

E-TENDER FOR ANNUAL MAINTENANCE CONTRACT

No: CPRI/EMD/SS-AMC/2019-20

DATED: 08-11-2019

Name of the Work

ANNUAL CONTRACT FOR OPERATION & MAINTENANCE OF 220kV, 33kV and 11 kV SUB STATIONS



Central Power Research Institute
(Govt. of India Society, Ministry of Power)
Electrical Maintenance Division
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Eligibility Criteria for the Bidder
COMPANY / FIRM / AGENCY

The bidder should fulfill the following technical specifications:

1. The bidder/ Company / Firm / Agency should be registered with the appropriate registration authority to Labour commissioner, Electrical Inspectorate and etc.
2. The bidder /Company / Firm / Agency should have a reputation with at least three years experience in maintaining 11kV, 33kV and 220kV or higher voltage capacity substations to Public Sector Companies / Banks / Government Departments / Research Organizations / Reputed Private Sector Companies. The bidder should have at least one running contract for a similar capacity.
3. The bidder /Company / Firm / Agency should be registered with Income Tax and Service Tax departments;
4. The bidder /Company / Firm / Agency should be registered with the appropriate authorities under the Employees Provident Fund and Employees State Insurance Acts.
5. Either the Registered Office or one of the Branch Office of the bidder should be located in Bangalore.
6. The bidder /Company / Firm / Agency should have its own Bank Account;
7. The bidder/Company/Firm/Agency should have a minimum FINANCIAL turnover during the last three years as specified in Schedule - A.

TERMS AND CONDITIONS

General

1. The contract is initially for a period of one year. The contract will be reviewed yearly, and may be extended for a period of maximum of three years. The requirement of actual manpower may vary according to the need and may be reviewed/reduced/enhanced as and when required.
2. The contract may be terminated before the expiry of the contract period owing to deficiency in service or substandard quality of the service provided by the selected Company / Firm /Agency. Further, CPRI reserves the right to terminate contract at any time by giving two months (60 days) notice to the successful bidder.
3. The bidder shall not be allowed to transfer, assign, pledge or sub-contract its rights and liabilities under this contract to any other agency without the prior written consent of CPRI.
4. The bidder will be bound by the details furnished by him / her to CPRI, while submitting the bid or at a subsequent stage. In case, any of such documents furnished by the firm is found to be false at any stage, it would be deemed to be a breach of terms of contract making the firm liable for legal action besides termination of contract.
5. The bidder shall ensure that the manpower deployed in CPRI, conforms to the qualification and experience prescribed in the Tender Document. At least 50% of the existing manpower, shall be redeployed under the new contract of the same bidder.
6. The successful bidder shall furnish the following documents in respect of the individual manpower who will be deployed to CPRI, before the commencement of work:
 - (i) List of Manpower short listed by agency for deployment at CPRI, containing full details i.e. Name, date of birth, marital status, address etc.,
 - (ii) Bio-data of the persons.
 - (iii) Character certificate from a Gazetted officer of the Central / State Government.
 - (iv) Certificate of verification of antecedents of persons by local police authority.
7. In case, the person employed by the successful bidder commits any act of omission / commission that amounts to misconduct /indiscipline/ incompetence / security risks, the successful bidder will be liable to take appropriate disciplinary action against such persons, including, making good the financial loss, their removal from work, immediately after being brought to notice, failing which it would be assumed as breach of contract which may lead to cancellation of contract.
8. The selected agency shall provide identity cards to the personnel deployed in this office carrying the photograph of the personnel and personal information such as name, date of birth, age and identification mark etc. attested by the Security officer of the institute.
9. The selected agency shall ensure that any details of office, operational process, technical know-how, drawings issued by CPRI or prepared by CPRI and agency for execution of work, security arrangements, and administrative/organizational matters are not divulged or disclosed to any person by its personnel deployed in this office.

10. The selected agency shall ensure the proper conduct of his personnel in institute/office premises, and enforce the prohibition of consumption of alcoholic drinks/ smoking. Etc.,
11. The selected agency shall designate a co-ordinator, out of the deployed personnel, who would be responsible for immediate interaction with this office, so that the optimal services of the persons deployed by the agency could be availed without any disruption.
12. The selected agency shall immediately provide replacement and ensure that as far as possible no designated post is left vacant in any shift. In case the agency fails to provide replacement within three working days, the 3% of the admin charges for the month will be charged as penalty.
13. CPRI is not liable at any stage to provide accommodation, transport, food, medical and any other requirement of their personnel deployed at the institute.
14. Payment shall be made only to the contractor and on a monthly basis as per actual services. The contractor has to submit invoices/bills by the third week of the next month for the services rendered during the preceding month along with ESI/PF Challans etc., pertaining to that month.
15. CPRI reserves the right to amend or withdraw any of the terms and conditions contained in the Tender Document or to reject any or all tenders without giving any notice or assigning any reason. The Director General, CPRI is the final authority for settling any disputes and the decision of the Director General in this regard shall be final and binding on all.
16. The duty hours should not exceed eight hours at a stretch. Continuous shifts by the same person should be avoided and no shift should remain unmanned. Odd duties/shifts may be required according to the exigencies, which are to be provided by the agency.
17. Items of Electrical equipments, headgears, torches, lathies, uniforms including rain coats, jerseys etc. for efficient conduct of duty by the agency personnel shall be provided by the agency and shall be in good working condition.
18. Absenteeism must not exceed 5% of the total deployment in any month. Further, within each shift the absenteeism should not be more than 10% of the deployment. The above should be achieved without individual electrician/helper/supervisor doing more than the maximum shift allowed by the contract (26/27 shifts in a month). Each occurrence of such excess absenteeism in a shift shall entail a deduction of 3% of the service /administrative charges to the agency for the month.
19. If the agency fails to provide services to the satisfaction of the institute, the same will be communicated to the agency in writing. If three such notices are issued to the agency, the contract will be terminated and the agency shall forfeit the performance Security.

