PASSENGER RAIL AGENCY OF SOUTH AFRICA

Minor repairs and installation of 44KV SF6 Three Phase Primary Circuit breaker at Pretoria Traction Substation.

SPECIFICATION AND SCOPE OF WORK

CIDB (Construction Industry Development Board = 2 EP)

***COMPULSORY REQUIREMENTS*:**

The following schedules shall be returned with the tender document which shall be evaluated:

- *Programme of execution with clear duration of project execution.*

SAFETY REQUIREMENTS:

All work in this contract shall comply with the Occupational Safety Act, 1993 (Act No: 85 of 1993). These items shall all be included in the tendered rates. A copy of the act as well as an approved safety file shall be kept on site for the duration of the project.

1. General

- The contractor shall be responsible for the removal and transportation of old equipment covered under this scope at Pretoria substation to Rebeca stores.
- The contractor shall be responsible for the Supply, delivery and installation of a 44kv SF6 three phase primary circuit breaker and all the associated works.
- The contractor shall be responsible for the Supply, delivery and installation and commission of the single core feeder cable (500mm2) XLPE copper cable from the positive isolator to the 3kV busbars and all the associated works.
- The contractor shall be responsible for the Supply, delivery and installation of an aluminium busbar from the rectifier to the reactor coil
- The contractor shall be responsible for the supply, delivery and installation of switch interlocking mechanism of unit A rectifier bay. The contractor will be given a sample of the

existing key so that the interlocking mechanism complements all the switching steps from the AC HT yard to the Rectifier bay.

- The contractor shall be responsible for the Transformer oil Purification of 3340KVA, 44KV/3KV Traction Transformer at Pretoria Traction substation.
- The contractor shall be responsible for the testing of 3340KVA, 44KV/3KV Traction Transformer at Pretoria Traction substation.

- The contractor shall
    - Perform the services as outlined by the scope of work below
    - Be responsible for cleanliness of site after the work is done
    - Work under Prasa supervision at all times
    - Be responsible for security and safety of their staff and equipment during the duration of the contract.

1.1. Subcontracting

1.1.1. The Contractor shall not make use of any sub-Contractor to perform the works or parts thereof without prior permission from the Project Manager.

1.2. Health and Safety

1.2.1. The contractor shall be responsible for the safety of personnel on site; a detailed safety plan shall therefore be submitted by the appointed contractor upon award. The safety file requirements are provided to assist the tenderers to cater for the safety aspects.

1.2.2. The site access certificate shall only be issued (to the successful bidder) after the evaluation and approval of the safety file.

1.2.3. The Contractor shall comply with all applicable legislation and Metrorail's safety requirements adopted from time to time and instructed by the Project Manager / Technical Officer. Such compliance shall be entirely at his own cost, and shall be deemed to have been allowed for in the rates and prices in the contract.

1.2.4. The Contractor shall ensure that a safety representative is at site at all times.

1.2.5. The Contractor shall report all incidents in writing to the Project Manager / Technical Officer. Any incident resulting in the death of or injury to any person on the works shall

be reported within 24 hours of its occurrence and any other incident shall be reported within 48 hours of its occurrence.

2. Financial

2.1. Payments shall be made for fully functional equipment only, i,e, all work completed.

2.2. All prices quoted shall be fixed and firm for the duration of the contract

2.3. Penalties shall be applicable for late completion of work and the rate shall be as stipulated in the contract terms and conditions for each day the completion is delayed. Terms and conditions in this contract are applicable in this regard.

