HPOIL GAS PRIVATE LIMITED
(A Joint Venture of HPCL & OIL)

TENDER FOR
PROVIDING OPERATION AND MAINTENANCE SERVICES FOR CITY GATE STATION, CNG STATION AND STEEL NETWORK AT AMBALA-KURUKSHETRA GA

TECHNICAL VOLUME

TENDER NO : HOGPL/2021-22/C&P/020
Date : 10.12.2021

1. INTRODUCTION

HOGPL is an involved in Piped Natural Gas Distribution to industrial, commercial, transportation, residential segments of major cities / towns in Kolhapur and Ambala & Kurukshetra GA. HOGPL is rapidly into a developing a multidimensional operational network that fulfils the India's energy needs by exploring, developing and harnessing newer energy services. It is leading throughaction towards a hydrocarbon economy in India with sustainable environmental activities, with the vision of becoming a "Complete Energy Company".

Natural Gas (NG) is today increasingly gaining popularity over as alternate auto fuel primarily because it is environment friendly, economical and more efficient as compared to other conventional auto and kitchen fuels. Emission of harmful oxide and other polluting particulates is minimal in case of CNG. HOGPL had established various type CNG stations & CGS to cater automobile sector in Kolhapur and Ambala & Kurukshetra GA.

HOGPL intends to appoint bidder for the Maintenance activities of City Gate Station & CNG Installations toprovide uninterrupted supply with due compliance of all the prevailing statutory and HSE norms keeping in view of the customer satisfaction.

The said maintenance contract for mechanical and electrical installation in CGS & CNG station & Steel Network Surveillance shall be not limited to: -

- Routine/Periodic and Preventive Maintenance of Mechanical installations like CNG Cascades both Static & Mobile, SS Tubing's and fittings, LCV/HCV filling & Unloading postper OEM guideline, Minor maintenance of CNG Compressor and Dispensers, Air Compressors, and Maintenance Checklist approved by HOGPL.
- Routine/Periodic and Preventive Maintenance of Electrical installations like HT installations, Power Transformer, LT panel, Power distribution boards, HT/LT Power and Control Cables, UPS with battery, Servo Stabilizer, earthing system etc. per OEM guideline and Maintenance Checklist approved by HOGPL
- Breakdown maintenance of Mechanical and Electrical installations at existing CGS & upcoming & CNG stations-COCO, Franchisee, Daughter Booster and Daughter CNG Stations.
- Breakdown maintenance carried out for all laid SS tubing's and fittings at CGS & all CNG stations, LCV/HCV cascades, LCV/HCV filling & unloading post, air and gas compressor, dispenser tubing and fittings in trench.
- Routine checking & maintenance of Ethyl Mercaptan dosing records.
- Fleet Movement to the respective ROs for the CNG catering at commissioned ROs.
- Providing well-equipped Emergency vehicle cluster wise to attend maintenance calls as and when required.
- Deployment of trained manpower as per specified in SOR cluster wise.
- Coordination with HOGPL team and other service providers as and when required toensure smooth operation.

- Support providing for removal/replacement of cascades of LCV/HCV as and when require.
- Assist in Testing and Calibration of instruments.
- Power Factor analysis, its Control, and recommendations.
- Display and updating of P&ID, Single line diagram, Earthing diagram, As-built drawings of CGS & CNG Stations.
- Arrangement of spares which are not available with M/s HOGPL
- Modification of existing Installations if asked by HOGPL.
- Routine Patrolling of entire Steel pipeline network of HOGPL excluding Ambala City, Cantt & Kurukshetra City Area with motorcycle covering minimum approx. 100 KMS a day along with ROU markers and ROU/related facility protection and reporting. responsibility in their scope, as per EIC instruction. They shall report to Supervisor at CGS. Cost of mobile and data of patrolmen shall be considered as included in quoted rates. GPS tracking application software shall be provided by HOGPL.
- Capturing TLP readings of entire Steel pipeline network at frequency given by HOGPL & coordination with supervisor/electrician.
- MDPE along Steel network Patrolling also comes in the scope of work & any damage found in MDPE shall be immediately reported to nearest PNG O&M control room.
- Routine patrolling also covers DRS, SV chambers & related facilities along entire steel pipeline network.
- Capturing DRS meter readings at frequency given by HOGPL.

2. STANDARD TO BE FOLLOWED

BIDDER shall carry out maintenance of CGS & CNG Stations based on following Codes /Standards, but not limited to;

- Laws, Codes, Rules and Standards as mandatory under the legislation of respective states and India and PNGRB regulations.
- ISO Standards and Euro Norms.
- Standard Operating Procedures established by HOGPL
- NZS-5425 Code of practice for CNG Compressor and Refueling Station
- Gas Cylinder Rules-2004.
- OISD 179, NZS-5422
- The National Fire Protection Association (NFPA) norms
- SMPV rule.
- Operation manuals of various equipment manufacturers.
- Indian Electricity Rules and Electricity Act
- Factory act 1948 & it's revisions.
- EPF act 1952 & ESIC act 1948

3. INSTALLATION DETAILS

Brief Description of CGS & CNG System / facilities & Steel Pipeline Network

Natural Gas is available at a pressure of 14-49 bar (g), atmospheric temperature and having dew point of 35°C at 25 bar (g). This gas is conditioned with removal of moisture and other condensate, filtered to remove foreign particles, odorized for easy detection before compression in the suction train. Conditioned gas is compressed to high pressure up to 250 bar (g) and is stored in cylinder or is being dispensed through dispenser into vehicle mounted storage cylinder or mobile cascade. Priority panel installed near compressors is configured in sequence to be followed for dispensing of gas.

The CGS & CNG Station dispenses CNG in to Vehicle (Cars, Auto Rickshaws, Buses, etc.) Cylinders, Mobile Storage Cascades. The natural gas available at low pressure by the pipeline is compressed to high pressure by means of reciprocating compressor and dispensed in Storage vehicle cylinder / Mobile cascade in a measured quantity.

A City Gate Station is a gas measurement and pressure regulating and reducing package which is installed outside the limits of a city on a gas pipeline. It supplies gas to the city users at required consumption pressure. City gate stations serve an important role in the natural gas distribution network. Consisting of metering and pressure regulating facilities, they are located at the custody transfer points where natural gas is delivered from transmission pipelines into the high-pressure lines of the local distribution company. Mobile Cascade vehicles are fueled from CGS cum Online Station to cater the daughter/daughter booster stations.

The facilities details are summarized for CGS & CNG Stations in below table;

Sr. No	Installation Description	Capacity	Applicability		
			COCO-Mother / Online/ CGS	OMC-RO Online / D. Booster	OMC-RO Daughter
1	CGS & CNG Compressors along withSuction Skid, CO2 Flooding Systems	1200/600/450/250 SCMH	Yes	Yes	No
2	Dispensers for buses, cars, three wheelers (Auto Rickshaw)	10-25/75 Kg/Min	Yes	Yes	Yes
3	Loading/Unloading facility for mobile cascades	-	Yes	Yes	Yes
4	Stationary & Mobile Cascades	Up-to 8800 WL	Yes	Yes	Yes
5	Fire Fighting Equipment	C02 - 4.5 Kgs. DCP - 75 Kgs. DCP - 10 Kgs. and ABC – 10	Yes	Yes	Yes
6	SS Tubes and Fittings interconnecting with CGS & CNG Equipment	Set	Yes	Yes	Yes
7	Generating Sets	Upto100 KVA	Yes	Yes (OPT)	No

8	Air Compressors	up to 7.5 kW	Yes	Yes	Yes (OPT)
9	Servo Stabilizer	Up to 500 KVA	Yes	Yes (OPT)	Yes (OPT)
10	HT/LT Power Cables	Up to 300 Sq.mm	Yes	Yes	Yes
11	Flameproof Installations		Yes	Yes	Yes
12	Power Distribution Boards with APFC Panel	Up to 1000A	Yes	Yes	Yes (W/O APFC)
13	Power Transformer (Optional)	Up to 1 MVA	Yes (OPT)	No	No
14	Outdoor/Indoor Lighting including High-mast towers	-	Yes	Yes	Yes
15	Earthing System	Set	Yes	Yes	Yes
16	UPS and battery bank,	Up to 10 kVA	Yes	Yes	Yes
17	Complete FML Skid including above ground piping's and accessories.	-	Yes	No	No
18	Odorization Unit	-	Yes	No	No

Steel Pipeline Network – 85 Kms Approx.

4. BIDDER SCOPE OF WORKS

The purpose of maintenance activities for the CGS & CNG station is to ensure smooth operation ofoperation in such a way to enhance dispensing of Compressed Natural Gas (CNG) in terms of station productivity with due adherence of HSE / Statutory aspects with utmost customersatisfaction.

4.1. PREVENTIVE / ROUTINE MAINTENANCE

4.1.1. The BIDDER shall prepare and submit Annual Maintenance Plan, which shall be in line with OEM manual and set frequency by HOGPL within 15 days of LOI/PO.

4.1.2. BIDDER shall execute the Routine / Preventive Maintenance of equipment's as per approved schedule and checklists as detail herewith in ANNEXURE II & III.

4.1.3. The spares required for carrying out preventive maintenance of shall be collected from stores specified by HOGPL and shall submit a brief report of spares used & spares returned.

4.1.4. All preventive / routine maintenance shall be performed in consultation with HOGPL EIC and to ensure that, forecourt is not suffered.

4.1.5. BIDDER shall himself familiarize for the work having obtained all necessary permit / approval / clearance/ authorization to carry work from the HOGPL before starting work at site.

4.1.6. Without limiting the generality thereon, BIDDER shall do all necessary work at each of the job which is complete in all respect.

4.1.7. BIDDER shall ensure that all required consumables such as cotton waste, cleaning solvent, insulation tapes, thinner, soap solution, Teflon tape, & all require tools soldering gun, torque wrench, power extension board, etc. including are available on site during attending activities.

4.1.8. BIDDER shall note down the Equipment performance before and after carrying out the maintenance activities in service report.

4.1.9. The spares required during preventive maintenance shall be arranged by BIDDER from HOGPL. However, BIDDER shall give priority to use spares which are kept in HOGPL stock. Change in schedule if any due to non-availability of spares shall be mutually agreed andthe same needs to be recorded vide email or letter.

4.1.10. Carrying out maintenance of all stationary and mobile Cascade, all laid SS Tubing & fittings, and LCV unloading & loading Post at owned DS/DBS/online/mother station.

4.1.11. Check all the equipment's as per the M/S HOGPL issued checklist at predefined frequency (Daily, weekly, fortnightly, monthly etc.) for proper functioning & carrying out Maintenance of Cascade of LCV/HCV and stationary cascade, all SS Tubing & fittings LCV/HCV loading and unloading Filling post at Daughter/daughter booster / online / mother station.

4.1.12. BIDDER shall ensure that the foundation on which the cascade is installed is free of any damages.

4.1.13. BIDDER shall also do periodic checking of cascade to verify that the frames of the cascade are sturdy to bear the entire load of the cylinder and it is fitted with lifting lugs and canopy for its protection from the sun and rain.

4.1.14. BIDDER shall carry out the schedule/routine/preventive maintenance of the electrical panel, Power Transformer, LT panel, Power distribution boards, HT/LT Power and Control Cables, UPS with battery, Servo Stabilizer, earthing system.

4.1.15. BIDDER shall be responsible for checking / ensuring that there is no accumulation of flammable or combustible liquids under the cascade by grading, pads or diversion curbs.

4.1.16. BIDDER shall be responsible for checking and up keeping of odorant level up to farthest point in the network at the CGS. The maintenance of other facilities like above ground pipeline, valves, Electrical & Mechanical maintenance of CGS is also in the scope of BIDDER (without spares).

4.1.17. BIDDER shall be responsible for Maintenance of DG set, UPS and batteries installed at CGS / Mother Station and all CNG stations. Maintaining records and Reconciliation of diesel used for DG sets on daily basis. Ensuring unit power factor at CGS / Mother Station by replacing capacitors as and when required.

4.1.18. BIDDER shall be responsible for Observing flow meters and panels at CGS / Mother Station and informing Shift I/C in case of abnormality. Recording of various parameters like Pressure, Temp, Flow Rate etc. and any malfunctioning report of the valves, instruments / equipment's to be given in HOGPL O&M whenever occurs.

4.1.19. BIDDER shall be responsible for the safe, trouble free & uninterrupted operation of City Gate Station, which includes monitoring of parameters (pressure, temperature, gas flow, Odorant level etc.), leak detection, customer meter reading, data logging, visual inspection, odor / gas smell, etc. on following major equipment's / installations.

- The skid at CGS comprises of knock-out drum/filter with accessories like safety relief valve for release of pressure in case of over pressure.
- The Shift Engineer shall maintain all relevant records and activities (testing, inspection, calibration, operation & monitoring) carried out on the CGS.

4.1.20. BIDDER shall be responsible for following work activities / events / incidents are noted in the logbook at the City Gate Station:

- Reports of unsafe fittings, conditions & appliances. Data pertaining to the parameters as per AOMP / MIS.
- Flow meter readings, composition of gas as per source available & updating with the help of flow computer and gas chromatograph.
- Inspections performed.
- Checks and surveys performed.
- Failures & defects found & rectification actions taken by the concerned.
- Incidents involving the failure of any fittings and control valves of CGS installation.
- Any incident relating to fire or break down of the equipment and their maintenance /correction procedures in details.

4.1.21. Providing support services for maintenance of electrical sub-station, panels, and feeders. Upkeep and maintenance of indoor / outdoor lighting system. Monitoring of earthing system and its maintenance. Monitoring of power availability / quality Liasioning with lineman of local electrical distribution body for proper supply, restoration of power and assisting in overall electrical operation and maintenance of the station.

4.1.22. BIDDER shall be responsible for Monitoring and logging all essential parameters of the electrical equipment and report/record if any discrepancy in operational parameters accompanied with updating logbooks/records/registers for electrical readings, data capturing, maintenance activities, DG set records etc.

4.1.23. BIDDER shall be overall responsible for the rotation of Mobile Cascade Vehicles from CGS cum Mother Station to all the daughter/ Daughter Booster Stations.

4.1.24. BIDDER must coordinate with Owner to ensure the safe, reliable & uninterrupted gas supply, installation and operation of all the equipment's, pipelines, fittings, valves, etc. while venting the pipelines, the BIDDER shall strictly adhere to the HSE norms specified in the contract.

4.2 BREAKDOWN MAINTANANCE

4.2.1 On receiving information from the representative of HOGPL, BIDDER shall ensure that, the service/maintenance team shall reach the concerned / affected station within **30 minutes**. If issue is normal type, shall be resolved within 4 hours from the intimation and major issues shall be resolved by required maintenance / repair of the equipment within 12 Hours.

4.2.2 Upon reaching the CGS & CNG stations, the BIDDER'S personnel shall immediately contact EIC of HOGPL to information of his attendance on site and confirm the breakdown report.

4.2.3 Such services shall be extended by them on 24 x 7 basis subject to the force majeure.

4.2.4 Before execution on breakdown work, BIDDER personnel shall collect necessary spares from the stores based on assessment of breakdown detail.

4.2.5 The BIDDER shall coordinate with the HOGPL representative for instructions on undertaking the repair work.

4.2.6 After attending & resolving the complaint, the BIDDER shall inform to HOGPL on the work executed and used spares, unused spares should be returned to HOGPL accordingly.

4.2.7 BIDDER shall be fully responsible for emergency management with full attention and effective measures / remedies to restore equipment operation.

4.2.8 BIDDER shall be responsible to arrange spares / items / consumables required for carrying emergency maintenance works which not available with HOGPL. Actual reimbursements shall be made upon submission of required original proof.

4.2.9 BIDDER shall attend the leakages or any breakdown related SS tubing's & fittings, BIDDER shall come into alert mode and carry out the following activities.

