

TRANSNET FREIGHT RAIL, a division of

TRANSNET SOC LTD

Registration Number 1990/000900/30

[hereinafter referred to as **Transnet**]

REQUEST FOR QUOTATION [RFQ] No : ERAC-FDT-MM55 21624

FOR THE PROVISION OF TESTING OF PROTECTION AND COMMISSIONING OF EQUIPMENT ON VARIOUS TRACTION SUBSTATIONS UNDER THE CONTROL OF THE DEPOT ENGINEER, ERMELO.

BRIEFING SESSION DATE: 10 JUNE 2016

TRANSNET

VENUE: INFRA ELECTRICAL BOARDROOM

AMERSFOORT ROAD

ERMELO

TIME 10:00

FOR DIRECTIONS CONTACT PERSON: MASALA NEMASETONI ON 083 444 0712

ISSUE DATE: 03 JUNE 2016

CLOSING DATE: 21 JUNE 2016

CLOSING TIME: 10:00

VALIDITY DATE: 30 SEPTEMBER 2016

Section 1
NOTICE TO BIDDERS

Quotations which must be completed as indicated in Section 2 of this RFQ are to be submitted as follows:

METHOD: Collection and Submission of tender document
CLOSING VENUE: Transnet Freight Rail, Tender Advice Centre
 Nzasm Building, Ground Floor G16
 Corner Minaar & Paul Kruger Streets
 Pretoria
 0001

NB: Tender box are only available from Monday to Friday from 07h00 to 16h00. Tender box is not available 24 hours.

1 Responses to RFQ

Responses to this RFQ [**Quotations**] must not include documents or reference relating to any other quotation or proposal. Any additional conditions must be embodied in an accompanying letter.

2 Broad-Based Black Economic Empowerment [B-BBEE]

Transnet fully endorses and supports the Government's Broad-Based Black Economic Empowerment Programme and it would therefore prefer to do business with local business enterprises who share these same values. As described in more detail in the attached B-BBEE Claim Form Transnet will allow a "preference" to companies who provide a valid B-BBEE Verification Certificate.

The value of this bid is estimated to be below R1 000 000 (all applicable taxes included) and therefore tender will be evaluated on **80/20** preference point system.

Respondents are required to complete Annexure A [the B-BBEE Preference Point Claim Form] and submit it together with proof of their B-BBEE Status as stipulated in the Claim Form in order to obtain preference points for their B-BBEE status.

Note: Failure to submit a valid and original B-BBEE certificate or a certified copy thereof at the Closing Date of this RFQ will result in a score of zero being allocated for B-BBEE.

1.1 B-BBEE Improvement Plan

1.2 Transnet encourages its Suppliers/Service Providers to constantly strive to improve their B-BBEE rating. Whereas Respondents will be allocated points in terms of a preference point system based on its B-BBEE scorecard to be assessed as detailed in paragraph 2.1 above, in addition to such scoring, Transnet also requests that Respondents submit a B-BBEE improvement plan. Respondents are therefore requested to indicate the extent to which they will maintain or improve their B-BBEE status over the contract period. Respondents are requested to submit their B-BBEE Improvement Plan as an additional document with their Proposals by completion of Annexure A appended hereto.

3 Communication

Respondents are warned that a response will be liable for disqualification should any attempt be made by a Respondent either directly or indirectly to canvass any officer(s) or employee of Transnet in respect of this RFQ between the closing date and the date of the award of the business.

A Respondent may, however, before the closing date and time, direct any written enquiries relating to the RFQ to the following Transnet employee:

Name: **Morris Mhlongo**
 Email: morris.mhlongo@transnet.net
 Telephone: **(012) 315 4122**

Respondents may also, at any time **after the closing date of the RFQ**, communicate with the Buyer of the Transnet Freight Rail on any matter relating to its RFQ response:

Name: **Matete Madisa**
 Email: matete.madisa@transnet.net
 Telephone: **(011) 878 7070**

4 MANDATORY BRIEFING

A compulsory clarification meeting with representatives of the Employer will take place on **Friday, 10 June 2016, 10H00 at Transnet, Infra Electrical, Amersfoort Road, Ermelo Depot**

(Contact Person: Masala Nemasetoni on 083 444 0712)

4.1. A Certificate of Attendance in the form set out in Section 14 hereto must be completed and submitted with your Quotation.