2.4. Rates supplied in the BOQ shall be used to calculate the final payment for equipment.

3. Particular Scope of Work

3.1. Specifications of the SF6 44KV Primary Circuit Breaker

- The contractor shall dismantle and remove from site the existing old primary circuit breaker (PCB), foundations and steelwork, the contractor shall transport all released material to the Metrorail store at Rebecca, Pretoria.
- The contractor shall drain oil from the old oil circuit breaker into storage drums (provided by the contractor) and disposed of in accordance with the environmental legislations.
- The contractor shall supply and erect concrete foundations suitable for mounting the PCB offered, the foundations shall be allowed sufficient time for curing before mounting equipment.
- The contractor shall supply and install support steel work and all other sundry items required for the proper support of the offered breaker.
- The contractor shall supply and install a 3 phase (SF6) Gas Filled Circuit Breaker complete with operating mechanisms and all material and equipment for proper mounting and connection to the existing infrastructure. The circuit breakers shall be supplied and installed in accordance with the requirements of specifications BBB1267 Version 6.
- The contractor shall supply and install (including connection) of the control and power cables, earthing and any other item necessary for the full functionality of the equipment. The operation of the circuit breaker shall be in accordance and interfaced with specification BBB2721 Version 10 attached.
- The Circuit Breaker shall be of ratings specified in the data sheet of specification BBB1267. Normal system phase-to-phase Voltage rating 44KV, Highest phase-to-

phase Voltage rating for the equipment 52KV, Rated lightning impulse withstand voltage peak 250KV and the rated short duration power-frequency with stand voltage 95KV. The normal continuous current rating 1600A, Breaking current 31.5KA, Making current 79KA.

- The contractor shall supply and install aluminium bus bars from the PCB to The CT's.

3.2. Specification of the single core feeder cable (500mm2) XLPE copper cable

- The contractor shall Supply, install and commission 500mm2 XLPE copper cables for Traction, Positive Isolator and negative returns of both indoor of substation and outdoor to rail, associated Terminations must be done. The cable shall be a single core (type A) 500mm2 with a rated voltage of 3.8/6.6kV in accordance with clause 37.1 of specification BBB5452 version 6 and clause 5.2 of specification BBC0198.

3.3. Specification of the aluminium busbar

The contractor shall supply and install an aluminium busbar which have a cross sectional of 127mm x 12.5mm and the length of the busbar must be 6m. The contractor is responsible for the banding of the aluminium busbar to fit and be able to connect between the rectifier and the reactor coil.

3.4. Specification of the Transformer oil purification

- The transformer oil shall be tested and the results of the test shall be submitted to the project manager before purification.
- The oil should be purified up to 11PPM as per (IEC 60814) and dielectric strength of at least 45KV as per (IEC 60156)
- The contractor shall provide test report on the condition of the purified oil.
- The contractor shall top up oil if needed to.
- The contractor shall check for any leaks, Buchholz oil level and irregular voltage readings
- The contractor shall do oil sampling (top & bottom samples), perform DGA using Rogers ratio, key gas method and DuVal triangle method.
- The contractor shall perform Transformer testing, which shall include open circuit voltage, short circuit voltage, transformer ratios and Transformer winding resistance.

- The contractor shall provide a data sheet to the project manager that shows all the parameter tests done in the traction transformer.

4. OVERALL STAFFING AND KEY PROFESSIONAL STAFF

4.1. The contractor shall provide qualified and experienced professional staff for the following positions.

a) Electrical Installation Supervisors

b) Electrician

c) Occupational Health & Safety Officers

4.2. Bidder to complete the Compliance Specification Sheet: Complete Yes to confirm compliance to the listed technical specifications. A sheet with a No or not fully completed sheet will be regarded as non-compliant to the specific technical specification.

4.3. Minimum Qualifications of the technical staff listed above are outlined below. All educational qualifications should be SAQA accredited.

4.3.1. **ELECTRICAL INSTALLATION SUPERVISORS**

(a) National Certificate level 3 (N3) in Electrical Engineering (Heavy Current) or valid A-brown certificate.

(b) Trade test certificate.

4.3.2. **ELECTRICIAN**

(a) National Certificate level 3 (N3) in Electrical Engineering (Heavy Current) or valid A-brown certificate.

(b) Trade test certificate.

4.3.3. **OCCUPATIONAL HEALTH AND SAFETY OFFICERS**

(a) National Diploma or Certificate in Safety, Health, Environment, Risk and Quality (SHERQ).

