

JAWAHARLAL NEHRU PORT TRUST
(M&EE Department – Utility Services Electrical Maintenance Section)

JNPT/M&EE/US/EM-SEZ/O&M CONTRACT/2020/

18.11.2020

Sub: Budgetary Offer for Operation and Maintenance of 220 KV Sub-Station, 33 KV Sub-Station (03 Nos.), 33 KV Compact Sub Station (01 no.), Street Lights, High Masts, Utility Buildings, Solar System and Other Areas at Jawaharlal Nehru Port Trust-SEZ.

The following may please be noted:

1. The vendor is advised to acquaint himself with the job involved at the site that may be necessary for preparing and submitting the Budgetary Offer.
2. The copy of valid Electrical License issued by State Govt. Authority or appropriate Govt. Authority is to be submitted.
3. **Period of Contract:**
Contract period for this work will be **02 Years (24 Calendar Months)** from the date of placement of work-order which shall be extendable by another one year on mutual consent, if services are found satisfactory.
4. **Rates and Amounts Include All Charges:**
The rates and amounts submitted by the vendor shall be in accordance with Price Schedule.
5. The vendors may quote as per the Price Schedule given in the enquiry and submit their budgetary offer **offline** from **18.11.2020 to 02.12.2020 up to 1500 hrs.** on the address given below:

MANAGER (Utility Services),
Jawaharlal Nehru Port Trust, Administration Building, 1st Floor,
Sheva, Navi Mumbai, India-400 707.

Contact Details:

Phone: +91 22 27244196/ 22 27245119/227245125/9820359387

**E-mail: arvindpradhan@jnport.gov.in /anilchopade@jnport.gov.in /
raviranjan@jnport.gov.in**

6. It is requested to submit the budgetary offer with validity period of **90 days** and in case vendor desires to give any input which may be indicated in their offer. Please submit the

offer on your firm's letter head on the address given above and also to forward the soft copy of the same on the e-mails mentioned above.

7. SCOPE OF WORK

7.1: DESCRIPTION OF ELECTRICAL SYSTEM IN JNPT-SEZ AREA:

Pre-amble:

- JNP SEZ receives electrical power from Maharashtra State Electricity Distribution Company Ltd. (MSEDCL) **{JNPT may procure power from other alternate sources apart from MSEDCL in later stages with whom contractor has to co-ordinate.}** at 220KV level through overhead transmission line at 220/33 KV Sub Station of JNPT-SEZ. It has 02 transformers bays with 02 nos. X 50 MVA which is stepped down to 33 KV level and further to 11 KV at three switching substations. The 33 KV lines shall be underground cables. The 11KV power supply shall be fed through underground cables to RMU in 11/0.415 KV system. The Power supply of 11KV will be catered to plot owners/consumers in JNPT-SEZ area for their use.
- One no. of 33/0.433 KV, 500 KVA station transformer is installed at 220/33 KV Substation. Make : Voltamp
- The total connected/available Electrical Load facility shall be 50MVA (for Sector 1 to 7). The max demand shall be approx. 36.3MVA.
- Electrical System has been designed to meet this power requirement of SEZ consumers and infrastructure.

- **HT PART :**
 - SEZ project is comprising of one 220/33KV Receiving Substation located at eastern boundary of JNT-SEZ area with 220/33 KV AIS and 33 KV GIS.
 - In 220/33KV substation the make of Current Transformer, Potential Transformer and Lighting Arrester is of CGL,
 - Transformers are of Voltamp,
 - Control and Relay Panel (CRP) & Substation Automation System (SAS) is of GE make,
 - 33 KV GIS is of Schneider,
 - Battery & Battery Charger is of Amara Raja,
 - 220 KV Circuit Breakers (CBS) is of Simens,
 - Isolators is of Faradays, and
 - Alternating Current Distribution Board (ACDB) is of Nitya Electricals.

 - 03 Nos. of 33/11 KV Indoor substations are proposed to meet the load demand of processing & & non-processing zones.

- 33/11 KV substation will receive power through two feeders from 220 / 33 KV switching station. 33KV & 11 KV VCB make is Schneider.
- Interconnection in between 33/11 KV substation & 220/33 KV substation proposed through 33 KV, 3C x 400 sq. mm. (E), Al. Round armored cable. Make of the Cable is Polycab.
- 3Cx400 Sq. mm. (E) HT cable are laid through trench.
- Connection in between Outgoing 11KV Bus bar & RMU has done through 3C x 300 Sq. mm. (E) HT cable laid through trench. Make of the Cable is Polycab.
- Total 45 number of RMUs are to meet the power demand of Residential and Industrial units.
- RMU's are with configuration of 2 IN & 3 OUT and with Load Break Switch & Vacuum Circuit breaker with protective relays. RMU's make is Schneider.
- Each 33/11 KV substation substations are comprising of 4 number of 8 MVA power transformers i.e. total 12 nos. of 8MVA, 33/11 KV transformers are of Telawne Make.
- SCADA System in substation area. Make :.....
- 1 MVA compact sub-station 33 KV/415 V for which incoming source of power is from Sub Station of Port Users Building (PUB).

➤ **LT PART**

- One no. of 220 KVA, 440V DG Set is at 220/33 KV Substation. Make Cummins....
- Two nos. of 100 KVA Outdoor transformers for street Lights/Station Transformers. Make: Super
- Street Light has been provided at every approx. 25 meters distance at road divider & side of roads.
- Wattage of light fixture for street lighting is approx. 150W LED for internal roads and 7W LED for landscape illumination.
- Centralized Solar System shall be installed for street light.
- For major road junctions 30 meters of height (1 No.), 25 meters of height (01 No.) & 16 meters of height (2 Nos.) High Mast lighting. For high mast lighting of 30 meters Pole Height 400W (16 Nos.) LED Flood Lights, for high mast lighting of 25 meters Pole Height 400W (8 Nos.)

LED Flood Lights & for High mast lighting of 16 meters Pole Height 240W (8 Nos.) LED flood light shall be provided.

- Power supply to PHE services i.e. Sewage Treatment Plant etc. shall be provided.
- Power Supply provision for landscape / parking shall be done through local transformer of street light.
- 315 KVA transformers will serve as supply for Admin. Building, Training Center & Security Cabin. Make Super.
- Proposed Gate Complexes and Kiosks/Shops/ Utilities Outlets.

The 220/33 KV sub-station at JNPT-SEZ will be commissioned shortly along with SCADA system to control all equipment operations from centralized control room. It is felt prudent to seek services of agencies who are expert in the field of sub-station operation & maintenance equipped with state of the art switchgears (Indicated in this document)/SCADA etc. and can provide specified technical manpower at JNPT-SEZ sub-station for "Operation and Maintenance" of all the 220 KV, 33 KV sub-stations and all other electrical installations & systems mentioned in this enquiry.

