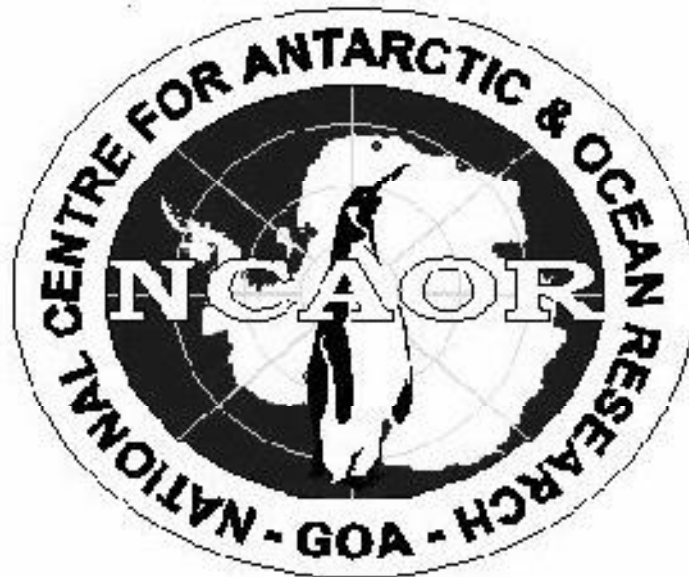


**NATIONAL CENTRE FOR ANTARCTIC & OCEAN RESEARCH**

(An Autonomous Society under the Ministry of Earth Sciences)

HEADLAND SADA, VASCO-DA-GAMA, GOA 403 804.



**TENDER NO: NCAOR/EST/EE/04/17-18**

**Name of The Work: Upkeep And Maintenance of Electrical Systems &  
Allied Work at NCAOR, Goa.**

**TENDER DOCUMENT**

**- CONTENT -**

<b>Sr.No.</b>	<b>Description</b>	<b>Enclosures</b>
1	Notice Inviting Tender	-
2	Tender Terms & Conditions	Annexure I
3	Scope of Work	Annexure II
4	List of Installations	Annexure III
5	Qualification, Duties & Responsibility	Annexure IV
6	Work Completion Proforma	Annexure V
7	Terms & Conditions of Contract	Annexure VI
8	Standard Terms and Conditions	Annexure VII
9	Schedule of Rates (Price Bid)	Annexure VIII
10	EMD & Tender Cost Details	Annexure IX
11	Particulars of Tenderer	Annexure X
12	Instructions to the Tenderer	Annexure XI
13	Appendix for Reference	Appendix I to X

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**NOTICE INVITING TENDER**

Tender No: NCAOR/EST/EE/04/17-18

The Director, NCAOR, Goa invites sealed Tenders in one cover for the following work from the eligible Electrical Contractors for the below mentioned work.

Name of Work	EMD (Rs)	Tender Fees (Rs)
Upkeep and maintenance of Electrical Systems & other related operational work at NCAOR, Goa.	1,27,875/-	1000/-

The tender documents may be obtained from the Estate Division, NCAOR on all working days between 10.00 hrs to 16.00 hrs on or before 13.11.2017 by a written request along with tender cost. Tender form can also be downloaded from NCAOR Website [www.ncaor.gov.in](http://www.ncaor.gov.in) and submitted along with Tender cost. Tenders duly completed in all respect should be dropped in the tender box kept in the office of Estate In-Charge on or before 14.11.2017 up to 11.00 hrs. Date of opening of tender is 14.11.2017 at 11.30 hrs. in presence of the tenderers, if any.

Director, NCAOR

## TENDER TERMS AND CONDITIONS

## ANNEXURE – I

1. The Director, NCAOR, Goa invites sealed Tenders in one cover for the work of Upkeep And Maintenance of Electrical Systems & Other Related Operational Work at NCAOR, Goa. from the eligible Electrical Contractors of Government/PSU/Reputed Organizations. The eligibility criteria is as below.
2. Eligibility Criteria:- The bidder should have,
  - (a) Valid Electrical Contractor License of minimum 11KV, issued by a Competent Licensing Authority of Electricity Department of Government of any State/UT, on his name.
  - (b) Executed at least one single Annual Maintenance Contract (AMC) in electrical work amounting not less than Rs. 40 lakh per annum Or two AMC in electrical work amounting not less than Rs. 30 lakh per annum Or three AMC in electrical work amounting not less than Rs. 20 lakh per annum, of any Govt/PSU/reputed organization, company during last seven years ending October 2017.
  - (c) Registered office in Goa.
    - *The bidder should fulfill all above eligibility criteria to become eligible for participating this tender.*
    - *Self attested copies of all above documents should be enclosed. The original documents should be presented for verification as & when asked.*
    - *The bidder who has been terminated or blacklisted from any organization is not eligible.*
3. The Contract period is initially for ONE YEAR extendable on yearly basis for a further period of Two Years on the same Rates, Terms & Conditions of the agreement based on the satisfactory performance assessed by NCAOR.
4. Rates ó While quoting rates for manpower, the bidder should strictly consider Minimum Wages regulations as per the prevailing State/ Central Government Labour Laws, ESI, EPF, Bonus Rules & Regulations.  
*After award of Contract, the Contractor will have to submit Bank a/c statements of previous month of all staff for the monthly bill for payment. The Contract is liable for termination if it is observed that payment made is less than the prevailing 'Minimum Wages' as prescribed by Ministry of Labour Employment.*
5. Tenders may be obtained from the office of **Estate Section, NCAOR** during office hours between 10.00 hrs. to 16.00 hrs on or before 13.11.2017, with a written request and a Tender Fees of Rs. 1000/- (Rupees One Thousand) by Demand Draft drawn in favour of Director, NCAOR, payable at Vasco-da-Gama, Goa. Those who are submitting tender by downloading from the web site should invariably enclose DD of Rs. 1000/- (Rupees One Thousand) as Tender Fees, drawn in favour of Director, NCAOR, payable at Vasco-Da-Gama, Goa.
6. Entire tender document (signed and stamped on all pages) should be submitted in a sealed cover, super scribed with the tender number & name of the work, date and time of opening. **Tenders will be received up to 11.00 a.m. on 14.11.2017 and will be opened at 11.30 a.m. on the same day.** Tenders should be dropped in the tender box kept in the Estate Section before the closing date and time. In case Tenders are sent by post/courier it should be addressed to **The Director, NCAOR.** Tenderers are to ensure that they post the tender well in advance so as to reach before the closing time and date. NCAOR is not responsible for any postal/transit delay. If the Tender Opening day happens to be a holiday then tenders will be opened on the next working day on the same time.

7. The Earnest Money Deposit (EMD) : EMD is **Rs. 1,27,875 (Rupees One Lakh Twenty Seven Thousand Eight Hundred Seventy five only)** in the form of a Demand Draft from any schedule bank, drawn in favour of **Director, NCAOR, payable at Vasco-Da-Gama, Goa** should be enclosed with the tender documents. EMD of a successful bidder will be converted in to security deposit & EMD DDs of unsuccessful bidders will be returned as it is. **Tender received without EMD will be rejected outright.**
8. It is mandatory to quote all items of the price bid. If all items are not quoted then tender is liable for rejection.
9. NCAOR does not bind to accept the lowest or any tender and reserves the right of accepting the whole or any part of the tender and the tenderer shall be bound to perform the same at the rates quoted.
10. Tender submitted shall remain valid for 90 days from the date of opening for the purpose of acceptance and award of work. The extension of validity beyond 90 days from the date of opening shall be by mutual consent.
11. The Tenderer shall quote rates both in figures and words against each item. Correction, cutting, omission, overwriting should be avoided. However even if any correction is made, it should be endorsed with signature. Use of correction fluid is not allowed & should be strictly avoided. On checking if there are differences noticed between the rates quoted by the tenderer in words and figures or in the amount worked out by him, the following procedure will be followed: (A).If there is a difference between the amount of rate in figure and in words of an item, and the total amount is worked out, then the rate which corresponds to the amount worked by the bidder shall be taken as correct. (B).If the bidder has not worked out the amount of an item, or the same does not correspond with the rates written either in figures or in words, then the rate quoted by him in words shall be taken as correct. (C).If the rate quoted by the bidder in figures and in words tallies, but the amount is not worked out correctly, the rate quoted by the bidder shall be taken as correct and not the amount.
12. Before submission of tender, interested tenderer may inspect the site to acquaint himself about the condition in regard to accessibility of site, nature and extent of ground, working condition of site and locality including stacking of materials, installations of tools and plants (T&P) etc., conditions affecting accommodations and movement of labour etc. required for the satisfactory execution of work contract. No claim whatsoever on such account shall be entertained by NCAOR under any circumstances.
13. Except writing rates and amount, the tenderer should not write any conditions or make any changes, additions, alterations and modifications in the Price bid of the tender. Tenders with conditional prices will not be considered.
14. To assist the process of examination, evaluation and comparison of the tender, NCAOR may ask the bidder individually for clarification if so required.
15. In the event of any tenderer withdrawing/modifying his tender during the validity of tender, EMD of such bidders will be forfeited.
16. Successful bidder should commence the work within 15 days from the date of issuance of Work Order, failure of which the Earnest money will be forfeited.
17. Director, NCAOR reserves the right to accept or reject any or all bids in full or part, or the right to not to accept lowest offer without assigning any reasons thereof, whatsoever. In case of any dispute, decision of Director, NCAOR shall be final and legally binding on the bidders.

## **SCOPE OF WORK**

### **(A) Maintenance of Electrical HT 11 KV & LT 11 KV/ 440 V Substation – 01 No.**

1. Daily maintenance of the HT 11 KV & LT 11 KV/ 440 V Substation for 24 hours by employing round the clock at least one qualified electrician and at least one Junior Electrician (in addition one supervisor shall look after the daily routine work during office hours on all days including major break down if any, even at off hours).
2. Substation shutdown maintenance.
3. Routine daily check of the safety relays.
4. Maintaining a daily logbook on the performance of the system.
5. Maintenance of the HT Switch gears and LT Switch gears.
6. Maintenance of HT Breaker VCB / ACB.
7. Maintenance of the HT 6 11 KV double pole structure. (Proper greasing once in a month, for double pole structure)
8. Monitoring of the capacitor 6 bank panel.
9. Monitoring and maintenance of all electrical outlets and fittings at all the NCAOR buildings (pump house, Administration block, laboratory block, Fellows lab, Auditorium, temporary shades etc within the campus) and Residential Quarters etc in NCAOR campus.
10. Meter readings of the sub-station as well as Residential Quarters and the water reading of the campus per day/ month and submitting to the concern Engineer-in-charge.
11. Any type of electrical work in NCAOR office (pump house, Administration block, laboratory block, Fellows lab, Auditorium, temporary shades etc within the campus) as well as residences of NCAOR Campus to be attended as and when required without any delay.
12. Maintenance of Bore wells and Pumping of water to the over head tank in the office and at the residence as well as for the lawns and plantation.
13. Any other work related to the electrical systems and stabilizer system, installation and fittings of a minor nature in the NCAOR complex including the UPS, Voltage stabilizers EPABX line checking.
14. Maintenance of the daily roster chart of the persons employed by the contractor and submitting to the Estate Section.
15. Once in a six months contractor shall arrange the servicing of double pole structure, this includes greasing, checking resistance of all insulators, checking tightness and conductivity etc. Also contractor should provide fuse wire.

## **(B)Day to day Operation and Maintenance of DG sets/Engine 320KVA/750 KVA/100KVA**

### **i. Diesel Generator (DG)**

1. The contractor shall carry out minor maintenance work such as switching ON/ OFF the DG Sets, checking the operation of the DG Sets and attending to the problems. In case the rectification of the fault in the DG Sets is beyond the reach of the party, the party may inform to the respective AMC agency. The party may provide proper assistance to the AMC Agency during their visits.
2. Check coolant level in radiator, if necessary, top up with drinking water.
3. Check oil level in oil pump, top up to max. Level in dip stick.
4. Check fuel level in fuel tank; ensure minimum level in a tank.
5. Clean Air Filter and Air Filter Housing.
6. Check Belt tension and for cracks.
7. Check hoses for leakages.
8. Clean breather for every six months.
9. Replace Engine oil if required or as per direction of Elect. Engineer of NCAOR during operations.
10. Renew oil filter and fuel filter / separator along with change of Engine Oil
11. Renew coolant conditioner element once in a year.
12. Carry out valve settings every 2000 hours of operation.
13. Check Anti vibration mounts.
14. Check smoke, vibration and sound level.
15. Clean/Check the battery leads.
16. Check the acid level in batteries and add the distilled water if necessary
17. Check for loose connections of terminals of starter motor.
18. Clean the EIM fuses
19. Check loose connections for ECM if fitted
20. Check the end connections of electrical outgoing Lines.
21. Maintaining a log book for above said jobs and take counter sign from Engineer and Estate In-Charge
22. Cleaning of both the D.G. and alternator once in a month.
23. Maintaining sufficient stock of diesel & arrangement of transport of diesel from the designated petrol pump at Vasco to NCAOR would be the responsibility of the contractor. The bidder may assess the transportation cost & include in the price bid. The diesel purchase bill will be directly settled by

NCAOR with the respective petrol pump. The contractor should timely collect the credit voucher from the Estate/Administration section and arrange diesel.

## **ii. ALTERNATOR**

1. Open cover of Alternator, AVR and speed control unit, clean gently the dust by air pressure.
2. Check the mountings of CTø for its position; ensure that does not make contact with body.
3. Check for loose connections for all Power/Neutral cables connections.
4. Check for the alternator fuses.
5. Check for loose connections at AVR and any speed

## **iii. CONTROL PANEL / SYNCHRONISING PANEL**

1. Check for loose connections of cables of Meters/Connectors.
2. Switch off the panels & open all the doors of the panels for cleaning by air blower; check for loose connections, once in a month. After cleaning the same, panels should be properly closed and switched on.

## **iv. CIRCUIT BREAKER (CB)**

1. Check the outgoing and incoming phase, neutral connections of CB.
2. Check mountings of Circuit Breaker and tightness of Power Cables.

## **v. BATTERY CHARGER**

1. Check loose connection of end leads and fuses
2. Check battery charger for its functions.
3. Clean the terminal connectors and apply the jelly once in a week.
4. Check the level of distilled water in all batteries by gravity tester and top up the level as directed by Engineer-In-Charge.

## **vi. GENERAL**

1. Ensure all covers are fitted, make a walk around inspection and then start the Genset.
2. Check all parameters and load the Genset, fill the Load Test Report.
3. Appraise the Eng-In-Charge regarding operation and daily check-ups of Genset.
4. All earthing connections to electrical installations/systems at office and residences at NCAOR Campus should be checked properly by Earth Megger every month. Proper record of the same should be maintained and take counter signature from the Concerned Officer periodically.

