**GENERAL INFORMATION:**

UNHCR Sub-office in Aden requires professional services and contractor cost proposals to perform preventive and corrective maintenance services of its generators in the office and guesthouse premises.

**SCOPE of WORK ‐ GENERATOR ROUTINE/PREVENTIVE/CORRECTIVE MAINTENANCE**

**Routine/Preventive Maintenance:** will be in 125 hours for each generator, the eight (8) visit for each generator is an estimated, but the visit should per running hours for each generator and to invoice UNHCR per actual visits

**CORRECTIVE MAINTENANCE:** will be in need basis. Corrective-maintenance call-outs will be made on needs' basis when a given unit of the Generator breaks down. The rate for corrective maintenance shall also apply to emergency call outs.

The contractor will be responsible for labor and materials required to carry out all routine, preventive and corrective maintenance as outlined in this Scope of Work document.

The contractor shall provide all materials, supervision, labor, tools, and equipment to perform the said maintenance.

* Contractor must setup with the Contract Manager, logbook to be used for performing maintenance service;
* Contract Manager must be kept informed at all times of working conditions of generators, and imminent equipment failure;
* Contractor must appoint a dedicated person for UNHCR to be visiting premises daily;
* Regular inspection and maintenance reports shall be submitted to the Contract Manager on weekly basis;
* Regular laboratory report for all chemicals (oil, coolant or fuel analysis) shall be submitted to the Contract Manager;
* Maintain a small inventory of spare parts in the office, after review of Contract Manager;
* Contractor to visit sites on daily basis for refueling, monitoring, and needed maintenance;
* For emergency visits, the contractor will respond within 1 hours after notification from the UNHCR Focal Point.

1. **Daily/Weekly Schedule - SERVICE LEVEL 1**

1. **Conduct visual inspection around generator.**

* Check for evidence of leaks, damage, loose or missing hardware.
* Inspect engine and generator wiring harness for wear and damages.
* Inspect supports and spring isolators for soundness and stability.
* Inspect unit for corrosion.
* Hoses and Clamps ‐ Inspect/Replace if needed.
* Belts ‐ Inspect/Adjust/Replace if needed.
* Inspect all fuel, oil, and water piping for secure mounting.
* Inspect exhaust piping and muffler insulation.

2. **Batteries**.

* Battery charger – Inspect operation and clean.
* Battery electrolyte level and specific gravity – Check and adjust.  Add distilled water as needed.
* Perform battery load test.
* Clean battery terminals and lugs (apply grease on terminal connections).

3. **Fluids and Filters.**

* Cooling System Coolant Level ‐ Check and adjust.
* Check coolant percentage and freeze protection. (Refractometer)
* Jacket Water Heater ‐ Check proper operation.
* Engine Oil Level ‐ Check and add if needed.
* Engine Air Cleaner Service Indicator – Check, clean filter if needed.

4. **Generator Room.**

* Fuel tanks – Inspect and treat fuel if needed, check fuel level, drain water and sediment.
* Fuel tanks – Inspect tanks for needed cleaning.
* Automatic fuel system ‐ Setup system, and regularly Check operation and control panel.
* Air intake/exhaust – Ensure nothing obstructs airflow; louvers are free and operate properly.
* Exhaust condensate trap – drain condensate.

5. **Control Panel.**

* Electrical Connections ‐ Check tightness
* Clean and remove dust from panel (inside and out of cabinet).

6. **Automatic Transfer Switch panels (ATS)**.

* Clean and remove dust (inside and out of cabinet).
* Inspect seals.
* Note date of last battery change.  (Replace if 2 years or older).
* Tighten connections on control panels and main power cable lugs.
* Check for hot spots.

7. **Run unit – No load.**

* Run the generator with no load for 15 minutes.
* Remote Start Panel‐Inspect and test operation.  Inspect and clean.
* Check the generator for unusual conditions, such as: excessive vibration, leaks,
* Excessive smoke and abnormal noise.
* Verify all gauges and indicators are normal and functioning properly.
* Check all indication lights, replace any defective bulbs.

8. **Start unit and run under load for 1 hour.**

* Note: Unit should be run under facility load if permissible.  If not, unit should be run with a minimum 80% load with load bank.
* Automatic Start/Stop – Inspect.
* Check ATS operations and calibrate if necessary.
* Observe and record engine start, transfer and retransfer/cool down time.
* Generator Set Vibration – Inspect.
* Read and record all gauges/meters.
* Record load readings – Voltage, amps, frequency, power factor, KW and % load.
* Check exhaust for excessive black or white smoke.
* Check turbocharger for vibrations or any abnormal noise during operation.
* Check generator bearing for noise and overheating.
* Check exhaust manifold, muffler, and piping for leaks and secure mountings.

9. **Additional**.

* Ensure Generator/ATS is left in proper position for automatic start and transfer.
* Clean generator and generator room.  Wash radiator if necessary.
* Annotate date, hours and maintenance in Generator log, fill out maintenance checklist

and report deficiencies to Contract Manager

* Perform any additional maintenance tasks as recommended in the manufacturer’s

operation and maintenance manuals.

* Submit Service Inspection and Test Report to the Contract Manager.

10. **Perform computer‐aided service diagnostic test by a qualified technician (all engines).**

* Use appropriate diagnostic tool
* Must be able to identify engine problem
* Override Power Wizard level three passwords
* Configure and/or change system parameters, as required
* Display, graph and record logs of parameter status
* Display the status of a group of parameters (temperatures, pressures, etc)
* View and clear active and logged diagnostic codes
* View and clear active and logged event codes
* Display, view or change the current Configuration File or Base level Flash File
* Upload, download and save configuration files
* View a list of irregularities logged by the ECM (engine control module)
* Perform diagnostic tests
* Perform calibrations as necessary
* Print reports and diagnostic results. Submit to Contract Manager after each inspections.

