentication or validation.</i></p>	<p>STEAG recommends Dongle based license for security purposes, However if software based licensing is required , can be possible.</p>	<p>Specification requirements are amply clear.</p>
Technical Section-II	7	<p>6. Specifications for simulation software tool- page 5 of 28; section-II</p> <p><i>Changes to tuning parameters or addition/deletion of new objects shall not require computer code programming or compiling or shutting down the simulation application. The simulation software will not employ the use of code generators for addition, modification, or updating of model components. Recompiling of the code, automatic or otherwise, will not be performed in order to add or modify a model.</i></p>	<p>Additional/deletion of new object will require compiling and reloading of the simulator model to make it effective. Addition, modification or updating of the model components will generate a new code and new executables. This does not have any implication in the operator training Simulator, functionality and purpose of the simulator</p>	<p>Refer to purchase specifications PS/418/SSR/INT Rev-01</p>

Technical Section-II	8	<p>7.0 Modeling Capabilities- page 9 of 28; Section II</p> <ol style="list-style-type: none"> 1. <i>The system should allow user to enhance an existing component available in the library to a new component by specifying additional specific functionality to the component.</i> 2. <i>The system should allow building a compound component to be developed from a set of individual components, which shall have all the characteristics of individual component.</i> 	<p>1. All entities required for power plant modeling such as Valve, Motors, etc have been already developed in the ProTrax and also available in the GUI, any modified characteristic for such components can be readily Introduced for the components.</p> <p>2. Enhancement of existing component is not possible and also not required based on our experience and very huge component library.</p>	Specification requirement will prevail.
Technical Section-II	9	<p>Point no 10. Modelling capabilities; page no 10 of 28; Section-II</p> <p><i>Point no 15: It should be possible to enter the data information for each of the equipments through excel interface by writing VB Scripts. Further each equipment interface should be easy and friendly for the modeler to input the data information.</i></p>	Data Entry is very simple and just a right click to the component. It is simpler than using excel and Vb Scripts.	Specification requirements are amply clear.
Technical Section-II	10	<p>Point no 19. Modelling capabilities; page no 10 of 28</p> <p><i>The system shall also have smart engineering tools such as case comparison to allow checks and balances for various revisions of the models file. This will ensure minimizing the engineering time required for integration and incorporating changes.</i></p>	Version control is a separate package. If BHEL required, standard version control software will be provided	Specification requirement will prevail.

Technical Section-II	11	<p>Point no 20. Modelling capabilities; page no 10 of 28</p> <p><i>The system shall have the capability to port the logic from the actual/virtual control system to the simulator directly or through suitable converter software. Vendor to specify, with a detailed write-up, on already available translator/converter software and to include it in the scope of supply.</i></p>	Trax modeling tool easily interfaced with the MaxDNA virtual system. Porting of logic is not required	Specification requirements are amply clear.
Technical Section-II	12	<p>8. Licensing features; page 12 of 28; Section-II</p> <p><i>Vendor shall provide network based licensing with soft files for license authentication. Dongles shall not be provided for software and hardware license authentication.</i></p>	STEAG recommends Dongle based license for security purposes, However if software based licensing is required , can be possible.	Specification requirement will prevail.
Technical Section-II	13	<p>8. Licensing features; page 12 of 28; Section-II</p> <p><i>It should be possible to lock either a section of the plant process or the entire model with a password.</i></p>	<i>Lock out features will lock the selected model.</i>	Refer to purchase specifications PS/418/SSR/INT Rev-01
Technical Section-II	14	<p>8. Licensing features; page 12 of 28; Section-II</p> <p><i>Licenses for internal development shall be capable to be hosted on a corporate network server with multiple machines accessing it similar to a token system. Depending on the machines connecting first to the server the licenses shall be allocated. The software shall be loaded on multiple machines but however the license shall be made available to machines on demand.</i></p>	Same as point no 12	Specification requirement will prevail.

Technical Section-II	15	<p>8. Licensing features; page 12 of 28; Section-II</p> <p><i>It should also be provided with administrative features to monitor the license usage in terms of machines utilizing currently the license component with a facility to force abort or terminate the licensing session such that other machines requiring the license on priority can avail the same.</i></p>	Same as point no 12	Specification requirement will prevail.
Technical Section-II	16	<p>9.b HMI Features; page 13 of 28; Section-II</p> <p><i>The system shall have the capability to port all the pictures of a third party HMI along with necessary IO Tags to the simulator directly or through suitable converter software. Vendor to specify on already available translator/converter software and to include it in the scope of supply.</i></p>	Trax modeling tools easily interfaced with the MaxDNA virtual system. Porting of picture is not required	Specification requirement will prevail.
Technical Section-II	17	<p>10.1 Initialization ; page 15 of 28; Section-II</p> <p><i>After any initialization condition is selected the system shall perform a switch check function to ensure that all parameters are at the expected value and only then it shall run either automatically or after instructor's intervention. Facility to override switch check shall be provided as an instructor function.</i></p>	Initial condition can either load successfully or will give a message unable to open.	Specification requirements are amply clear.
Technical Section-II	18	<p>10.16 Real Plant Event Reconstruction; Page 19 of 28</p> <p><i>It shall be possible to reconstruct an event / malfunction as per the historian / log data imported from the real plant.</i></p>	<p>Simulator is an independent operator training system and hence does not require to connect with the plant historian/log data.</p> <p>Malfunction can be created directly through the malfunction features available in the tools.</p>	Specification requirement will prevail.

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CLARIFICATIONS – BIDDER D

S No	RFP Clause	Requirement	WSC Recommendation	BHEL's reply
Section-I				
1	4.0 Collaborative Approach	<p>.....Through this collaboration approach, BHEL will have access to any developments made independently by the Associate in OTS. Also the Agreement shall enable Associate and BHEL to work together on an exclusive basis and accordingly Associate shall not approach or work with any other organization in area of Operator Training Simulators in India.....</p>	<p>WSC recommends modification as stated below</p> <p>.....Through this collaboration approach, BHEL will have access to any developments made independently by the Associate in OTS <i>being jointly executed with BHEL</i>. Also the Agreement shall enable Associate and BHEL to work together on an exclusive basis and accordingly <i>BHEL/Associate</i> shall not approach or work with any other organization in area of Operator Training Simulators in India <i>unless such business is in Associate's current forecast and is in proposal or project execution state. It is recommended that a list of targets be created and added to this exclusive agreement rather than the current approach</i></p> <p>BHEL to review this requirement based on current market situation alternately BHEL may limit bidders to ones that have not provided any work in India.</p>	Specification requirement will prevail.

2	8.0 information sharing and Rights	(j) Exclusive rights to be given to BHEL to modify Hardware and/or Software beyond agreement period, on no charge basis	<p>(i) Exclusive rights will be given to BHEL to modify Software <i>for the Simulation components/models</i> beyond agreement period, on no charge basis. <i>BHEL can modify existing component/model software or add new component/model software.</i></p> <p>WSC licenses its software in source and object form. The 3KEYMASTER software is divided into two distinct areas. The first, is the 3KEYMASTER environment; this includes the Graphical Engineering Station (GES), the real-time executive and the object builders. The sources for this part of the software are supplied in object code only. Sources for the environment are not necessary to use, modify models, develop new objects or tools. The second area which includes all the modeling tools is provided in source format to allow the user with the ability to modify the tools or objects as necessary. This part of the software is supplied in source format unless other licensing restrictions apply.</p> <p>WSC will deliver source file into Escrow for the environment where required by the Customer for simulator long-term security.</p> <p>BHEL to review this requirement and/or confirm acceptance.</p>	Specification requirement will prevail.

Section II

3	1 Introduction	<p>The Bidder should have designed, developed, supplied and commissioned</p> <p>1 At least 2 Nos Full Scope Replica simulator system for 210MW or above capacity thermal power plants (sub—critical plants) in India and shall be in operation for at least 1 year on date of Bid submission.</p>	<p>WSC recommends modification as stated below</p> <p>The Bidder should have designed, developed, supplied and Commissioned</p> <p>1 At least 2 Nos Full Scope Replica simulator system for 210MW or above capacity thermal power plants (sub—critical plants) in India/<i>Global</i> and shall be in operation for at least 1 year on date of Bid submission.</p> <p>BHEL shall confirm acceptance.</p>	<p>Refer to purchase specifications PS/418/SSR/INT Rev-01</p> <p>Specification requirements shall prevail.</p>
4		<p>3 The Bidder should have local Establishment in India and should have adequate have design & manufacturing capability with minimum 20 simulation Engineers to deliver the project with BHEL and provide post implementation support as necessary.</p>	<p>This requirement is inconsistent with BHEL vision that the Associate cannot provide any simulation software to anyone in India without BHEL agreement. No company can keep 20 simulation engineers in India without the guarantee that these engineers are gainfully employed.</p> <p>WSC has supported customers Worldwide from our Moscow or US offices.</p> <p>BHEL to review this requirement based on India's current and future market requirements.</p>	<p>Refer to purchase specifications PS/418/SSR/INT Rev-01</p> <p>Specification requirements shall prevail.</p>
5	7.0 Modeling Capabilities	<p>4. The system shall readily provide exhaustive modeling components to enable the user to construct a model in part or full for Hydel and Thermal power plants including Super critical, CFBC, and from the library of these component model for steady state and dynamic process.</p> <p>In addition to the above listed components, any additional components which are required to complete a typical power plant model will also be provided or developed for BHEL by BHEL associate.</p>	<p>4. The system readily provides exhaustive modeling components to enable the user to construct a model in part or full for Hydel and Thermal power plants including Super critical from the library of these component model for steady state and dynamic process.</p> <p>Due to the number of CFBC technologies available. Any additional components including CFBC which are required to complete a typical power plant model will also be jointly developed with BHEL domain knowledge.</p> <p>BHEL shall confirm acceptance.</p>	<p>Specification requirement will prevail.</p>