4.2.10 Identify the Leakage, dismantling tubing's, Rectification/Replacing, Laying, testing and commissioning of SS tubes along with all fittings i.e. Ball Valves (2 way/3 way/new design), QRC (Socket + Nipple), Unions, Reducers, Elbows, Tees, Front Ferrule, Back Ferrule, NRV if required complete with all supports for CGS & CNG Station and Burst Disc, Manifold etc. required in Mobile & Stationary Cascade whereas the tubes & fittings, PVC heavy duty clamps, Burst Discs shall be free issued by HOGPL.

4.2.11 BIDDER shall provide all tools, tackles, instruments, manpower and other related accessories for carrying out the testing of SS tubing. If observe leakages while leak test, vendor shall rectify the leakage immediately. Testing procedure shall be provided by the vendor to EIC for approval.

4.2.12 BIDDER shall attend the electrical breakdown maintenance immediate basis.

4.3 MISC ACTIVTIES

4.3.1 BIDDER shall assist in Testing, Re-setting & Calibration of various Instruments as per instruction of O&M HEAD.

4.3.2 BIDDER shall assist in obtaining approvals from Electrical Inspector during annual inspection or Up-gradation including submission of required documents.

4.3.3 BIDDER shall assist in obtaining NOC from Dy. Chief Elect. Inspector (Energy Audit required if any) including submission of Energy Audit report, preparation of Follow-ups Report, Coordination with Govt. Approved Energy Auditor, Site visits as when required.

4.3.4 BIDDER shall prepare/update As-built drawings (indicating all details like cable layout, outdoor lighting, SS Tubing's etc.), Earthing Diagram, P&ID in soft & hard color copy based on actual installations at site. HOGPL will make the payment as per the approved rates against SOR.

4.4 SPARES / INVENTORY MANAGEMENT

4.4.1 BIDDER shall reconcile the spares issued by the HOGPL as per MIS or as instructed.

4.4.2 HOGPL shall recover the cost against any damage, theft, shortage, Loss of material if anyduring reconciliation from the BIDDER.

4.4.3 Unused / Replaced spares should be returned to HOGPL accordingly.

4.4.4 Bidder shall provide consumable materials and/or labor of every description and all tools, tackles, measuring instruments, storage, and transport necessary for execution and completion of the work to the satisfaction of HOGPL.

4.5 WELL-EQUIPPED EMERGENCY VEHICLES WITH DRIVER

4.5.1 BIDDER shall be ready with a **Maintenance Vehicle,** 4-Wheeler with crew cabin.

4.5.2 Maintenance Van shall be equipped with communication equipment, required tools & tackles (including any special tools) and important spares location wise. Calibrated Measuring instruments like Multi-meter, Clamp meter, Earth Tester, Megger/Insulation tester, Temperature gun etc. shall be with vehicle. Tools-tackles like plyer, screw drivers, FLP hammer, Cutter, Spanners, Pipe wrench, rope, excavation tools, SS tube bender & SS tube cutter for 1", ¾", ½", ¼", etc. also shall be with emergency vehicles.

4.5.3 The emergency vehicle shall upkeep by BIDDER in a good conditions & optimized all the time. Driver to be deployed on this vehicle must be well trained / experienced, non-alcoholic or drug addict & dressed. Necessary manpower, machine / equipment's, spares/ materials & consumables shall be arranged by BIDDER for any emergency.

4.5.4 Bidder shall maintain VTS system installed by Owner, if any damage of instruments, charges shall be recovered from bills as actual.

4.5.5 BIDDER shall maintain the day-to-day records as per MIS & submit it along with monthly reports.

4.5.6 Vehicle should be maintained in proper working conditions throughout the tenure of the contract by carrying out preventive, periodic & breakdown maintenance as per Manufacturer's recommendations. All the inspection & maintenance should be carried out by authorized dealers only.

4.5.7 BIDDER shall make an alternate arrangement in case of Routine, Periodic maintenance to be carried out for vehicles required from time to time at his own cost & risk. Bidder shall ensure that in such case the O&M is not affected.

4.5.8 Bidder shall pay the Taxes like Toll, RTO endorsement, Renewal / Passing, Vehicle insurance premium, etc.

4.5.9 BIDDER shall ensure the validity of driving license for the driver deployed on vehicle at his own cost.

4.5.10 BIDDER shall be solely responsible for any accident of vehicle & caused damages to vehicle or the property of third party or the human (injury or death). Such cost shall be

recovered from BIDDER & any complaints in police or competent authorities in this regard shall be taken up at his cost & risk including insurance claim, repairing of vehicle, damage to third party, etc.

4.6 DEPLOYMENT OF MANPOWER

4.6.1 To provide uninterrupted CNG supply at existing/upcoming CGS & CNG stations, BIDDER shall make necessary personnel available in Cluster/GA/Location to maintain the facility as per specified scope and SOR in working shifts as per instruction of HOGPL. The scope also includes conveyance, food, lodging, transportation, and Incidental expenses for the jobs.

4.6.2 BIDDER shall depute trained expert(s) who are familiar with related maintenance work. The BIDDER shall arrange skilled labor/technicians for servicing/replacing/handling of spares equipment's/instruments carefully.

4.6.3 BIDDER deputed personnel should not be without training of activities to be handled. The training records also be kept updated with Identity Card.

4.6.4 BIDDER shall deploy the adequate numbers of skilled / unskilled personnel, to carry out the entire work, under the scope. BIDDER will submit the CV of personnel to OWNER for approval of recruitment on his role till the end of the tenure.

4.6.5 Indicative Qualification & Experience of the manpower deployed at the CGS & CNG station are as follows: -

CITY GATE STATION & CNG STATION MINIMUM SERVICES

Sr. No.	Manpower	Qualification	Experience	Shift - Gen	Shift - I	Shift - II	Shift - III	Total
1	**In-charge**	B. Tech	3 Years		01	01	01	**03**
2	**Technician**	ITI (Mech.)	3 Years	-	02	02	-	**04**
3	**Technician**	ITI (Inst.)	3 Years	-	01	01	-	**02**
4	**Technician**	ITI (Elect.)	3 Year	-	02	02	-	**04**
5	**Helper**	Literate	1 Year	-	01	01	-	**02**
6	**MCV Operator**	Diploma/ITI	2 Year	-	01	01	01	**03**
7	**Driveway Salesman**	12th	2 Year	-	01	01	-	**02**
8	**General Services**	Literate	1 Year	01	-	-	-	**01**
9	**Patroller**	Literate	2 Year		01	01		**02**
	Total Manpower for CGS							**23**

Booster/Compressor Operator should have a Diploma/ITI (Mech./Elect. /Inst.) with a minimum of 2 years' experience in the same.

Sr. No.	Site Name	Booster/Compressor Make	Shift - Gen	Shift - I	Shift - II	Shift - III	Total
1	**Abhay Highway FS**	ICL	-	1	1	1	**03**
2	**Balaji FS**	Sopan	-	-	1	1	**02**
3	**CMHP FS**	ICL	-	1	1	1	**03**
4	**Dhillion FS**	ICL	-	1	1	1	**03**
5	**Fateh FS**	Ideate I. LLP	-	-	-	1	**01**
6	**SNSK Ladwa**	Ideate I. LLP	-	-	-	1	**01**
7	**Gautam FS**	Ideate I. LLP	-	-	-	1	**01**
8	**Adhoc Shiv Om FS**	Ideate I. LLP	-	-	-	1	**01**
	TOTAL						**15**

Note:

- The Manpower shown above is only directional and actual requirement of Manpower (Increase / Decrease) would be communicated by OWNER from time to time.
- Vehicle shall be deployed with trained driver having valid driving license.
- BIDDER to ensure for leave relief / Weekly Offs and Holidays as per Labor Laws.
- Bidder to ensure the **reliver** for the deployed manpower during weekly off / leave relief and noextra payment shall made against the same.
- No overtime shall be paid by the OWNER.
- Planning & Roster shall be shared with HOGPL team.
- Necessary interviews shall be taken by the OWNER prior to deploying at station.
- BIDDER to submit monthly shift schedule well in advance and get it approved by OWNER's representative.
- Public Holidays shall be entertained and approved by OWNER from time-to-time. However, BIDDER shall ensure that operations are not affected.