1. **Quarterly Schedule - SERVICE LEVEL II**
   1. Conduct Semi‐Annual PM service
   2. Engine Air Cleaner Elements – Replace.
   3. Engine Crankcase Breather – Clean.
   4. Engine Oil Sample ‐ Obtain and perform analysis.  Submit report to COR.
   5. Engine Oil and Filter – Replace.
   6. Fuel Filters and Water Separators – Replace.
   7. Obtain fuel sample at day tank and storage tank for analysis.
   8. Radiator – Clean (pressure wash).
   9. Intake louvers and ducts – Inspect/Clean (pressure wash).
   10. Fan Drive Bearing – Lubricate.
   11. Magnetic Pickups ‐ Clean/Inspect.
   12. Cooling System Coolant Sample ‐ Obtain
   13. Cooling System Supplemental Coolant Additive (SCA) ‐ Test/Add
   14. Coolant filter – Change if applicable
   15. Crankshaft Vibration Damper ‐ Inspect
   16. Engine Protective Devices ‐ Check
   17. Engine Valve Lash ‐ Inspect/Adjust
   18. Turbocharger – Inspect/Check, Check end play and radial clearance on the turbine wheel and shaft.
   19. Clean and lubricate fuel pump linkages if applicable.
   20. Fan bearing – Inspect/Grease.
   21. Clean dust and vacuum all the controls, meters, switching mechanism components, interior buswork, Remote Start control panel, Annunciator and connecting lugs of the ATS.
   22. Inspect/Check buswork and supporting hardware for carbon tracking, cracks, corrosion, or any type of deterioration on ATS.
   23. Check all control wiring and power cables (especially wiring between or near hinged door) for sign of wear and deterioration on ATS.
   24. Check the cabinet interior for loose hardware – tighten connections.
2. **Annual Maintenance - Schedule SERVICE LEVEL III**
3. Conduct the Semi‐annual and Annual PM Service.
4. Inspect water pump and seals; replace any worn or defective parts.
5. Clean and inspect the oil cooler.
6. Clean and inspect the after cooler.
7. Generator – Check for moisture, dust, oil, grease, and debris on main stator windings, exciter.
8. Clean as needed
9. Generator bearing – Inspect/Grease (or as recommended by manufacturer).
10. Cooling System Coolant – Flush system and replace coolant (Note CAT ELC coolant to be replaced every 12,000 hrs or 6 years).
11. Cooling System thermostat – Replace
12. Belts and hoses – Replace
13. Batteries ‐ Replace
14. Generator Main Stator Winding Temperature (if equipped with winding defectors)
15. Check and record main stator winding temperatures with engine under load.
16. **Emergency Response**

Provide UNHCR with an Emergency Contact and Telephone Number where Contractor can be reached twenty-four (24) hours per day - Contractor’s personnel shall respond within one (1) hour.

**Safety**.

To ensure safe site operations, adequate measures to be adopted to prevent damage to properties or utilities and injuries to persons. UNHCR shall not be liable for loss or damage resulting from contractor’s failures to take the necessary precautions. The provision of all personal protective equipment shall be the responsibility of the Contractor.

**Table 1: List of Generators.**

|  |  |  |  |
| --- | --- | --- | --- |
| **Asset Description** | **Location** | **Tag Number** | **Acquisition Date** |
| CATERPILLAR, PRIME  Model: GTP01514  200 KVA | Guesthouse | 561749 | 09/05/2019 |
| CATERPILLAR, PRIME  Model: GTP01442  200 KVA | Office | 561750 | 09/05/2019 |
| PERKINS, 170 KVA  Model: U079702G  170 KVA | Guesthouse | 749004 | 17/11/2021 |
| PERKINS,  Model: MGBF5083N07593C  500 KVA | Office | 529380 | 06/03/2018 |
| PERKINS,  Model: U18170T  350 KVA | Office | 529162 | 25/03/2010 |

**Table 2: Estimated Spare Parts.**

|  |  |
| --- | --- |
| **Part** | **Quantity/Year** |
| ***Regular Consumable Spare Parts:*** | |
| Oil Filter | 50 |
| Primary Fuel Filter | 100 |
| Secondary Fuel Filter (Fuel Water Separator) | 100 |
| Air Filter | 25 |
| Engine Oil (L) | 1800 |
| Coolants (L) | 250 |
| ***Mechanical Spare Parts:*** | |
| Coolant Tank | 4 |
| Belt Set | 8 |
| Water Pump | 6 |
| Unit Injectors | 5 |
| Timing Case Cover | 5 |
| Lift Pump | 5 |
| Fuel Injection Nozzles | 5 |
| Oil Pump | 5 |
| Radiator Cap | 5 |
| Thermostat | 5 |
| Top Gasket Kit | 5 |
| Intake Valve | 5 |
| Exhaust Valve | 5 |
| Oil Cooler | 5 |
| Radiator Rubber Mountings | 5 |
| Thrust Washer | 5 |
| Seal | 5 |
| Rear Oil Seal | 5 |
| Front Oil Seal | 5 |
| Exhaust Insulation | 5 |
| Valve Guide | 5 |
| Main Bearing | 5 |
| ***Electrical Spare Parts:*** | |
| Electronic Governor | 5 |
| Starter Monitor | 5 |
| Startup Battery | 5 |
| Battery Charger | 5 |
| ***Instruments:*** | |
| Oil Sensor | 8 |
| Fuel Sensor | 8 |
| Pressure Sensor | 8 |
| Coolant Temperature Sensor | 8 |
| Speed Potentiometer | 8 |

**Acknowledgment:**

Company name:

Stamp

Date: