

## **SCOPE OF WORK AND EVALUATION CRITERIA**

### **THE APPOINTMENT OF SERVICE PROVIDER TO PROVIDE MOTOR REPAIRS SERVICES TO SANPC REFINERY FOR 36 MONTHS**

#### **1 INTRODUCTION.**

The scope of work detailed in this document is for the supply of all labour, equipment, tools and material to overhaul, repair, rewind and replacement of electric motors for South African National Petroleum Company Refinery, hereinafter shall be known as "SANPC Refinery".

This contract specification shall be read together with the following appendices:

a) Appendix A: Schedule of Rates of Low Voltage Motors (380V and below), Medium Voltage Motors (6600V) and other rates.

b) Appendix B: Technical Requirements for Overhaul, Repairs, and Rewind of Electric Motors.

#### **1.1. TERMS AND CONDITIONS.**

1.1.1. This is a unit rates contract. Individual Call Off Orders (or Job Instructions) will be issued to the Repairer according to the respective rates in Appendix A

1.1.2. "Delivery Days" in the appendices is defined as the total number of days\* from the first day\* following the arrival of the motor at the Repairer's workshop to the day\* when the motor is delivered to SANPC Refinery.

*\* For "Normal" works, days refer to "working days" whereas for "Urgent" works, days refer to "calendar days"*

1.1.3. "Normal" in the appendices is defined as work to be carried out at the Repairer's own planning schedule.

1.1.4. "Urgent" in the appendices is defined as work to be carried out

immediately by the Repairer to achieve the shortest possible turnaround time. Continuous work where practicable

- 1.1.5. Motor Service Cards - Motor data will be forwarded to the Repairer together with the work instruction in the form of Motor Service Cards. The Repairer in turn will record the overhaul/repair/rewind information in the Motor Service Cards Report section.
- 1.1.6. The Repairer shall use suitable Ball Bearing or Pillow Block grease on all the overhaul / repair of the motors.
- 1.1.7. The Repairer shall have a Quality Assurance system to ISO9001 or equivalent.
- 1.1.8. Any deviation from the contract documents shall be clearly stated.
- 1.1.9. The Repairer shall provide one (1) year guarantee for all work executed under this contract. The guarantee shall cover all workmanship and material supplied by the Repairer. The Repairer shall bear the repair cost if it is proven that the failure, during the guarantee period, was due to poor workmanship or material.
- 1.1.10. The Repairer facilities shall be made available for SANPC Refinery representative to inspect repair work or to witness any required testing.
- 1.1.11. The Repairer must obtain SANPC Refinery's written approval of all sub-contractors and specialist services.

## **2 WORK SPECIFICATION**

This specification covers the work method in the overhauling, repair and rewinding of electric motors. Any variation from this specification must be agreed by SANPC Refinery engineer / focal point.

The repair, overhaul and rewind of motors for use in potentially explosive atmospheres (i.e. 'Ex' motors) shall be carried out in accordance with SANS IEC60079-19:2015: Equipment repair, overhaul and reclamation for equipment used in explosive atmospheres (other than mines or explosive)

## **2.1. PRESERVICE TESTS / CHECKS AND INSPECTION**

### **2.1.1 Incoming Inspection**

2.1.2. Prior to off-loading the machine, the motor should be inspected by the Repairer for obvious damage that may have occurred during shipment. Photographs must be taken.

2.1.3. A damage report should include broken or missing parts and/or any unusual problem(s). For unusual damages or conditions that cannot be adequately described, pictures should be taken to identify the condition.

2.1.4. Motor nameplate details shall be checked against the data reflected on the motor repair card.

2.1.5. Pre-service Tests: Test insulation resistance (IR) to earth and record the results. Refer to section 8 for the test voltage and minimum acceptable IR values.

2.1.6. Measure and record winding resistance.

2.1.7. Surge test to be carried out after dismantling the fan covers, fan, end-covers and rotor removed. Refer to section 8 for the surge test voltages.

## **2.2. DISMANTLING**

2.2.1. The Repairer shall use a marking system to facilitate the re-assembling of components to their original positions

2.2.2. Brackets and bearings (make and designation) shall be identified and recorded.

2.2.3. Motor shall be dismantled down to its individual parts. All parts shall be

cleaned and degreased by a method which has no subsequent detrimental effect on the electrical and/or mechanical work of the motor.

- 2.2.4. Perishable components shall not be subjected to harmful cleaning operations.
- 2.2.5. The removal, cleaning and refitting of couplings shall be carried out in such a manner that coupling faces or bearings are not damaged. Hammering is not permitted. The coupling exact position on the shaft shall be recorded.
- 2.2.6. The keyway should also be inspected for wear.
- 2.2.7. End shield bearing looseness or journal loose shall be checked.
- 2.2.8. SANPC Refinery shall be informed if a sealed bearing is found in a motor with regreasing facility, or non-seal bearing in a motor without regreasing facility.
- 2.2.9. Check and record the condition of stator windings and rotor. For stator, check for signs of overheating, carbonizing of wedges, general aging of insulation. For rotor, check for signs of cracks, arcing in slots, for cage migration, etc.
- 2.2.10. Any evidence of the following shall also be recorded:
  - 2.2.10.1. Over-greasing
  - 2.2.10.2. Grease contamination
  - 2.2.10.3. Corroded parts (feet, coupling, fan blades, fan cover, underneath motor, cooling fins, keyway, etc.)
  - 2.2.10.4. Water ingress into motor internal or into lubrication system (e.g. grease tube or discharge).
  - 2.2.10.5. bent shaft

## **2.3. OVERHAUL/RECONDITIONING**

- 2.3.1. Stator Overhaul
  - 2.3.1.1. Thoroughly clean the stator irons, casing and windings.