20. The Electrician/Helper/supervisor deployed by the agency shall ensure that the institute properties are protected from theft/pilferage/damage. After necessary investigations, if proved that the agency/their personnel are responsible for the incident, the agency is liable and will be penalized to the extent of the value of the loss and additional charges for each incident as decided by the competent authority.
21. The agency shall not involve in any bribery or other unethical activities with anyone employed in the institute. The involvement in any such activity shall entail in the termination of the contract.
22. All disputes that may arise shall be referred to the Director General of CPRI, whose decision in this regard shall be final.
23. All major faults and problems shall be reported to the JD/HoD,EMD CPRI Bengaluru or Unit Head, CPRI,UHVRL Hyderabad, immediately of occurrence through a memo. After inspection by Joint Director, EMD., and HOD UHVRL Hyd. procedures for rectification shall be got approved by the agency.
24. Any damage or loss due to failure to carry out prescheduled maintenance work shall be at the risk and cost of the agency.
25. Any other work covered under respective terms and conditions, if required or insisted by any regulatory body, including tests and calibrations etc., shall be undertaken by the agency.
26. The necessary salary and other allowances due to the employees of the contractor shall be paid by him and shall strictly comply with all rules and regulations of statutory bodies and other labour laws. All employees engaged by the contractor shall be comprehensively insured for accidents and injuries.
27. The payments to the successful contractors are subject to all statutory deductions as are applicable at the time of payment.
28. All materials used, including oils, lubricants for replacement, topping, testing, etc., will be supplied by CPRI.
29. The annual service maintenance of the sub-station equipments shall be carried out as per the manufacturer's manuals/Schedule applicable from time to time. The work shall be carried out through authorized personnel. **The service charges shall be paid by the agency.**
30. The Contractor shall note that they shall have to carry out their work in close co-ordination with other contractors' agencies working in the same premises.
31. In the event of contractor showing lack of attendance / negligence to work or under-performance in the opinion of JD/HoD,EMD CPRI Bengaluru or Unit Head, CPRI,UHVRL Hyderabad, then the contract may be terminated at any stage without prejudice to the right of action under any other relevant clauses of the contract.

32. The contractor shall follow all security rules framed by JD/HoD,EMD CPRI Bengaluru or Unit Head, CPRI,UHVRL Hyderabad, from time to time regarding the removal of material from the site, the issue of identity cards, control of entry of persons and other similar matters.

33. The contractor shall keep his work spot, site office and surroundings neat, clean and tidy. It should be free from dust, rubbish, scrap, surplus materials and unwanted tools and equipments. All scaffolding and temporary structure, including the tools and equipments shall be removed as soon as the job for which they are intended are completed. All equipment and material to be taken inside the sub-station / building shall be cleaned thoroughly before taking them inside. The JD/HoD,EMD CPRI Bengaluru or Unit Head, CPRI,UHVRL Hyderabad, has right to stop the work, if the contractor fails to improve upon the cleanliness after having been notified.

34. JD/HoD,EMD CPRI Bengaluru or Unit Head, CPRI,UHVRL Hyderabad, will have the right to withdraw the work-permit for any of the workmen for reasons of misconduct, incompetence in work, violation of safety and fire rules, negligence on duty etc.,

35. The knowledge/Information about availability of manpower on a daily basis shall be responsible of contractor himself, the information regarding manpower absences shall not be communicated to the JD/HoD,EMD CPRI Bengaluru or Unit Head, CPRI,UHVRL Hyderabad. The contractor should ensure availability through his representative throughout the contract period who shall be responsible for manpower management and keeping their records Etc.,

36. The contractor shall depute staff to ensure round-the-clock maintenance of services on all the days of the week as given below:

CPRI - Bengaluru

Sl. No.	Description	1 st Shift	2 nd Shift	3 rd Shift	Reliever	General Shift	Total
1.	Electrician (Skilled)	2	2	2	2	2	10
2.	Helper (Unskilled)					2	2
3.	Trained Engineer /Supervisor	1					1

CPRI -UHVRL Hyderabad

Sl. No.	Description	1 st Shift	2 nd Shift	3 rd Shift	Reliever	General Shift	Total
1.	Electrician (Skilled)	1	1	1	-	-	03
2.	Helper (Unskilled)	2	2	2	-	-	06
3.	Trained Engineer /Supervisor	1					1

37. The contractor shall deploy persons as detailed below

- i. **Electrician (Skilled)**: Having Certificate in Electrician/Wireman trade issued by ITI/Local authorities/Govt. of India and with minimum 3 years experience in the relevant field.
- ii. **Helpers (Un-skilled)**: Minimum of 2 years experience in this field.
- iii. **Supervisor**: Having Degree in Electrical Engineering with a minimum 3 years of experience in the satisfactory execution of similar works.

LEGAL

1. For all intents and purposes, the bidder shall be the "Employer" within the meaning of different Labour Legislations in respect of manpower so employed and deployed at the office of JD/HoD,EMD CPRI Bengaluru and Unit Head, CPRI,UHVRL Hyderabad,Joint Director, EMD., for contractual services.
2. The selected agency shall be solely responsible for the Redressal of grievance / resolution of disputes relating to person deployed. JD/HoD,EMD CPRI Bengaluru or Unit Head, CPRI,UHVRL Hyderabad, shall in no way, be responsible for settlement of such issues whatsoever. JD/HoD,EMD CPRI Bengaluru or Unit Head, CPRI,UHVRL Hyderabad, shall not be responsible for any damages, losses, FINANCIAL or other injury claims to any person deployed by service providing agency in the course of their performing the functions/duties, or for payment towards any compensation.
3. The manpower deployed by the contractor shall not have any claims of Master and Servant relationship vis-à-vis JD/HoD,EMD CPRI Bengaluru and Unit Head, CPRI,UHVRL Hyderabad,nor have any principal and agent relationship with or against the JD/HoD,EMD CPRI Bengaluru and Unit Head, CPRI,UHVRL Hyderabad,
4. The manpower deployed by the contractor for the contract shall not be entitled for claim, pay, perks and other facilities which may be admissible to casual, ad-hoc regular / confirmed employees of CPRI, during the contract or after expiry of the contract. In case of termination of the contract also, the persons deployed by the contractor shall not be entitled to or and will have any claim for absorption or relaxation for absorption in the regular / otherwise capacity in CPRI. The Contractor should communicate the above to all the manpower deployed in CPRI.
5. The agency shall alone be liable to pay compensation for any damage/death/injury sustained by the personnel or any other members of the agency as sustained by them in the course of the work/duty at the institute during the contract period.
6. In the event of theft, pilferage or damage to the institute's property, after necessary investigations, if proved that the agency/ their personnel are responsible, the agency shall be penalized for all the losses/damage.
7. The selected agency will be required to pay minimum wages as prescribed under the Minimum Wages Act of Central Government. The bidder will maintain proper record as required under the Law / Acts.
8. The selected agency will be responsible for compliance of all statutory provisions relating to the Provident Fund, and Employees State Insurance, etc. in respect of the persons deployed by it at CPRI.
9. The selected agency shall also be liable for depositing all taxes, levies, cess etc. on account of service rendered by it to CPRI& income tax to concerned tax collection authorities from time to time as per extant rules and regulations on the matter.