## **vii. PREVENTIVE MAINTENANCE**

### **a. Daily Routine**

1. Check the coolant in the radiator, lubricating oil in the engine and fuel in the fuel tank and replenish, if necessary.
2. Check the battery voltage, level of electrolyte in the battery and top up if needed. Also check the charging current of the battery.
3. Check up the fan belt for proper tension.



4. Start the DG set and check up rated RPM, proper output voltage and frequency.
5. Check for proper oil pressure.
6. Check up the operation of AMF panel
7. The details of all parameters should be recorded in the designated register. Contractor shall arrange the registers / stationary at his cost as per requirement.
8. The generator should be operated at least one time on load for 10 minutes daily in case there is no power failure from the Electricity Department.
9. The DG set to be operated round the clock in the event of power failure from the Electricity Department, by a qualified and authorized operator only.
10. May keep the running of both the D.G. Sets depending upon the load and as directed by Engineer-In-Charge.

#### **b. Weekly routine**

1. Check up the alternator terminal connection for tightness.
2. Check up the battery terminal connections for tightness and apply petroleum jelly on their terminals.
3. Check the starter connection for tightness.
4. Clean all parts of the diesel engine with cloth or cotton waste.
5. The NCAOR will supply all consumable items on written demand e.g. (Consumable-diesel, lubricant oil, coolant, grease petroleum jelly, cotton waste, distilled water etc.)
- 6 Filling the diesel in the oil tank; NCAOR arrange the diesel from Vasco at its own cost. The Contractor shall arrange to bring it from Vasco at his own cost.
7. Proper assistance/manpower to be provided by the AMC's (for DG sets).
8. Checking of Pump Motors, MV Panels, Feeder pillars, Switch gears, Street lights and Periphery Lightings.

#### **c. Regular Checking**

Checking Feeder pillars, Cables, Ceiling Fans, Geysers and energy meter panels. Checking and noting Earth resistance measurement of all houses and installations including installations identified by Electrical Engineer/Estate I/c.

#### **(C) Preliminary checking of Air Conditioning System in NCAOR:**

1. The Contractor shall carry out the Maintenance work such as switching ON/OFF the A.C. unit.
2. Any major fault in the A/C system to be reported to Electrical Engineer or Estate In charge, NCAOR immediately.
3. The machines are to be operated regularly or as and when required, for their better performance.
4. Only qualified and authorized operator may be allowed to operate the system.
5. The Contractor shall assist the AMC (AC unit) Agency during their visits.

#### **(D) Maintenance of Lights/Fans /Telephones etc. in Office buildings as well as Residential Complex including Pathway Lights, Flood Lights.**

1. Repair and Replacement, Maintain the wall/ceiling mounted fittings, tube light fixtures and fans, Cables /wiring etc. in NCAOR Campus.
2. Change the fused bulbs / tube lights as and when required and maintain the stock and issue register.
3. Change the unserviceable electrical material as per requirement and direction by concerned officer.

4. If there is any fault in the electrical cable lines/wiring or any other electrical problems, the party shall attend and replace the same immediately. The required material shall be arranged by NCAOR on written demand.

5. The contractor shall carry out the work of fixing any extra electrical fixtures, fittings or points or telephone wiring as required. The party shall also carry out the work of electrical points with surface or concealed wiring as instructed by Electrical Engineer/Estate I/c, also the work related to line shifting/ removing/ extending/ checking of the telephone lines as well as telephone instrument as and when required without any extra cost. The required materials will be provided by NCAOR as per the actual requirement.

6. The contractor should monitor Energy meter in the Residential Quarters and report any problems to concern Engineer.

**(E) Maintenance and Operation of UPS systems (60 KVA x 1, 40 KVA x1, 30 KVA x 3, 15 KVA x 1, 20 KVA x 1, 10 KVA x 2):**

1. The party shall carry out minor maintenance work such as switching ON/ OFF the UPS, checking the operation of the UPS and attending to the problems such as tripping of the UPS etc. In case the rectification of the fault in the UPS is beyond the reach of the party, the party may inform to the respective AMC agency. The party may provide proper assistance to the AMC (AC units) Agency during their visits.

2. The party has to clean the UPS and Batteries by air blower periodically and maintain the register of all services rendered and should take counter signature from the concerned officer.

3. Regular Battery Health Check up and submit Battery volume report monthly.

**(F) Maintenance and Operation of voltage stabilizers (60 KVA x 2, 200KVA x 1):**

1. The party shall carry out minor maintenance work, checking the operation of the voltage stabilizers and attending to the problems such as tripping etc. In case the rectification of the fault in the voltage stabilizers is beyond the reach of the party, the party may inform to the respective AMC agency. The party may provide proper assistance to the AMC (AC units) Agency during their visits.

2. The party has to clean by air blower periodically and maintain the register of all services rendered and should take counter signature from the concerned officer.

**(G) Water Management, & minor Plumbing & Work.**

1. Checking the level of Overhead Water tank thrice in a day and report if not satisfactory. Day to day Operation of the Overhead water tank pumps and taking daily readings of PWD water supply & calling of water tankers if required with permission of Estate I/C.

2. Checking the float valves of all the Overhead water tanks & replacing the same when found faulty. (material will be supplied by NCAOR).

3. Repair/replacement of taps, pipe lines, drains etc. & do necessary plumbing works as and when directed by the Estate I/c.

4. Maintenance of automatic toilet flushing system, check flow of water, change of batteries.

5. As & when told check/oiling/fixing of door closers, tower bolts, handles, latches.

6. To arrange specialized personals other than regular maintenance staff for dismantling, reinstallation of faulty overhead water tank motors including transport, loading, unloading. However repair work will be under scope of NCAOR.

**(H) Miscellaneous Works.**

1. Cleaning & maintenance of Electrical Signages of NCAOR.
2. The scope of services includes servicing and routine repairs and replacement of parts and accessories.
3. The contractor should follow preventive maintenance methods to prevent sudden breakdown. Painting/Antirust treatments to apply to avoid rusting of machine parts, accessories (material will be provided by NCAOR).
4. In case of break down of any electrical item/equipment which the contractor's staff unable to repair it at site, the contractor shall get it repaired/serviced from outside & make it functional within max. 48 hours.

**(I) Fire Alarm System.**

- 1) Acknowledgement of alarms in Fire alarm panel and intimating the same to engineer incharge.

**(J) Fire Fighting System.**

- 1) Weekly testing of all the motors and generator, also checking the water flow through fire hydrants.
- 2) To arrange specialized personals other than regular maintenance staff for dismantling, reinstallation of faulty fire fighting pumps including transport, loading, unloading. However repair work will be under scope of NCAOR.

**(K) Flood Lights and Height Work.**

- 1) Contractor has to arrange specialized personals for all the works at height like maintenance/repair work of flood lights, auditorium hall lights on it false ceiling.
- 2) With all safety equipments and safety measures shall be contractors responsibility

**(L) Additional Electrical Installations.**

During the contract period if there is increase of any additional Electrical Installations, the contractor has to maintain the same in the same contract cost.