- 2.3.1.1. Bake and dry the motor at temperature allowable for the existing varnish type.
- 2.3.1.1. Varnish impregnate the winding.
- 2.3.1.1. For stator windings reported with overheating problem, a core loss test shall be performed to evaluate the condition of the laminations.

#### 2.3.2. Rotor Overhaul

- 2.3.2.1. Thoroughly clean and bake the rotor. Varnish impregnate the rotor after it has been cooled.
- 2.3.2.2. Single phase test (applying 10% rated voltage to only two leads of the motor, turn the rotor slowly by hand and observe for current variations indicating possible presence of cage defect) or 'growler' test shall be carried out if the rotor is suspected with broken rotor bars.
- 2.3.2.3. SANPC Refinery shall be notified if rotor re-barring is required.

#### 2.3.3. Bearing Journal and End shield

- 2.3.3.1. End shields and journals fits are to be inspected against OEM specifications. Where OEM specifications are not available, end-shield housing fits shall be H6, and journal fits k5.
- 2.3.3.2. Shaft journal and Bearing end shields may be reclaimed by use of metal spraying or bushing.

#### 2.3.4. Rotor and Stator Lamination Repair

If rotor and stator are to be lightly skimmed to remove eccentricities and surface damage, the resultant increased air gap between rotor and stator shall not produce higher internal or external surface temperatures that infringe the temperature class of the machine. Skimmed or damage stator core should be subjected to a flux test to ensure that there are no remaining hot spots which could infringe the temperature

classification or cause subsequent damage to the stator windings. Refer to IEEE Std 1068 section 2.3.4.3 for various methods of repair.

#### 2.3.5. Balancing

- 2.3.5.1. Motor required balancing shall be dynamically balanced in 2-plane with half key and fan fitted.

#### 2.3.6. Terminal Box

- 2.3.6.1. All weatherproof gaskets shall be examined and replaced if in poor condition. On Explosion Proof/Flame Proof/EX 'd' motors, all mating faces must be cleaned and free from dirt and rust. On assembly, these faces shall be smeared with a thin layer of copper grease. Special attention shall be paid to the joint between the motor body and the terminal box.
- 2.3.6.2. Terminal block shall be inspected for damage and replaced if necessary. Terminals shall be correctly marked in accordance with BS 4999: Part 3: 1981 or BS 822: Part 6: 1964 as appropriate
- 2.3.6.3. Motor tails on back of terminal block shall be checked for damage and either repaired or replaced as deemed necessary. Ends shall be brought out in correct sequence to ensure the original direction of rotation.
- 2.3.6.4. All covers and connections shall have the full complement of the correct nuts, bolts, screws, washers and lock washers, and the necessary links must be fitted. Damaged and missing parts shall be replaced.

### 2.4. STATOR REWIND

- 2.4.1. Winding insulating material shall be Class 'H' or higher.
- 2.4.2. Before any rewinds, the stator laminations must be tested and checked for hot spots. SANPC Refinery engineer's approval is required for any additional repair work.
- 2.4.3. The removal of windings is to be carried out in such a manner that no damage is caused to either the core plates or insulation between the core plates. Coil stripping shall be either using controlled burn-out oven or via cold stripping (reference to IEEE Std 1068-1990). The use of direct flame heating to soften insulation is not permitted.
- 2.4.4. All rewinds shall be 'copy' windings to the motor manufacturer's specification and the insulation materials used shall meet the temperature "class" of the motor, but the minimum shall be Class 'H'. In the older type windings, it is acceptable to use modern insulation materials.
- 2.4.5. The complete high voltage winding and connection ring, if fitted, shall be securely lashed together using a suitable class of lashing cord. All loose pieces shall be secured in their correct position. Coil ends shall be secured by ties applied to the coil during winding and extra binding must be kept to the minimum. Ties applied to the coil's ends should be positioned in the same relative position on each coil or group of coils in order to impart a neat regular appearance. Ties shall be securely fastened and trimmed off so as to preclude the possibility of them becoming loose or long ends projecting into the bore. Care shall be taken to ensure that winding overhangs do not make contact with any other part of the machine when finally assembled.
- 2.4.6. The windings of high voltage motors shall have anti-corona protection realised by means of semi-conducting tape covering the slotted part of the winding. Anti-corona protection by means of semi-conducting paint is not allowed.
- 2.4.7. On terminating the winding at motor terminal boxes, the terminals shall be correctly marked and brought out in the correct

sequence to ensure that the original direction of rotation is maintained.

- 2.4.8. If thermistor, thermocouples or temperatures switches are fitted, the Repairer shall contact the SANPC Refinery engineer to check if they are to be replaced.
- 2.4.9. All stator windings of rewound motors shall have identical insulation levels irrespective of the electrical location of the winding e.g. star-point shall have the same voltage rating of the line terminals.
- 2.4.10. The final insulation of all rewound stator windings should preferably be vacuum pressure impregnated (VPI). Resin-impregnated method is the second acceptable alternative.
- 2.4.11. Any insulation system used shall comply with the certification requirements of the motor (Ex'd', Ex'e', Ex'n' etc.)

## **2.5. REASSEMBLING**

### **2.5.1. Bearing and Bearing Housings**

- 2.5.1.1. All bearings must be changed unless specifically requested not to do so by the SANPC Refinery engineer.
- 2.5.1.2. Bearings, supplied by the Repairer at SANPC Refinery's request, shall be in accordance with the manufacturer's recommended size and clearance fit.
- 2.5.1.3. Fitting of bearings is to be carried out by the heat shrinkage method. Where the bearing assembly makes this method impracticable, bearings shall be tapped on using a steel drift against the inner race.
- 2.5.1.4. Grease-lubricated bearings shall be packed with the correct quantity of grease before assembly. All grease nipples, grease relief system and pipes shall be checked, cleaned and replaced or repaired if damaged.
- 2.5.1.5. All pipes and bottles of oil-lubricated bearings shall be cleaned and checked for damage and leakages. Damaged parts shall be repaired or replaced.
- 2.5.1.6. On bearing assemblies for Explosion Proof/Flame Proof/Ex 'd' motors, all mating faces must be cleaned and free from dirt and rust.



On assembly, these faces shall be smeared with copper grease.

- 2.5.1.7. On all bearing assemblies, the full complement of nuts, bolts, screws and washers shall be fitted. Damaged and missing parts shall be replaced.
- 2.5.1.8. Sleeve or antifriction bearings that are electrical insulated shall be assembled accordingly, to ensure no bridging to motor enclosure. All accessories such as lubrication system piping, fittings, temperature or vibration sensors shall be replaced such that the bearing insulation is not short circuited.
- 2.5.2. When re-assembling Explosion Proof/Flame Proof/EEEx 'd' motors, all joints/mating faces shall be thoroughly cleaned and lightly greased (with copper grease) to prevent corrosion and assist weatherproofing. Only non-metallic scrapers and non-corrosive fluids shall be used to clean all flanges.
- 2.5.3. Painting
  - 2.5.3.1. All motors shall be cleaned, primed and painted to SANPC Refinery's specification, with the nameplate left legible, on return to SANPC Refinery.
  - 2.5.3.2. Ensure all grease nipples, grease relief ports are not covered with paint or other material.
  - 2.5.3.3. Exposed machine surfaces such as rotor shaft shall be coated with corrosion inhibitor.
- 2.5.4. If coupling or pulley is delivered with the motor, this must be refitted and returned with motor.
- 2.5.5. The earth connection bolt on the motor shall be checked and replaced or repaired as necessary. It should also be free of paint.

## **2.6. TESTING**

### **2.6.1. For Overhauled Motors**

- 2.6.1.1. All windings shall be tested with a bridge megger to ensure that their resistance values are balanced.
- 2.6.1.2. All windings shall be insulation tested to earth. Refer to section 8 for

the test voltages and minimum acceptable IR values.

- 2.6.1.3. All motors shall be test-run, at the nominal voltage, for 2 hours. (This may be waived in case of urgent repairs). All motors shall have the direction of rotation, when viewed from the drive end, recorded on the test sheet. This direction of rotation shall be for terminals connection, R-Y-B to A1-B1-C1.
- 2.6.1.4. Vibration levels, measured on the bearing housings to BS.4999: Part 50: 1978, shall not exceed 2mm/s RMS. The motor under test shall be rigidly mounted on all its feet. For 3000rpm motors, the contribution of vibration at twice the supply frequency (100 Hz) to the overall vibration should not exceed 1.4 mm/sec RMS.
- 2.6.1.5. Where necessary, the Repairer shall dynamically balance the rotor to reduce the vibration to the specified value. The rotor shall be dynamically balanced with the fan and coupling mounted. Test reports shall be submitted to SANPC Refinery.

#### 2.6.2. For Rewound Motors

##### 2.6.2.1. New Stator Coils Quality Assurance

- 2.6.2.1.1. Insulation system of the new coils shall be verified according to SANS IEC 60034 standard.
- 2.6.2.1.2. Test report on the insulation system QA shall be submitted to SANPC Refinery

##### 2.6.2.2. Carry out test as per item 2.6.1.1 – 2.6.1.2.

- 2.6.2.3. Surge comparison test shall be carried out prior to varnishing the new windings. Refer to section 2.7. for the relevant surge test voltage.
- 2.6.2.4. Carry out high-voltage test to new windings according to SANS IEC 60034.