10. The selected agency shall maintain all statutory registers under the applicable Law. The agency shall produce the same on demand to the concerned authority of CPRI or any other authority under Law.
11. The Tax Deduction at Source (T.D.S.) shall be deducted as per the provisions of the Income Tax Act Act 1961, as amended from time to time and a certificate to this effect shall be provided to the agency by the Finance & Accounts Section.
12. In case, the service provider fails to comply with any statutory / taxation liability under the appropriate law, and as a result thereof CPRI is put to any loss / obligation, monetary or otherwise, JD/HoD,EMD CPRI Bengaluru and Unit Head, CPRI,UHVRL Hyderabad, will be entitled to recover such damage/loss out of the outstanding bills or from the Performance Security Deposit of the agency.
13. The selected agency will indemnify CPRI from all legal, FINANCIAL, statutory, taxation, and associated other liabilities.
14. In case, the service provider fails to comply with any statutory / taxation liability under the appropriate law, and as a result thereof CPRI is put to any loss / obligation, monetary or otherwise, JD/HoD,EMD CPRI Bengaluru or Unit Head, CPRI,UHVRL Hyderabad, will be entitled to recover such damage/loss out of the outstanding bills or from the Performance Security Deposit of the agency.
15. The selected agency will indemnify CPRI from all legal, FINANCIAL, statutory, taxation, and associated other liabilities.
16. If any disputes arises between the parties of this Agreement regarding interoretation/implemenatation of the Agreement of any other matter incidental or connected with the subject matter of the Agreement shall be resolved as far as possible amicably by mutual consultation,failing which, the parties shall be resolved suchsuch diputes though Indian Arbitration and Conciliation Act 1996 and as amended from time to time. The arbitrator will be appointed by the Director General, CPRI. The seak of Arbitration proceedings shall be conducted in Bengaluru and the language of arbitration shall be in English and court of Bengaluru shall have excusive juristriction.
17. On all matters pertaining to this tender, the decision of the Director General of the Institute shall be final and binding.
18. The successful Agency/Contractor is required to execute an agreement on a prescribed format immediately on the award of the contract.

FINANCIAL

1. The proof of the annual turn-over for the previous years in the form of audited balance sheet or statement of accounts shall be provided, failing which the tender shall be rejected outright.
2. **Bids offering rates which are lower than the Minimum Wages for the pertinent category would be rejected.**
3. The proof of remittance of statutory deductions of PF, ESI to the appropriate agency, for those employed at CPRI, must be provided by the selected agency to CPRI every month along with the claim bill, failing which the claim bill shall not be settled. These remittance /payments must be made in a separate challan specifically for the contract personnel deployed at CPRI in the name of CPRI.
4. The rates agreed upon except the Minimum wages and service tax as notified from time to time by the Central Government shall remain unchanged until the expiry of contract period or till they are amended by the institute.
5. The successful bidder will have to deposit a Performance Security Deposit (15% of the contract value for 1 year), subject to the revision at the time of placing the work order, within 15 days of the receipt of the formal order. The performance security will be furnished in the form of an account payee Demand Draft or Bank Guarantee from a nationalized/scheduled bank drawn in favour of The Accounts Officer, CPRI, Bangalore - 560 080, payable at Bangalore, The performance security should remain valid for a period of 60 days beyond the date of completion of all the contractual obligations of the service provider.
6. In case of breach of any terms and conditions attached to this contract, the Performance Security Deposit of the agency will be liable to be forfeited besides annulment of the contract.
7. The agency shall raise the monthly bill, in duplicate, and submit to Joint Director, /HoD, EMD CPRI Bengaluru and Unit Head, CPRI, UHVRL Hyderabad, along with necessary documents such as Original Invoice, Attendance Register, Delivery Challan, PF & ESI subscription paid challans etc., by 25th of the following month. As far as possible the payment will be released within two weeks from the date of submission of bills.
8. The Tenderer shall give the offer after understanding the above terms and conditions.

Signature of the Contractor / Agency with seal.

Date:

Place:

Contact No.:

E-Mail:

(To be uploaded as PDF Document)

**Operation and Maintenance of
220kV, 33kV and 11kV substation distribution networks**

1. Name of Tendering Company/ Firm / Agency : _____
(Attach certificate of registration)
2. Name of proprietor / : _____
of Company/Firm/agency
3. Full Address of Reg. Office with Regn No. _____
4. Telephone No. : _____
5. Fax. No. _____
6. E-Mail Address _____
7. GST No. (Attach Attested Copy) _____
8. Labour Regn. No. (Attach Attested Copy) _____
9. E.P.F. Regn. No. (Attach Attested Copy) _____
10. E.S.I. Regn. No. (Attach Attested Copy) _____
11. COMMERCIAL turnover of the tendering **Company / Firm / Agency**
for the last **3** Financial Years as below: (Attach the pdf document for reference)

Financial Year	Amount (Rs. In Lakhs)	Remarks, if any
2014-15		
2015-16		
2016-17		

Give details of the Experiences of similar nature of works contracts handled by the tendering Company / Firm / Agency on behalf of PSUs /Research Organization /Government Departments etc., during the last three years in the following format. Attested copies of work orders with annexures may also be attached.