4.2. Respondents failing to attend the compulsory site meeting and/or RFQ briefing will be disqualified.

5 Legal Compliance

The successful Respondent shall be in full and complete compliance with any and all applicable national and local laws and regulations.

6 Changes to Quotations

Changes by the Respondent to its submission will not be considered after the closing date and time.

7 Pricing

All prices must be quoted in South African Rand on a fixed price basis, excluding VAT.

8 Prices Subject to Confirmation

Prices quoted which are subject to confirmation will not be considered.

9 Binding Offer

Any Quotation furnished pursuant to this Request shall be deemed to be an offer. Any exceptions to this statement must be clearly and specifically indicated.

10 Disclaimers

Transnet is not committed to any course of action as a result of its issuance of this RFQ and/or its receipt of a Quotation in response to it. Please note that Transnet reserves the right to:

- modify the RFQ's goods / service(s) and request Respondents to re-bid on any changes;
- reject any Quotation which does not conform to instructions and specifications which are detailed herein;
- disqualify Quotations submitted after the stated submission deadline;
- not necessarily accept the lowest priced Quotation or an alternative bid;
- reject all Quotations, if it so decides;
- place an order in connection with this Quotation at any time after the RFQ's closing date;
- award only a portion of the proposed goods / service/s which are reflected in the scope of this RFQ;
- split the award of the orders between more than one Supplier/Service Provider should it at Transnet's discretion be more advantageous in terms of, amongst others, cost or developmental considerations;
- make no award at all.

Should a contract be awarded on the strength of information furnished by the Respondent, which after conclusion of the contract, is proved to have been incorrect, Transnet reserves the right to cancel the contract.

Transnet reserves the right to award business to the highest scoring bidder/s unless objective criteria justify the award to another bidder.

Transnet reserves the right to conduct Post Tender Negotiations (PTN) with selected Respondents or any number of short-listed Respondents, such PTN to include, at Transnet's discretion, any evaluation criteria listed in the RFQ document.

Should the preferred bidder fail to sign or commence with the contract within a reasonable period after being requested to do so, Transnet reserves the right to award the business to the next highest ranked bidder, provided that he/she is still prepared to provide the required goods at the quoted price.

11 SCOPE OF WORK

This specification covers the work and procedures for routine testing of protection equipment at Traction and Distribution substations. This specification also covers any other work arising out of or incidental to the above or required contractor for the proper completion of the works in accordance with the true meaning and intent of the contract document.

11.1. ROUTINE TESTING REQUIREMENTS

Routine tests: The purpose of routine testing is to verify that the electrical protection equipment is functioning correctly and that protection settings are according to relevant equipment ratings.

All equipment in Distribution Substations-, Traction Substations- and Tie Stations must be tested as follows:

11.1.1 Current transformers: Magnetisation curve to be tested at all voltage points as depicted on previous routine or commissioning test reports. If not within tolerances a ratio test must be performed to prove the integrity of the current transformer.

11.1.2. Protection relays: Secondary current injection tests on all phases and to earth at all percentages i.e. at 200 and 600,000 % of set value for Distribution and AC Traction equipment. DC Traction equipment to be tested at 200,300 and 400 % of set value. Tripping times to be recorded with indications as indicated on relevant test sheets. Where Distribution Ring feed systems are protected by Pilot Wire protection the SOLKOR / ERA SLA relays must be tested by secondary injection to trip at the percentage values in the local and remote substations with a stability test by primary injection on one phase to earth or to a second phase, noting the milliamp current flow in the pilot wires.