Various makes of Switchgears/Equipment have been installed at the sub-stations to provide emergency power to various critical loads of JNPT-SEZ. Details of some of the Major equipment are given above & also mentioned below for reference of the bidder. The contract covers operation & maintenance of the 220 KV and 33 KV sub-stations and other installations by providing service of appropriate level of experienced manpower in each shift and in General shift.

NOTE:

JNPT may procure power from other alternate sources apart from MSEDCL in later stages with whom contractor has to co-ordinate.

7.2 Scope of the work for:

- a. Operation and Maintenance of 220 KV, 33 KV Substations, Street Lights, High Masts, Utility Buildings, Solar System and Other Areas at JNPT-SEZ.**

The Operation and Maintenance envisage all the required tasks to ensure:

- a) Uninterrupted power supply to all locations at JNPT-SEZ on 24 X 7 basis.
- 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 all Electrical safety and General safety rules, regulations and procedures.
- f) Preventive Maintenance / Scheduled Maintenance.

- g) Break down Maintenance.
- h) Maintenance of proper records of operation and maintenance (Log book, Registers, check list etc., shall be approved by Contractor).
- I) Assistance to JNPT-SEZ in expansions and modification.
- J) Additional manpower for maintenance activities shall be posted as and when required as per instructions of the Engineer-in-charge.
- K) In case of problem with any critical equipments / system e.g. 220 KV AIS, 33 KV GIS switchboard, Battery & Battery Charger and SCADA etc., the successful contractor has to liaise with equipment's OEM and attend the problem. In case of any major repairs needs to be attended, the contractor shall submit detailed report and recommendation to the Engineer-in charge in consultation with equipment OEM so that further necessary action can be initiated for rectification. For the work which are highly critical in nature and OEM or its authorized representative is required for that JNPT-SEZ will make back to back AMC arrangement with them e.g. 33Kv GIS, SCADA, DG Set & OLTC.
- L) The contractor shall comply with all type of Insurances as per labour laws/Acts/Rules/Regulations etc.
- M) Provision of Uniform and safety gears/PPEs to deployed staff shall be the contractor's responsibility.
- N) To inform the JNPT and arrange for ensuring of all statutory compliances necessary under Electricity rules/Acts/Rules and Regulations.
- O) To attend all H T a n d L T electrical complaints reported at sub-stations in all shifts.
- P) To follow the various procedures/systems prevalent in the JNPT e.g. documentation as per ISO etc.
- Q) To provide Tools & Tackles, Test instruments/Meters, PC/Laptop with Printer, Stationeries necessary for day to day works.
- R) To provide Accommodation in near vicinity, Local conveyance to its staff during contract period.
- S) Charges towards OEM services, all required spares for maintenance, all statutory payment, Annual Inspection charges to Government authority, Local body etc. will be the employer's responsibility.
- T) Details of the major equipments installed at 220 KV, downstream 33 KV sub-stations and 11KV RMU etc. are mentioned in this document for reference however besides these, other auxiliary/supporting equipments are also installed which are deemed to be covered under this contract. It is also possible that certain new equipments will be added at the sub-stations and these equipments will also be deemed to be covered under this contract.
- U) The scope of contract works also includes maintenance of D. G. sets, Air-conditioning system of control room and kiosk, Switchyard/road illumination system, Firefighting pump house, water supply availability etc. For Air condition, any minor spares like filter, oil, glands, related to operation of AC plant shall be in contractor's scope.
- V) The contractor shall also maintain protection system including relay co-ordination and settings, liaison / co-ordination as per guideline of employer and other statutory

authorities. The testing of relays & protection system is to be carried out in presence of Owner/employer Engineer only.

- X) The contractor shall inform Engineer in charge well in advance for taking power shut down (Outage) as and when required for preventive / periodical maintenance in 220 kV sub-stations and switchyard in order to intimate concerned officials to enable them to make necessary arrangements during power shut down.

- Y) The shutdown for the maintenance of substation equipments will be provided by Engineer in charge on submission of request by contractor / his authorized representatives. The records are to be maintained in register by the contractor as per Proforma provided by Engineer in charge of concern sub-station at the time of handing over the sub-station and the same is to be certified by Engineer in charge of Employer before passing of monthly bill.

- Z) The proper performance of the equipment and system shall be the sole responsibility of contractors. If the nature of repairs is minor for any of the equipment installed in the sub-station, the rectification of the same would be the whole responsibility of the contractor. The contractor should preferably have tie up with OEM/or liaise immediately with the relevant equipment/system OEM and get it rectified immediately. The deployed staff should have adequate technical knowledge to attend defects.

- AA) The scope of breakdown maintenance should include all the services required for replacement/repair of defective equipment/parts due to equipment failure. The equipments / major spares, if available, will be provided by Employer.

- BB) If outages is to be extended for further period of scheduled time, it is to be got approved by the Employer.

- CC) In case of emergency and if the employer is not able to supply the equipments / spares, the contractor will be required to arrange for procurement of equipment / spares /OEM services, the cost of which will be reimbursed to the contractor as per actual expenditure on production of invoice of the same however estimate/expenditure for the said work shall be got approved from the engineer-in-charge in advance by collecting at least three quotations from the market for estimation purpose based on which approval for the procurement/services will be given. In case of major spares, the employer will process for payment as per approved procedure at its place.

- DD) During the execution of contract, if any kind of repairs is considered to be of the major nature and it is absolutely necessary to be undertaken at work place of manufacturers / suppliers, it should be reported to the Engineer In-charge(EIC) immediately with failure analysis report so that repair work may be taken up. The contractor shall suggest suitable vendors/contractors who are well experienced/qualified and can take up the repair jobs.

EE) The contractor shall ensure that all Tools and Plants / items are readily available in the sub-station for attending any kind of running breakdown. All break downs including electrical / mechanical shall be promptly attended in shortest duration by the contractor. Special spares related to equipments shall be arranged by the Employer.

FF) Handling transportation of materials for day to day maintenance from store to required site shall be the responsibility of the contractor.

GG) Returning of unused/replaced/scrap material to Stores by taking certification of Engineer-in-Charge for purpose of accounting.

HH) Operation and maintenance of equipment like Breakers, RMU, VCB, Switches, Lighting system, equipment's etc.

II) Deployment of Jeep for 24 hours for shifting of men and material at site as specified above.

JJ) **SAFETY**

a. The bidder shall comply all safety Norms prescribed by I.E rules related to the work. He shall provide safety gears to all his employees. All employees entering the premises should wear Safety Helmets, Safety Shoes, and Uniform, carry Identity Cards etc.

a. The Bidder shall maintain Fire Fighting Equipment provided at Sub Station Premises in healthy & working condition. He shall inform the Engineer In-Charge for refill of all firefighting equipment and validity of the certificates.

