Bhabha Atomic Research Centre

Atomic Fuels Division

Engineering Services & Automation Section

Ref.AFD/TSS/BP/21/I/5719 **Date: 15/11/2021**

Sub: Tender enquiry for "Fabrication, supply, wiring & installation, testing and commissioning of Power Control Center and other miscellaneous electrical work at AFD".

Sealed offers are invited for and on behalf of the President of India, for "Fabrication, supply, wiring & installation, testing and commissioning of Power Control Center and other miscellaneous electrical work at AFD". This work includes dismantling of Power Control Centers and associate cables, supply, installation & testing of Power Control Center and Power Distribution Boards, Provision of power supply to different loads from Power Control Center and Power Distribution Board, dismantling of Cooling Tower Panel and associate cables, shifting of Cooling Tower Panel into Compressor Room, cable laying & termination associated with Cooling Tower Panel, cable laying and termination associated with Power Control Center on melting platform, provision of alternate power supply to Thorium Lab and NDT Laboratories.

Scope of Work:

S.No.	Description	Specification and Qty.
1.	**Fabrication, supply, wiring & installation, testing and commissioning of Power Control Center and other miscellaneous electrical work at AFD.**	As per Annexure –A

Terms and conditions:

1. Offer should be valid for minimum 90 days otherwise it will be rejected.
2. Only Lump sum price to be quoted.
3. The completion period of this job should be within 6 months from the date of issue of work order.
4. Persons having valid Police Verification Certificate willonly be allowed to enter BARC to execute the job.
5. Warranty period should be 12 months (Minimum) after completion of work.

6. The payment will be made after the satisfactory completion of the work.
7. From the bill amount, Income tax @2% and GST TDS @2% will be deducted.
8. Any delay which is attributed to the contractor is liable for penalty @0.5 % Per Week (Max 10%).
9. Quotations are to be printed on letter head / quotation format which should consist of GST registration number registered with local authority and PAN of the firm. Computer generated quotation shall be considered as invalid & rejected.
10. Sealed offer with tender no. and due date legibly written on the sealed envelope should reach **through speed/registered post** on or before26/11/2021**.**

    To,

    Shri Bhupendra Patidar,

    Scientific Officer (F)

    Atomic Fuels Division

    Bhabha Atomic Research Centre

    Trombay,Mumbai 400 085.

b) The contractor shall have to visit the site to comprehend the scope of work. The same will be arranged by the undersigned. The site can be visited on any working days between 10:30am to 4:00 pm before tender due date. however prior intimation of at least three working days is necessary.(Tel: 02225597410/6112,email: bpatidar@barc.gov.in)

c) Supplier shall have valid electrical license and previous experience of installation & commissioning of similar work with documentary evidence. Without documents for above type of work execution, site visit shall not be considered.

The quotation submitted without site visit will be rejected.

Details and Confidentially & Publicity Clause

I. No party shall disclose any information to any third party concerning the matters under this contract generally. In particular, any information identified as“proprietary” in nature by the disclosing party shall be kept strictly confidential by the receiving party and shall not be disclosed to any third party without the prior written consent of the original disclosing party.

This clause shall apply to the sub-contractor, consultant, adviser or employees engaged by a party with equal force.

II. “Restricted information” categories under section 18n of the Atomic Energy Act, 1962 and “Official Secret under Section 5 of the Official Secret Act, 1923: -

Any contravention of the above-mentioned provisions by any contractor, sub-contractor, consultant, adviser or the employees of a contractor will invite penal consequence under the aforesaid legislation.

III. Prohibition against use of BARC's name without permission for the publicity purpose:

The contractor, sub-contractor, consultant, adviser or the employees engaged by the contractor,shall not use BARC's name for any publicity purpose through any public media like press, Radio, T.V. or Internet without the prior written of BARC. Contractor shall obtain Police verification certificate for all his employees including his supervisors and workers engaged in the work.

(B. Patidar)

SO/F, ES&AS, AFD

For & On behalf of President of India

Annexure-A

I. Fabrication, supply, wiring & installation, testing and commissioning of Power Control Center and other miscellaneous electrical work at AFD.

Sr. No.	Description	Quantity
1.	**Dismantling of Power Control Center-5(PCC-5)** i. Panel Dimensions (Size: 2550 mm (W) x 2380 mm (H) x 550 mm (D)): 1 No. ii. Main Incomer: 1 No. ➢ SFU Rating : 1000 A ➢ Voltage: 415 V iii. Outgoing ➢ SFU Rating : 6 Nos. x 250 A,5 Nos. x 100 A iv. Removal of 1 x 4 core x 400sqmm aluminium armoured cable (PCC-3 to PCC-5): 20 m. v. Removal of 1 x 4 core x 70sqmm aluminium armoured cable (PCC-5 to PDB-10): 35 m. vi. Removal of 1 x 4 core x 25sqmm aluminium armoured cable (PCC-5 to PDB of Helium Leak testing room): 45 m. vii. Removal of 1 x 4 core x 35sqmm aluminium armoured cable (PCC-5 to PDB-25): 50 m. viii. Removal of 1 x 4 core x 35sqmm aluminium armoured cable (PCC-5 to PDB-28): 40 m. ix. Removal of 1 x 4 core x 70sqmm aluminium armoured cable (PCC-5 to Cooling Tower Panel): 10 m.	**1 Set**
2.	**Dismantling of Power Control Center-4(PCC-4)** i. Panel Dimensions (Size: 1100 mm (W) x 2260 mm (H) x 380 mm (D)): 1 No. ii. Main Incomer: 1 No. ➢ SFU Rating : 250A ➢ Voltage: 415 V iii. Outgoing	**1 Set**

	SFU Rating : 1 No. x 250 A,2 Nos. x 63 A, iv. Removal of 1 x 4 core x 240 sqmm.aluminium armoured cable (PCC-2 to PCC-4): 60 m. v. Removal of 1 x 4 core x 70sqmm.aluminium armoured cable (PCC-4 to Control Panel of Bar Turning Machine):25 m. vi. Removal of 1 x 4 core x 25sqmm. aluminium armoured cable (PCC-4 to PDB-40):20 m.	
3.	**Dismantling, shifting, installation and testing of Cooling Tower Panel from PCC-3 to Compressor Room**	**1 Set**
4.	**Fabrication, supply, wiring & installation, testing and commissioning ofPower Control Center (New Power Control Center-4)** i. Make : Arrow/Pyrotech/Dukati/Tenco/Abak Electrofab ii. Panel Dimensions (Maximum Size: 2500 mm. (W) x 1700 mm. (H) x 400 mm. (D)): 1 No. iii. Main Incomer MCCB: 1 No. a. Rating : 630A b. Voltage: 415 V± 10 % c. Frequency: 50 Hz ± 3 % d. Pole : 4 P e. Short circuit capacity : 36kA f. Protection : Built-in Thermal Magnetic Based Release for (O/C, S/C Protection) g. Accessories : ROM – Rotary Handle, Spreader, Aux + Trip contact iv. Outgoing MCCB's a. Rating : 1 No. x 400 A,2 Nos. x 250 A, 3 Nos. x 160 A b. Pole : 3 P c. Short circuit capacity : 25kA d. Protection : Built-in Thermal Magnetic Based Release for(O/C, S/C Protection) e. Accessories : ROM – Rotary Handle, Spreader, Aux + Trip contact	**1 Set**

	v. Outgoing MCB's a. Rating : 4 Nos. x 63 A,2 Nos. x 32 A, b. Pole : 3 P c. Short circuit capacity : 25kA d. Protection : Built-in Thermal Magnetic Based Release for(O/C, S/C Protection) vi. In-grass protection: IP55 vii. Panel material : CRCA MS sheet of 2 mm. thickness for entire panel board viii. Tinned coated copper busbar:Minimum size 400 sqmm. (Main Bus Bar) Minimum size: 200 sqmm. (Bus Bar for outgoing feeders) ix. Clearance between phases (min.) : 25 mm. x. Clearance between live parts and earth (min.) : 19 mm. xi. Power frequency withstand voltage : 2.5 kV xii. Space heater : 230 V AC operated with protection & cut-off xiii. One minute power frequency voltage for power and control circuits : 2.5 kV xiv. Earthing points : 2 Nos. (Tinned copper bus bar minimum size 20 x 3 mm) xv. Control wiring : 1.5 sqmm., 1100 V grade, FRLS grade PVC insulated multi stranded copper conductor cables xvi. Power wiring : 25sqmm., 1100 V grade, FRLS grade PVC insulated multi stranded copper conductor cables xvii. Metering • Multifunction meter ➢ Model No. : PM5320 or better ➢ Make : Schneider electric ➢ Size : 96 x 96 ➢ Measurement parameters :(I,V,F,P, cosΦ, Harmonics Distortion, Individual Harmonics) ➢ Accuracy: IEC 62053-22 Class 0.5S, IEC 61557-12 PDM-S	

	➢ Protocols: Modbus, DNP3, IEC 61850 ➢ Ports: RS-485, dual-port Ethernet, Ethernet-to-serial gateway ➢ Input voltage : 57 - 400 V L-N / 100 - 690 V L-L ➢ Input current : 1 A (0.5S), 5 A (0.5S) , 10 A (0.5 ANSI) ➢ Ingress Protection:IP 54 ➢ UL type 12: Panel mount and Remote display, front • Current transformer ➢ Ratio : 630/5 A ➢ Applicable standard: IEC-61869-1&2 / IEC- 60044 -1, BS 3938, ➢ IS 2705 -1, 2&3 ➢ Case:10% glass filled polycarbonate; flame retardant grades classified UL94V-0. ➢ Insulation class: E (120°C max) ➢ System voltage: 720V maximum ➢ Operating frequency: 50Hz ➢ Class of accuracy: 0.5S or better xviii. Digital Voltmeter ➢ Make: Selec/Trinity/L&T ➢ Phase : 3 ➢ Size : 96 mm x 96 mm xix. Digital Ammeter ➢ Make: Selec/Trinity/L&T ➢ Phase : 3 ➢ Size : 96 mm x 96 mm ➢ Current transformer ratio : 630 A /5A ➢ Current transformer accuracy : 0.5S or better xx. LED Indication • Incomer : R,Y,B • Outgoing : Red for ON	

	Green for OFF	
5.	**Supply, Laying and Termination of** i. 2 x 4 core x400 sqmmaluminium armoured cable (from PCC-3 to PCC-4):25 m. ii. 1 x 4 core x 400 sqmmaluminiumarmoured cable (from PCC-3 to PCC-7) : 60 m iii. 1 x 4 core x 25sqmmaluminiumarmoured cable laying and termination (from PCC-4 to PDB-28 in scientific assistant seating area) :25 m iv. 1 x 4 core x 70sqmmaluminiumarmoured cable laying and termination (from PCC-4 to PDB-10 in Ingot cutting area of Main Hall) :30 m v. 1 x 4 core x 16sqmmaluminiumarmoured cable laying and termination (from PCC-4 to PDB in Helium Leak testing room) :30 m vi. 1 x 4 core x 70sqmmaluminiumarmoured cable (From PCC-4 to New Bar Turning Machine area) : 35 m vii. 1 x 4 core x 70sqmmaluminiumarmoured cable (from DG Panel to Cooling Tower Panel) : 40 m viii. 3 x 4 core x 16sqmmaluminiumarmoured cable (From Cooling Tower Panel to Cooling Tower Motors) : 60 m ix. 2 x 4 core x 35sqmmaluminiumarmoured cable (From Cooling Tower Panel to Cooling Tower Motors) : 30 m x. 1 x 4 core x 35sqmmaluminiumarmoured cable (From PCC-7 to PDB-25 in NDT Labs) : 25 m xi. 1 x 4 core x 70sqmmaluminiumarmoured cable (From PCC-7 to Thorium Lab) : 20 m	**1 Set**
6.	**Power distribution board in Ingot Cutting Area and New Bar Turning Area** i. Make : Legrand/Schneider/L&T ii. Incomer rating : 160 A MCCB iii. Outgoing : 8 way (4 Nos. x 63 A MCB and 4 Nos. x 32 A MCB)	**4 Nos.**

	iv. With provision for DPX3 160 MCCB as incomer and SP/TP MCB's as outgoing v. Double door vi. As per IEC 61439-3 vii. Suitable for Surface Mounting viii. 250 A Copper Busbar for each phase ix. 2 Earthbar, 2 Neutral bar and Cable ties for Cable management x. Fully insulated busbar & shrouded Neutral bars	