- 2.6.2.5. Proceed with test as per item 2.6.1.3 – 2.6.1.5.
- 2.6.2.6. All stator windings of cage machines should be energized at an appropriate reduced voltage with the rotor locked to obtain the full load rated current and to ensure balanced current on all phases.
- 2.6.3. Test results shall also include the following: -
  - a) Copy of balance certificate (where applicable)
  - b) No load current (at rated voltage)
  - c) Locked rotor voltage and currents (where applicable)
  - d) Direction of rotation.
- 2.6.4. A copy of the test report shall be provided and delivered with the motor.
- 2.6.5. Motor replacement – for LV Motors only
  - 2.6.5.1. Where the repair cost of the motor exceeds 60% of the replacement cost, the SANPC Refinery engineer is to be notified, and a decision will be made whether to replace or repair the motor.
  - 2.6.5.2. All replaced motors to carry a 24-month manufacturer's warranty.
  - 2.6.5.3. Replaced motors shall be stripped down, modified as detailed out in Section 7.5 and re-certified as per the Zone for use.
- 2.6.6. Modifications – MV & LV Motors
  - 2.6.6.1. Motor tags must include M on all tags, e.g. P101 must now be PM101, K101 must now be KM101, E101 must now be EM101, S101 must now be SM101. If in doubt, please obtain clarity
  - 2.6.6.2. Vertical down Inpro/seal bearing isolators to be fitted to all vertical pump motors on the drive end as a standard. SANPC Refinery to approve type of seal.

## **2.7. TEST REQUIREMENT AND ACCEPTANCE CRITERIA**

### 2.7.1. Insulation Resistance Test

#### 2.7.1.1. Test Voltages

LV Motors – 500VDC

MV Motors – 5KVDC

### 2.7.2. Acceptance Insulation Resistance (IR) values

LV Motors after overhaul –  $\geq 20$  Mega Ohms

LV Motors after rewind –  $\geq 500$  Mega Ohms

MV Motors after overhaul –  $\geq 100$  Mega Ohms

MV Motors after rewind –  $\geq 1000$  Mega Ohms

### 2.7.3. Acceptable Polarization Index

Overhauled Motors –  $\geq 1.5$

Rewound Motors –  $\geq 2$

### 2.7.4. Surge Test Voltages

LV Motors – 2.5KV

MV Motors – 10KV

## 2.8. DOCUMENTATION

All test sheets and quality documentation shall specify which standard or specification the work will be done to

The test report that accompanies the motor shall comprise of

- The photographs prior to stripping
- The first line root cause of failure
- All pre-test results – mechanical and electrical
- Bearing manufacturer results if applicable
- Balancing data from third party if applicable
- Vibration analysis including the spectrum during test run
- All post repair test results – mechanical and electrical.
- The temperature rise in a graphical format – not less than 2 hours.
- Ex Certification including IA numbers.
- Installed bearing data.

**REPAIRER TO SUBMIT SPECIMEN CHECK SHEETS, REPORTS AND QUALITY CONTROL DOCUMENTS IN THE TECHNICAL TENDER SUBMISSION.**

**2.9. RELEVANT STANDARDS**

SANS 60034	Rotating electrical machines
SANS 60034-1	Part 1: Rating and performance
SANS 60034-2	Part 2: Methods for determining losses and efficiency of rotating electrical machinery from tests
SANS 60034-5	Part 5: Classification of degrees of protection provided by enclosures of rotating electrical machines (IP code)
SANS 60034-6	Part 6: Methods of cooling (IC code)
SANS 60034-7	Part 7: Classification of types of constructions and mounting arrangements (IM code)
SANS 60034-8	Part 8: Terminal markings and direction of rotation of rotating machines
SANS 60034-12	Part 12: Starting performance of single speed three-phase cage induction motors for voltages up to and including 660V
SANS 60034-14	Part 14: Mechanical vibration of certain machines with shaft heights 56 mm and higher. Measurement, evaluation and limits of the vibration severity
SANS 60034-15	Part 15: Impulse voltage withstand levels of rotating AC machines with form-wound stator coils
SANS 60034-18	Part 18: Functional evaluation of insulation systems
SANS 1019	Standard voltages, currents and insulation levels for electricity supply

SANS 60060-2	High-Voltage Test Techniques Part 2: Measuring Systems
SANS 60072-1	Dimensions and output series for rotating electrical machines. Part 1: Frame numbers 56 to 400 and flange numbers 55 to 1080
SANS 60072-2	Dimensions and output series for rotating electrical machines. Part 2: Frame numbers 355 to 1000 and flange numbers 1180 to 2360
SANS 10108	The classification of hazardous locations and the selection of apparatus for use in such locations
SANS 60079	Electrical apparatus for explosive gas atmospheres
SANS 60079-1	Part 1: Flameproof enclosures 'd'
SANS 60079-2	Part 2: Pressurized enclosure 'p'
SANS 60079-7	Part 7: Increased safety 'e'
SANS 60079-10	Part 10: Classification of hazardous areas
SANS 60079-15	Part 15: Construction, test and marking of type of protection 'n' electrical apparatus
SANS 60529	Degrees of protection provided by enclosures (IP code)
SANS 60751	Industrial platinum resistance thermometer sensors
IEC TR 60894	Guide for test procedure for the measurement of loss tangent on coils and bars for machine windings
ISO 15	Rolling bearings - radial bearings - boundary dimensions
ISO 281	Rolling bearings - dynamic load ratings and rating life
ISO 1132-1	Rolling bearings - tolerances – Part 1: Terms and definitions
ISO 1132-2	Rolling bearings - tolerances – Part 2: Measuring and gauging principles and methods

ISO 1680	Acoustics - Test code for the measurement of airborne noise emitted by rotating electrical machinery
ISO 1940-1	Mechanical vibration - Balance quality requirements for rotors in a constant (rigid) state – Part 1: Specification and verification of balance tolerance

### 3 SCOPE OF THE WORKS - GENERAL

3.1 The description given below defines the general requirements particular to the scope of the **works** and is to be read in conjunction with the other documents forming the Tender and/or the agreement as the case may be. Procedures for job card shall follow the sequence of events as per Central the Planning Workflow and as outlined below:

#### 3.1.1.

- a) SANPC Refinery normally uses individual job card numbers to apportion the **works**. The **contractor** will be required to use the job card system for call-offs (pricing) and the SANPC Refinery **job card system** for progress reporting of the **works** in conjunction with the duly authorised SANPC Refinery **Zone Supervisor**. SANPC Refinery will provide the level 1 schedule (overall schedule – early start and late finish) for the contractors planning and execution.
- b) The contractor is required to provide man-hours expended to execute the work from the schedule of prices and compare against those listed in the man-hour norms for the job. The overall schedule will be compared against the initially agreed schedule.
- c) This information will be used in the KPI measures.

3.1.2. The **Area Engineer or the duly authorised person**, together with the **Zone Supervisor** identifies the required maintenance work, where after a priority is placed against each maintenance activity.

**Table 3.1 - MAINTENANCE PRIORITISATION TABLE**

PRIORITY	PRIORITY/RISK LEVEL	START DATE	INITIAL COMPLETION PERIOD
C	Routine	Request Date + 30 days	3 Months
B	Routine	Request Date + 14 days	1 Month
A	Schedule Breaker	Request Date + 1 days	1 Week
E	Emergency	Immediate	ASAP + Overtime

Priorities A, B, C & E are scoped by the respective Zone Scooper or the discipline Artisan.

A job card number is assigned to the scope and job card is issued to the contractor. Emergency Status Classification will be the 'A' and 'E' priority jobs. In such a case the Area Engineer agrees upon the staffing and general planning requirements with his execution Team (Scoper, Planner, Zone Supervisor and the Contractor). The Area Engineer confirms

the release of the works and identifies which lower priority job(s) can be postponed to accommodate the Emergency priority job.

- a) An 'E' priority job is supposed to commence immediately, and shift work is to be effected, and an 'A' priority job will require the contractor to commence within 24hrs of receiving the scoping form and order number. An 'A' priority job may require extended hours to be undertaken by the dayshift crew.
- b) In the event that the contractor resources in the Zone are insufficient for the Emergency Job, then the Area Engineer is to be consulted as he/she has overview of all resources and is in the position of suggesting what jobs across site could be postponed to accommodate the 'E' priority job.
- c) For an 'E' priority job after hours, the Planner is to immediately issue a Manual job card for the work to start. In the event the 'E' priority job occurs outside of normal working hours, the system generated job card with a valid job card number will be issued at the beginning of



the next normal working day.

- d) The contractor is expected to obtain the necessary permits and proceed with the works. The workflow from here shall proceed in the same manner as for normal priority works.
- 3.1.3. For (A, B, C & E) priority work a scope of work package, in the form of a Contractor Work Request (CWR), is generated in SAGE by the Area Scoper. A job card is generated by the Zone Scoper and followed up with a manual scoping form to the contractor. The contractor estimates the cost and man hours for a CWR, in accordance with the Schedule of prices, and returns the estimated CWR in electronic format to the Area Engineer. The Area Engineer evaluates and awards the contractor's estimated CWR.
- a) When awarded, the contractor compiles a Work Pack which includes the relevant drawings and Material Take-off's (MTO's) etc.
  - b) The Contractor's supervisor is required to facilitate the generation of the Safety Certificate.
- 3.1.4. The contractor presents the compiled work pack to SANPC Refinery, which must be reviewed and verified in writing by the respective SANPC Refinery authorities. SANPC Refinery shall, at the same time, ensure that the material required is in stock or ordered. Central Planning draws up a 30-day look-a-head schedule, for review by the Area Execution Team including the contractor. From time to time, SANPC Refinery may impose a limit to contractor numbers on site.
- 3.1.5. After confirmation with all relevant parties in the Weekly planning meeting, the Planner issues a seven-day look-ahead level 1 schedule. From that schedule, job cards will be issued to the relevant contractor. The seven-day schedule will be extracted from the monthly schedule.
- a) The contractor is to ensure that the relevant QCP, Work-pack is approved and that the permits are obtained at the latest by close of business of the day prior to the planned start date.
  - c) Thereafter the contractor is to get daily clearances for each activity

from the respective Maintenance Services Focal Point (MSFP) before commencing with the works.