C. He shall conduct Safety Training to his employees periodically with intimation to the Employer.

b. **Operation and Maintenance of Sub-stations:**

a) Switching ON and Switching OFF of 11kV, 33kV and 220 kV Circuit Breakers, Isolators, all incoming and outgoing breakers, HT Panels, Yard Lights etc. as and when required according to load requirements and instructions from Engineer In-Charge.

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 Engineer In-Charge which require major / minor improvements/repairs.
- e) Maintaining system of 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 Engineer In-Charge changing the taps of transformers as and when required.
- i) Co-ordination with electricity distribution utility for efficient, reliable operation of 220kV and 33 kV Substations.
- 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 Engineer In-Charge before being implemented.

The Operation of 33kV and 220 kV Switchyard, 11 KV RMUs Outdoor, 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 RMUs, 33kV and 220 kV Switch Yard, indoor / outdoor equipments like Control Relay Panels, Station Metering Panel, Switchyard Control Panel, AC& DC Distribution Boards and LT Distribution System.
- b) Routine Surveillance of 11kV, 33kV and 220kV 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 RMUs, 33kV and 220 kV overhead 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 LT Distribution System, 11kV RMUs, 33kV and 220 kV Switch Yard, raising deficiency reports and communicating to Engineer In-Charge.
- 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 Engineer In-Charge.
- 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 Engineer In-Charge.
- 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 JNPT-SEZ.
- 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 33kV and 220 kV Switchyard Sub Station, 11 KV Indoor Panels /Outdoor, RMUs, HT< Switch Gear & Distribution Systems.

q) For removing trees/big branches shall be reported to Engineer In-Charge which will be taken up with JNPT's PPD Dept.

C) Co-ordination with MSEDCL/MSETCL/Any other Electricity Distribution Utility engaged /Inspectorate

a) Co-ordination with MSEDCL/MSETCL/Any other Electricity Distribution Utility engaged /Inspectorate officials for all related works and giving reports to Engineer In-Charge regarding, information from these Electricity Distribution Utility and co-ordination with Electrical Inspectorate in all relevant activities.

A. 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 substations and related equipment will be provided by Contractor. 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, and 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 petroleum 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/liason with Engineer In-Charge, and the Original Equipment Manufacturer (OEM) 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. (Provided by JNPT-SEZ)
- n) Sweep Frequency Response Analysis (SFRA 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. (Provided by JNPT)
- 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 JNPT-SEZ.

C. Lightning Arrestors

Daily :

- a) Checking the readings of surge arrestor counters.

Monthly:

- a) Cleaning of porcelains Insulators of LA. (Cotton Rags etc. to be provided by Contractor)

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 Lightning Arrestor pole. (LA to be provided by JNPT-SEZ)

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. (Provided by JNPT-SEZ)
- 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 in case of lead screw type.
 - ii. Oil auxiliary switch linkage and pivot on the guard aperture for manual operation. (Provided by Contactor).
 - 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 disconnecter 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. (Provided by JNPT-SEZ)
- 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/ Any Reputed Make with the approval of Engineer In-Charge . (Provided by Contractor)

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, composite 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. (Provided by JNPT-SEZ)
- 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 JNPT-SEZ).

I. 11 KV/33 KV/220 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. (Materials will be supplied by JNPT-SEZ or Contactor as mentioned and tools should be provided by the contractor)

J. LT and HT 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. (Provider by Contractor)
- e) Checking of Indication Meter and rectification/replacement if, required. (Provider by JNPT-SEZ)
- f) Checking/replacement of fuses if required. (Provider by JNPT-SEZ)

- 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. (Provider by Contractor)
- 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 JNPT-SEZ.
- 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. (Provider by JNPT-SEZ)
- 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 JNPT-SEZ.

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 JNPT-SEZ.
- 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:

- 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.

Q. Maintenance Schedule for Station Battery Set and battery Charger:

Daily

- 1. Float charger Auto Mode output voltage measurement.
- 2. Battery set connected to load DC Voltage measurement.
- 3. Check the specific gravity of the cells and temperature of cells.

Weekly

- 1. Check Voltages of all cells of batteries.

Monthly:

- 1. Check Battery Charger.
- 2. Check Corroded Cells and repair/replacement. (Provided by JNPT-SEZ)

Half Yearly :

- 1. Check the voltage of all the cells with the float charger ON.

Yearly :

- 1. Check Battery Stand.

R. Maintenance Schedule for Capacitor Bank:

Weekly:

- 1. Check for cracks or bulging of the relay of capacitor units.
- 2. Check for continuity and tightness

Monthly :

- 1. Capacitor unit : Check of leakage of impregnate form terminals/ lid , welded seams.
- 2. Check for general cleanliness Capacitor bank, busbar connections and rack.

3. Voltage transformer (RVT).

Half Yearly:

1. Check IR values of the capacitor units.
2. Check charging current.

As per MSE Manual:

1. Series reactor

As and When Required:

1. Repaint capacitor units and supporting structures. (Provided by JNPT-SEZ)

P: RMU Maintenance:

1. Hourly Checking: NA
2. Daily Checking: Visual inspection Manometer status (Gas leakage level) / metering compartment(Look out for Low Battery Indication on Battery Charger).Thermostat of space heater setting should be at 40degree centigrade.
3. Weekly Checking: Visual inspection Manometer status / metering compartment(Look out for Low Battery Indication on Battery Charger).
4. Monthly Checking: Similar to Point 2&3. Also if you have the opportunity for **shut down** kindly check the RMU ON/OFF operations. In case of Monthly shut down visual inspection of the cable termination should be checked (look out for BOOTs alignment) & Cleaning of cable box , LV chamber.(As per the cable termination guide lines shared in the Manual during delivery).
These activity should be carried out in line with product catalogue advise (Consisting of safety and Shut down guidelines).
5. Yearly Checking: Complete testing of RMU through AMC.

8.0 Objective of the contract:

In order to maintain above-mentioned installations, the JNPT-SEZ would like to enter into “ Annual Operation & Maintenance contract” with eligible agency. The basic objectives of outsourcing the maintenance activity is as under:

1. Efficient utilization of assets and seeking for lowest life cycle cost.
2. Continuous condition monitoring and better spares inventory management.

3. Reduction in occurrences of breakdowns.
4. Reduction in duration of breakdowns.
5. Maintaining Uninterrupted power supply to all locations with power factor to near **"Unity"**.

In order to attain the objectives, the successful contractor will have to arrange the services of the team of Engineers / Supervisors / Electricians/Helpers at our works. The staff should be sufficiently experienced & knowledgeable to take up such kind of job. It would also be necessary to impart them various types of trainings from professional institutes, while on the job, to improve upon their performance and to take up additional challenges as per the need of time.