Job Responsibility of Manpower:

BIDDER shall deploy the above stated manpower, with relevant educational qualifications & professional experience to perform their duties, as described below (but not limited to);

Technician (Mech./Instru. / Electrical)

Technician should have relevant experience in the required field and adequately qualified and experienced of Maintenance of all CGS & CNG Equipment's and Electrical installations. He shall be responsible for trouble free operation / minimize affected hours of CGS & CNG Stations and day-to-day reporting to the In-charge.

Technician-Mech./Inst. shall carry out preventive maintenance for Dispensers, Storage/Mobile Cascades, LCV/HCV points, SS Tubing's, CO2 Flooding System, Air Compressors, utilities associated with City Gas Distribution system etc. as per check-list

and OEM guidelines. The breakdown of CGS & CNG equipment's to be attended within a stipulated time frame, inventory management, reporting as per MIS etc.

Technician-Electrical shall carry out preventive maintenance for LT Panel, APFC Panel, Power Distribution boards, Electrifications, Earthing System, Indoor/Outdoor Lighting, Power Cables, UPS System with batteries, HT Installations if any like Power transformer, Two-pole structure, HT Switch boards etc. as per check-list, work instruction, safe practices and OEM guidelines. The breakdown of CGS & CNG equipment's to be attended withina stipulated time frame, inventory management, reporting as per MIS etc.

Technician should be obedient, hardworking and with learning aptitude. He shall hand over status of job to shift technicians during relieving his duties. He shall follow HSE practice, all safety precaution, hazard control measures as shown in work permit and instructed and use the PPEs as per job.

Helper

Helper shall be literate. Helper is responsible for House Keeping of equipment's, assist in maintenance activities to technicians. He will up keep the working area in neat and clean condition after and before maintenance. He shall be responsible for excavation of trenches, removal of MS covers, pits, cutting of excessive grass / housekeeping in vicinity of CGS, ROs, Vehicle, etc. During job he should give tools tackles to his superiors as demanded and return the same in the van after completion of the job.

Driver:

Driver should have necessary valid driving license for LMV from regional transport office. Driver should have perfect eye sight / vision, He should always carry his driving license and produce / display when demanded. He should be obedient, cooperative and hard working. He should have basic knowledge and troubleshooting techniques of maintenance van. He should drive, lawfully and safely every time, everywhere, during emergency and routine maintenance.

He should always ensure security of vehicle, and all equipment's, tools, tackles etc. stored in van, by locking doors and keeping watch as per requirements. Apart from, driving of vehicle, he will help technical group, at site and in office. He should clean & upkeep the vehicle in good working condition.

Patroller:

He will be responsible for daily patrolling of entire Steel pipeline network (MDPE along steel) of HOGPL excluding Ambala City, Cantt & Kurukshetra City Area. The patroller will start the patrolling in the designated route and carry out a thorough patrolling & checks like Road/ Nalla/ Rail Crossing, Valve-Chamber, Excavation on Pipeline, Gas Leakage if any, condition of Markers etc. during the patrolling, In case of any observation is mentioned &/or narrated by the patroller, HOGPL engineer must immediately rush to the site of the vulnerable location to confirm the third-party activity. The vulnerable location format shall be filled by the patroller & shall be submitted to the O&M in-charge/supervisor at CGS. The filled-up format after site visit & review shall be submitted to HOGPL engineer. He shall be also responsible for Capturing TLP readings, DRS meter readings at frequency given by HOGPL.

4.6.6 BIDDER shall, at its own cost, provide 2 pairs of uniforms and identity card to its employees deployed at the station and shall ensure that such uniforms / identity card is worn by his employees while on duty during maintenance.

4.6.7 BIDDER must maintain timely attendance, performance of duty, dress codes and personal protective equipment to all workers.

4.6.8 BIDDER shall provide organization chart with role and responsibility to OWNER. In case of any change in manpower allocation, BIDDER shall seek prior approval from OWNER.

4.6.9 Bidder shall deploy Manpower shift-wise as per instruction by HOGPL. If any change in requirement of manpower, HOGPL may inform to bidder in advance.

4.6.10 The services shall be provided 24 hrs. and 7 days a week at HOGPL owned station as well as co-located CGS & CNG station falls under cluster/GA's/Locations.

4.6.11 All personnel of BIDDER entering work premises shall be properly and neatly dressed and shall wear uniform, badges and personnel protection equipment's like helmets, safety shoes, safety gloves etc. while working in premises of the company including work sites.

4.6.12 Payment against over time of the employees deployed by the Bidder shall be verified by respective EIC and shall be paid on pro-rata basis.

4.6.13 BIDDER to submit monthly shift schedule well in advance and get it approved by OWNER'S representative.

4.6.14 BIDDER'S personnel shall be educated, trained and experienced in CGS & CNG Station maintenance and aware of the prevailing codes / standards applicable to CGS & CNG maintenance and handling such as PESO, OISD-179, NFPA, ANSI, ASTM, NZS 5425, NGV, CENELEC, Indian Electricity Rules, Indian Explosive Act, Weight and Measuring Rules, Statutory Taxes and Levies, etc...

4.6.15 Supervisor with minimum qualification of Diploma / B. Tech in Mechanical / Electrical engineering with 5/2 years of relevant experience is required as Single point coordinator for all guiding the manpower and taking care of maintenance activities. Supervisor shall be available on phone 24 hrs X 365 days.

4.6.16 Supervisor should have PC/laptop along with Data card and mobile phone for communication.

4.6.17 Technician (Mechanical/Electrician) provided at site shall have minimum qualification of ITI from a reputed institute with 3 years of relevant experience.

4.6.18 Technicians should be trained to handle all schedule/preventive/breakdown maintenance of SS tubing & fittings related jobs in trenching and on Cascades.

4.6.19 BIDDER shall provide the resume of all the manpower used for maintenance with the copy of certificates, photographs, and address details to HOGPL.

4.6.20 For any change / replacement of manpower for maintenance shall be informed to M/s HOGPL at respective GA. New candidate shall be interviewed and confirmed by M/S HOGPL only.

4.6.21 BIDDER shall arrange skilled welder and fitter along with welding machine, tools and welding rods or any other material or tools required for site work as and when required. Same manpower and their transportation cost bear by BIDDER for moving welding set from one place to another place will be in the scope of BIDDER'S.

4.6.22 HOGPL shall be having right to use the existing manpower for the machines under contract for any kind of modification work for CGS & CNG Station.

4.6.23 BIDDERS shall ensure the good workmanship all the time. Any loss arises due to unskilled manpower negligence and poor workmanship of manpower shall be recovered from the monthly bill.

4.7 RECORDS / REPORTS /DOCUMENTS

4.7.1 BIDDER shall be responsible for reporting as per OWNER'S "Management Information System" (MIS). OWNER shall provide the copy of MIS to the BIDDER after award of contract, BIDDER shall submit the same accordingly.

4.7.2 BIDDER shall update history card for each equipment's and maintain as chronologically mentioning all incidence/Routine/Preventive/Breakdown Maintenance including the charges incurred & spares replaced.

4.7.3 BIDDER shall generate & produce the following reports, but not limited to the followings:

- Breakdown maintenance and Testing Report accompanied with the Preventive Maintenance Reports of individual equipment.
- Planned Maintenance (AMP) Vs. Actual Maintenance.
- History card for each of the equipment's.
- Spares consumption for preventive Maintenance & breakdown repair.
- Power Consumption, Power Factor analysis quarterly for each office.
- Setting parameter of protective instruments.

4.7.4 All the copies of manuals and other documents issued by HOGPL shall always have to be maintained under safe custody at site by BIDDER for reference. The access of the same will be restricted to authorized personnel only.