II. General Condition

1. Low voltage switch gear shall complied IEC 60947.
2. All wires and cables used in electric panel shall be FRLS type.
3. All wires and cables shall be of suitable colour code.
4. Spacing between electrical components in panel shall be as per the IEC standard (60439).
5. Two earthing points shall be provided on electrical panel.
6. Electrical components used in the panel shall be of reputed make.
7. Panel shall be coated in Siemens gray standard with seven tank processing and supplier shall provide certificate of powder coating of panel.
8. Proper cooling arrangement shall be made inside the panel to limit temperature with in 40^0C.
9. The panel shall be designed for continuous operation (24 hrs X 7 Days).
10. All unwanted, removed fittings, parts, panels are to be disposed as per the instruction of departmental engineer.
11. All panelling and other installation works include earthing as per I.S 732:1989. It shall also be conformity with Indian Electricity Rules and Regulations, National Electrical Code and requirement of the Local Electrical Supply Authorities.
12. Submit all catalogues, brochures and datasheet of the offered products along with quotation.
13. All accessories required for cable laying and termination will be in scope of supplier.
14. All doors and removable covers shall be completely lined with no-deteriorating neoprene rubber gasket and shall be lockable. Gasket without any discontinuity shall be preferred. Gasket shall be held in position in groove, in shaped sheet steel work.

The adhesive used shall be of good quality to prevent peeling up of the gasket during service.

15. All the hardware shall be corrosion resistant.
16. Panel shall be constructed only of materials capable of withstanding the mechanical, electrical and thermal stresses, which are likely encountered in normal services.
17. The panel shall have standard danger boards of appropriate size complete with system voltage, skull mark etc. with letter in English and Hindi.
18. Engraved metal nameplate shall be provided on the door of the compartment for identification.
19. Cable marking at both the end shall be provided for easy identification of cable size and termination details.
20. GA drawing of panel board, busbar arrangement & SLD shall be submitted for approval prior to fabrication.

III. Inspection and test

1. Before leaving the manufacturing work, all equipments shall have been inspected and tested and the results recorded in test report.
2. The manufacturer shall provide test report of each and every electrical component at the time of inspection / execution.

IV. Following test shall be carried out at supplier's site:

1. Visual and functional check
2. Continuity test
3. Insulation test

After installation of system at purchaser premises, the above tests shall be again conducted for checking of smooth functioning of the system.

V. Documentation and training

1. The manufacturer shall give at least two sets of following drawing /documents.
   - 1.1. Bill of material
   - 1.2. Transport, installation, commissioning, operation, maintenance instruction and fault finding procedure.
   - 1.3. Single line diagram
   - 1.4. As built control and power wiring diagram
   - 1.5. Manual of multifunctional meter
   - 1.6. List of recommended spare parts
   - 1.7. Test certificate of each components

VI. Warranty and support services

1. Supplier shall provide minimum one year of warranty ofPower Control Center and Power Distribution Board.
2. The supplier shall indicate the organization, manpower and other resources of customer support division.
3. The supplier shall have support from the principal for a period of 5 years. The address of the principal may also bementioned.
4. Supplier shall provide list of customers along with the name, address and contact details to whom similar or higher capacity system supplied.
5. The supplier shall further ensure the availability of all spares for at least 5 years from the date of acceptance of the system.

VII.Services available

1. Electrical: 415V, 3-phase, 50Hz & 230V, 1-phase, 50Hz are available.
2. Compressed air at 6 kg/cm^2 is available.
3. Cooling water at 2 kg/cm^2 is available.
4. Vendor shall mention the Electrical power requirement, voltage, current,connection method, line size etc.
5. Vendor shall inform the services requirements in advanced for appropriatearrangement to be made by purchaser.

VIII. Packing and forwarding

All the items shall be divided into several shipping sections for protection and ease of handling during transportation. The equipment shall be properly packed for transportation by ship or rail or trailer. Electrical items shall be wrapped in polyethylene sheet before being placed in the wooden crates or cases to prevent damage to the finish. This side up, centre of gravity, weight, owner particulars, purchase number, shall be clearly marked on the package together with other detail as per purchase order.