(b) Professional registered with SACPCMP.

5. ANNEXURE "A": EVALUATION MATRIX

NOTE: The Technical or Functionality criteria must be guided by the project scope of works and area of focus.

Scoring of Functionality:

Responsive tenders will firstly be evaluated on functionality. The minimum score for functionality is 80% and a bidder who scores below this minimum shall not be considered for further evaluation in terms of the preference point systems.

Functionality and Capabilities	Max Points	Minimum Required
Compliance to Technical specification **Clause by clause compliance** **Bidder to complete the Compliance Specification Sheet: Complete YES to confirm compliance to the listed technical specifications. A sheet with a NO or NOT FULLY COMPLETED sheet will be regarded as non-compliant to the specific technical specification.** Fully Comply = 50 points Non-compliance= 0 Points	50	50
Similar Works: provide client list including letter of reference with contactable details 4 and above similar projects = 20 points 3 similar projects = 15 points 2 similar projects = 10 points 1 similar project = 5 points **NB!! Submit letter of references from your previous clients, with traceable contacts details. PRASA will undertake measures to confirm experience, this may include site visits.**	20	10

Experience (Personnel that will be assigned to this project) Tenderers shall provide CVs & certified certificates **NB!: Evaluation will be done on all 3 personnel listed below and each must meet the stipulated minimum experience.** a) Electrical Installation Supervisors b) Electrician c) Occupational Health & Safety Officers. ≥ 4 years = 30 Points 3 years= 25 points 2 years= 20 points 1 year= 15 points	30	20
GRAND TOTAL	**100**	**80**

6. SCHEDULE OF QUANTITIES AND PRICES

Item	Description	Unit	Qty	Unit Cost	Total Cost
1.	Removal and transportation of old equipment from site to Rebecca stores	Sum	LOT	**R……**	**R……**
2.	Supply deliver and install 44KV three phase SF6 Primary Circuit breaker, including filling up the SF6 gas in the breaker and all the associated works. As per clause 3.1.	Each	1	**R……**	**R……**
3.	Supply Deliver and install single core feeder cable (500mm^2) XLPE copper cable and all associated works. As per clause 3.2.	m	25	**R……**	**R……**

4.	Supply deliver and install (127mm x12.5mm) aluminium busbar between the rectifier and the reactor coil, and all the associated works. As per clause 3.3.	m	6	**R……**	**R……**
5.	supply, delivery and installation of a complete set of 5 switch interlocking mechanism of unit B rectifier bay	Each	1	**R……**	**R……**
6.	Supply and deliver Rectifier Temperature Card	Each	5	**R……..**	**R……**
7.	Supply and deliver Rectifier Diode monitor Card for 24 diodes rectifier.	Each	5	**R……**	**R……**
8.	Supply and deliver Electronic Control systems card of the rectifier box that controls rectifier.	Each	5	**R……**	**R……**
9.	Transformer oil testing and Purification of 3340KVA, 44KV/3KV Traction Transformer at Pretoria Traction substation. As per clause 3.4.	sum	1	**R……**	**R……**
10.	Re-gasketing and sealing of the traction Transformer.	Sum	1		
11.	Installation of indoor earthing for RUA using 95mm copper cable and all associated works	sum	1	**R……**	**R……**
12.	Cleaning of oil spillage on the Transformer bay.	Sum	1	**R……**	**R……**
13.	Supply and install Rectifier control Relays in the control Panel	each	4	**R……**	**R……**

14.	Testing of 3340KVA, 44KV/3KV Traction Transformer at Pretoria Traction substation. As per clause 3.4.	sum	1	**R……**	**R……**
15.	Supply and deliver 210 litres drum of transformer oil to be topped up in the transformer	sum	5	**R……**	**R……**
TOTAL EXCL. VAT					**R……**
VAT @ 15%					**R……**
GRAND TOTAL					**R……**

Note: This service requires CIDB Grading EP level 2.