6	8.0 Licensing Features	<p>a. Vendor shall provide network based licensing with soft files for license authentication.</p>	<p>WSC provides soft licensing through our website or dongle licensing. BHEL to provide the number of seats required by BHEL which is independent of the approach used to control the software.</p>	<p>Refer to purchase specifications PS/418/SSR/INT Rev-01 Specification requirements shall prevail.</p>
		<p>d. Licenses for internal development shall be capable to be hosted on a corporate network server with multiple machines accessing it similar to a token. System Depending on the machines connecting first to the server the licenses shall be allocated. The software shall be loaded on multiple machines but however the license shall be made available to machines on demand.</p> <p>e. It should also be provided with administrative features to monitor the license usage in terms of machines utilizing currently the license component with a facility to abort or terminate the license session such that other machines requiring the license shall avail the same.</p>	<p>BHEL to review this requirement and/or confirm acceptance of soft or dongle based registration.</p>	
7	9.0 HMI Features	<p>b. The system shall have the capability to port all the pictures of a third party HMI along with necessary IO Tags to the simulator directly or through suitable converter software....</p>	<p>BHEL to elaborate and specify the type and details of the third party HMI</p>	<p>Specification requirements are amply clear and shall prevail.</p>

8.	10.0 Instructor Station Capabilities	10.2.2 The record program shall initially store the current status of all parameters at the same rate at which the simulation module of highest interaction rate is running. The replay/record system shall be able to record eight hours of simulator operation...	<p>BHEL to elaborate.</p> <p>If the simulation module highest interaction rate is 20Hz, does the replay/record system needs to record @20Hz for eight hours of simulator operation.</p> <p>WSC approach to record and replay is to record changes affecting the unit introduced by an instructor or operator and replaying these through time stamped reproduction. This reduces the volume of data stored and provides an exact replay of a scenario with no time limitation.</p> <p>BHEL to review this requirement and/or confirm acceptance of replay approach as stated above.</p>	Specification requirements are amply clear and shall prevail.
9	10.8	<p>10.8 TRAINEE EXERCISE PROGRAM</p> <p>A computerized exercise program shall be provided that shall automatically step the trainee through a series of simulator drills and exercises plus a number of operational problems. This program shall be developed so as to eliminate / minimize manual control manipulations by the instructor. There shall be a minimum of 20 exercises in trainee exercise programs/exercises shall be submitted to the owner for approval</p>	<p>The system allows for unlimited number of exercise to be developed by BHEL.</p> <p>WSC will support BHEL to develop the exercise program as plant configurations and operations are plant specific.</p> <p>BHEL to review this requirement and/or confirm acceptance.</p>	Specification requirements are amply clear and shall prevail.

10	10.9	<p>10.9 SIMULATOR EXERCISE GUIDE Bidder shall provide a suggested guide that shall contain a series of simulator drills and exercises (minimum 50) arranged in logical sequence and according to difficulty of the task to be learned, subject to acceptance by BHEL. The guide shall also contain a number of operational problems that the trainee shall be required to solve at the simulator. The guide shall assist the instructor by outlining training objectives and specifying the practice sessions required to accomplish performance goals.</p>	<p>WSC will support BHEL to develop the guide as plant configurations and operations are plant specific. BHEL to review this requirement and/or confirm acceptance.</p>	<p>Specification requirements are amply clear and shall prevail.</p>
11	10.16	<p>10.16 REAL PLANT EVENT RECONSTRUCTTON It shall be possible to reconstruct an event/ malfunction as per the historian / log data imported from the real plant.</p>	<p>The simulator will be able to reproduce an event based on the knowledge of the event in the plant. For example if a turbine trip occurred in the plant due to high bearing temperature. The same can be introduced in the simulator. The simulator has over 1,000,000 variables of internal calculations that may not be able to be initialized through a historian log which is limited to few 1000s BHEL to provide more clarification</p>	<p>Specification requirements are amply clear and shall prevail.</p>
12	10.17.3	<p>b. The model should have capability to speed up and speed down based on the various situation of the training. speed factor should vary from 0.1 X Real time to 100 X real time.</p>	<p>Shall be modified as indicated below b. The model should have capability to speed up and speed down based on the various situation of the training. speed factor should vary from 0.1 X Real time to 10 X real time. 100x can be performed if the computer is capable of doing so. Such a computer maybe cost prohibitive in the current computer power. BHEL to review and confirm acceptance.</p>	<p>Specification requirements are amply clear and shall prevail.</p>