Sl. No.	Details of client along with address, telephone and FAX numbers	Nature of work executed (as in work order)	Amount of Contract (Rs. in Lakhs)	Duration of Contract	
				From	To
1					
2					
3					
4					

(Attach the pdf document for reference)

12. Additional information, if any _____

Signature:

Company Seal

Name:

Place:

Date:

Scope of the work

The scope of work for the following works are given below:

Operation and maintenance of 11kV, 33kV and 220 kV Substation.

The Operation and Maintenance envisage all the required tasks to ensure

- a) Maximum system availability.
- b) Most efficient, effective and optimum usage of electrical system.
- c) Enhance the life expectancy of equipments.
- d) Regular operation and maintenance of equipments.
- e) Compliance of safety rules and regulations.
- f) Preventive maintenance / scheduled maintenance.
- g) Break down maintenance.
- h) Maintaining uninterrupted power supply.
- i) Maintenance of proper records of operation and maintenance (Log book, Registers, check list etc., shall be approved by CPRI).
- j) Assistance to CPRI in expansions and modification.

I. Operation and Maintenance of Sub-stations.

- a) Switching ON and Switching OFF of 11kV, 33kV and 220 kV Circuit Breakers, Isolators, 11kV incoming and outgoing breakers, HT Panels, Yard Lights etc. as and when required according to load requirements and instructions from Joint Director, EMD.
- b) Maintaining records of all the operations and records of loads such as voltage, current, power factor, frequency, connected load, energy consumption on hourly/daily/weekly/fortnightly/monthly/quarterly/half yearly and yearly basis.
- c) Maintaining records of power failures with reasons.
- d) Observing the yard and control room continuously and reporting any problem or faults to the Joint Director, EMD. which require major / minor improvements/repairs.
- e) Maintaining system handing over and taking over charge sheets.
- f) Current and voltage settings of feeders right from 11kV, 33kV and 220 kV I/C line till the user end (at least till 440 V 3Phase level)
- g) Maintaining records of maintenance.
- h) With prior intimation to JD/HoD, EMD CPRI Bengaluru or Unit Head, CPRI, UHVRL Hyderabad, Changing the taps of transformers as and when required.
- i) Co-ordination with operators in KPTCL/BESCOM Substations for efficient, reliable operation of 220kV and 11kV Substation.

- j) Attending the faults and restoration of the power supply without delay.
- k) Follow permit system (Line Clearance) and maintain a permit book to facilitate system maintenance without accident / mishaps.

Taking preventive maintenance such as maintenance of defective insulators, lightning arrestors, cables, transformers, Isolators, Breakers, HT panels, LT panels, Station Transformers, CT, PT, Battery chargers, Battery bank, control room wiring etc., Contractor has to maintain a check list for preventive maintenance & upkeep the system accordingly. However contractor has to prepare a detailed check list covering all the required items and submit for Engineering Officer Cum Officer In-charge approval before being implemented.

The Operation of 11kV, 33kV and 220 kV Switchyard, 11 KV Indoor / Outdoor Sub Station, HT< Switch Gear and Distribution Systems involves deployment of right persons as mentioned above for operation and these persons would be responsible for the work contracted for this purpose. The main jobs will include:

- a. Routine Surveillance of 11kV, 33kV and 220 kV Switch Yard, indoor / outdoor equipments like Control Relay Panels, Station Metering Panel, Switchyard Control Panel, AC& DC Distribution Boards.
- b. Routine Surveillance of 11kV, 33kV and 220 kV Switch Yard Outdoor equipments such as Power Transformers, SF6/Vacuum Circuit Breakers and their respective Field Control Panels, Isolators and their Respective Field Control Panels, Air Compressors, CTs, VTs, LAs etc., Distribution Transformers and all Indoor HT Boards and LT Distribution System.
- c. Routine/Monthly maintenance of 11kV, 33kV and 220 kV over head line/underground cables by trimming the tree branches below the lines.
- d. Filling up of Approved Data Sheets for the different Indoor & Outdoor equipments of 11kV, 33kV and 220 kV Switch Yard, raising deficiency reports and communicating to JD/HoD,EMD CPRI Bengaluru and Unit Head, CPRI,UHVRL Hyderabad.
- e. Recording all tripping of breakers and other events that occur in the order of sequence with the time of occurrence correctly and record them in Log Book.
- f. Carrying out operations correctly and accurately and recording the same in the relevant Log Books.
- g. Strictly following operating instructions given by the JD/HoD,EMD CPRI Bengaluru and Unit Head, CPRI,UHVRL Hyderabad.
- h. Observing all safety precautions and ensure safety to men and material and the equipment during the contract period.

- i. Attending to all emergencies which may arise during the contract period such as equipment failures, fire accidents, etc., shall get acquainted with the operations of all equipments covered under the contract.
- j. Attending to all Telephone calls and issue receipt message promptly.
- k. Preparing daily reports and periodic returns in the prescribed format in duplicate and submit to the concerned JD/HoD,EMD CPRI Bengaluru or Unit Head, CPRI,UHVRL Hyderabad.
- l. Assuming responsibility for the equipment & other materials kept at the Sub-station area.
- m. Assuming responsibility for any damages that occur due to mal-operation of equipment and shall make good the loss suffered by CPRI.
- n. To be alert and attending to all operations and events promptly without any delay.
- o. Updating of interruptions Register, Call register, Data Book. Apart from the above, the contractor shall carry out the checks in the document during the contract period daily.
- p. Ensuring routine, preventive and breakdown maintenance works for the Maintenance of 11kV, 33kV and 220 kV Switchyard, 11 KV Indoor/Outdoor Sub Station, HT< Switch Gear & Distribution Systems.
- q. Removing trees/big branches shall be reported to Civil Engineering Division.

Co-ordination with KPTCL/BESCOM/Inspectorate

- r. Co-ordination with KPTCL/BESCOM officials for all related works and giving reports to JD/HoD,EMD CPRI Bengaluru or Unit Head, CPRI,UHVRL Hyderabad, regarding, information from KPTCL/BESCOM and Co-ordination with Electrical Inspectorate in all relevant activities.

TECHNICAL AND GENERAL SPECIFICATIONS

1. TOOLS & TACKLES:

All tools and tackles required for the safe and satisfactory operation and maintenance including preventive and break down maintenance of the substation and related equipment will be provided by CPRI. The careful maintenance and management of these tools will be the responsibility of the agency.

2. OPERATIONS:

Hourly:

1. Taking readings of all meters installed at control panels, ACDB, DCDB, Battery Charger etc.
2. Air and Gas pressures of Gas circuit breakers.
3. Oil & Winding temperatures of Transformers.
4. Taking the reading of surge arrestor counters of Lightning Arrestors,
5. Checking any sparking or flash over / hotspots in the substation.

Daily:

1. Checking the operation of compressors of Circuit breaker.
2. Visual inspection of Isolators contacts for proper position.
3. Checking oil levels of all bushings, Main & OLTC Conservator, CTs and PTs, etc.
4. Checking oil leakages if any for Transformers, CTs & PTs & taking appropriate action for its timely repair.
5. Checking air / gas/ oil leakages if any for Circuit Breakers.
6. Checking the condition of Silica gel.
7. Checking of Battery & Charger DC voltage.
8. Cleaning of premises, Control relay panels etc.
9. Maintaining log books and daily check list.
10. Grass removal from yard and surroundings of the substation
11. Checking Deposition of dust and dirt on Insulators.
12. Checking Locks and doors of substation are in good condition.
13. Checking no leaks have developed in the roof. Ventilating systems.
14. Checking the heating systems are working normally.
15. Checking the prescribed safety aids are in place and in good order.
16. Checking the earthing connections for proper connectivity.
17. Checking the packing of cables entering and leaving the trenches or tunnels within the premises is intact.
18. Checking the ventilating louvers is not damaged.
19. Checking the access roads to the oil filled devices is not obstructed.
20. Draining the air / moisture from air conservators of circuit breakers.
21. Trouble shooting and repair of Electrical circuit's components in case of any abnormal conditions.
22. Checking Yard and control room lighting.

Weekly:

1. Checking Yard and control room lighting circuit.
2. Checking of individual battery voltage, liquid level, specific gravity, contacts, applying of petrolium jelly, etc.

Monthly:

1. Checking Auto/ Manual operations of OLTC.
2. Checking earthing points and their contact tightness wherever required.
3. Checking and sealing of cable entry holes.
4. Preparation of monthly checklist and events log for the month.

Events:

1. Logging auto / manual operations of OLTC.
2. Logging the breakdown events with relay indications etc.
3. Logging shut down events, log of operations during shut down period.
4. Logging of on /off of feeders in the 220kV, 33kV &11 kV distribution system.
5. Maintaining visitor registers along with their comments and details of their visits.

3. MAINTENANCE

This Maintenance scope (includes both preventive and breakdown maintenance) is indicative only and shall include other maintenance activities required for satisfactory operation. Preventive Maintenance shall be routinely carried out as per the details provided.

Breakdown maintenance shall be provided as and when the situation warrants with a failure/fault in the system. The breakdown maintenance shall be attended at the highest priority so as to make good the faulted system and putting into operation. For breakdown maintenance, the contractor shall coordinate/liaison with Joint Director, EMD and the original equipment manufacturer for replacement of parts and services as necessary. During the preventive (routine) maintenance, the contractor shall carry out the following as listed for various system components:

Though the list contains several individual jobs they could be executed in a combined scope as in the servicing or overhauling of the component.

A. Transformers:**Hourly:**

- a) Check oil & winding temperatures, check for abnormalities & recording them.
- b) Observe and record Load (amperes) and Voltage. Check against rated figure.
- c) Visual check for overheating if any at terminal connections (Red hots) and observation for any unusual internal noise. This check is must in each shift.

Daily:

- a) Observation of oil levels in (i) main conservator tank (ii) OLTC conservator (iii) bushings and examining for oil leaks if any from the transformer.
- b) Checking the colour of silica gel in the breather and also oil level of the oil seal. If silica gel colour changes from blue to pink by 50% the silica gel is to be reconditioned or replaced.
- c) Visual check of explosion vent diaphragm for any cracks.

Monthly:

- a) Physical examination of diaphragm of vent pipe for any cracks.
- b) Cleaning of bushings, inspect for any cracks or chippings of the porcelain and checking of tightness of clamps and jumpers.
- c) Measurement of IR values of transformer with suitable megger according to the rating of the transformer. Recording of the values specifying the temperature at which measurements are taken
- d) Cleaning of Silica gel breather.
- e) Checking of temperature alarms by shorting contacts by operating the knob.

Quarterly:

- a) Testing of main tank oil for BDV and moisture content.
- b) Testing of OLTC oil for BDV & moisture content.
- c) Testing of Bucholz surge relays & low oil level trips for correct operation.
- d) Checking of all connections on the transformer for tightness such as bushings, tank earth connection.
- e) Lubricating / greasing all moving parts of OLTC mechanism.

Yearly:

- a) Testing of oil for dissolved gas analysis, acidity, tan delta, interface tension specific resistivity.
- b) Tan delta testing for Bushings.
- c) Calibration & testing of oil & winding temperature indicators.
- d) Measurement of magnetizing current at normal tap and extreme taps.
- e) Measurement of winding resistance.
- f) Turns ratio test at all taps.
- g) Overhaul of tap changer and mechanism.
- h) Calibration of tap position indicator.
- i) Filtration of oil or replacement of oil in the main tank/OLTC when the BDV of the oil is found less than the acceptable limit.
- j) Changing the gaskets at all locations as and when leakage is found or the gasket is damaged or else yearly.
- k) Replacing of Buchholz relay, OTI, WTI if found malfunctioning.
- l) OLTC mechanism shall be completely over-hauled for smooth and trouble-free operation.
- m) Replacement of bushing if required.
- n) SFRA test
- o) Core Clamp Isolation Test.

B. Circuit Breakers:

Hourly:

- a) Check Air and Gas pressure.