4.7.5 BIDDER shall maintain register for the Attendance of manpower, Vehicle movement, Complaint analysis report, firefighting equipment and submit the report for the same.

5. HEALTH, SAFETY & ENVIRONMENT

5.1. BIDDER shall develop a health, safety and environment (HSE) plan that addresses the HSE risks specific to the work and the management of controls to eliminate, reduce or mitigate risks.

5.2. BIDDER shall ensure its personnel are:

- Medically, physically and mentally fit to carry out the duties to which they are assigned in respect of the work.
- Technically competent and experienced in the tasks assigned to them.
- Aged eighteen years or above.
- Specifically trained for hazardous material transportations.

5.3. BIDDER shall arrange related PPE (i.e. Hard hat, Safety Shoes, Uniform, Hand Gloves, Gumboots, Ladders, Safety Belts, safety gloves etc.) to his manpower and ensure to wear it during the maintenance job.

5.4. BIDDER personnel shall not smoke or resort to misuse of drugs, medicines or alcohol while on duty. BIDDER shall also ensure that in no case the ability of his employees to carry out their assigned duty is impaired using the substances mentioned herein.

5.5. BIDDER shall ensure the safety of Man and Machine all the times. The BIDDER shall always remain liable to OWNER for any loss or damage caused to building plant and machinery, due to carelessness, negligence, inexperienced act of default of the BIDDER, his agents, representative or employees.

5.6. BIDDER shall provide relevant training (Technical / Fire and Safety, etc.) to his personnel from time to time for better functioning of the station at his cost and risk, without affecting Operations. OWNER may provide special training, to be required; hence, BIDDER shall direct his personnel for such trainings.

6. STATUTORY COMPLIANCE

6.1. BIDDER shall ensure that the BIDDER as well as the CGS & CNG station complies with the Statutoryrequirements / Rules / Laws like Labor Laws, Minimum Wages Act, Payment of Wages Act,Workmen Compensation Act, Personal Injury (Compensation Insurance) Act, Industrial Dispute Act, Shop and Establishment Act, Employee Provident Fund Act, or any other act related to the Employee's welfare. Any assistance / compliance required from the OWNER should be informed in time and followed up for compliance.

6.2. BIDDER shall be responsible for Insurance Coverage of the complete manpower engaged under the workmen's compensation Act / Group personal accident policy for the number of persons engaged by him at any point of time. He shall produce necessary documentation for the same to OWNER. He shall not engage any person less than 18 years of age and shall not pay less than what is prescribed under minimum wages act.

6.3. BIDDER shall indemnify and keep indemnified the OWNER and its officers / servants and agents from and against all third party claims whatsoever including but not limited to property loss and damage, personnel accident injury or death etc.

6.4. BIDDER shall at his own expenses comply with all labour laws and keep the OWNER indemnified in respect thereof. The OWNER shall be entitled to deduct directly from the bills to be paid to the BIDDER any sum, fines / penalty payable by the BIDDER and which sum / sums the company is required to pay as the principal employer on account of the BIDDER'S default in respect of all liabilities referred to in above clause.

6.5. Public Holidays shall be entertained and approved by OWNER from time-to-time. However, BIDDER shall ensure that operations are not affected.

6.6. BIDDER shall be responsible for the payment of all salaries / wages, allowances emoluments, gratuity and other payments etc. as may be required to be paid to employee by the BIDDER under any law or statutory rules applicable to the employee, and the BIDDER shall discharge all such liabilities promptly and keep OWNER indemnified and from same at all time.

6.7. BIDDER shall be responsible for the payment of contribution under Employee State Insurance Act, Provident fund and other statutory payment to be made under any law or statutory rules and regulations for the time being applicable to the staff engaged by the BIDDER for the work at the OWNER'S premises and the BIDDER shall discharge all such liabilities promptly and indemnify and keep the OWNER indemnified from same at all time.

6.8. BIDDER shall not allot subcontract any or part of the above job without prior approval of the OWNER.

6.9. All persons engaged by the BIDDER shall be the BIDDER’s own employees and they will claim no privileges from HOGPL. The BIDDER will be directly responsible for the administration of his employee as regard general discipline and courteous behavior.

6.10. Proof of payments made against all statutory payments like PF, ESI etc., are to be submitted along with bills (in subsequent month i.e. payments for April'19 with bills of May'19 submitted in 1st week of June'19. Payments made against statutory requirements will be audited for genuineness.

6.11. Bidder’s monthly Invoice will only be cleared, if Salary & Attendance of Bidder’s employee & Proof of payments made against all statutory payments like PF & ESI are cleared as per the below given Acts.

6.12. In view of death, injury or accident to employee, BIDDER should take Workman's Compensation Policy / Group Personal Accident Policy for the person being engaged with BIDDER at a time.

6.13. BIDDER shall be responsible to comply with all the liabilities and accordingly, BIDDER shall maintain all record and registers and produce before the competent Authorities under the Act or the OWNER as and when demanded.

6.14. By way of illustration of various Acts as stated in the contract, the BIDDER thereof shall comply with the following Acts prevailing from time-to-time or any amendments therein;

- The Employee's Provident Fund Act, 1952 The Employee's State Insurance Act, 1948
- The Contract Labour (regulation and abolition) act, 1970 The Minimum Wages Act, 1948
- The Payment of Wages Act, 1936
- The Workmen's Compensation Act, 1923 The Payment of Bonus Act, 1965

- The Factories Act, 1948

6.15. Any other statutory requirements of Local / State Government / Government of India shall be fully complied by the BIDDER and the same shall be included in his scope of work.

6.16. All the statutory approvals and Liasioning required for CGS & CNG operation (stamping - legal metrology from weight and measure department of government) will be in the scope of theOWNER. However, BIDDER shall assist to obtain approvals.

6.17. BIDDER shall follow the safety procedures, from time to time, specified by OWNER in operating the outlet while handling of CGS & CNG . Specifically, the firm shall comply with and observe the Safety Code of Practice, notified by OWNER to the BIDDER for ensuring safe refuelling of vehicles with CGS & CNG . In addition, the bidder shall also ensure full and strict compliance with the guidelines, norms, rules, stipulations etc. as may be prescribed by chief controller of Explosives (CCOE, PESO) Nagpur, Chief Fire Officer (CFO), Dy. Chief Inspector of Factories and any other statutory authorities in respect to safe handling, storage and sale of CGS & CNG at the site.

7. SCOPE OF WORK-HOGPL

7.1. HOGPL shall issue work permit or site clearance for the CGS & CNG station maintenance. However, the Bidder shall coordinate the entire work pertaining to above from time to time. Supervisor to ensure that everybody working at CGS & CNG station shall have Permit to work.

7.2. HOGPL shall provide adequate office space with sitting arrangement. In case, same arrangement shall not available with HOGPL then BIDDER shall provide proper space, seatingarrangement for their manpower, communication system, etc

7.3. HOGPL shall maintain and issue available spares required for maintenance. HOGPL shall approve the rates of job/spares which are not included in tender. However, BIDDER shall extend such services on chargeable basis as agreed mutually.

7.4. HOGPL shall monitor movement of vehicle running for maintenance words, bidder shall maintain odometer readings in logbook with relevant details for further verification of Owner.

7.5. HOGPL shall make necessary vigilance on all the activities at any time during the tenure and reserves all right to take disciplinary action in case of any misbehavior, damages, fault at Bidder's part, theft / manipulation, malpractice, etc.

7.6. HOGPL has all the rights reserved to carry out the job pertaining to the station from any other vendor, if found dissatisfactory or half / partial completion in terms of workmanship, duration, etc. In such case, necessary deduction from Bidder shall be made.

8. PENALTY AGAINST NON-COMPLIANCE IN MAINTENANCE

8.1. The following critical parameter describes the system performance and service level expectations and requirements during the Implementation phase of Contract. The service level includes target performance measures, unacceptable measures and the related penalties for not meeting required service levels.