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## ANNEXURE – III

**LIST OF INSTALLATIONS :**

Sr.No.	Description Of Unit	Type/rating	No. of Sets
1	Transformer (HT 11 KV & LT 11KV/44OV)	750KVA	1
2	Diesel Generator	320KVA 750KVA 100KVA	1 set 1 set 1 set
3	Centralized UPS	60 KVA 40 KVA 30 KVA 10 KVA 15 KVA 20 KVA	1 set 1 Set 3 Set 2 Set 1 Set 1 Set
4	Residential Quarters of Different Types	TYPE I TYPE II TYPE III TYPE IV TYPE V TYPE VI	2 2 5 1 4 1
5	Bore Wells	5 HP Motor	2
6	Water pumps	10 HP Motor	2
7	Fire fighting	7.5HP Jokey 30KW Pump	1 1
8	Street Lights Pathway Lights Flood Lights	-	80 90 28
9	Electrical Substation with HT /LT Panel capacity	HT-800A LT - 630A LT- 1600A	1 1 1
10	HT/LT lines /poles	Double pole structure	1
11	Telephone lines	-	150
12	Voltage Stabilizers	60 KVA 200 KVA	2 1
13	Auditorium with LT Panel capacity	LT ó 400 A	1
14	Fellows lab with LT Panel capacity	LT ó 250 A	1

*This is a list of existing installations however there may be addition/deletion in future.*

## ANNEXURE – IV

### **QUALIFICATION, DUTIES AND RESPONSIBILITIES** (of Contractor & his staff)

#### **a) Contractor:**

**Qualification:** Qualified as per the eligibility criteria mentioned in the tender.

#### **Duties & Responsibilities:**

1. Visit the site at least once in a week.
2. Compulsory presence of contractor on the days of important meetings, functions at NCAOR & as & when informed by the Estate In-charge.
3. Weekly verification, sign & submission of registers.
4. Providing all essential tools to his staff for day to day maintenance & emergency.
5. Providing all safety equipments, material to his staff. Providing uniform of cotton/terrycotton cloth (02nos) per worker per year, safety shoes, insulated gloves, raincoats, caps, umbrellas, torch etc. to his all staff.
6. Provide necessary training to his staff on quality, safety & technology.
7. If any staff is on leave/absent for more than 24 hours, the contractor should provide immediate replacement with equally qualified & experienced person. Also there should be a reliever for any absentees such that reliever does the duty in place of absent technicians.
8. The Contractor has to arrange repairs, maintenance, fittings of fixtures etc. for the installations in the campus of all heights & depths.
9. To arrange transport, loading, unloading of diesel for D.G.
10. To arrange specialized personals other than regular maintenance staff for dismantling, reinstallation of faulty motors of overhead tank, fire fighting, bore well etc including transportation , loading, unloading for the same.
11. To arrange specialized personals other than regular maintenance staff for rectifying any major breakdown in HT/LT line which includes HT/LT breakers, DP structure, distribution panel etc such that operation is sustained.
12. **Payment to his staff:** The Contractor shall make payment to his staff as per the prescribed rates of Minimum Wages Act for Area B (Goa). The Helper is to be considered as un-skilled worker, the Junior Technician is to be considered as semi-skilled worker, the Senior technician to be considered as skilled worker. The Supervisor should be paid at par with the corporate salary structure. *(Note : Pl refer Order No./F.No.1/13(3)/2017-LS-II of Ministry of Labour & Employment, Office of the Chief Labour Commissioner (C) dated 20/4/2017 and The Gazette of India Extraordinary [part II-Sec3(ii)] and consequent orders issued in the same regard)*

Salary of all staff should be directly deposited to their bank a/c after deduction of ESI, EPF, perks etc. Bank a/c statement of a previous month of all staff should be enclosed with the monthly bill for payment.

The Contractor shall be liable for strict action if it is observed that payment made to his staff is less than the prescribed rates.

#### **b) Supervisor:**

**Qualification:** (i) Should have minimum qualification of Diploma in Electrical/Electronics Engineering, 3 years regular course from Govt. recognized Institution.

(ii) Should have Electrical Supervisory License issued by Electrical Department of any State Govt/UT

(iii) Should have relevant work experience of minimum 7 years.

**Duties & Responsibilities:**

1. He should get the work done from the deployed staff of the contractor to the satisfaction of the Electrical Engineer / Estate In-Charge.

He is responsible for normal operation in the campus, planning & execution of work.

2. He should have strict supervision on all his staff & maintain discipline.

3. He should keep record of daily consumption of water and electricity.

4. He should take a round to the campus on regular basis, inspect the electrical, water arrangements and inform/attend problems if found any.

5. He should give all shifts report to the Engineer and get it signed in the Shift Log Register.

6. He should check the voltage of Incoming HT line (11 KV) and other LT lines thrice a day.

7. Supervisor shall co-ordinate with his staff of all shifts & distribute work.

8. For any minor/major electrical maintenance/breakdown work supervisor/contractor shall attend the work at any point of time 24/7.

**c) Senior Electrician:**

**Qualification:** (i) Should have minimum qualification of ITI Electrician trade of any Government recognized Industrial Training Institute.

(ii) Should have relevant work experience of minimum Three years.

**Duties & Responsibilities :**

1. He will visit the problem area, plan action & execute under instructions from Supervisor/ Engineers.

2. He should assist the Supervisor in work

3. He should take all readings like water meter, electricity meter, DG, Transformer etc.

4. Make Entries in the register.

5. He should attend the complaints.

**d) Junior Electrician:**

**Qualification :** (i) Should have minimum qualification of ITI Electrician trade of any Government recognized Industrial Training Institute.

(ii) Should have relevant work experience of minimum One year.

**Duties & Responsibilities :**

1) He will visit the problem area, plan action & execute under instructions from Supervisor/Estate Engineer/Senior Electrician.

2) He should assist the Supervisor /Senior Electrician in work.

3) He should attend the complaints.

4) Assist Estate Office in day to day work.

**e) Helper:**

**Qualification :** (i) Should be minimum 10<sup>th</sup> Passed, healthy & fit to do material handling work.

(ii) Experience of working in office set up is preferred.

(iii) Basic knowledge of Electrical work.

**Duties & Responsibilities :**

1) Cleaning of All electrical equipments, machines, tools, signages etc.

2) Handling, carrying ladders, Electrical stores material etc.

3) Assisting to senior technicians in their work.

4) Assisting to Estate Office staff etc.

**General duties for Supervisor, Sr. Electrician, Jr. Electrician, Helper :**

- 1) At the end of the shift, log register should be maintained to write the jobs /work done and also the pending work so that subsequent shift technician can complete the jobs.
- 2) Everyone should know to take the changeover when the power fails.
- 3) At least one person should compulsory present in the Plant Room all the time.
- 4) All staff of the contractor shall assist the Estate Section in day to day office work.
- 5) Strict duty timings should be followed. No staff should leave his duty unless his reliever reports to duty. No staff shall leave office between duty hours without permission of Estate In-Charge.
- 6) All staff will work in 3 shifts on rotation basis as per the shift schedule fixed by Supervisor/Engineer Incharge. All staff is entitle to get weekly one day off.