11.1.3. AC / DC Earth and Frame Leakage systems: Insulation values to earth and between separate systems/zones by suitable earth and insulation meggers .Tripping current values by Primary injection for relevant zone/systems to be noted to give required tripping, indications and lockout. Systems shall be tested for possible parallel paths as well.

11.1.4. Transformer Protection: Buchholtz relays to be tested by air injection/test trip noting trip level to give lockout and indication. Oil and Winding Temperature Gauges to be tested by dial indication to give trip, indication and lockout as applicable. Where required

a calibration test is to be done by heat simulation. Pressure Relief Devices tested by test trip noting trip, lockout and indication.

11.1.5. **Indicating meters:** By secondary injection of Current and Voltage applicable at full scale deflection. By exception, in DC traction substations the 4 kV DC indicating voltmeters must be tested by primary HV DC injection.

11.1.6. **Insulation levels:** Pressure test not required.

11.1.7. **Main and auxiliary supplies failures:** Phase/AC fail relays to be tested and Battery undervoltage relay to be calibrated to trip and lockout all circuit breakers.

11.1.8. **3 kV Undervoltage Protection:** To be calibrated by HV DC primary injection.

11.1.9. **Rectifier Protection:** Overtemperature, diode indication and attenuation circuit protection to be verified by simulation tests.

11.1.10. **Wave filter equipment:** To be measured and calibrated

11.1.11. **Primary and Secondary Circuit Breakers:** To be tested electrically according to relevant test sheet including, speed and contact resistance tests on Primary and Secondary circuit breakers. Dew point test to be done on all SF₆ PCBs.

11.2. DC TRACTION SUBSTATIONS

The following test sheets are applicable as per annexures:

Equipment to be tested	Original version	Revised Version
3.2.1 Meters, Current Transformers, Main & Auxiliary overload relays, AC Earth leakage & Transformer Protection. Transformer / Rectifier protection Trafogaurd T100 Transformer / Rectifier protection Brown Boveri	BBB0342	BBF9000
3.2.2 Earth and Insulation measurements, 3 kV & 110v Undervoltage -- & DC Earth leakage relays & Wave filter equipment, Metering.	BBB0343 BBF9295	BBF9001
3.2.3 Tie station Earth and Insulation measurements, 3 kV & 110v Undervoltage-- & DC Earth leakage relays	BBF9294	

3.2.4 Primary – and Secondary Circuit Breakers YYY0000

Contact Resistance and operational timing test,
Dew point test on SF₆ PCBs.

11.3. AC TRACTION SUBSTATIONS

The following test sheets are applicable as per annexures

Equipment to be tested	Original version	Revised Version
3.3.1 Main Transformer Protection Current Transformers, Main Overload relays, 110v Undervoltage Relay, Earth Measurement		BBF8995
3.3.2 Incomer and Line Feeder VCB's, Current Transformers, Protection relays DC Supply Undervoltage Relay		BBF8996
3.3.3 Protection Distance Protection Relay setting sheet.		BBF9297
3.3.4 Primary and Secondary Circuit Breakers Contact Resistance and operational timing test, Dew point test on SF ₆ PCBs.		

11.4. SIGNAL SUPPLY & DISTRIBUTION SUBSTATIONS

The following test sheets are applicable as per annexures

Equipment to be tested	Original version	Revised Version
3.4.1 Bus coupler Protection Current Transformers, Frame Leakage relays, 110v Undervoltage Relay, Earth/Insulation Measurements.	BBB0346	BBF8995
3.4.2 Incomer, Ring, Transformer & Transmission line Feeder VCB's,	BBB0346	BBF8996

13. QUALITY AND INSPECTION

- 13.1. Transnet Freight Rail shall inspect the equipment under contract on the premises of the Manufacturer or successful Contractor.
- 13.2. The Contractor shall notify Transnet Freight Rail 14 days in advance of such an inspection date.
- 13.3. The Contractor shall apply 14 days in advance for the date of energizing and ensure that all work is completed before any commissioning can take place.
- 13.4. The Contractor shall be responsible to issue a compliance certificate in terms of SANS 0142 for each site before energizing of the equipment shall take place.