- 3.1.6. In the event of any variations to the scope of the works, SANPC Refinery Authorised person (Area Engineer, the Zone Planner, the Zone Scoper) and the contractor shall identify such variation/s and this must be recorded. The contractor shall include such variations into the work pack. A variation order (VO) shall be raised and approval by the Area Engineer before the extra work commences.

Execution of works without a job cards will not be accepted.

- 3.1.7. The contractor must submit the job cards to the Planner for progress reporting. These job cards must be signed by the Discipline Supervisor as verification that the work is completed to the required standard and to process payments.
- 3.1.8. The Planner updates all progress and closes off the work upon issue of the handover/takeover certificate from the contractor.
- 3.1.9. Quality of workmanship must be verified by duly appointed persons for all categories of work which will be on record as part of the contractor workpacks.
- 3.1.10. All material specifications must be as per SANPC Refinery /ISO standards. If at any instance the specifications are not clear, then the SANPC Refinery Area Engineer is to be consulted for guidance and resolution.

- 1.2. SANPC Refinery may require the contractor to prepare a workpack prior to commencement of the works, which may include:

- a) Health, Safety and Environment Action Plan.
- b) Method Statement.
- c) Quality Plan.
- d) Completion of the SANPC Refinery integrated Risk Assessment Method Statement ("RAMS")

## **4 SAFETY**

- 4.1** The contractor and contractor personnel must, as far as reasonably practical comply with requirements prescribed by the OHS Act and OHS Regulations- Act 85 of 1993.
- 4.2** The contractor will also comply with the SANPC rules and regulations
- 4.3** The contractor safety officer will ensure that regular audits are done on site to identify and intervene on unsafe situations and near miss acts during work execution. Any findings to be reported and recorded in the SANPC incident management system
- 4.4** All incidents to be reported to the relevant clearance issuers and maintenance supervisors

## **5 ADMINISTRATION PROCEDURES**

### **5.1 Meetings**

- 5.1.1 The following meetings are compulsory for contractor's representative to attend when any work is in progress:
  - a) Daily planning and progress meetings as directed by Area Engineer and/or the Zone Planner.
  - b) Weekly look-ahead meetings as directed by Area Engineer and/or the Zone Planner.
- 5.1.2 The following meetings are compulsory for the contractor Site Manager to attend:
  - a) Monthly KPI review meeting
  - b) Quarterly performance and safety review meetings or as directed by the Contract Manager (CM).

### **5.2 Planning and Progress**

- 5.2.1 SANPC Refinery shall provide the contractor with a 30-day look-a-head schedule outlining planned windows for activities. The contractor is to manage and administer the manpower resources as such to enable him

to comply with the defined service levels and meet the required works order completion dates, irrespective of absenteeism or leave. The contractor must ensure these objectives are fully understood and that management structures and procedures are in place to ensure timeous and successful execution under the above-mentioned constraints.

- 5.2.2 The contractor is responsible to plan, supply, coordinate and manage his manpower, logistics, equipment and materials resources for the works in accordance with the schedule from Central Planning as a guide. The coordination, progress monitoring and reporting is the responsibility of the contractor and shall take place at the daily progress meetings. These meetings shall be recorded (as per respective meeting's criteria) by the Zone Planner and agreed to or signed by the contractor. The contractor shall update his plan, provide progress at the daily and weekly progress meetings.
- 5.2.3 The contractor is to arrange and coordinate with the required SANPC Refinery personnel, all RAMS sessions in order to ensure that work starts timeously.
- 5.2.4 The operations of SANPC Refinery and interconnecting facilities in outlying areas will be carried out continuously during the period of this agreement, and the contractor shall allow for working in close proximity to and in liaison with other contractors in order to minimise inconvenience and shall plan for flexibility in labour resources input and any other factors in complying with these restrictions.
- 5.2.5 Restrictions may be imposed upon the contractor in his execution of the works as a result of SANPC Refinery 's operations. The contractor is to immediately notify SANPC Refinery (Area Engineer and the Contract Manager (CM) in writing, of such an interruption. The contractor along with the Area Engineer shall re-coordinate the manpower to other available sections, areas, items of equipment in order to minimise standing time.
- 5.2.6 All priority "E" and "A" work to be clearly defined by the Area Engineer and closely coordinated with the Contract Manager (CM). The Planner/Planning Manager will ensure that the necessary job cards are

raised within 24 Hrs (or the next normal working shift). The contractor Supervisor and the Supervisor will both sign the Job Card for progressing purposes.