Sr.	Parameter	Service Level Agreement	Penalty
1.	Preventive maintenance	As per approved schedule / Annual Maintenance Plan	200/- per delayed day per site after 7 days from the scheduled date of maintenance.
2.	Breakdown maintenance	Within 30 min on receipt of written / telephonic intimation	500/- per delayed hour per site after 4 hours from the written / telephonic intimation
3.	PPE's OR Uniform	Fully compliance for all Manpower	200/- per instance
4.	HSE Compliance	Fully compliance to HOGPLHSErequirements	500/- per instance* during the execution of job.
5.	Use of Equipment /Instruments	Deployment of equipment /Instruments with calibration	500/- equipment /Instruments observedwithout calibration.
6.	Maintenance / Service of Van	Healthy condition all time,regular service from auth service centre	1,000/- per instance
7.	Upkeeping Measuring instruments, tools-tackles and equipment's in Maintenance Van	Fully compliance	500/- per instance
8.	Child labour	Non employment of child labour less than 18 years	2,000/- per instance
9.	Availability of Skilled Manpower	Deployment of skilled manpower	500/- against non-availability of skilledmanpower per instance
10.	Any incident leading damage to Owner asset	No damage during entire contract period	1000/- or repair costwhichever less
11.	Up-keeping First Aid kit complete	Complete as per Owner requirement	200/- per instance
12.	Compliance to any statutory & legal requirement	Fully compliance to HOGPLrequirements	500/- per instance
13.	PF Management	To maintain PF value ≥0.95,No penalty shall be imposed against poor PF	As Actual Penalty
15.	Patrolling of Steel Network	Daily Patrolling of Steel Network	1000/- per Instance

8.2. The cumulative penalties arising out of Service Level Agreements shall belimited to 10% of the Total Contract Value. (The Complete Technical Document Service Level Agreement).

8.3. If the Cumulative Penalties exceed limit of 10% of contract value, then Owner reserves the right to invoke the termination clause accordingly

8.4. Any noncompliance to applicable statutory and legal requirements may lead to termination of services or contract subject to discretion of HOGPL

8.5. No penalty shall be applicable in case of:-

- Force majeure.
- When HOGPL has instructed not to carry out the work, for which only written evidenceshall be considered / granted.
- Reasons not attributable to BIDDER.

ANNEXURE-II

PLANNED MAINTENANCE SCHEDULE (AMP)

Sr.	Description	Frequency
1	Preventive Maintenance of Mechanical and Electrical Installations as per check lists.	Monthly
2	Carry out leak check of stationary cascades tubing and fittings connections, tightness, cleanliness, burst disc, grouting, and any other joint connected to cylinder.	Monthly
3	Carry out leak check at LCV filling & unloading post of SS tubing & fittings, house keeping of post, QRC coupling with connector, cascade base connection with LCV/HCV, tightness of cascade frame.	Monthly
4	Carry out leak test at all LCV/MCV/HCV cascades cylinder of SS tubing's and fittings, rupture disc, dent, corrosion, damage if any	Monthly
5	Ensure that the all types of Cascades of SRVs, pressure gauges / temperature gauges are tested / calibrated as per the requirement and reports submitted.	Monthly
6	Check tightness of all SS Fittings and Clamps	Monthly
7	Cleaning of the tubing Trench, Dispenser, Cascades, Electrical Installations and other applicable	Monthly
8	Carry out leak test for CGS & CNG stations equipment's-Cascades Dispensers, AirCompressor piping, LCV Points, SS tubings and fittings etc	Monthly
9	BIDDER should ensure good housekeeping in SS tube trench, cable tray, cascade / compressor base and internals of dispenser / Electrical panels.	Monthly
10	Earthing Testing of all earth pit & record the earthing resistance value with & without grid.	Half yearly
11	Functional Check of Protective relays, Instruments & Switchgears. Assist in Testing and Resetting/Calibration activities running in CGS & CNG Stations, maintain / record Calibration Certificates of it.	Yearly
12	Testing of transformer insulating oil & Necessary Oil testing Certification be required for annual Asst. Electrical Inspection.	Yearly
13	Assist in obtaining approvals from Electrical Inspector during Annual inspection.	Yearly
14	Assist in obtaining Plan Approvals / NOC from Electrical Inspector required during Up-gradation / modification works	As & When Req.
15	Check setting of Protective Relays as per site conditions and recommended.	Half yearly
16	Check Insulation Resistance of live part of Electrical Installations like power cables, Power Transformer, Servo Stabilizers, LT Panels	Yearly
17	Painting to the Lighting Poles, Two Pole Structure, Earth Pit Covers	Yearly /As & When Req.
18	Identification of all feeders, Earth Pits, Lighting Poles, Equipment's	Yearly /As & When Req.
19	Filtration of Transformer oil & basic testing of Transformer at Site i.e Continuity, Winding Resistance Unbalance Voltage Test.	As & When Req.
20	Display and update Earthing diagram/SLD as per site situation and modification if any.	Yearly /As & When Req.
21	Patrolling of entire steel network excluding city areas of Ambala & Kurukshetra.	Daily
22	Capturing TCP readings, DRS Meter readings.	As &Req.
Note:	BIDDER shall carry out preventive maintenance as per Equipment Manufacture's Instruction Manual but not limit to above mentioned activities. Also, shall take Work Permit from Authorized issuer and approved by respective site manager/engineer with all respect.	

ANNEXURE-III

MAINTENANCE CHECK LISTS

HPOIL GAS	**Preventive Maintenance Check-List for SS Tubing & Fittings, Storage Cascade, LCV/HCV Filling & Unloading Post**	**Format No.**	
		Rev. No.	0
		Effective Date	

Report No.: Date of Maintenance:
GA: Location:
Name of the BIDDER: Maint. Order No.:
Performed By: Witness By:

Sr.	Inspection Item	Inspection Status	Remarks
SS Tubing & Fittings			
1	Carry out leak check of each joint of tubing using soap and water solution.		
2	Check leakages of SS tubing & fittings in dispenser		
3	Check leakages of SS tubing & fittings of Air Compressor		
4	Check leakages of SS tubing & fittings in Trench		
5	Check tightness of all SS Fittings		
6	Check tightness of all tubing clamps		
7	Cleaning of the tubing Trench		
Storage Cascade (Stationary, static & Mobile In LCV/HCV)			
8	BIDDER shall verify that the cascade cylinders are hydro tested as per the statutory requirement and submit report for same.		
9	BIDDER shall verify that equipment's are being calibrated as per the statutory requirement and submit report for same.		
10	The cylinders are cleaned, visually checked for corrosion / damage and submitted reports for necessary action.		
11	Check leakages of all fittings.		
12	Check the tightness of all fittings.		
13	Check tightness of all cylinder clamps.		
14	Check Rupture Disk on each cylinder.		
15	Check leakages and Operations of SRV.		
16	Check tightness of Cascade mounted on LCV.		
17	Check the grouting of the cascade frame.		
18	Check for proper bracket-to-vehicle mounting.		

