

 <b>Eskom</b>	<b>Standard</b>	<b>Technology</b>
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Title: **TENDER TECHNICAL EVALUATION STRATEGY FOR BRENNER SUBSTATION 88KV SHUNT CAPACITOR PROJECT – HARMONIC AND SWITCHING STUDY PROFESSIONAL SERVICES**

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## **1. Introduction**

The Brenner shunt capacitor Project requires two (2) new shunt capacitor banks at Brenner substation rated 48 MVar each at 88 kV system voltage level.

The harmonic and switching study is required to determine the need and sizing of filter requirements for new shunt capacitor banks, which will be installed at the Transmission substation situated in the Central Grid, Gauteng Province. The installation of the new capacitor banks will improve the reactive power compensation and the voltage control resolution at the substation. The filter will mitigate harmonic distortion violations and harmonic amplifications as to comply with quality of supply standards where required.

The switching part of the study will identify and rate switchgear equipment to adequately meet any filter mitigation requirement identified.

## **2. Supporting clauses**

### **2.1 Scope**

This document outlines the requirements and evaluation criteria for harmonic and switching study professional services required on the Brenner shunt capacitor Project.

#### **2.1.1 Purpose**

The purpose of this document is to define the requirements and evaluation criteria to be used in contracting and assessing the capabilities of harmonic and switching study professional services required on the Brenner shunt capacitor Project.

#### **2.1.2 Applicability**

This document shall apply to Eskom Holdings LTD

## **2.2 Normative/informative references**

Parties using this document shall apply the most recent edition of the documents listed in the following paragraphs.

### **2.2.1 Normative**

None

### **2.2.2 Informative**

None

## **2.3 Definitions**

### **2.3.1 General**

<b>Definition</b>	<b>Description</b>
<b>The Contractor</b>	The successful engineering firm/consultancy and staff being appointed to deliver scope of work as specified
<b>The Employer</b>	Eskom Holdings SOC LTD or designated representative

### **2.3.2 Disclosure classification**

**Controlled disclosure:** controlled disclosure to external parties (either enforced by law, or discretionary).

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## 2.4 Abbreviations

Abbreviation	Description
FAT	Factory Acceptance Testing
RTS	Real Time Simulation
SAT	Site Acceptance Testing

## 2.5 Roles and responsibilities

Power Electronics Care Group Convener will maintain and update this document as required.

## 2.6 Process for monitoring

Not applicable.

## 2.7 Related/supporting documents

Not applicable.

## 3. Scope of Work for Engineering Consultants

### 3.1 Main requirements

The scope of the study comprises:

- Steady state switching studies to determine violations of the maximum change in steady state voltages due to switching of the capacitors
- Frequency scanning studies to determine the network resonances with various combinations of capacitor switching configurations
- Harmonic load flow studies to determine voltage violations at each harmonic frequency arising from the assumed harmonic current injections and network resonances
- Identification of filter requirements and selection of the most appropriate filter(s) to mitigate the harmonic violations. The aim is to determine if the bank should remain as a shunt bank or be converted to a filter.
- Transient switching studies to establish the transient recovery voltages (TRVs) and inrush currents due to capacitor switching.
- The study shall be conducted for the horizon period 2020-2030.
- Background harmonic measurements shall be supplied by Eskom
- Confirmation that the capacitor bank sizing is still adequate and required by the system

The study shall be conducted at the following substation:

No.	Substation	Description		Location	GPS coordinates
1	Brenner substation	Two new shunt capacitor banks are required on the 88 kV busbar rated, 48 MVar.		Gauteng Province, Central Grid	-26.27887S 28.27720E

The following minimum criteria shall be used to conduct the harmonic integration studies:

- All future Network Expansions as per Case File
- All major N-1 contingencies to be used when frequency scan is performed
- High and Low load conditions
- Operational status of bus couplers and bus sections
- Filter solutions to be rated to operate at maximum continuous operating voltage, UM
- Planning versus Compatibility Levels as per NRS048 standard to be included where filter ratings are determined
- Impact on existing compensation devices
- Tuned versus de-tuned filter solutions to be considered
- Filter solution selection to consider Network Losses
- Filter solutions to optimise and support interchangeability of component ratings between various shunt capacitor substations and installations

### **3.2 Training**

Eskom staff will be identified to work closely with the consultant during the harmonic and switching studies. The intention is that the Eskom staff will gain experience and knowledge in undertaking the work together with the consultant.

Eskom Employees fall into the Engineer in Training, Engineer, Senior and Chief Engineer/Consultant. The ratio of consultants to Eskom employees will be in the order of 1 to 2 or higher.

The above will be included in the offer and contract to be signed with the consultant.

### **3.3 Legislation**

In undertaking the Scope of Work, The Contractor shall comply with the Occupational Health and Safety Act and Regulations, Act 85 of 1993 of the Republic of South Africa, and the amendments.

When undertaking work in foreign territories The Contractor shall comply with applicable local legislation.

#### **3.3.1 Matters on which the specification is silent**

In all matters on which this specification is silent, a ruling shall be sought from The Employer and such ruling shall then form part of this specification.

Whilst every attempt has been made to ensure that this specification is complete, any errors and/or omissions and items not clearly defined or requiring clarity shall be brought to The Employer's notice.

### **3.4 General requirements**

All staff of The Contractor will be required to comply with and complete a non-conflict declaration.

The Contractor shall strictly comply with all applicable provisions of The Employer's Accident Prevention Manual, ORHVS, SHEQ and Construction Safety Manual. This is of utmost importance.

The Contractor shall observe working clearances when working near or about energized lines or equipment as per The Employer's Accident Prevention Manual and ORHVS.

The Contractor shall provide necessary personal protective clothing and equipment for their staff and implement their correct use as required.

## **4. Evaluation of proposals**

All required documentation requested in this specification as well as indicated below shall be included in the tender package and shall form part of the evaluation unless specifically indicated otherwise.

The required information shall be in the form of compliance statements, staff resumes, project reference lists and reference letter as applicable in demonstrating compliance to requirements stipulated.

### **4.1 Procedure**

Bidders who are unable to demonstrate compliance to all applicable requirements and/or scoring thresholds at the required stages in the procurement process will be rejected.

Information submitted with the tender at the bid stage must adequately address all items listed under the functionality Criteria in Table 1 in Annex A. The submitted information must be of sufficient detail to allow the evaluating team to make a confident evaluation of the offer against the requirements stipulated.

The technical evaluation begins after the tender closing date and once all submissions are received by the technical cross-functional team evaluating the offers. An outline of the process is provided below:

- 1) The evaluation and scoring will be conducted on each submission in accordance with the Criteria and Scoring Allocation defined in Tables 1 and Table 2 in Annex A.
- 2) Items requiring clarifications (if any) will be communicated to The Contractor for official response. The Contractor will be given a period of 5 working days to respond on issued clarification requests.
- 3) Only submissions that score above the stipulated Threshold will then be allowed to progress further in the procurement process. The stipulated Threshold is 80 %.
- 4) If there are any deficiencies in the submissions that score above the stipulated threshold, the Contractor may be required to submit outstanding information and correct any deficiencies to the satisfaction of Eskom prior to contract award.

### **4.2 Deviations from specification**

The supplier shall notify Eskom of any deviations from this specification and listed normative references in the submission at tender stage. This shall be clearly labelled and included in the technical files.

## **5. Authorisation**

This document has been seen and accepted by:

<b>Name and surname</b>	<b>Designation</b>
Bheki Ntshangase	Senior Manager – Substation Equipment and Diagnostics
Neels van Staden	Senior Consultant – Substation Equipment and Diagnostics
Vuyani Masuku	Senior Engineer – Substation Equipment and Diagnostics
Boipelo Mabilu	Project Manager - AME

## **6. Revisions**

<b>Date</b>	<b>Rev</b>	<b>Compiler</b>	<b>Remarks</b>
May 2021	1	N van Staden	First issue

## **7. Development Team**

The following people were involved in the development of this document:

- Vuyani Masuku

## **8. Acknowledgements**

Not applicable.

## Annex A –

**Table A.1: Functionality Criteria**

Name of Tenderer		
Item	Functionality criteria	Weighting
1	<b>Capability to perform all of the services required</b> The bidder must demonstrate in their proposal that:	50 %
1.1	They have the capability and necessary resources to perform all of the services required e.g. adequate staffing available to the project, software resources, administrative support, etc.	21%
1.2	Reference list greater than 5 years detailing harmonic and switching studies experience related to scope of work (Section 3.1 bullet points 1-18,)	21%
1.3	They have specific understanding and familiarity with the particular requirements of this project and how to address them.	8%
2	<b>Experience and qualifications of key personnel</b> Detailed resumes of the two most senior engineers/consultants to be allocated to undertake and lead this work must be submitted. All of the following requirements must be met in this regard for both individuals:	50 %
2.1	<b>Minimum qualification :</b> BSc (Eng) (ECSA accredited or Washington Accord equivalent)	21%
2.2	<b>Minimum Experience:</b> Greater than five years of study experience on compensation devices related to scope of work (Section 3- bullet point 1-18,)	21%
2.3	Minimum of three reference letters from previous harmonic and switching projects.	8%
<b>Total</b>		<b>100%</b>

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Table A.2: Criteria Scoring Matrix

(%)	Definition
100	<p><b>COMPLIANT</b></p> <ul style="list-style-type: none"> <li>Meet technical requirement(s) AND;</li> <li>No foreseen technical risk(s) in meeting technical requirements;</li> </ul> <p>OR</p> <p><b>COMPLIANT WITH ASSOCIATED QUALIFICATIONS</b></p> <p>Meet technical requirement(s) with;</p> <ul style="list-style-type: none"> <li>Acceptable technical risk(s) AND/OR;</li> <li>Acceptable exceptions AND/OR;</li> <li>Acceptable conditions.</li> </ul>
0	<p><b>NON-COMPLIANT OR TOTALLY DEFICIENT OR NON-RESPONSIVE</b></p> <ul style="list-style-type: none"> <li>Does not meet technical requirement(s) AND/OR;</li> <li>Unacceptable technical risk(s) AND/OR;</li> <li>Unacceptable exceptions AND/OR;</li> <li>Unacceptable conditions.</li> </ul>
<p><b>Note 1:</b> Foreseen acceptable risk(s), exceptions and conditions includes: Evidence that is missing or in conflict with the requirements that is considered minor, correctable prior to contract award and does not prevent the evaluating team from making a confident evaluation of the offer.</p> <p><b>Note 2:</b> Foreseen unacceptable risk(s), exceptions and conditions includes: Evidence that is missing or in conflict with the requirements that is considered a significant deficiency and/or significant deviation from the requirements or The Employers intent.</p>	

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