- 5.2.7 The contractor shall, at all times, demonstrate positive and proactive participation in the efficient execution of the works in order to achieve satisfactory levels of productivity.
- 5.2.8 The contractor is to note that whilst the overall scope of works must be completed in the required time, the contractor must ensure that by proper preparation and quality execution the planned man-hours are not exceeded.
- 5.2.9 The contractor's attention is drawn to the fact that the works to be executed may be in the vicinity of insulated pipework, equipment and electrical and instrument installations. The contractor shall be held responsible for any damage caused to these or any other installations by his operations. If damages are identified prior to commencing work, the Area Engineer or the Supervisor must be notified of such damages immediately.
- 5.2.10 Access to and from the worksite is by means of existing hard roads or temporary access roads and will be through such gates and by such routes as will be defined by SANPC Refinery. The contractor is to operate his own vehicles with minimum of inconvenience to other traffic at the Refinery sites.
- 5.2.11 All electrical equipment brought on site for work execution must be inspected and approved by the SANPC Refinery electrical department.

### **5.3 Contractor Organisation and Training**

- 5.3.1 SANPC Refinery will not pay for trainees. It is however acknowledged that consistency in staff qualifications is of mutual benefit. All workers are to undergo training through a SETA approved Training facility. For the manning of strategic positions, the contractor may present proposals for traineeships, for approval by the Contract Manager (CM).

- 5.3.2 In the event that the candidate is found to be not coping with the work, SANPC Refinery reserves the right to insist on change for a more suitable candidate.

#### 5.4 Staff Issues

- 5.4.1 As a control system the contractor is to supply a full organogram with functions and names of resources to SANPC Refinery. SANPC Refinery reserves the right to assess all contractor supervisors before they report for work at the SANPC Refinery sites.
- 5.4.2 SANPC Refinery shall have the right to assess the contractor's core resources and performance on a continuous basis for the duration of this agreement.
- 5.4.3 Only approved resources may be used by the contractor. Changes in core resource staff shall be justified to and approved by the SANPC Refinery Contract Manager (Contract Manager (CM)), whose approval will not be unreasonably withheld. (This includes non-recoverable resources).

### 6 DIVISION OF RESPONSIBILITIES

#### Definitions:

E	Execute
P	Participate
A	Approve
S	Supply
M	Maintain

#### 6.1 Division of Responsibilities - Work Descriptions

The following work descriptions define the division of responsibilities with respect to the work required and exclusions from the **agreement** scope of work: -

Work Description	By CONTRACTOR	By Others	By SANPC Refinery
Timeous Application for Work Permit	E		P
Issue of daily work permits			A/E

Work Description	By CONTRACTOR	By Others	By SANPC Refinery
Gas Testing			<b>E</b>
Quality Checking	<b>E</b>		<b>P/A</b>

## 6.2 Division of Responsibilities - Provision of Construction and associated Equipment

The following defines the division of responsibility with respect to the provision of construction and associated equipment for the implementation of the **agreement**:

Task Description	By CONTRACTOR	By Others	By SANPC Refinery
Transportation	<b>S</b>		
Site huts, ablution facilities, storage and where required services	<b>M</b>		<b>S</b>
Lighting – General			<b>S/M</b>
Required protective clothing and equipment include. B.A. Compressor	<b>S/M</b>		
Cranage		<b>S/M</b>	
Lifting gear, ropes, slings and shackles			<b>S/M</b>
Safety Equipment	<b>S/M</b>		
Firefighting facilities			<b>S/M</b>
Resuscitator			<b>S/M</b>
Standby B.A. set			<b>S/M</b>

## 6.3 Division of Responsibilities - Supply of Installed Equipment and Materials

The following defines the division of responsibility with respect to the supply of installed equipment and materials required for the **agreement** work:

Task Description	By CONTRACTOR	By Others	By SANPC Refinery
Identify work and raise Job card			E/A
Prepare and issue detailed scope of work	S/P		A
Price	E		A
Rates for non-bill items	E		A
Plan sequence of work	E		A
Carry out the work	E		
Progress reporting	E		A
Prepare V.O.	P		E/A
Handover (ready to use)	E		A

The above noted items are intended to be indicative of the categories of work to be undertaken. They are not intended as a comprehensive list of the same.

## 7 PRELIMINARY AND GENERAL

7.1 The motor repair service supplier shall make provision for P&G's in their all-inclusive unit pricing.

## 8 PRICING SCHEDULE

This is a unit rates contract. Individual Call Off Orders (or Job Instructions) will be issued to the Repairer according to the respective rates in Appendix B.



## 9 EVALUATION CRITERIA

### 9.1. Phase 1

#### Mandatory Requirements

At this phase, bidder's responses are reviewed against the below Mandatory Requirements. **Failure to comply with any of the Mandatory Requirements will lead to the bidder being disqualified and not be considered for further evaluation on Technical Requirements.**

No.	Description of the Mandatory requirements	Comply	Not Comply
9.1.1.	<p>The Repair facility shall be certified under an approved product certification scheme to repair or overhaul explosion-protected apparatus, Ex n, Ex d, Ex e. in accordance with ARP0108 / National Code of Practice for Electrical Machinery in Hazardous Locations: Regulatory Requirements for Explosion-Protected Apparatus, GN 2398.</p> <p><b>The Bidder to submit valid certificates.</b></p>		
9.1.2.	<p>Coida Certificate</p> <p><b>Submit Valid copy of Coida certificate.</b></p>		
9.1.3.	<p>The bidder must have a repair workshop within the eThekweni Municipality region.</p> <p><b>Submit title deed or lease agreement of workshop.</b></p>		
9.1.4.	<p><b><u>ISO 9001 Certification</u></b></p> <p>Bidder must provide valid <b>ISO 9001 certification</b> for their repair facility.</p>		

## 9.2. Phase 2

### Technical evaluation

Bidders will be evaluated according to the below technical evaluation criteria. Minimum Technical Threshold is **70%**. It must be noted that if the Bidder does not meet the **70%** minimum threshold, the bidder will be disqualified and not be evaluated further.