The work has to be carried out as per the best engineering practices and as per the OEM's instruction manuals.

It is most important that the entire work should be organized without any assistance from the JNPT-SEZ. The services from contractor team are required for 24 hr. x 7 basis. During weekly OFF day or on holidays, specified minimum manpower in this document should be made available. The responsible personnel should be available in nearby vicinity to attend / guide the team for any of the emergency that may occur anytime during the contract period. The updated valid contact details for all the personnel should be available at control room of substation JNPT-SEZ all the time. The contractor may request JNPT for allotment of township quarters for their staff which shall be allotted to them as per rules and regulation of JNPT.

The over-all In-charge will be responsible for maintaining the health of the equipments, operations of the equipments and finally to ensure reliability of power supply at all areas. He should be capable of driving /guiding the team of the Engineers and Operators to maintain the infrastructure. He is also responsible for managing entire maintenance activities including but not limited to the following:

- i. The contractor shall have to provide man power / supervision in addition to minimum assured manpower to attend break downs, routine & periodic maintenance, testing of equipment, representatives of equipment manufacturers for attending trouble shooting. The contractor shall organize his resources in such manner to provide uninterrupted Power Supply to the Bidder.
- ii. The scope of operation and maintenance of 220 kV sub-station includes all the works as required under the 220 kV sub-station manual of CPIB/standard norms of JNPT/PGCIL. The periodical maintenance reports of 220 kV sub-station shall have to be submitted to the employer in hard and soft copy by mail on monthly basis. The lists of such activity are to be submitted by the bidder in technical bid submission. The scope also included routine/periodical maintenance of sub-station and accessories

including preventive/breakdown services as and when required.

- iii. The scope includes maintaining Minimum specified assured manpower as per Schedule for 24 hours Operation & Maintenance of sub-station. The contractor shall have to provide man power / supervision in addition to Minimum assured Manpower to attend Break downs, Routine & Periodic Maintenance, testing of equipment and arranging representatives of equipment manufacturers for attending trouble shooting as and when ordered by the employer.
- iv. The bidder should maintain good quality Infrared camera & should carry out Temperature scanning of the clamps & connectors periodically of switchyard and transmission lines. At no cost there should be any interruption due to hot spot. He should also be equipped with latest facility for testing of transformer oil and to check it periodically.
- v. The bidder shall arrange all types of consumables items / materials required for routine/periodical maintenance for s/s like fuses, indication lamps, and PVC tapes, luminary lamps like LED lamps, SF-6 gas cylinder, including first-aid items as per IE Rules during the period of Annual Maintenance Contract. All the costs of consumables items & materials and non-consumables required for routine/periodical maintenance are to be included in the scope of works. The contractor shall arrange all the tools and tackles as specified in the tender, testing instruments etc., as and when required during AMC period. All required tools and plants should be kept ready at the Sub-station for all 24 hours.
- vi. **Watch & Ward:** The watch and ward of entire sub-station switchyard premises is the responsibility of the successful contractor. Staff deployed shall take care and ensure that no meter/testing equipment or parts of any switchgear etc. is damaged/stolen.
- vii. To initiate various energy conservation activities and take active part in each efforts.
- viii. To maintain/ensure cleanliness in all areas of sub-stations and Switchyards.
- ix. To plan and execute for shutdowns for preventive maintenance of each of the substation equipment's in co-ordination with department-in-charge.
- x. To maintain the stock of consumables such as cloth, grease, Insulation tapes, Jelly, CRC, Emery paper, etc. These consumables will be provided by the JNPT-SEZ and shall be withdrawn from sub-store as per requirement.
- xi. To prepare and maintain documents/drawings such as SLD, Schematics, Manuals, History sheets, Inspection & PM report, Permits issued for all the

installations. To update all the maintenance data in JNPT SAP /JNPT-SEZ SAP maintenance module/MM module and obtain various reports as and when necessary.

- xii. To co-ordinate & maintain for operation and maintenance of street lighting / High mast lighting, Lighting inside sub-stations and nearby area.
- xiii. To prepare and monitor the shift schedules of workmen, Manpower Positioning, work allocation, etc.in consultation with Engineer-in-charge.
- xiv. **Emergency Operations:** Taking action to avoid any abnormal condition arising on account of over loading, over voltage, under frequency, excessive temperature rise, which may result into partial or total grid failure.
- xv. Operations to be carried out in total supply conditions.
- xvi. **SCADA System** monitoring and Supervision of proper functioning of switch yard equipments in service and protective relay inside the control room. Recording of condition of equipment in shift duty registers on hourly basis or as informed by the Engineer In-Charge. Condition monitoring of Online DGA monitoring system periodically, any abnormality / deviation of condition of substation equipments shall be intimated immediately to the in-charge engineer of substation for remedial actions.
- xvii. The staff on duty will not allow any outside person to enter in the substation yard without permission of JNPT's authority.
- xviii. During tripping of any Lines / Feeder / Equipment the relays / Facias / Alarms observed in control room panels are to be noted immediately and carefully before resetting the same and the equipment not to be charged again without ensuring that the Relays / Facias are not indicated any heavy fault / Damaged to equipment. This is to be informed immediately to Engineer In-charge of sub-station and concern authority (employer). In sort before charging the equipment / lines it is to make sure that no fault persists and relays / Facias appeared does not indicate likely hood of damaged to equipment or chances to damage equipment.
- xix. Energy Meter installation/replacement/checking etc. of consumers as per instruction of Engineer In-charge and co-ordination with MSEDCL etc. (Provided by JNPT-SEZ)

9.0 To initiate time bound actions for the following and report the progress every month:

- i. Data collection & identification of avenues for energy conservation w.r.t international benchmark data.