14. SPECIFICATIONS

14.1. SOUTH AFRICAN NATIONAL STANDARDS:

- 14.1.1 SANS 1091 NATIONAL COLOUR STANDARD.
- 14.1.2 IEC 62053-21 WIRING CODE.

14.2. Transnet Freight Rail:

- 14.2.1 BBB4182 Specification for MV switch
- 14.2.2 BBD752 Specification for surge protection
- 14.2.3 BBB8128 Specification for Testing and commissioning
- 14.2.4 4P9 Engineering Instructions
- 14.2.5 CEE.0224.2002 Drawings, catalogues, instruction manuals and spares list for electrical equipment supplied under contract.

14.3 ELECTRICAL TEST SHEETS

BBB0342 & BBF9000 : 3 kV DC Substations: Meters, Main & Aux. Transformer Protection, AC Earth Leakage.

BBB0343, BBF9001 & BBF9295: 3 kV DC Substations: Earth and Insulation measurements, 3 kV & 110v Undervoltage -- & DC Earth leakage relays & Wave filter equipment.

BBF9294: 3 kV DC Traction Tie Station Protection.

BBB0344 : Transformer / Rectifier protection Trafogaurd T100

BBB0345: Transformer / Rectifier protection Brown Boveri.

YYY0000 : 3 kV DC Traction Substations : Primary and Secondary Circuit Breaker Contact Resistance and Operational timing tests

BBB0346, BBF9296 & BBF9297: Signal Supply/Distribution Protection.

ZZZ0000 : Signal Supply/Distribution Substations: Primary Circuit Breakers

Contact Resistance and Operational timing tests.

BBF8995 : 25 kV AC Traction Substations : Main Transformer Protection,

Current Transformers, Protection Relays, Transformer Protection.

BBF8996 : 25 kV AC Traction Substations : Incomer and Line Feeder VCB's,

Current Transformers, Protection Relays, Undervoltage Relays.

BBF8997 : 25 kV AC Traction Substations : Primary and Secondary Circuit Breakers

Contact Resistance and Operational timing tests

BBB0347: Substation Defect Report

BBB0348: Transformer Insulation & Ratio tests

BBB0349: Insulation oil report

**Transnet urges its clients, suppliers and the general public to report any fraud or corruption to
TIP-OFFS ANONYMOUS : 0800 003 056**

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RFQ FOR THE PROVISION OF TESTING OF PROTECTION AND COMMISSIONING OF EQUIPMENT ON VARIOUS TRACTION SUBSTATIONS UNDER THE CONTROL OF THE DEPOT ENGINEER, ERMELO.

CLOSING VENUE: TRANSNET FREIGHT RAIL TENDER ADVICE CENTRE, NZASM BUILDING, GROUND FLOOR G16, CORNER MINAAR & PAUL KRUGER STREETS, PRETORIA,0001

CLOSING DATE & TIME 21 JUNE 2016 AT 10:00

VALIDITY PERIOD: 90 DAYS

SECTION 2

EVALUATION CRITERIA AND RETURNABLE DOCUMENTS

Transnet will utilise the following criteria [not necessarily in this order] in choosing a Supplier/Service Provider, if so required:

Criterion/Criteria	Explanation
Administrative	<ul style="list-style-type: none"> • Completeness of response and returnable documents • Verify the validity of returnable documents • Whether the bid has been lodged on time • Whether the bid contains a priced offer with a completed schedule of prices.
Substantive responsiveness	<ul style="list-style-type: none"> • Completed Clause by clause compliance to specification • Trade Test Certificate - Electrical <p style="text-align: center;">NB (Failure to submit the above mentioned document, tender will not be evaluated to the next stage)</p>
Functionality Threshold	<p>Pre-qualification criteria, if any, must be met and whether the Bid materially complies with the scope and/or specification given.</p> <ul style="list-style-type: none"> • Submit Health/Safety/Risk/Environmental Plan - 10% • List Technical capacity/ Plant and Equipment/ resources – 40% • Indicate the Delivery period to complete the project - 10% • Proven experience of testing of protection and commissioning of equipment substation – (40%) <p>Respondents are to note that functionality is included as a technical threshold with a prescribed minimum percentage of 60% must be obtained in order to advance to next stage 3.</p>
Final weighted evaluation based on 80/20 preference point	<ul style="list-style-type: none"> • Pricing and price basis [firm] • B-BBEE status of company - Preference points will be awarded to a bidder for attaining the B-BBEE status level of contribution in accordance with the table indicated in Annexure A: B-BBEE Claim Form.

Respondent's Signature

Date & Company Stamp

15. Validity Period

Transnet desires a validity period of 90 [ninety] Business Days from the closing date of this RFQ. This RFQ is valid until **30 September 2016**.

16. Disclosure of Prices Quoted

Respondents must indicate here whether Transnet may disclose their quoted prices and conditions to other Respondents:

YES NO

17. Returnable Documents

Returnable Documents means all the documents, Sections and Annexures, as listed in the tables below.

All Returnable Sections, as indicated in the header and footer of the relevant pages, must be signed, stamped and dated by the Respondent.

- a) Respondents are required to submit with their Quotations the **mandatory Returnable Documents**, as detailed below.

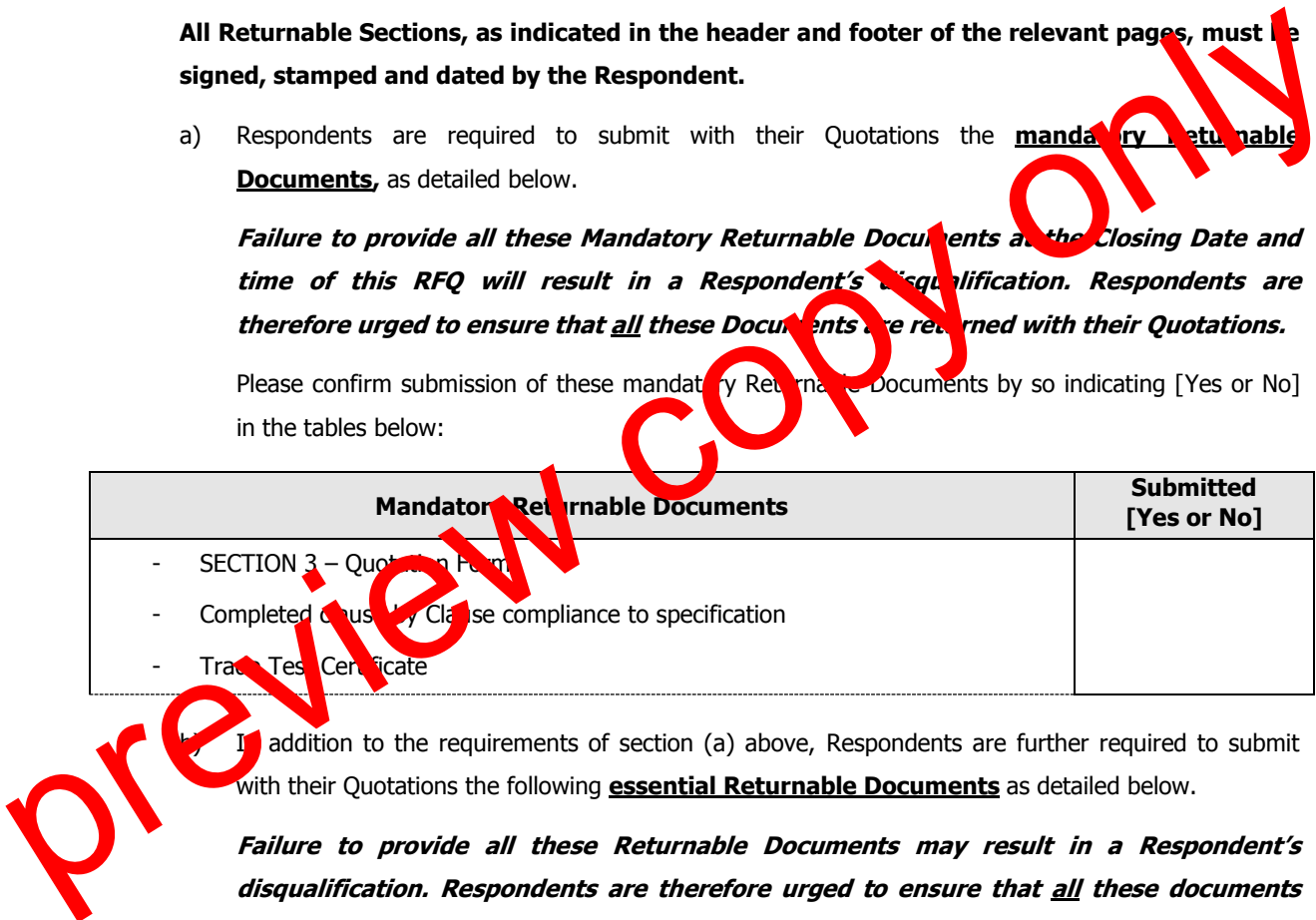
Failure to provide all these Mandatory Returnable Documents at the Closing Date and time of this RFQ will result in a Respondent's disqualification. Respondents are therefore urged to ensure that all these Documents are returned with their Quotations.