<b>9.2.1. Company Experience</b>				
The service provider is required to have the necessary experience to provide the services to Overhaul, Repair, and Rewind Electric Motors for use in potentially explosive atmospheres in accordance with applicable standards. Please submit a minimum of three (3) relevant and contactable references of your current and/or previous petrochemical industry clients for Overhaul, Repairs, Rewind and Replacement of Electric Motors. The assignments/projects completed must be in the past 10 years <b>(2014-2024)</b> .				
<b>Please provide reference letters as proof of similar services or work done in the past 10 years. The reference letter must be signed, dated by the client, and must be on the client's letterhead and include the date when the work was executed, the company name and contact details.</b>				
	Evaluation Criteria	Document as Evidence	Score	Weighting %
Experience in Motor Repairs and maintenance.	3 Reference letters and more submitted	<b>Reference letters</b>	5	30%
	2 Reference letters submitted		3	
	1 Reference letter submitted		2	
	No Reference letter Submitted		0	

#### **9.2.2. Company Response times**

Bidder must provide response times for different priority jobs as defined in Table 3.1 in Section 3.

	Evaluation Criteria	Document as Evidence	Weighting %
Company Response times	Service provider to provide their response times for Emergency (E) Priority Jobs for LV motors and MV motors that include: 1. Pick-up times 2. Turnaround times	<b>Bidder to submit a document that specifies response times.</b>	8%

#### **9.2.3. Company Response times**

Bidder must provide response times for different priority jobs as defined in Table 3.1 in Section 3.

	Evaluation Criteria	Document as Evidence	Weighting %
	Service provider to provide their response times for Schedule Breaker (A) Priority Jobs for LV motors and MV motors that include: 1. Pick-up times 2. Turnaround times	<b>Bidder to submit a documents that specifies response times.</b>	7%

#### **9.2.4. Company Response times**

Bidder must provide response times for different priority jobs as defined in Table 3.1 in Section 3.

	Evaluation Criteria	Document as Evidence	Weighting %
	Service provider to provide their response times for Normal (B, C) Priority Jobs for LV motors and MV motors that include: 1. Pick-up times 2. Turnaround times	<b>Bidder to submit a document that specifies response times.</b>	5%

#### **9.2.5. Service Provider Team Experience**

On average, the project team that will be assigned to CEF must have a minimum of eight (8) years' experience average in Overhauling, Repairing, and Rewinding Electric Motors.

**Provide a C.V. for each of the personnel that will be part of the team, clearly indicating their roles and responsibilities.**

	Evaluation Criteria	Document as Evidence	Score	Weighting %
Team Experience	8 and more years of experience	<b>CVs of the Proposed team clearly listing the name of clients and work done</b>	5	25%
	7 but less than 8 years of experience		4	
	6 but less than 7 years of experience		3	
	Less than 6 years of experience		0	

#### **9.2.6. Quality Management System (QMS)**

The Services Provider must have a Quality Management System (QMS) in place which includes, specimen check sheets, reports and Quality Control Plans showing hold points, for Overhaul, Repair, and Rewind of Electric Motors used in potentially explosive atmospheres? The QC Packs must meet the requirements specified below and in the Section 2.8 of the Scope of Work.

- The photographs prior to stripping
- The first line root cause of failure
- All pre-test results – mechanical and electrical
- Bearing manufacturer results if applicable
- Balancing data from third party if applicable
- Vibration analysis including the spectrum during test run

- All post repair test results – mechanical and electrical.
- The temperature rise in a graphical format – not less than 2 hours.
- Ex Certification including IA numbers.
- Installed bearing data.

**Bidder to submit at least one completed documentation pack of a previous Ex motor repair job done by the Service Provider. The pack should comply with the requirements specified above and in the Section 2.8 of the Scope of Work.**

	Evaluation Criteria	Document as Evidence	Score	Weighting %
Quality Management System (QMS)	Bidder complies with 90% - 100% of the applicable Section 2.8 requirements	<b>Completed documentation pack (check sheets, test reports, Quality Control Plans) of at least 1 example of Ex motor repaired.</b>	5	25%
	Bidder complies with 70 - 89% of the applicable Section 2.8 requirements		3	
	Bidder complies with 50 - 69% of the applicable Section 2.8 requirements		1	
	Bidder complies with less than 50% of the applicable Section 2.8 requirements		0	