19	Check proper connection of Fuel and vent Hose.		
20	Check whether, Rubber mounting pads are in place or not, if not specify same in the report.		
LCV Filling & Unloading Post			
22	Check for any CGS & CNG leaks from SS tube fittings using soapand water solution.		
23	Condition of QRC Coupling with connector (L/M/H). Replacing of QRC 'O' rings, if required		
24	Check Mass flow meter for its proper functioning at CGS & CNG Mother station		
25	Check Clamps and Supports in trench		
26	Replacing of spares required, if any.		
27	Check for Earthing cable with clip (Replace if required).		
28	Housekeeping of LCV fill Post area.		
29	Re-installation of LCV fill post in case of damaged by any accident / Incident		
30	Condition of Pressure gauge, 2 & 3 - Way ball valve, H P Filling Hose (L/M/H)		
31	Vent height of LCV filling point should be (03 Mtr. From GL), modify if not.		
Major Observation If any: -			

Certification	Signature:	**BIDDER**		
	Name:	Prepared by (AMC BIDDER)	Verified By (Engineer In-charge/ Station Owner)	Authorized By (O&M In-charge)

	Preventive Maintenance Check-List for Power Distribution Boards/LT Panel	Format No.	
		Rev. No.	0
		Effective Date	

Report No.: Date of Maintenance:
GA: Location:
Name of the BIDDER: Maint. Order No.:
Performed By: Witness By:

Sr.	Inspection Item	Inspection Status	Remarks
1	Check all the MCCB's by operating & its connections. Check Condition of its Handle.		
2	Check Air circuit breaker connection, tripping commands, ON-OFF in test mode as well as No load condition.		
3	Check for incoming supply during load and no-load conditions.		Voltage: RY_____V, YB_____V, RB_____V
4	Check for Overload, Under Voltage, Overvoltage, Earth Fault Relay operation. Note the setting parameter.		OLR:_____ UV: _____ OV: _____: EFR: _____
5	Check for proper 3-Ph load distribution (For balance current)		Current: R_____Amp, Y_____Amp, R_____Amp
6	Internal Bus bar connection, any damages in bus bar supports insulators etc.		
7	Check change over switch connection & its ON-OFF Operation.		
8	Check function of APFC relay, CT's connection, ON-OFF contactor		CTs connection should be on GEB Incomer.
9	Identification of all feeders as per connected equipment.		
10	Check for presence of foreign materials, Open entry etc.,		
11	Check Emergence stop Push Button		
12	Check connection. Tightness and Physical condition of outgoing Cable and lugs.		
13	Check healthiness of all fuses, size & rating by continuity tester and Check the rating with related scheme drawings. Change if not in order.		
14	Check insulation resistance of the all point's w.r.t chassis with 500 V megger. (yearly)		IR Value: _____MΩ

15	Check condition of enclosing cabinets including hinges, latches, locks, door gaskets, Painting to body, if req attend.		
16	Check proper space between bus bars and Bus bars to Body. Put an isolator/Hylam Sheets if required.		Min 25 mm
17	Check for overheating of cable, terminal blocks, fuse base and isolator ends. If found replace it.		
18	Check the APFC Relay operation in Auto and Manual Mode. Record the Power Factor from display in load condition.		P.F.: _____
19	Take the Current Reading of each capacitor, if found current less 33% from Rated current, replace the same.		Nos. of Power Capacitors with less current:
20	Check earthing to Panel Body & each capacitor bank.		
21	Check APFC interlocking between DISCOM & DG set for avoiding reverse power to alternator.		
22	Check all connections of APFC module & tightening of termination at Contactor/Thyristor, fuse, bus link, and connector.		
23	Check condition of discharge resistors on capacitors OR Surge Suppressor on Contactors.		
24	Ensure the PF adjustment charges from electricity supplier. Check power factor readings & records for the same.		

Major Observation If any: -

Certification	Signature:	**BIDDER**		
	Name:	Prepared by (AMC BIDDER)	Verified By (Engineer In-charge/ Station Owner)	Authorized By (O&M In-charge)

HPOIL GAS	**Preventive Maintenance Check-List for UPS System**	**Format No.**	
		Rev. No.	0
		Effective Date	

Report No.: Date of Maintenance:
GA: Location:
Name of the BIDDER: Maint. Order No.:
Performed By: Witness By :

Sr.	Inspection Item	Inspection Status	Remarks
1	Check output voltage setting of UPS System.		Voltage Setting: _____V
2	Check for alarms logged in display.		
3	Check terminations are tightened. And no open entry in UPS system.		
4.	Monitoring the load on UPS system.		Full Load Current: _____Amps.
5.	Check level of electrolyte, if low Top-up electrolyte as per mentioned in manual.		Top-up electrolyte after confirmation from O&M O&M HEAD.
6.	Clean the UPS by dry clothes & blower.		
7.	Check cooling fan of UPS module. Replaced immediately if found.		
8.	Check for fuse rating as per manuals.		
9.	Check connection of UPS system through isolation transformer and standby servo stabilizer.		

Major Observation If any: -

Certification	Signature: Name:	**BIDDER**		
		Prepared by (AMC BIDDER)	Verified By (Engineer In-charge/ StationOwner)	Authorized By (O&M In-charge)

	Preventive Maintenance Check-List for Batteries - Installation & Its Operation	Format No.	
		Rev. No.	0
		Effective Date	

Report No.:
GA:
Name of the BIDDER:
Performed By:

Date of Maintenance:
Location:
Maint. Order No.:
Witness By:

Sr.	Inspection Item	Inspection Status	Remarks
1	Make sure battery terminals and cable connections are clean and tight.		
2	Maintain electrolyte level as marked on it, neither high nor too low. (**Never add acid to cells** as electrolyte in any type of batteries.)		Refer OEM manual for proper method
3	Check for bulging effect of installed each battery, if found replace at earliest.		
4	Check for any crack/damage, acid Leakage/ terminal damage.		
5	Check for the charger operation. Overcharging produces gases, rapid deterioration and corrosion which shorten battery life.		Float Charging is recommended.
6	Check for no excessive Charging Voltage.		13.6-13.8 V for SMF / AGM/Gel Batteries & @1.4V/Cell for Ni-Cd Batteries.
7	Check for Vent caps are Cleaned, Gases can be expelled during overcharging.		
8	Check installation at well-ventilated area and away from Heat Sources or direct sunlight.		
9	Check connected batteries are with same voltage & AH rating.		Preferably form the same lot.
10	**Chec**k voltage of each battery & make record in logbook.		
11	Check Specific gravity of electrolyte & make record in logbook.		It should be 1.19±0.01.
12	**Replace** the batteries if; • Bulging effect observed on body, • Any crack/damage/leakage observed, Completion of <u>three years</u> from installation for SMF/VRLA/AGM/Gel type batteries.		

Major Observation If any: -

Certification	Signature: Name:	**BIDDER**		
		Prepared by (AMC BIDDER)	Verified By (Engineer In-charge/ Station Owner)	Authorized By (O&M In-charge)

	Preventive Maintenance Check-List for Power and Control Cable	Format No.	
		Rev. No.	0
		Effective Date	

Report No.: Date of Maintenance:
GA: Location:
Name of the BIDDER: Maint. Order No.:
Performed By: Witness By:

Sr.	Inspection Item	Inspection Status	Remarks
1	Check the proper laying/fitting on cable tray, in duct or open trench.		
2	Check cable route for any water seepage, damage if any etc.		
3	Tighten all terminations, check safe distance between lags, provide separator if found misplaced, provide insulation Tap/PVC Insulator if found damaged.		
4	Check insulation resistance Ph. to Ph, Ph. to Ground by using 500V megger for LT cable & 1000V megger for HT cable allowable limit of IR value for LT cable >1MΩ and HT >5MΩ (once in a year)	Last Checked on……. Last checked value……	Acceptable HT IR Value >5MΩ Acceptable LT IR Value >5MΩ
5	Cleaning of power Cable trench in electrical room, Cable entry & exit and cable trays.		
6	Check all power/control cables dressed are properly		
7	Check the tag of each end. If found missing, provide the same.		Tag Details shall be as per cable schedule
8	Check the route marker & its condition. If found missing, provide as per instruction of O&M HEAD.		
9	Check FRLS Cable and FLP Cable Gland in specified Gas Zone.		