- ii. Predictive maintenance such as Diagnostic testing, keeping history/ record of Condition monitoring of all Critical equipment's (Maintaining all equipments health/history card), Periodic Relay testing & co-ordination in all sub-stations, Checking interlocks of HT/LT breakers, etc.
- iii. Preventive maintenance (Planned Maintenance) to be attended in General shift as per approved preventive maintenance schedule.
- iv. Material Management, Inventory control, Data Collection for spares & management, Management of stores for upkeep of critical spares of HT/LT Substation equipment's & other areas etc.
- v. To co-ordinate the visit of the Electrical Inspector for Annual Inspection and provide the data / Information as may be required by him and also to comply the electrical inspector's requirements.
- vi. The successful contractor is required to submit complete profile of the company containing details of present and past clients, List of permanent, experienced and qualified staff, and certificates of satisfactory services from clients, organizational setup of company, Electrical Contract License, Shop act license, ESI / PF numbers etc.
- vii. It would be necessary to prepare Maintenance manual before commencement of the O&M activities under this contract. Although, several instructions in this regard would be necessary from time to time, the manual will help working team to reduce equipment failure & improve the services to be rendered. It is requested to study in detail the requirement and provide your Quote.
- viii. The scope of preventive maintenance/breakdown service should include all the services required for replacement of defective equipment/parts due to equipment failure during normal operation and due to natural calamities /act of God including collapse of foundations, substation equipment failure etc. All special T&P/testing equipment required for maintenance are to be arranged by the bidder. If JNPT is not able to supply the replacement equipments/spares, the employer may ask the contractor to arrange for supply of replacement/spares, the cost of which will be reimbursed as per actual expenditure by the employer on production of bill.
- ix. The contract shall also include relay co-ordination and settings, liaison / coordination with MSEDCL/MSETCL/Any Other Electricity Distribution Utility etc., all JNPT-SEZ customers and other statutory authorities as and when required.
- x. The successful bidder shall attend day-to-day maintenance work like leakage of transformer oil, checking and tightening of nuts & bolts, control/power cable terminals & cleaning of all 220 KV and 33 kV indoor panels, OLTC & RTCC Panels transformers etc. The

Bidder shall also arrange to clean all the 220 kV insulators including GI structure periodically at least once in a three month or as directed by the JNPT. The equipment in 220/33 kV switchyard shall also be attended for cleaning work simultaneously and petroleum jelly or grease shall be applied wherever required.

- xi. The Contractor shall inform well in advance for taking power shut down as and when required for preventive/periodical maintenance in 220/33 kV Sub-station and switchyard in order to intimate concerned officials to enable them to make necessary arrangements during power shut down.
- xii. During the execution of AMC, if any kind of repairs is considered to be of the major nature and it is absolutely necessary to be undertaken at work place of manufacturers/suppliers, it should be reported to the employer immediately and with the approval of employer the same may be taken up. The cost of such repairs shall be reimbursed by employer on actual basis on production of relevant original documents/bills.
- xiii. The proper performance of the equipment and system shall be the sole responsibility of contractors. If the nature of repairs is minor for any of the equipment installed in the S/S, the rectification of the same would be the whole responsibility of the Bidder.
- xiv. The Contractors shall deploy their staff who are technically qualified as mentioned in this document to perform round the clock shift duty for operation and maintenance of 220/33 kV sub-station and switchyard. These staff will report to the station-in-charge posted at sub-station who will make himself available at site as and when required by the JNPT-SEZ within shortest time on intimation in addition to his normal daily visits in connection with relevant work of Annual Maintenance Contract. In case of any additional manpower requirement the contractor shall be in position to deploy it within the minimum time.
- xv. It will be entirely the responsibility of contractor to take required steps to adequately safeguard their personnel during carrying out the work and to ensure that the work is carried out in such manner that maximum safety to the staff is ensured. Any casualty to human life during the contract period contractor will be fully responsible.
- xvi. Contractor shall comply with all precautions as required under safety of workman by IE Rules, regulation, IDLR appliances i.e. safety belts, helmets, hand gloves, safety shoes, first-aid box etc. to the workman and the staff. He will be responsible for violation of any these rules & regulations which will attract the relevant unpleasant actions accordingly binding on the contractor. The contractor shall be solely responsible for any accident, damage or Injury caused to any of his employees during contract period. The contractor shall carryout the work strictly in accordance with the contract conditions and to the entire satisfaction of the Electricity Department JNPT. The contractor has to provide security of all assets and materials for entire sub-station area/compound.

10. Lighting and Electrical System Maintenance: RMU, Street Lights, High masts, Utility Buildings and other areas etc.

Providing manpower as per manpower deployment statement mentioned in this scope of work.

- A) Providing tools and tackles for effective maintenance and proper functioning of electrical and lighting system for JNPT-SEZ area.
- B) Manning of all the areas round the clock to keep the lighting system in proper working condition.
- C) Any fault or break-down shall be attended immediately and set right in working condition within stipulated period as directed by Engineer-in-Charge.
- D) Handling transportation of materials for day to day maintenance from store to required site.
- E) Returning of unused/replaced/scrap material to Main Stores/Stores by taking certification of Engineer-in-Charge for purpose of accounting.
- F) Operation and maintenance of equipment like breakers, RMU VCB, switches, lighting system, equipment's required for maintaining the lighting system etc.
- G) Recording of readings of energy meters provided in each substation and the meter readings of Private consumers in JNPT-SEZ area and updating in SAP System. After updating, forward the same to Engineer-In-Charge.
- H) Preparation of maintenance schedule for running and planned maintenance for lighting and electrical system for JNPT-SEZ area.
- I) Keeping the records of day to day & scheduled maintenance activities and submission of the same to Engineer-in-Charge & JNPT-SEZ officials. The Contractor's Engineer has to brief activities performed / being performed to JNPT official time to time. The contractor or his representative shall have to attend a monthly meeting with Engineer-In-charge on regular basis. All the reports shall be sent by email on daily basis/monthly as suggested by Engineer In charge and concern coordinating officer depending upon the urgency on site work.
- J) Deployment of manpower for day to day activities and the situation demands.
- K) Maintenance of LT (1.1KV) / HT (11KV/33KV) cables, finding out the faults in the cables as the case may be. The fault-finding equipment's shall be provided by the contractor on site. After finding the cable fault, the contractor shall carry out

necessary excavation at the site to free the cable and the backfill the excavated site after attending to the cable fault.

- L) Maintain the lighting system above minimum level of 95 %. The faults in the street light cables, circuit cables, any other cables shall not be excuse for maintaining the specified illumination level.
- M) Working at any location in JNPT- SEZ as ordered by Engineer-In-Charge.
- N) Submitting all the reports regarding maintenance work as executed.
- O) Receiving and recording the complaints and attending & rectifying the same as within time.
- P) Checking the lighting system weekly and prepare the report of the same.
- Q) Supply of material whenever required as ordered by Engineer-in-Charge in writing.
- R) Preparation of material consumed and returned to Main Stores/ Stores statement for every month.
- S) The contractor shall prepare maintenance schedule, day-to-day allocation, various preventive / scheduled maintenance reports, daily reports, material statements etc. All these reports shall be prepared in Excel Format and sent to JNP officials for acknowledgement.
- T) The contractor shall deploy Mobile Street light ladder mounted on vehicle for carrying out maintenance of street lighting for JNPT-SEZ.

10.1 Solar System Maintenance:

The solar system of the JNPT-SEZ area is too maintained by technical persons experienced in the Operation and Maintenance of solar system including cleaning of solar plates and noting and maintaining the daily solar units readings and attending problems, if any etc.