Please confirm submission of these mandatory Returnable Documents by so indicating [Yes or No] in the tables below:

Mandatory Returnable Documents	Submitted [Yes or No]
<ul style="list-style-type: none"> - SECTION 3 – Quotation Form - Completed Clause by Clause compliance to specification - Trade Test Certificate 	

- b) In addition to the requirements of section (a) above, Respondents are further required to submit with their Quotations the following **essential Returnable Documents** as detailed below.

Failure to provide all these Returnable Documents may result in a Respondent's disqualification. Respondents are therefore urged to ensure that all these documents are returned with their Quotations.



Essential Returnable Documents	Submitted [Yes or No]
SECTION 2 : Evaluation criteria and returnable documents	
- SECTION 4 : RFQ Declaration and Breach of Law Form	
- Valid and original, or a Certified copy, of your entity's B-BBEE Verification Certification as per the requirements stipulated in Annexure A: B-BBEE Claims Form Note: failure to provide these required documents at the closing date and time of the RFQ will result in an automatic score of zero being allocated for preference	
- Original valid Tax Clearance Certificate [Consortia / Joint Ventures must submit a separate Tax Clearance Certificate for each party]	
- Submit Health/Risk and Safety Plan	
- List of plant and equipment relevant to the project	
- Indicate how long it will take to complete the project - Delivery period	

In terms of paragraph 5.6 of the NATIONAL TREASURY SCM INSTRUCTION NO 4 OF 2017/2017, which became effective on 1 May 2016, Transnet may only award bids to suppliers after verifying that the supplier is registered as prospective suppliers on the National Treasury Central Supplier Database.

Supplier Number	Unique Registration Reference	Yes/No

If Yes column above, please confirm registration by providing National Treasury Unique Vendor Number.

If No column above, please register your company on the National Treasury Central Supplier Database and confirm registration by submitting National Treasury with "MAAA" Supplier Reference number.