Major Observation If any: -

		BIDDER		
Certification	Signature:			
	Name:	Prepared by (AMC BIDDER)	Verified By (Engineer In-charge/ Station Owner)	Authorized By (O&M In-charge)

	Preventive Maintenance Check-List for Earthing System	Format No.	
		Rev. No.	00
		Effective Date	

Report No.:
GA:
Name of the BIDDER:
Performed By:

Date of Maintenance:
Location:
Maint. Order No.:
Witness By :

Sr.	Inspection Item	Inspection Status	Remarks
1	Visually inspection of Earth pit, its size, cleanness, earth pit cover with Identification.		
2	Check proper connection of Earth Electrode with Earth strips. Apply grease or bitumen on outer surface of Bolts and nuts. Replace SS Nut-bolts if found corroded.		
3	Check Earthing resistance with grid and Without grid though calibrated earth tester & as per approved procedure.		Annexure-3 Acceptable ER Value: With Grid <5Ω Without Grid <10Ω
4	Check proper Installation of Earthing marker and update the value.		
5	Check double point earthing of all equipment having more than 250V power supply (Three Phase supply).		Both points shall be connected at grid directly.
6	Check Earthing continuity from earth pits to equipment.		
7	Make coating to earth strips joints by applying zinc-rich or black bitumen paints, if corroded after doing surface preparation.		
8	Check isolated earthing to the UPS Neutral, DG set neutral, Power transformer neutral and Lighting arrester.		
9	Display and update Earthing diagram as per site situation and modification if any.		Annexure-8
10	Do Maintenance of earthing pit whose resistance value is higher.		If found ER >10 Ω after Maint.
11	Check all earth connection to be checked for tightness. Loose connections or bolted joints lead to hot spot & sparking which can become a source of fire/explosion in the hazardous areas.		

Major Observation If any: -

Certification	Signature: Name:	BIDDER		
		Prepared by (AMC BIDDER)	Verified By (Engineer In-charge/ Station Owner)	Authorized By (O&M In-charge)

	Preventive Maintenance Check-List for Lighting System	Format No.	
		Rev. No.	0
		Effective Date	

Report No.: Date of Maintenance:

GA: Location:

Name of the BIDDER: Maint. Order No.:

Performed By: Witness By:

Sr.	Inspection Item	Inspection Status	Remarks
1	Check the all lights by operating.		Nos. of Lighting not working: _____
2	Check the internal /external earthing of lighting fixture.		
3	Check Capacitor, Choke, and Igniter capacity with lighting fixtures.		
4	Check termination of Cables in DB's, Switches, Lugs Identifications etc…		
5	Check Lighting Load distribution in all three Phases.		L.Load in Phase R:_____Y:_____, B:_____
6	Check record of spares consumed / frequent failure of lighting material.		
7	Check FLP Junction Boxes, Cable Gland, FLP Plug, FLP Sleeve condition in Gas Zones. If found damage, replace it.		
8	Painting to the lighting Poles by isolating power supply as & when required.		
9	Check Gasket of FLP lighting fixtures/ Junction Box/Control Panel, if found cracked, replace the same.		
10	Drum, winch, Motor working to be check		
11	Apply grease on rope/gear of motor		
12	Check direction shifting if any of hi-mast lighting fixtures, set if required.		
13	Check proper fitting of junction boxes installed on poles/hi-mast		

Major Observation If any: -

		BIDDER		
Certification	Signature: Name:			
		Prepared by (AMC BIDDER)	Verified By (Engineer In-charge/ Station Owner)	Authorized By (O&M In-charge)

MAINTENANCE CHECK LISTS

FOR

HT INSTALLATIONS

(IF APPLICABLE)

	Preventive Maintenance Check-List for HT Switch Board / Vacuum Circuit Breaker	Format No.	
		Rev. No.	0
		Effective Date	

Report No.: Date of Maintenance:
GA: Location:
Name of the BIDDER: Maint. Order No.:
Performed By: Witness By:

Sr.	Inspection Item	Inspection Status	Remarks
1	Clean outside of breaker with dry clothes.		
2	Check external screws, bolts, open entry to inside.		
3	Check for presence of foreign materials, birds' nests, etc. inside of VCB part.		
4	Check loose or overheating connections; ground connections. Tighten all bus. Bushing and ground connections.		
5	Check connection Tightness and Physical condition of outgoing Cable and lugs.		
6	Check the neutral link proper connection.		
7	Check condition of enclosing cabinets including hinges, latches, locks, door gaskets, and paint it if req.		
8	Check for proper alignment of fixed & moving contacts, inspected moving contacts for decolourisation, carbonization, pitting or any other abnormality & replace, if found bad.		
9	Check breaker operation for manual as well as remote.		
10	Check healthiness of all fuses, size & rating by continuity tester and Check the rating with related scheme drawings. Change if not in order.		
11	Check power pack function.		Output Voltage: _____
12	Check relay setting as per site situations and installations.		Setting Value: _____
13	Check earth continuity of busbar, breaker module, and cubicle.		Acceptable Value<1Ω
14	Check breaker operation for manual as well as remote.		

Major Observation If any: -

Certification	Signature: Name:	**BIDDER**		
		Prepared by (AMC BIDDER)	Verified By (Engineer In-charge / Station Owner)	Authorized By (O&M In-charge)

	Preventive Maintenance Check-List for Power Transformer	Format No.	
		Rev. No.	0
		Effective Date	

Report No.: Date of Maintenance:
GA : Location:
Name of the BIDDER: Maint. Order No.:
Performed By : Witness By :

Sr.	Inspection Item	Inspection Status	Remarks
1	Check for Electrically Loose Connection at Bushing Terminal.		
2	Check for oil leakage from bushing Terminal, gaskets or other body parts.		
3	Check the Oil Level in Conservator Tank MOG / Gauge.		
4	Check the Explosion Vent Diaphragm		
5	Check function check of Off-Load Tap Changer, Note Down Tap Position.		
6	Check output voltage setting in AVR and record it.		
7	Check OLTC Operation manually and automatically.		
8	Interlock Checking for HT Breaker Trip in Test Position.		
9	Check parameter of Oil Temperature and Winding Temperature & Its Alarms setting, if applicable		OTI: …… WTI:……
10	Ensure all fasteners and gasket is in position.		
11	Check humming / reprehensible voice from transformer.		
12	Check dielectric strength (BDV) of oil (yearly)		Acceptable Value >30 KV, if found lower, filtration process to be carry out.
13	IR Value of Transformer Primary Winding (H.T side) with Megger. Also check the Winding Continuity (yearly).		Acceptable Value >50MΩ
14	IR Value of Transformer Secondary Winding (LT Side, 415V) from back side of Incomer of Respective Transformer on the LVs after Isolating from Transformer. (yearly)		Acceptable Value >50MΩ
15	Check condition of silica gel in breather		If found pink colour of silica gel, take drying method or replace.
16	Clean outside of transformer with dry clothes.		
17	Check & clean of marshalling box, indicator, and terminals.		

Major Observation If any: -

Certification	Signature: Name:	**BIDDER**		
		Prepared by (AMC BIDDER)	Verified By (Engineer In-charge/ Station Owner)	Authorized By (O&M In-charge)

	Preventive Maintenance Check-List for Two Pole (DP) Structure	Format No.	
HPOIL GAS		Rev. No.	0
		Effective Date	

Report No.: Date of Maintenance:
GA: Location:
Name of the BIDDER: Maint. Order No.:
Performed By: Witness By:

Sr.	Inspection Item	Inspection Status	Remarks
1	Check Insulation Resistance of HT Accessories w.r.t Chassis with 1000V Megger.		Acceptable Value >5MΩ
2	Clean all accessories of Two Pole Structure.		
3	Check Drop out Fuse condition, it not to be loose / Broken / wired condition. If found, replace as required or with set.		
4	Check Lightening arrester condition, it not to be damaged. If found, replace as required or with set (mainly during pre-monsoon).		
5	Painting to the Pole by isolating HT power supply as and when required.		
6	Check isolated earthing to the lightening arrester. Replace insulator/spacer of Earth strips if required.		
7	Check Earthing continuity to the Pole at two points.		
8	Check Earthing continuity of GOD operating rode & handle.		
9	Check for Electrically loose connection & No spark at terminal. Tighten all electrical connections.		
10	Check ON-OFF operations of Air Breaker / Isolator, Male-Female contacts etc.		
11	Check availability of HT rated hand glows for operating HT isolator in case emergency.		
11	Check Electricity Supplier Energy Meter for any abnormal reading.		

Major Observation If any: -

		BIDDER		
Certification	Signature: Name:			
		Prepared by (AMC BIDDER)	Verified By (Engineer In-charge/ Station Owner)	Authorized By (O&M In-charge)