Daily:

- a) Check the operation of compressors /motors. Check timing and sound.
- b) Check gas density in each shift.

Monthly:

- a) Air cleaning with blower.
- b) Cleaning of circuit breaker body and bushings.
- c) Auxiliary contacts cleaning.
- d) Tightening of nuts and bolts.
- e) Checking breaker Operation (Local/Remote operation).
- f) Check anti-condensation protection.
- g) Check of motor control
- h) Checking and sealing of cable entry holes.
- i) Use of anti-corrosion spray where required.

Quarterly:

- a) Check for SF6 leaks.(Gas leakage test)
- b) Oiling and greasing of all moving parts.
- c) Functional check of trip circuit.
- d) Checking the settings of air and gas pressure switches.

Half-yearly:

- a) Checking ON/OFF Timings of Circuit breaker poles.
- b) Complete servicing, lubricating and greasing of all moving parts. Replacement of any defective part.
- c) Measurement of contact resistance and contact gap.
- d) Operation of control and Auxiliary circuits.
- e) Recharge time of operating mechanism after specified sequence.
- f) Checks on specific operations.
- g) Inspection and operation of control circuit.
- h) Measurement of Humidity if necessary.

Yearly:

- a) Touch up painting wherever required.
- b) Checking contact resistance of Breaker main contacts.
- c) Checking of circuit breaker position level by using spirit level indicator.
- d) Mechanism checking and lubrication to all moving parts.
- e) IR values of Power and Control Circuits.
- f) Operating circuits power consumption during operations.
- g) Verification of correct rated operating sequence.
- h) Checking and adjustment of Track alignment and Interlocking mechanism.

Repairs:

- a) Filling the breaker with SF6 – The CB may be filled only by or under the supervision of qualified personnel and in accordance with the SF6 filling curve. SF6 filling kit and SF6 gas cylinder to be provided by CPRI .

C. Lightning Arrestors

Daily :

- a) Checking the readings of surge arrestor counters.

Monthly:

- a) Cleaning of porcelains Insulators of LA.

Quarterly:

- a) Removing of bird nests, if any.
- b) Monitor the total leakage current (capacitive and resistive current) and resistive current.
- c) Records of the number of operations of the Arrestor should be maintained and if more number of operations are seen then the same should be informed to the concerned authority.

Yearly:

- a) Testing of counters

Repairs:

- a) Replacement of Lightening Arrestor pole.(LA to be provided by CPRI)

D. Isolators

Daily:

- a) Visual Inspection

Monthly:

- a) Clean the porcelain insulators and inspection for cracks and chip off.
- b) Check for tightness of nuts and bolts,drive tube locknuts,drive lever and phase coupling plan bolts etc.,

Quarterly:

- a) Open the disconnecter and earthing switch and inspect the contacts. (Wipe the contact surface with solvent).
- b) Check for contact surface coating/wearing.
- c) After maintenance and inspection, smear the contact surface lightly coated with contact lubricant (petroleum jelly).
- d) Check for split pins in clevis replace the same if damaged.
- e) Lubricate all clevis pins.
- f) Check contact gap, if found inadequate replace contact spring.

Half Yearly:

- a) Maintenance of Drive Mechanism:
 - i. Apply grease on the teeth of the spur gear and GEAR box / Lead screw and guide nut incase of lead screw type.
 - ii. Oil auxiliary switch linkage and pivot on the guard aperture for manual operation.
 - iii. Cleaning of auxiliary switch contact & greasing with silicon grease
 - iv. Check that all the electrical components are firmly fixed and let the contactors operate freely.
 - v. Check all electrical connections for tightness.
 - vi. Check all mounting bolts for tightness.

- vii. Apply grease to mechanical interlock-cam groove, if the disconnect is with earth switch.
- b) Check interlocks.
- c) Adjustment of limit switch if it is required.
- d) Main Contacts
 - i. Cleaning and lubrication of main contacts
 - ii. Check Alignment.
 - iii. Main contact resistance measurement
 - iv. Tightness of nuts, bolts and pins etc.,
- e) Cleaning of support insulators and checking of insulator cracks, if any.
- f) Earth Switch
 - i. Checking and Alignment of earthing blades
 - ii. Cleaning of contacts
 - iii. Checking of Contact resistance
 - iv. Operation of earthing switch.
- g) Checking of aluminum/Copper flexible conductor.
- h) Checking of earth connections of structures and marshalling box.
- i) Marshalling Box
- j) Visual check of auxiliary contacts.
- k) Cleaning and terminal tightness.
- l) Checking of space heaters and illumination.
- m) Checking of healthiness of gaskets, else replace the gaskets.

Lubricants recommended:

For Contact Surface - Clean contact surface with plain cloth and apply contact grease (Petroleum jelly).

For External drive linkage - Shell Alvania grease

E. Current Transformers

Daily:

- a) Visual Check
- b) Check for Oil leakage

Monthly:

- a) Clean the porcelain insulators and inspect for cracks and chip off.
- b) Secondary connection of the CT should be intact.

Half yearly:

- a) Check the I.R. value of each Current Transformer and keep record.
- b) Check the Pressure Diaphragm. If pressure diaphragm is defective, replace it with new one as per the procedure explained in the instruction manual.
- c) If the insulation resistance of the current transformer is low it can be improved by oil filtration under vacuum.
- d) Attending to oil leakage in the CT. If it is due to failure of gaskets, the gaskets need to be replaced. (Gaskets should be provided by the contractor)

yearly:

- a) Accuracy test, FS, on metering core,
- b) Ratio and phase angle error, composit error test on Protection core,

- c) Turns ratio and Knee point voltage test on Special core.

F. Voltage Transformers

Daily:

- a) Check Oil level and check for any leakage
- b) Chattering sounds

Monthly:

- a) Cleaning of Bushing
- b) Checking for Oil level & topping up of oil if required
- c) Checking of secondary fuse & fuse contacts.