13	14.0 Deliverables	<p>1.Vendor should Supply Standard Power Plant Simulation Models developed using this simulation software tool for the following configuration.(Vendor can deliver the simulation packages within three months from the date of supply of simulation software tool, if it is not readily available)</p> <ul style="list-style-type: none"> . Supercritical thermal power plant (660MW, 800MW) . Subcritical thermal power plant (500MW, 250MW) 	<p>Please clarify whether one sample simulator of supercritical and one for subcritical are acceptable for the electrical MW ranges provided.</p> <p>BHEL to review and confirm acceptance.</p>	<p>Refer to purchase specifications PS/418/SSR/INT Rev-01 Specification requirements shall prevail.</p>

Section III

INSTRUCTION TO BIDDERS & COMMERCIAL TERMS AND CONDITIONS:

14		7 Bids shall be accompanied by Earnest Money Deposit in separate envelope, either in form of DD or Banker's cheque for an Amount of Rs.20,00,000 (Rupees Twenty Lakhs only).	Please clarify whether Bank Guarantee for Earnest Money Deposit will be acceptable. Request to reduce EMD Amount to Rs.10,00,000 (Rupees Ten Lakhs only) BHEL to review and confirm acceptance.	Specification requirements are amply clear and shall prevail.
15		17 Upon signing of Framework Agreement, the Associate shall furnish a FA performance guarantee in the form of a Bank Guarantee valid for 36 months from Date of signing of Framework Agreement equivalent to sum of INR 50,00,000 (Rupees Fifty Lakhs only).	Request to reduce Bank Guarantee to a percent value of the license and services per specified project. BHEL to review and confirm acceptance.	Specification requirements are amply clear and shall prevail.
16		26 Payment Terms Supply portion : ➤ 50% of P.O supply price component shall be paid within 45 days of date of acceptance of supplies by BHEL-EDN. ➤ 10% of P.O supply price component shall be paid within 30 days of Completion of FAT at BHEL-EDN Works ➤ 10% of P.O supply price component shall be paid within 30 days of Completion of Commissioning at Project Site ➤ 15% of P.O supply price component shall be paid within 30 days of Completion of SAT at Project Site ➤ 15% of P.O supply price component shall be paid within 30 days of Completion of Warranty Period	Suggest to modify as indicated below: ➤ 50% of P.O supply price component shall be paid within 45 days of date of acceptance of supplies by BHEL-EDN. ➤ 20% of P.O supply price component shall be paid within 30 days of Completion of FAT at BHEL-EDN Works ➤ 15% of P.O supply price component shall be paid within 30 days of Completion of Commissioning at Project Site ➤ 10% of P.O supply price component shall be paid within 30 days of Completion of SAT at Project Site ➤ 5% of P.O supply price component shall be paid within 30 days of Completion of Warranty Period <i>from the date of Tool supply to BHEL-EDN.</i> BHEL to review and confirm acceptance.	Specification requirements are amply clear and shall prevail.

17		<p>26 Payment Terms Services portion</p> <ul style="list-style-type: none"> ➤ 50% of P.O services price component shall be paid within 30 days of Completion of FAT at BHEL EDN works. ➤ 20% of P.O services price component shall be paid within 30 days of Completion of Commissioning at Project Site. ➤ 20% of P.O services price component shall be paid within 30 days of Completion of SAT at Project Site ➤ 10% of P.O services price component shall be paid within 30 days of Completion of Warranty Period 	<p>As the scope of Services indicated in the Section-II 14.0 Deliverables gets completed by SAT completion, request you to modify as indicated below:</p> <ul style="list-style-type: none"> ➤ 50% of P.O services price component shall be paid within 30 days of Completion of FAT at BHEL EDN works. ➤ 25% of P.O services price component shall be paid within 30 days of Completion of Commissioning at Project Site. ➤ 25% of P.O services price component shall be paid within 30 days of Completion of SAT at Project Site <p>BHEL to review and confirm acceptance.</p>	<p>Specification requirements are amply clear and shall prevail.</p>
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