10. Manpower Deployment and Experience:

- i. The manpower shall be available in all the three shifts on a round the clock basis. In case of Absenteeism/Leave of any of the employees, the contractor shall make arrangements to retain available manpower at no extra cost to Employer. It is also necessary to keep spare trained manpower in case of absenteeism of any regular employee for more than 2-3 days and avoid

double shift working of regular staff. Employer will provide Gate Pass/ permission for required list of employees, if required.

- ii. The **Station in-charge** should have minimum **Degree in Electrical Engineering** having at least **10 years'** experience in the field of Operation & maintenance of minimum 400/220/132 KV grade substations equipped with SCADA (GE/ABB/Siemens/Reputed Make). He should be familiar with O&M of sub-station SCADA, MV GIS and EHV hybrid equipments. Experience of the personnel in the same organization for indicated period is also acceptable. A documental proof indicating satisfactory experience in this regard shall be submitted with tender document. He should be capable for the handling of all types of administrative and maintenance activities such as power failure, load shedding, breakdowns, etc. He shall liaise with equipments OEM as mentioned earlier to attend any critical breakdown. He should be in a position to be called on phone round the clock. He should be familiar with working of SAP system and shall have working knowledge of Maintenance and Stores module. He will be the overall Station in charge of the O&M works at sub-stations under this contract and all shift engineers will report to him. He shall identify the responsibilities of Field Engineers and other supporting staff and intimate to the Employer. In addition to handling deployed team of engineers and regular supervision of works, he will also be required to carry out tendering works/Material Indenting/ Inventory Management/ Preparing MIS reports (on Weekly, Monthly, Yearly basis), Making PPTs, assisting JNPT-SEZ in project management works, Energy conservation works with all necessary documentation and assisting in any other administrative works as required and as directed by the Engineer-in-charge.
- iii. The **Shift Engineers** should have minimum **Degree in Electrical Engineering** with at least 03 years experience in the field of Operation & Maintenance of 400 or 220 or 132 KV grade substations equipped with SCADA (GE/ABB/Siemens/Reputed Make) for a period as mentioned above. A documental proof indicating satisfactory experience in this regard shall be submitted with tender document. Experience of the personnel in the same organization for indicated period is also acceptable. They are required to work with own hands while attending to any faults as well as assisting General shift staff for preventive maintenance as and when required. The shift engineers shall be familiar with working of SAP system and shall have working knowledge of Maintenance and Stores module. The successful contractor shall send the engineer for appropriate training/OEM training during the contract period to upgrade his working knowledge and improve his performance. During his absence, the contractor shall substitute an engineer with similar qualification & experience as approved by the engineer-in-charge.

- iv. **Storekeeper** should have minimum **Degree in Electrical Engineering/Engineering** with at least **03 years** experience for working with SAP system especially on MM Module of SAP and all Store-related activities module of SAP. A documental proof indicating satisfactory experience in this regard shall be submitted with tender document. The successful contractor shall send the engineer for appropriate training during the contract period to upgrade his working knowledge and improve his performance. During his absence, the contractor shall substitute an engineer with similar qualification & experience as approved by the engineer-in-charge.
- v. **Electrician** shall have **ITI/NCTVT Electrical** with at least **02 years experience** for working. A documental proof indicating satisfactory experience in this regard shall be submitted with tender document. The successful contractor shall send the electrician for appropriate training during the contract period to upgrade his working knowledge and improve his performance. During his absence, the contractor shall substitute an electrician with similar qualification & experience as approved by the engineer-in-charge.
- vi. Please note that the upper age limit for all the deployed staff under this contract is **60 yrs.**
- vii. The contractor shall possess valid **Electrical Supervisory License** issued by the appropriate Government authority.
- viii. Contractor has to submit the list of all employees and the details of the training imparted to them. Successful contractor will also train its employees for relay testing, control wiring, fault finding, etc. through experienced agencies. The contractor has to maintain the record of such training workshops conducted. Also list of authorized persons of contractor is to be displayed in all substations.
- ix. It is expected that the successful contractor retain all the O&M staff throughout the tenancy of this contract. Except as the Employer may otherwise agree, no changes shall be made in the deployed staff. If, for any reason beyond the reasonable control of the Contractor, it becomes necessary to replace any of the Personnel, it has to be done with the express consent of the Engineer-in-charge and the replacement should be of equivalent or higher technical competency. The contractor at their own cost shall provide all facilities such as transport, computers, stationery, printing, steno/ typist to the key personnel employed for this assignment.

- x. If the Employer finds that any of the Personnel has committed serious misconduct or has been charged with having committed a criminal action, or has reasonable cause to be dissatisfied with the performance of any of the Personnel, then the Contractor shall, at the Employer's written request specifying the grounds therefore, forthwith provide as a replacement a person with qualifications and experience acceptable to the Employer.
- xi. All the employees shall be governed by the prevalent rules regarding ESI, provident fund, minimum wages, Gratuity etc. as per relevant act & rules. The contractor shall have to provide the necessary documents regarding the above.
- xii. The Contractor shall provide 01 no. Desktop PCs/Laptop and printer with Internet facility for preparing various reports and data handling. Office space with tables and chair shall be provided by Employer.

11. Insurance

- i. Contractor shall be responsible for insurance of its manpower & tools deployed.
- ii. The successful contractor shall pay to its staff not less than the salary mentioned below:
 - Overall In-charge: Not less than **Rs. 60,000/- per month.**
 - Shift Engineer and Store keeper: Not less than **Rs. 35,000/- per month.**
 - Electrician : Not less than prevailing **Minimum Wages** including PF & EL Encashment per month.(Minimum Wages Act to be fully complied with ESIC-Employee States Insurance Corporation).

The salary shall include all the components including Basic salary, Medical, Insurance, and HRA, paid Leave. This shall exclude cost towards Employers contribution to provident fund, Gratuity, Bonus Uniform, PPEs and Conveyance. The contractor shall submit copy of salary slip/Bank account details as a proof. The salary of Shift Engineer and Overall In-charge must be always higher than Electrician Salary.

12. MINIMUM MAN POWER REQUIREMENT DURING CONTRACT PERIOD:

A) 220 KV Substation, 33 KV S/S and all other works mentioned in the enquiry.

Position / Post	Qualification	Minimum Experience	Allocation of Manpower				Total
			1st Shift	2nd shift	3rd shift	Gen shift	
Overall Station In-charge (06 days/week)	B.E (Electrical Engg.)	10 years min.	---	---	---	1	1
Store keeper (06 days/week)	BE in (Electrical Engg./Engg.)	3 years	---	---	---	1	1

Electricians for (06 days/week)	NCTVT (Electrical)/ITI (Electrical)	2 years	---	---	---	4	4
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Position / Post	Qualification	Minimum Experience	Allocation of Manpower				Total
			1st Shift	2nd shift	3rd shift	Reliever Shift	
Shift Engineer for all three shifts + 1 reliever (Shift Engineer shall be available round the clock in all shifts).	BE in (Electrical Engg.)	3 years	2	2	2	1	7

B) Total Manpower deployment at JNPT-SEZ for 220 KV (01 No.) and 33KV substations (04 Nos. at 03 locations) and all other works mentioned in the enquiry.