**The following Registers shall be provided and maintained by the Contractor.**

1. Complaints register.
  2. Daily work done register.
  3. AC Package unit log book.
  4. Daily Shift Log Register.
  5. D.G. Engine maintenance registers (each).
  6. D.G. Sets Alternator maintenance log book (each).
  7. U.P.S. maintenance log book (each).
  8. Any other log books as directed by Estate In charge.
  9. Attendance register.
  10. HT/LT and Power factor reading register.
- The above registers shall be submitted to Electrical Eng. /Estate In-Charge for their verification.
-

## ANNEXURE - V

**WORK COMPLETION PROFORMA**

Pl provide details of work executed, at least one single Annual Maintenance Contract (AMC) in electrical work amounting not less than Rs. 40 lakh per annum Or two AMC in electrical work amounting not less than Rs. 30 lakh per annum Or three AMC in electrical work amounting not less than Rs. 20 lakh per annum, of any Govt/PSU/reputed organization, company during last seven years ending October 2017.

Sr. No	Name of the Work	Location of site	Value of work completed (Rs)	Date of completion of Work	Name & Contact details of Organization & the Officer under whom work is done.

\* Pl. enclose self attested copies of work orders & work completion certificates.

**Name & signature of the tenderer with the seal :**



## **TERMS AND CONDITIONS OF CONTRACT**

## **ANNEXURE - VI**

1. The Contractor is responsible to provide qualified and well experienced personnel, who can independently handle, operate and maintain electrical installations as per the guide lines of the Estate Section. The work force to be deployed will be screened for technical capability by NCAOR to ensure the deployment of suitable candidates by the Contractor.

The successful bidder should submit details of all deployed personnel with a brief resume of their qualification, age, experience etc. All staff will work in rotation shifts. Shift timings will be fixed by the Estate Section. Weekly off should provided to every staff.

**Contractor's staff should posses minimum Qualification and Post Qualification Experience as below:**

**a. Supervisor (01 No.):**

The person should have minimum qualification of Diploma in Electrical/Electronics Engineering (3 years regular course) from Govt. recognized Institution and shall have relevant work experience of minimum seven years.

**b. Senior Electrician (06 Nos.):**

The person should have Electrical Trade ITI certificate (Two years course) from Govt. recognized institutions. He should have a relevant work experience of not less than three years.

**c. Junior Electrician (06 Nos.):**

The person should have minimum ITI in Electrical trade certificate course (minimum one year course) with minimum one year relevant work experience.

**d. Helper (01 No.):**

The person should be at least SSC pass with good health, able to communicate.

2. All the above persons should be healthy, physically fit, of good character & none of them should have any criminal background or registered any police case against them.

3. The Contractor shall execute operation and maintenance services only through the qualified manpower as described in the tender document.

4. The Contractor and his staff shall strictly follow the Standard Industrial Safety & Security Norms.

5. Full time daily supervision by the Supervisor at site is compulsory.

6. Liaisoning with Electricity Department, for arranging shutdown of HT/LT lines for any maintenance work will be responsibility of the Contractor.

7. Service / Maintenance Report should be maintained in each case and should be submitted duly countersigned by the Supervisor & Estate Engineer while submission of monthly bill. Report should contain the following details:

- a) Time of call
- b) Time of report
- c) Time of restoration
- d) Probable cause
- e) Action taken
- f) Components replaced
- g) Nature of failure etc.

**8.** The successful bidder within 15 days from the award of contract, under intimation to NCAOR should provide all - (i) tools and equipments required for effective maintenance such as Multi meter, Megger, Ammeter, Galvanometer and Earth tester, all required tools/equipments & safety items etc. should be arranged by the AMC contractor himself at his own cost. Tools like, Drill machine, bits, Air blower, crimping tool size 0.5 mm. to 300sq mm and all other electrical tools, screw driver, spanner, cutting plier set, hammer, pipe range, spanner set, hack-saw or any other tools required for daily maintenance/repair job and should be available at site till completion of the contract period. All the Meters & testing equipment, which are used at site, should be periodically calibrated from Authorized Test Laboratory. (ii) New safety gadgets like shock resistant Hand Gloves, safety belts, Safety shoes, Raincoats, umbrellas, Torches etc. should be provided per year of contract.(iii) Contractor should also provide HT fuse wire for 11KV DP Structure, dust cloth,WD-40.(iv)Each technician shall be equipped with the set of cutting plier,screw driver and tester.(v)Providing uniform of cotton/terrycotton cloth (02nos) per worker per year.

**9.** The NCAOR will supply all the electrical spares and consumables in case of replacement and installation required for operation, maintenance & services without any cost to the contractor.

**10.** Periodical cleaning, testing & routine maintenance of electrical systems are to be done as recommended by manufacturers, and as directed by Electrical Engineer/ Estate In-charge.

**11.** The Contractor shall ensure and display the monthly duty chart / Shift roster provided by Estate Division In-charge. For leave replacement service providers / work force should also be identified at the beginning of the contract such that they should also be aware of the operation & maintenance of the system fulfilling all other conditions as described in.

**12.** It shall be the responsibility of the Contractor for the safety of service providers / work force and maintain cleanliness of the installation/equipment's particularly which are under his sole possession/use as required. All his service providers shall be provided with Identity Card as per the norms of NCAOR.

**13.** The Contractor shall furnish local contact telephone number, Mobile number & contact address and e-mail. E-mail correspondence shall be treated as authorized official correspondence.

**14.** The Contractor shall be responsible to maintain records and furnish data about mandatory tests i.e. insulation and earth tests of all the installation as per Indian Electricity rules & IS specifications. Also to maintain records at the site e.g. attendance of duty staff, log books for equipment etc as required.

**15.** The Contractor's staff shall be responsible to dispose the electrical waste like fused bulbs, tubes, burnt cables, parts etc. at the proper place.

**16.** It shall be the responsibility of contractor to maintain and hand over back all the installations covered under the scope of service after completion of the contract period in good working condition as required.

**17.** The Contractor shall be responsible for the equipments, materials handed over to him, and in case of its damage or missing, the same shall be replaced or repaired at his own risk and cost.

**18.** All dismantled/unused materials shall remain the property of NCAOR and shall be the responsibility of the contractor to return the same to Estate store periodically as required

**19.** Any damage done to the existing installation, equipment or to the building particularly due to negligence shall be entire responsibility of Contractor to repair, rectify or replace the same at his own cost.

**20.** The installation equipments covered under this operation and maintenance contract are briefly as mentioned in the Annexure ÷ VIII attached herewith. The same shall be signed by the Contractor in token of having taken over for Operation & maintenance services in hand and shall be liable to hand

over back the installation/equipment as incorporated therein after due completion of the contract service or at the end of the contract.

21. The Contractor shall provide proper all safety gadgets like shock resistant Hand Gloves, Safety shoes, Raincoats, Torches etc. to the each staff, engaged by him during Operation and Maintenance services at site.

22. The contractor shall make own arrangements for transport and other logistics to service providers / work force.

23. Contractor shall be fully responsible for releasing payment to service providers/work force engaged by him as per provision of the Minimum Wages Act and also shall be responsible for complying with the Labour Regulations in vogue regarding the Maintenance of attendance and other registers etc. **The Contractor in addition to the above is also fully responsible for complying with the EPF and ESI Act in respect of his staff members.** The Contractor has to submit the proof of monthly deposition.

24. The service providers deployed at site of services to be carried out shall be trained and qualified as per the Indian Electricity (IE) standards and should be able to behave properly with the NCAOR's officials. In case of complaint about any misbehavior & or for improper working of any of the staff of the Contractor is received or noticed, he should be replaced by the Contractor immediately failing which it shall be presumed that no such service provider is deployed and accordingly the corresponding charges will be deducted from the bill.