Half yearly:

- a) Check the I.R. value of each Voltage Transformer and keep records.
- b) Check the Pressure Diaphragm. If the pressure diaphragm is defective, replace it with new one as per the procedure explained in the instruction manual.
- c) If the insulation resistance of the Voltage transformer is low it can be improved by oil filtration under vacuum.
- d) Attending to oil leakage in the VT. If it is due to failure of gaskets, the gaskets need to be replaced (Gaskets should be provided by the contractor)

Yearly:

- a) Accuracy test on metering core.

G. Switch Yard

(All equipment including structures that are not covered elsewhere)

- a) Checking the yard at periodic intervals and attend to any unusual observations, defects, sparks, loose contacts, red hot spots and loose bolts and nuts etc., and informing the concerned authority. The records of operational persons shall also be consulted for this purpose.
- b) Checking the earth resistance of earthing half-yearly.
- c) Checking the Protection and control circuit of each equipment monthly.
- d) Checking of operation and interlock of all equipments monthly.
- e) The premises should be kept neat and clean.

H. Control & Relay Panels:

Daily:

- a) Check for any tripping chattering in the electrical parts, abnormal noise, overheating in the panels.
- b) Check whether indication lamps, annunciator lights, bell, buzzers and hooter are working.
- c) Check all terminal cubicles for healthy contacts, minor repairs/services/cleaning etc.
- d) Observe the annunciation window, and there is any alarm then consults the concerned authority.

- e) Check panel for proper closing.
- f) Cleaning of relay cases of dirt etc.
- g) Cleaning the panels, relay covers, blowing dust from inner side of panels.
- h) Voltage of DC supply.
- i) Physical checks of all wiring & connections.

Monthly:

- a) Check for the proper working of all ammeters, voltmeters, relays, contactors malfunction etc.
- b) Clean the panels from inside with the help of the blower/ vacuum cleaners.
- c) Check all the cables for overheating, tightness of the glands, lugs & crimping.
- d) Check the fuse-link & fuse holders.
- e) Check the control wiring of the panel along with the controls for the proper functioning and tripping at the preset parameters.
- f) Tightening of all earthing connections.

Yearly:

- a) Check the operation of MCB, relays, Etc.,
- b) Testing and calibration of relays.

Repairs:

- a) The following items can be replaced and made the circuit functional with MCB, Contactors, Cable termination with glands, relays, selector switch, indicating lamps, voltmeter, ammeter, fuse holders etc. (All material to be provided by CPRI).

I. 11 KV Panels :

Daily:

- a) Visual inspection
- b) Check whether indication lamps, selector switch, ammeter, MF meters Etc., are working.
- c) Checking and ensuring the closing of all the panel doors etc.,
- d) Check whether all relays, are functioning properly.

Quarterly:

- a) Visual inspection of panels.
- b) Checking of control scheme for healthiness.
- c) Visual Checking of Panel Meters.
- d) Checking of heater circuit & rectification if required.
- e) Checking handles and doors & rectification if required.
- f) Checking and sealing of cable entry holes.
- g) Tightening of all earthing connections.

Yearly:

- a) Measurement and recording of IR values for Main Bus bar.
- b) Checking of all terminations for tightness.
- c) Checking of CT, PT and Relays connections for tightness.

- d) Testing of all panel Relays and Meters CT & PT.
- e) Measurement of insulation resistance value of circuit breaker.
- f) Measurement of breaker closing and tripping time.
- g) Vacuum test
- h) Measurement of contact resistance
- i) Checking of control circuit
- j) Visual inspection of earth connections and checking of tightness
- k) Checking of mechanical and electrical interlocks, interlocks within the switch board to ensure proper functioning of the same.
- l) Checking and sealing of cable entry holes

Repairs:

- a) During the time of operation any of the items mentioned above are found malfunctioning then they must be replaced.(All materials will be supplied by CPRI and tools should be provided by the contractor)

J. LT Panel:

Daily:

- a) Visual inspection
- b) Check whether indication lamps, selector switch, TNC & all meters are working.
- c) Checking and ensuring the closing of all the panel doors etc.,
- d) Check whether all relays, are functioning properly.

Quarterly:

- a) Visual inspection of panels.
- b) Checking and sealing of cable entry holes.
- c) Checking of D.C. supply & control switchgear.
- d) Checking of Indication lamps, replacement if required.
- e) Checking of Indication Meter and rectification/replacement if, required.
- f) Checking/replacement of fuses if required.
- g) Checking of Bus bar connection, Tightening of nut bolts, cleaning of bus bar if, required.
- h) Cleaning and Tightening of bus bar in the bus bar chamber.
- i) Tightening of all earthing connections.
- j) Checking and sealing of cable entry holes.
- k) Cleaning of the inside and outside panels using blowers and vacuum cleaner.

Yearly:

- a) Checking of D.C. supply & control switchgear.
- b) Checking & ensuring the closing of the wall panels/panel doors including the supply of necessary material if required.
- c) Cleaning of circuit breakers, lubricating the moving parts as per maintenance procedure
- d) Checking of alignment in racking mechanism of breakers for free and smooth movement of circuit breakers

- e) Checking of contact wearing of circuit breakers
- f) Checking of mechanical/ electrical interlocks, interlocks within the switchboard to ensure proper functioning of same
- g) Functional operations check of limit switches, auxiliary contacts Etc.,
- h) Visual inspection of earth connections and checking of tightness
- i) Measurement of insulation resistance value of circuit breakers
- j) Measurement of contact resistance of circuit breaker poles
- k) Measurement of circuit breaker closing and tripping time
- l) Functional operations check of circuit breaker
- m) During operation, any of the items found malfunctioning must be replaced. All materials will be provided by CPRI.
- n) Measurement and recording of IR values for Main Bus bar.
- o) Checking of all terminations for tightness.
- p) Checking of CT, PT and Relays connections for tightness.
- q) Testing of all panel Relays and Meters, CT & PT.

K. 415V Distribution System (Main DBs and DBs):

Daily:

- a) Visual inspection & proper doors closing.
- b) Check whether indication lamps, selector switch, ammeter, MCBs etc are working.