S.N.	Position / Post	Nos.	Remarks in Brief	Shift
1	Overall Station I/C	1	JNPT-SEZ Electrical In-charge-220/33KV & 33/11 KV S/S. etc.	General (0800 hrs. to 1730 hrs.
2	Store keeper	1	220 KV S/S & 33/11 KV S/S. etc.	General (0800 hrs. to 1730 hrs.
3	Shift Engineer	7	220 KV S/S & 33/11 KV S/S. etc.	Shift - 24 hrs.
4	Electrician	4	All O&M Works - HT / LT side etc.	General (0800 hrs. to 1730 hrs.
Total Man Power Deployment		13		

12.1 This is Minimum assured Manpower required.

Apart from above minimum required staff the successful Bidder shall provide additional staff well experience in Electrical and Electronics, Experts for attending Break down, Routine Maintenance, shut down etc. as and when required and ordered by the Engineer-in-charge. Please note that the employer reserves the right to increase or decrease the above manpower deployment, for any of the above category at any time as per work

requirement. The staff can be asked to work out at any sub-station under JNPT control in case it is necessary. Decision of the Engineer-in-charge shall be final and binding on the contractor.

12.2 Remuneration Component:

Please indicate the **monthly** rates for deployment of the Station in-charge, Shift Engineers/Store Keeper/Electrician inclusive of residential accommodation, allowances, transport, all other expenses/overheads etc. Please note that this rates shall be considered only for addition/Deduction of said manpower only if ordered by Employer.

Sr. No.	Position	Rate in (Rs)/ person/month
1	Over all In-charge	
2	Shift Engineer/Store keeper	
3	Electrician	

Note: Any external/internal experts as and when required for tackling technical matter/breakdown, same has to be arranged by the successful contractor. Contractor has to take note of all these aspects while submitting the it's quote for subject contract.

i. MODE OF PAYMENT & PENALTY:

i) Monthly payment shall be made at actuals through RTGS/NEFT to the contractor within **30 days** after submission of monthly Bill, Performance Guarantee, and Documents required for payment. Contractor shall mention the JNPT-SEZ GST No. in their Invoice. The bill shall be submitted in triplicate.

ii) Penalty:

a. Penalty towards non-compliance of Safety:

During inspection of work, if the contractor and their employees are found not following safety norms (wearing PPEs), a penalty @ **Rs.500/- per instance** will be deducted from the contractor's bill. GST at prevailing rate will also be levied on Penalty amount. Record of such observations will be made duly signed by both the contractor and the employer.

b. Penalty for shortage of manpower:

Amount of penalty for shortage of manpower shall be deducted from the monthly payment of contractor. It shall be a calculated on pro-rata basis as follows.

For e.g. Contract amount per month including GST=A

No. of days per month=B

Total Manpower to be supplied under this contract: 13 Nos.

Penalty towards absenteeism per person per day= ((A)/ (B*13))

ii. Working Days and Working Hours:

The working days for this contract will be all days throughout the year. The working hours for day-to-day operations & maintenance will be as follows:

- | | | |
|------|---------------|------------------------|
| i) | First Shift | 0700 hrs. to 1530 hrs. |
| ii) | Second Shift | 1500 hrs. to 2330 hrs. |
| iii) | Third Shift | 2300 hrs. to 0730 hrs. |
| iv) | General Shift | 0800 hrs. to 1730 hrs. |

iii. Provision of Safety Gears:

Contractor shall at his own cost provide safety gears i.e. Helmet, Insulating Gloves for electrical work, Cotton Gloves, Industrial safety shoes, Gum-boots, Rainy Wear, safety belts, fluorescent vest, uniforms to their employees. The sample of each safety gear shall be approved by the Engineer-in-charge. The details of provision of safety gears are as given below:

Industrial Safety Shoes: Colour: Black, IS 15298, Make: Liberty-Warrior/Allen Cooper/Any Reputed Make. One pair of shoes shall be provided every year for each worker.

- **Set of Rainy Wears:** It includes rainy shoes & rain coat. A set of one rain coat (2-piece with cap) & one pair of rainy shoes shall be provided for each worker at time of commencement of work. If the contract is extended for the third year, a set of one rain coat (2-piece with cap) & one pair of rainy shoes shall be provided for each worker by the contractor.

Rain Coat: Jacket with Hood & legging, 100% nylon fabric with PU backing, overall reflective tape, Colour-Red/orange, Make- Top-in-Town/ Duck back, Dove/Duster /Any Reputed Make.

Rainy shoe: Colour-Black, Make – Duck back/Action/Coaster/Any Reputed Make.

- **Uniform Dress:** Made out of cloth of Grasim, Vimal, Raymond or other reputed make. Uniform/Dress (pant & shirt) shall be provided for each worker. Different colour codes shall be maintained for each category.
- **Fluorescent Vest** shall be provided for each staff at the time of commencement of work and shall be replaced if worn out/torn/damaged during the currency of contract.
- **Industrial Safety Helmet:** Ratchet Type, IS 2925-1984, Reflective tape at front & back,

Colour: Red/Orange -- 01 No. helmet shall be provided for each employee at time of commencement of work and shall be replaced if worn out/torn/damaged during the currency of contract.

- **Safety Hand Gloves:** Leather cotton mix with full leather on index finger and web between thumb & index finger, double palm patch, size-12" shall be provided for each worker as per requirement.
- **Good Quality Toxic Fumes Respirators (Mask) make-Venus** or Any reputed make shall be provided for each worker fortnightly.

A. Price Schedule for O&M Electrical Contract for JNPT-SEZ.

Price Schedule for the work of "Operation and Maintenance of 220 KV Master unit sub-station, 33 KV sub-stations, 33 KV Compact Sub Station (01 no.), Street Lights, High Masts, Utility Buildings, Solar System and Other Areas at Jawaharlal Nehru Port Trust-SEZ."		
Sr. No.	Description	Quoted Rate In Rs.
1	Operation and Maintenance of 220 KV Master unit sub-station, 33 KV sub-stations 33 KV Compact Sub Station (01 no.), Street Lights, High Masts, Utility Buildings, Solar System and Other Areas at Jawaharlal Nehru Port Trust-SEZ towards Supply of Manpower, Tools & Tackles, Meter and Testing equipment, Manpower Insurances, Conveyance, Accommodation, Safety Gears, Petroleum jelly, Silica Gel, Lubricant, Grease, Silicon Grease, Shell Alvania Grease CRC, Cotton Rags, Gaskets, Indication lamps, Emery Paper, First-aid box all sundries etc. as per requirement and Scope of Work.	X
A	Quoted rate Rate In Rs. for 1st Year	
B	Quoted rate Rate In Rs. for Second year	

2	SUB-TOTAL IN RS. (A+B)	
3	<u>GST@.....%</u>	
4	Total Amount in Rs. including applicable GST (2+3)	

Note : List of Tools & Tackles is at Point No. 13 below.