25. In case of any accident occurs due to any reasons during duty hours within NCAOR campus, NCAOR will not be responsible in any way for the same. No extra payments shall be made to the Contractor and No claim what so ever nature will be given or paid on this account and **Contractor is fully responsible for such eventualities and he should indemnify the Department from such happening.**

26. Unauthorized person belonging to the Contractor will not be allowed to enter NCAOR campus.

27. The Contractor shall be responsible for the entire criminal, civil, liabilities arising during the contract period and he should indemnify NCAOR from such implication / eventualities / happenings.

28. The Contractor or his bonafide representative shall visit the site at least once a month and meet the Estate In-Charge to take instructions, monitor operations and review the complaint register/site order books, thereby attending the site requirements efficiently & effectively, failing which In-charge shall be free to take suitable action as per relevant terms & conditions of agreement at his discretion as required.

29. NCAOR reserves the right to increase the number of manpower as classified in the contract and may ask contractor to supply additional manpower as required by NCAOR as per rate of the contract.

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## **STANDARD TERMS AND CONDITIONS**

## **ANNEXURE – VII**

### **1. INTERPRETATION:**

- a. In construing these conditions the Specifications, the Schedule of Quantities, additional Conditions and Agreement, the following words shall have the meanings herein assigned to them except where the subject or context otherwise requires.
- b. This contract shall comprise of the Articles of Agreement, General Conditions of Contract, Additional Conditions, Scope of Work, the Schedule of Quantities , Specifications, drawings , letter of acceptance of tender and other documents mentioned in the contents sheet attached hereto and including those to which only reference is made herein.

**WORK OR WORKS:** shall mean all work or works defined in schedule of quantities. Specifications and such other work or works as the contractor may be entrusted with for carrying out under this contract.

**EMPLOYER:** shall mean the Director, NCAOR (National Centre for Antarctic & Ocean Research) or any Officer authorized by the Director for the purpose.

**ENGINEER:** shall mean the Engineer designated by the Employer to superintend and perform other duties as indicated in the contract.

**CONTRACTOR:** shall mean an individual or Firm or Company , whether incorporated or not, undertaking the work and shall include the legal personal representative or such individual or the persons composing such Firm or Company or the successors of such Firm or Company and the permitted assignees of such individual or Firm or Firms or Company. The Contractor is also called Party or Agency.

**SITE:** shall mean the site of the contract works including any buildings and erections thereon and any other land adjoining thereto (inclusive) as aforesaid allotted by the Employer or the Engineer for the contractor's use.

**2. GUARANTEE:** At the end of the contract, all the units/systems covered under AMC should be handed over to NCAOR in good working condition, if any fault found the EMD will be forfeited and other recovery will be made from the contractor, as per actual damages/losses etc.

**3. LABOUR LAW:** The contractor shall submit a valid license under the Contract Labour (R&A) Act 1970 and the Contract Labour (Regulation & Abolition) Central Rules 1971 before the commencement of work and continue to have valid license during the currency of the contract. The contractor to follow,

- a) Contract Labour (Regulation and Abolition) Act 1970
- b) Payment of Wages Act 1956
- c) Employment of Children's Act 1923
- d) Minimum Wages Act
- e) Employee Provident Fund Act 1952 and scheme made under said Act.
- f) Obtain required licenses/clearances etc. from Assistant Labour Commissioner, Municipality and other local agencies/bodies at his own cost, wherever necessary. And any other existing laws in this regards.

**4. SAFETY:** Contractor shall be fully responsible for any injury (whether fatal or otherwise) to his representatives/service personnel, for any loss or damage to property or for any other loss,

damage, costs and expenses whatsoever caused during visits to the site for the purpose of maintenance and to be liable to indemnify the NCAOR against any claim that may arise for any damage or loss to NCAOR property or injury caused to NCAOR.

#### **5. RENEWAL/TERMINATION OF THE CONTRACT**

- a. The Contract period is Twelve Months extendable on yearly basis for a further period of Two Years with the same rate & same terms & conditions of the agreement based on the satisfactory performance assessed by NCAOR.
- b. The work performance of the contractors & individuals service providers will be assessed periodically and if the same is found unsatisfactory the contractor should immediately replace the service provider / work force.
- c. If the Contractor is found to be not performing satisfactorily during the course of the Contract period, or refuses to do any part of the work or becomes bankrupt or knowingly submits a false statement then NCAOR may terminate the contract at any stage after giving due notice. If the Contract is terminated for any reason, EMD & Security Deposit will be forfeited.

#### **6. PENALTY CLAUSE**

- a. For non deployment of Personnel 5 % of the total monthly contract amount would be levied as penalty if full strength of agreed personnel are not present for continuous 03 days in one month.
- b. For non performance 5 % of the total monthly contract amount would be levied as penalty.
- c. The penalty to be imposed is @5% but not limited to it. All repairs should be made at the NCAOR premises as much as possible. In case any part has to be taken outside NCAOR for repair, then the same should be taken by a written request against issuance of necessary gate pass. The contractor shall replace/return the parts within two working days. Any delay in conducting maintenance/repair/replacement of critical component which leads to malfunctioning/stoppage of any of the functionaries would be dealt seriously & treated as break-down of the entire system and the entire loss incurred due to this will be recovered from the contractor and decision of NCAOR authorities will be final in such matters.

#### **7. PAYMENTS TERMS:**

- a. NCAOR will release the payment to the party against submission of Monthly Bill in duplicate after satisfactory completion of monthly work after deduction of statutory taxes. No part payment/advance will be made.
- b. The copies of deposit challans of EPF and ESI and Bank Statements of previous month of all personnel is the pre-requisite for processing payment.
- c. The contract is a fixed price contract & no escalation will be permissible during any stage of contract.

**8. SECURITY DEPOSIT (SD):** This is security cum performance guarantee deposit. EMD of the successful bidder will be converted into Security Deposit and 10% amount of every monthly bill will be deducted as SD. It is an interest free deposit and will be refunded on successful completion of the contract period. In the event of contractor fails to comply the terms and conditions of the contract the Security Deposit will be forfeited

**9. AGREEMENT:** A formal Agreement of Contract will be made between employer and the successful bidder within a week from the date of award of contract. If the Contractor fails to make an Agreement of Contract within two weeks from the date of Award of Contract, EMD shall be forfeited.

**10. POST TENDER CORRESPONDENCE / ENQUIRIES:** Any correspondence or enquiry subsequent to opening of the bids is not desirable, if the same is indulged into, it will be considered for disqualifying the tender. The Tenderer will be required to abstain from pursuing / canvassing the matter, directly or indirectly with any Officers of NCAOR, as otherwise the same would also amount to disqualification of the tender. However, bidder can ask their queries in

writing regarding bidding conditions, bidding process prior to the bid opening and/ or rejection of its bid, reason for rejecting a tender after opening of bids.

**11. SETTLEMENT OF DISPUTES/ARBITRATION:** The decision of the Director, NCAOR shall be final and binding for any dispute whatsoever. All questions, disputes or differences whatsoever which may at any time arise between the parties to this agreement touching the agreement or subject matter thereof, arising out of or in relation there to shall be referred to the decision of the Sole Arbitrator, appointed by the Director of NCAOR and the decision of the said Arbitrator shall be final and binding upon the parties.

**12. RIGHT TO CANCEL TENDER/WORK ORDER:** In case of strike, accident or any other unforeseen conditions causing stoppage of work, NCAOR reserves the right to cancel and/ or modify the tender / work order without any liability for any compensation and / claim or any description.