Quarterly:

- a) Check if all the panels are ingress protected.
- b) Checking of termination of incoming and outgoing cables
- c) Routing of cables for new loads if required (only flexible cables and indoor).
- d) At the time of adding new cable proper tags and ferruling must be done.
- e) Cleaning of the panel.
- f) Checking and sealing of cable entry holes.
- g) Tightening of all earthing connections.

Repairs:

If any component is found malfunctioning it has to be replaced. Material will be provided by CPRI.

L. CABLE NETWORK:

Monthly:

- a) Visual inspection of cables.
- b) Checking all cable terminals & joins for overhauling /loose connections and tightening, terminating, rejoining, if required termination will be done by the contractor and material will be provided by CPRI.
- c) Checking and recording of IR values of all cables with Megger of suitable range.

M. EARTHING SYSTEM:

Daily:

- a) Watering and proper closing of earth pit chamber

Quarterly:

- a) Checking of all earthing connections, joints and cleaning and tightening thereof.
- b) Checking and recording of earth resistance of all points, pits and taking corrective action to improve it, if required.
- c) Identification marking and updating the details of the indication board

N. METERS:**Yearly:**

- a) Checking of each meter (analog/digital) for its correct operation.
- b) Calibration of indicating/ measuring meter.

O. PROTECTIVE RELAYS:**Quarterly:**

- a) Visual inspection and cleaning from outside.

Yearly:

- a) Checking of each relay for its correct operation by secondary injection.
- b) Cleaning of relay contacts by cleaning agent.
- c) Calibration of relay.
- d) Checking of current/voltage setting as per recommended setting.
- e) Checking of time characteristic as per recommended setting.

P. ENERGY METERS/POWER QUALITY ANALYSER:

1. Note down the energy meter reading as per scheduled time and monitor the power consumption.
2. Submit daily report /log books on power consumption.

Duty of Trained Engineer

1. To carry out the check as required,
2. Carrying out the preventive maintenance check as per the manufacturers guidelines.
3. Submit the daily report as required by the Joint Director, EMD.
4. To attend break down/ maintenance works.

Details of the Substation equipments: 220kV

ISOLATORS :

a) 220 kV

[with earth switch – 01(BIMCO), without earth switch – 01(WS)]

Make : BIMCO / WS

Voltage : 220 kV

Current : 1250A

Type : Centre post rotating, Gang operated,

b) 33kV

[with earth switch – 01(BIMCO), with out earth switch – 01(WS)]

Make : IMCO / WS

Voltage : 33 kV

Current : 400A

Type : Centre post rotating, Gang operated,

CIRCUIT BREAKERS:(Single phase, Three No.s)

Make : ABB

Voltage : 245 kV

Current : 2000A

Type : SF 6

CAPACITIVE VOLTAGE TRANSFORMER/POTENTIAL TRANSFORMER :

R PHASE	Y PHASE	B PHASE
220 kV - CVT	220 kV - PT	220kV - CVT
Make : WS	BHEL	ABB
Voltage :220 v3 kv /110V	220 v3 kv /110V	220 v3 kv /110V

Details of the Substation equipments: 220kV

CURRENT TRANSFORMERS :

a) 220 kV (03 No.s)

Make : AEE

Voltage : 220 kV

Current : 200-100/1A

Type : Out door oil cooled Live tank

b) 33 kV (06 No.s)

Make : EPEC

Voltage : 33 kV

Current : 500/1A

Type : Outdoor oil cooled Live tank

LIGHTING ARRESTERS :

a) 220 kV side (03 No.s)

Make : WS Industries Ltd.,

Voltage : 198 kV

Current : 10kA

b) 33 kV (03 Nos.)

Make : WS Industries Ltd.,

Voltage : 30 kV

Current : 10kA

TRANSFORMERS: 02 Nos.

Make : NGEF

Voltage : 220 kV/33kV

Rating : 20 MVA

Tap changer : Onload

Impedance : 3.03 %

DETAILS OF THE EQUIPMENTS 33kV Substation

ISOLATORS : (With earth switches)

MAKE : BIMCO (KAUSHIK SWITCH GEARS) HYDERABAD

VOLTAGE/CURRENT : 33kV, 1250A With motor operated Mechanism

TYPE : Centre post rotating gang operated mechanism

Single phase 03 no's 33kV, 1250A Tandem isolators

MAKE : GR Power switch gear ltd

VOLTAGE/CURRENT : 36kV, 1250A With out earth switches

TYPE : Lattice type Solid core

CIRCUIT BREAKERS :

MAKE : a) ALIND (The aluminum industries India ltd) 04.Nos./ On load gears
(OLG)01 No.
b) Megawin

VOLTAGE/CURRENT : 36kV / 1600A

TYPE : Vacuum circuit breaker / outdoor type

CT'S

MAKE : A.E . (Automatic Electricals)

VOLTAGE/ CURRENT : 33kV/500/1(INCOMING SIDE)
200/1A (OUT GOING SIDE)

PT'S

MAKE : A.E. (Automatic Electricals)

VOLTAGE : 33kV/ $\sqrt{3}$ /110/ $\sqrt{3}$ (SINGLE PHASE - 03 NOS)

LIGHTNING ARRESTORS (LA)

MAKE : W.S. Industries ltd

VOLTAGE/ CURRENT : 33kV, 10kA (SINGLE PHASE - 03 NOS)

5 MVA TRANSFORMER (2 Nos.) :

Make : Rima
Voltage : 33 kV/11kV
Rating : 5 MVA
Tap changer : Off load
Impedance : 7.1 %

9 MVA TRANSFORMER (01 No.) :

Make : Alstom / Onload gears
Voltage : 33 kV/6.4 /0.695kV
Rating : 9 MVA
Tap changer : On load
Impedance : 8.6%,20.9%,10.1%.

DETAILS OF THE EQUIPMENTS 11kV Substation

Transformers (22 Nos.)

kVAno.s

3900	01
2500	01
2000	01
1000	04
630	03
500	07
400	02
250	03
1000 (CSS)	02 SC Lab, WS and SG Lab.
2000 (CSS)	03 EMI/EMC, IP Lab, LED Lab.

Note : 11kV Circuit Breakers, Load break switches, Isolators and associated LT Panels for the above transformers.