Signature of the vendor

Date

Stamp

B. PRICE SCHEDULE: Qty. mentioned is for Two years.

Sr. No.	Item Description	UNIT	Qty.	BASIC Rate	<u>GST@ 18%</u>	Total
1	Supply of cable fault finder along with suitable cable fault finding machine/equipment for finding cable fault in LT cables up to 1.1 KV voltage grade.	Per Fault	15	0	0	0
2	Supply of Cable route tracer for tracing of any power cable as per directions of the Engineer-in-charge.	Job	5	0	0	0
3	Supply of cable fault finder along with suitable cable fault finding machine / equipment's for finding cable fault in HT cables from 11 Kv and up to 33 KV voltage grade.	Per Fault	5	0	0	0
4	Supply of cable jointer Authorized from M/s Raychem/ for Cable Jointing of			0	0	0
4(a)	3 Core X 33 KV (E) armoured, Screened cable of 400 sqmm size.	Job	5	0	0	0
4(b)	3 Core X 33 KV (E)/11KV armoured, Screened cable of 300 sqmm sizes.	Job	5	0	0	0
5	Supply of cable jointer Authorized from M/s Raychem for providing Cable end termination / Booting work for			0	0	0

5(a)	3 Core X 33 KV (E) armoured, Screened cable of size 400 sqmm.	Job	5	0	0	0
5(b)	3 Core X 33 KV (E)/11 KV armoured, Screened cable of 300 sqmm sizes.	Job	5	0	0	0
6	Laying of RCC/DWC pipes (including excavation) for laying of power cable and backfilling. & cleaning the site by removing debris & backfilling the trench & make the site good/original.			0	0	0
7	In Hard Murrm area as described at tender specifications.	Cu. Mtrs	200	0	0	0
8	In Hard rock/ across Road/ Concrete area as described at tender specifications.	Cu. Mtrs	200	0	0	0
9	Supply of skilled Welder for welding works.	Per Day	5	0	0	0
10	Supply of Earth Excavator (JCB) for excavation works.	Per Day	14	0	0	0
11	Supply of Hydra for lifting & shifting materials from any place in JNPT.	Per Day	5	0	0	0
12	Removal and shifting of installed /damaged streetlight poles from any place in JNPT-SEZ.	No	10	0	0	0
13	Installation of streetlight pole along with luminaire with suitable foundation.	No	10	0	0	0
14	Laying of LT cables through pipes under ground	Mtrs.	300	0	0	0
	Total In Rs.					

Signature of the vendor

Date

Stamp

13. DEPLOYMENT OF TOOLS AND TACKLES:

- a) The Contractor shall make available the various tools and tackles that are required for the operation and maintenance of the system/equipment. The following are the **minimum tools and tackles** that are required to be made available at site all the time.

Sr. No.	Description of Tools	Unit	Qty. JNPT-SEZ

1	Hack Saw frames with blades: 12" & 6"	Nos.	3
2	12 Ft Aluminium Ladder Self Supporting (any ISI make)	Nos.	3
3	Hammer (500 gms), Chisel (8-10 inches,, Sledge hammer, Chisel, Pipe wrench14 inches (TAPARIA MAKE	set	2
4	Digital Multi Meter (Rishabh/Motwane/Meco make)	No.	2
5	Electrical Portable drilling machine including bits 2-13 mm diameter (Concrete & Metal each). Make: KPT, Black & DECKER make or any reputed make.	Nos.	1
6	Tarpaulin Tent Set suitable for jointing the cable in Monsoon season	Nos.	1
7	All Ring, open & box spanners up to 36 mm and 40 & 42 mm box spanner with handle (Taparia make)	set	2
8	Allen Key Sets up to 14 mm.	Set	2
9	Files – Round, Half Round & Flat	set	2
10	Tap Set for Threading (06 mm to 16 mm)	set	1
11	Safety Belts conforming to relevant IS	Nos.	4
12	Torch LED (Tiger Eveready)	Nos.	3
13	Blow Lamp 9 Kerosen Stove for cable jointing purpose of 1 hr and 2 hrs. Capacity.	Nos.	1
14	7 Ft. Aluminium Ladder Self Supporting	Nos.	1

NOTE: Above mentioned tools does not limit the inventory of tools. Contractor shall provide all tools and tackles at no extra cost as and when required to fulfill his contractual obligation.

Contractor should provide all tools and tackle as per contractual provision before commencement of contract. Contractor will also make available all approved tools for inspection whenever demanded by the JNPT Official. In case of damage or misplace of the above tools, contractor has to replace the same without any additional cost to the port.

Contractor shall deploy Fork-lift, Hydra for lifting & shifting of material and JCB for excavation purpose as and when required with the instruction of Engineer – In – Charge. Payment shall be made as per work-order per day rates for the same.

b) LIST OF EQUIPMENTS, INSTRUMENTS REQUIRED TO BE MADE AVAILABLE AT SITE UNDER THIS CONTRACT:

- 1) Basic electrical tool kit box comprising various spanners, screw drivers, crimping and skinning tools, insulation materials, cutting and nose pliers, etc.
- 2) Digital Insulation Tester (Megger) 1 kV & 5 kV with PI measurement.
- 3) Digital Tong Tester (minimum two nos.).
- 4) Earth Resistance Tester.
- 5) Phase Sequence Meter.
- 6) Infra-red thermometer (short range) as and when required as ordered by the Engineer-in-charge.
- 7) Hand Pump for transformer oil topping up.
- 8) Non-contact Line tester High voltage, 11 KV and 33 KV.
- 9) Non-contact type low voltage Line tester.
- 10) HT Hand Gloves (As per Voltage level) and LT Hand Gloves.
- 11) Electrical grade Safety shoes, goggles, safety harness and Helmets.
- 12) Capacitance Meter.
- 13) Online Battery Cell Testers (2 nos.)
- 14) Vacuum Cleaner & Electrical Blower, etc.
- 15) Relay testing kit.
- 16) Primary and Secondary current injection transformers as and when required.
- 17) Voltage/Potential injection transformer kit as and when required.
- 18) Transformer oil testing kit.
- 19) Any other instruments which are more useful for the maintenance jobs.

All the testing meters/tools shall be calibrated periodically and possess valid test/calibration certificate during contract period.