**13. JURISDICTION:** All questions, disputes or differences arising under out of or in connection with the Tender / Contract if concluded shall be subject to the exclusive jurisdiction of the court under whose jurisdiction the place from which the tender / Acceptance of tender is issued, is situated i.e. Goa.

I/ We have read all the above Terms and Conditions carefully and agreed to it.

*Name & Signature of the Tenderer with seal :*

**SCHEDULE OF RATES (PRICE BID)****ANNEXURE – VIII**

Sr.	Particular	No. of person / Quantity	Amount per Person Per MONTH	Total	GST %	GST Amount (Rs)	Total (Rs)
(a)	(b)	(c)	(d)	(e) =(c)x((d)	(f)	(g)	(h) =(e)+(g)
1	Supervisor	01					
<i>Only Amount (d) in words –</i>							
2	Senior Electrician (Skilled)	06					
<i>Only Amount (d) in words –</i>							
3	Junior Electrician (Semi skilled)	06					
<i>Only Amount (d) in words –</i>							
4	Helper (Unskilled)	01					
<i>Only Amount (d) in words –</i>							
5	Cost of accessories, equipments, tools necessary for maintenance, safety equipments, transportation of diesel etc, cost of uniform - 2 sets each and one pair of shoes etc.as mentioned at Annex-VI /Sr. 8.(lumpsum amount per month to be quoted)						
<i>Only Amount (e) in words –</i>							
6	Service Charges of the Contractor						
<i>Only Amount (e) in words –</i>							
7	Other Charges if any :						
<i>Only Amount (e) in words –</i>							
A	Total GST Amount(g):						—
B	Sub Total of (h):					—	
C	<b>Grand Total per month (g) + (h) :</b>						

Grand Total (C) Amount Per Month in words, Rupees í ..

Total Amount Per Year (C) x12 is Rs. í

Total Amount per year (C) x12 in words, Rupees .....

.....

*Pl. note :*

- The Rates for the contractor's personnel from sr.1 to 4 should be inclusive of his monthly wages, EPF, ESI, bonus & other benefits as directed by Labour Dept. The wages should be strictly as per the minimum wages act and as per the existing rates of the Labour Department of Govt of India/Goa.
- If the rate quoted for each personnel is less than the existing minimum rates of wages including Variable Dearness Allowance then the bid is liable for rejection
- The cost of Sr. no. 5 above may be derived as a total cost for a year & then divide by twelve to quote as a lump sum per month.
- Other than the above if any cost factor which bidder wish to quote may be quoted as Any Other Charges at Sr. No. 7.
- Discount offered if any, should be included in the quoted rates & should not be shown separately.
- Contractor should quote all items given in the price bid.
- Price Evaluation Criteria - The Lowest Evaluated Bidder (L1) would be arrived from the Grand Total (C) above.

**Certificate:**

It is certified that I/We \_\_\_\_\_ am/are  
authorised to submit this bid on behalf of M/s. \_\_\_\_\_

I/We have read the tender document carefully, accept all the terms & conditions of the tender and submitting the duly filled Price Bid within the due date and time. It is indemnified that if the work is awarded to me/us, It will be completed as per the rates quoted, within the time & as per the terms & conditions of the Tender.

**Name & Signature of the tenderer :**

**Date & Seal :**



EMD & Tender Fees details

I / we have enclosed,

1. A crossed DD No. *í í í í í í í í* . dated *í í í í í í í í*  
of Rs. 1,27,875/- (*Rs. One Lakh Twenty Seven Thousand Eight Hundred Seventy five\_only*)  
drawn in favour of NCAOR payable at Vasco-da-Gama **towards EMD.**

2. (*If the Tender Form is downloaded from NCAOR website*)

A crossed DD No. *í í í í í í í í* . dated *í í í í í í í í*  
of Rs. **1000/-** (*Rs. One Thousand only*) drawn in favour of NCAOR payable at  
Vasco-da-Gama towards **Tender Fees.**

Name & Signature of the Tenderer with seal :

PARTICULARS OF THE TENDERER

1. Name of the Tenderer : \_\_\_\_\_

2. Main Office Address : \_\_\_\_\_

3. Goa Office Address : \_\_\_\_\_  
\_\_\_\_\_

*(Pl. enclose copy of Electricity Bill/ Telephone Bill etc. of Goa address as a proof of establishment)*

(a) Name of the contact person : \_\_\_\_\_

(b) Telephone No. (s) : \_\_\_\_\_

(c) Fax No. : \_\_\_\_\_

(d) E-mail Address : \_\_\_\_\_

*(E-mail address should be provided which will be used for official correspondence)*

(e) Website Address : (if any) : \_\_\_\_\_

4. Electrical Contractor Licence Number : \_\_\_\_\_

For KVA : \_\_\_\_\_ Registration Valid up to date : \_\_\_\_\_

*(Please enclose copy)*

5. PAN No. of the quoted Firm / Tenderer : \_\_\_\_\_

*(Please enclose copy)*

6. Goods and Service Tax (GST) Number : \_\_\_\_\_

*(Please enclose copy of registration number)*

7. Whether the firm is ESI Registered? : YES / NO

*(Please enclose copy of registration certificate)*

8. Whether the firm is EPF Registered? : YES / NO

*(Please enclose copy of registration certificate)*

9. Have you ever terminated/Black Listed by any organization : YES / NO

*Name & Signature of the Tenderer with seal :*

**INSTRUCTIONS TO THE TENDERERS**

Tenderers are advised to submit tender strictly as per conditions stipulated in the tender document. Please enclose the following with the tender & submit all in a **Single Sealed Cover**.

***Cover (Sealed):***

1. Covering letter from the Tenderer on his own letterhead.
2. Tender fee in the form of DD, if down loaded from NCAOR web site.
3. EMD in the form of DD
4. Annexure ó IX (EMD & Tender Fee details)
5. Annexure ó X (Particulars of the Tenderer)
6. Eligibility & Work Completion Proforma (Annexure ó V) along with self attested copies of Work Orders & Work Completion Certificate.
7. Price Bid (Annexure ó VIII, with signature & stamp on all pages)

All above document should be submitted in one sealed envelope (Single BID SYSTEM) superscribing **Name of the Tender, Tender Number, date and time of tender opening** and address to **Director, National Centre for Antarctic & Ocean Research, Headland Sada, Vasco-Da-Gama, Goa**. Tender duly completed in all respect should be dropped in the tender box kept in the office of Estate section well before the due date & time.

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**APPENDIX –I to X****PMI SCHEDULE FOR ELECTRICAL SYSYTEM:**

Sr. No	Check for the following	D	W	M	Q	H
a.	Non-burning of lights	*	-	-	-	-
b.	Noise from choke	*	-	-	-	-
c.	Flickering of tube, blackening of tube light ends and if yes. Corrective action to be taken.	-	*	-	-	-
d.	Loose connections/Loose wiring	-	-	*	-	-
e.	Switch/Power plug condition	-	-	*	-	-
f.	Cleaning of Fixtures & tubes	-	-	-	*	-
g.	Cleaning of fitting louvers	-	-	-	*	-

**APPENDIX -II****FAN, EXHAUST FAN, WALL MOUNTING FAN AND PEDESTAL FAN**

Sr. No	Check for the following	D	W	M	Q	H
a.	Cleanliness of fan blades	-	-	*	-	-
b.	Noise, loose connection and loose wiring	-	-	*	-	-
c.	Split pins for holding the ceiling fans	-	-	-	*	-
d.	Condition of switches and fan regulator	-	-	-	*	-

**APPENDIX -III****VIP ROOM and DIRECTOR'S ROOM**

Sr. No	Check for the following	D	W	M	Q	H
a.	Cleanliness of Fittings, switches/sockets	*	-	-	-	-
b.	Condition of working of exhaust fans	*	-	-	-	-
c.	Neatness an general appearance of all electrical fittings/equipments in the room	-	*	-	-	-
d.	checking of Serviceability Emergency Lights	*	-	-	-	-

**APPENDIX -IV****WATER SUPPLY PUMPS, DRAIN PUMPS, SEWAGE PUMPS AND HYDRO PNEUMATIC SYSTEM**

Sr. No	Check for the following	D	W	M	Q	H
a.	Check current drawn by each pump set	*	-	-	-	-
b.	Lubricate all moving parts of pumps sets as and when required	-	-	-	*	-
c.	Check the control wiring of panel	-	-	-	*	-
d.	Check the foot valve gasket	-	-	*	-	-
e.	Record the No. of pumps in operation in the register	*	-	-	-	-

**APPENDIX -V****GENERAL CHECK**

Sr. No	Check for the following	D	W	M	Q	H
a.	Broken switches/switch boards in public area shall be replaced with new ones quickly	-	*	-	-	-
b.	Fans in the public use toilets shall be cleaned every week or earlier	-	*	-	-	-
c.	All the switches and switch boards shall be regularly cleaned and all fixing screw shall be checked and fixed tightly	-	-	*	-	-
d.	Proper tightness of cable/wire connections in MCB/DB valve gasket	-	-	*	-	-
e.	Closing/locking arrangement of MCB DB	-	-	-	*	-
f.	Proper circuit marking in the MCB DB with location	-	-	-	-	*
g.	Cleaning of Sign Boards	-	-	*	-	-

**APPENDIX -VI****ELECTRICAL SUBSTATION**

Sr. No	Check for the following	D	W	M	Q	H
a.	General cleanliness of the switch room, unwanted and inflammable materials should not be stored in the switch room	*	-	-	-	-
b.	Voltages in three phases and current in each phase.	*	-	-	-	-
c.	Indication lamps	-	*	-	-	-
d.	Illumination level inside the room.	-	-	*	-	-
e.	Fuses/MCB/MCCB and SF Units.	-	-	-	*	-

f.	Working condition of meters, voltmeters and ammeters in the panel.	-	-	-	*	-
g.	Cable termination tightness inside the switchboard	-	-	-	*	-
h.	Earthing of LT Panel	-	-	-	-	*
i.	First aid procedures for electrical accidents	-	-	-	-	*

## **APPENDIX -VII**

### **Schedule of Maintenance Check for HT/LT Panels, Bus duct changeover Panel and Syn. Panel**

Sr. No	Check for the following
	<b>Daily</b>
1	Check cleanliness of switch room/panels/bus ducts.
2	Check and clear unwanted material from switch rooms
3	Check for proper spreading of insulated rubber mats in front/rear side of panels.
4	Check the working of meters, indication lamps, control switches and audiovisual annunciation in the panels
5	Check for over heating/burning smell/any abnormality in all the panels
	<b>Monthly</b>
1	Check for operation of ACBs/OCBs and switches
	<b>Quarterly</b>
1	Check the termination/connection of all incoming and outgoing cables/bus ducts
2	Check the tightness of cable termination and lugs
3	LT panels, Bus duct, Syn and changeover panel
4	Check the tightness of control cables
5	Check the rating of fuses for all incoming and outgoing switches, control/indication circuits.
6	Check the insulated/backelite portion of switches for carbon formation.
7	Check the condition/continuity of body earthing
8	Check for operation of relays.
	<b>Yearly</b>
1	Check for the continuity of earth bus for panels/busduct.
2	Check the calibration of all relays.

3	Check for the need for painting.
4	Check the tightness of cable termination and lugs of HT panels.
*	All the panels inside the S /stn, shall be checked daily. As regards other panels in T.B/other installation periodicity of the daily check could be made weekly.

### **APPENDIX -VIII**

#### **Schedule of Maintenance Check for Power Transformers**

Sr. No	Description
	<b>Daily</b>
1	Check cleanliness of transformer yard
2	Check for uniform spread of Gravel and grass / vegetation growth in the yard
3	Check for any abnormal noise
4	Check for any oil leakage
5	Check the condition of silica gel
6	Check oil level in conservator
7	Check the explosion vent diaphragm for any crack or breakage
8	Check the locking arrangement of transformer yard
	<b>Quarterly</b>
1	Check oil level in breather oil cup
2	Check emergency trip push button operation
3	Check Earthing, clean the pit, put salt, water in earth pit.
	<b>Half Yearly</b>
1	Check/ examine bushings for cracks/dirt deposits
2	check tightness of connection at HT, LT and earth terminals
3	Check for free operation of Tap changer
4	Check tightness of connections at Marshalling Box
	<b>Yearly</b>
1	Check acidity of transformer oil



2	Check insulation resistance of Transformer
3	Check and tighten the Gasketed joints
4	Check cable box for Sealing of holes
5	Check cable box for moisture condensate
6	Check Buchholz relay contracts and their operation
7	Check Magnetic oil level gauge contacts and their operation
8	Check winding Temp. Indicator contacts and their operation
9	Check oil Temp. Indicator contacts and their operation
10	Check the pockets holding Thermometer for Temp. Indication
11	Check Transformer oil dielectric strength and Record.
*	Annually or earlier as per the manufacturers recommendation.

## **APPENDIX -IX**

### **Schedule of Maintenance Check for Earthing System**

Sr. No	Description
	<b>Monthly</b>
1	Cleanliness of Earth pit/ area
2	Check the condition of earth pit cover
	<b>Quarterly</b>
1	Check the condition of watering funnel
2	Watering of earth pits
3	Check earth resistance and record
4	Check the tightness of earth connections and continuity
5	Check the identification marking of earth pits
6	Check continuity of main earthing lead from earth pit to panel/ Equipment
*	The above schedule shall be strictly followed for substation equipments. For earth pits at other locations, these quarterly checks can be carried out semiannually.

**APPENDIX -X****Schedule of Maintenance Check for Battery Bank**

Sr. No	Description
	<b>Daily</b>
1	Cleanliness of Battery room/ battery/battery bank.
2	Check and record specific gravity, cell voltage and electrolyte level of battery.
3	Check the working of exhaust fan in battery room.
4	Check the working of meters, indication lamps and audio - visual annunciation in the Battery charger.
	Check the working of main and standby of battery charger i/c all functioning of battery charger.
	<b>Monthly</b>
1	Check the battery terminals
2	Check the interconnection of cells in battery bank
3	Check the condition of hydrometer, cell tester used for battery maintenance
4	Check for loose connections or any abnormality in DCDB
	<b>Quarterly</b>
1	Check the condition/continuity of body earthing
2	Check the tightness of connection in Battery charger.

Pl. Note that all above,

1. There activities and periodicity are minimum.
2. Any missing activities can be incorporated and implemented.
3. On checking the individual parameters, deficiency found shall be rectified immediately in a time bound manner.

*Abbreviations used :*

*PMI : Preventive Maintenance & Inspection*

*D : Daily, W : Weekly, M : Monthly, Q : Quarterly, H : Half Yearly*