CONTINUED VALIDITY OF RETURNABLE DOCUMENTS

The successful Respondent will be required to ensure the validity of all returnable documents, including but not limited to its Tax Clearance Certificate and valid B-BBEE Verification Certificate, for the duration of any contract emanating from this RFQ. Should the Respondent be awarded the contract [**the Agreement**] and fail to present Transnet with such renewals as and when they become due, Transnet shall be entitled, in addition to any other rights and remedies that it may have in terms of the eventual Agreement, to terminate such Agreement forthwith without any liability and without prejudice to any claims which Transnet may have for damages against the Respondent.

Respondent's Signature

Date & Company Stamp

SECTION 3
QUOTATION FORM

I/We _____
hereby offer to supply the goods/services at the prices quoted in the Price Schedule below, in accordance with the conditions related thereto.

I/We agree to be bound by those terms and conditions in:

- the Standard RFQ Terms and Conditions for the Supply of Goods or Services to Transnet; and
- any other standard or special conditions mentioned and/or embodied in this Request for Quotation.

I/We accept that unless Transnet should otherwise decide and so inform me/us, this Quotation [and, if any, its covering letter and any subsequent exchange of correspondence], together with Transnet's acceptance thereof shall constitute a binding contract between Transnet and me/us.

I/We further agree that if, after I/we have been notified of the acceptance of my/our Quotation, I/we fail to deliver the said goods/service/s within the delivery lead-time quoted, Transnet may, without prejudice to any other legal remedy which it may have, cancel the order and recover from me/us any expenses incurred by Transnet in calling for Quotations afresh and/or having to accept any more favourable offer.

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Respondent's Signature

Date & Company Stamp

Price Schedule

I/We quote as follows for the service required, on a "delivered nominated destination" basis, excluding VAT:

A	ROUTINE TESTING OF 3KV DC TRACTION SUBSTATION PROTECTION AS PER SPECIFICATION BBF 8128 AND CLAUSE 3.2 OF THIS SPECIFICATION				
	DESCRIPTION	Quantity	Unit of Measure	Unit Price	Total Price
1	Ermelo Yard Substation	Substation Unit	1		
2	Ermelo Substation	Substation Unit	2		
3	Nooitgedacht Substation	Substation Unit	2		
4	Rietvleirus Substation	Substation Unit	2		
5	Hamelfontein Substation	Substation Unit	1		
6	Davel Substation	Substation Unit	1		
7	Webbsrus Substation	Substation Unit	1		
8	Midpoint Substation	Substation Unit	2		
9	Halgewonnen South Substation	Substation Unit	2		
10	Halgewonnen North Substation	Substation Unit	1		
11	Aberdeen	Substation Unit	1		
12	Bothmasboskop Tie Station	Substation Unit	1		
13	Bothasnoek Substation	Substation Unit	1		
14	Woestalleen Tie Station	Substation Unit	1		
15	Speculate Substation	Substation Unit	1		
16	Rietkuil Tie Station	Substation Unit	1		
17	Grootlagte Substation	Substation Unit	1		
18	Leeuwfontein Tie Station	Substation Unit	1		
19	Middelburg Mine Substation	Substation Unit	1		

Respondent's Signature

Date & Company Stamp

20	Gelluksplaas Substation	Substation Unit	2		
21	Broodsneriersplaas Substation	Substation Unit	1		
22	Blinkpan Substation	Substation Unit	2		
23	Vandyksdrift Substation	Substation Unit	2		
24	Kroomklip Substation	Substation Unit	2		
25	Saaiwater Substation	Substation Unit	2		
26	Ogies Substation	Substation Unit	2		
27	Minnaar Substation	Substation Unit	1		
28	Blackhill Substation	Substation Unit	2		
B	TESTING OF 25KV AC TRACTION SUBSTATION PROTECTION AS PER SPECIFICATION BBF 8128 AND CLAUSE 3.3 OF THIS SPECIFICATION				
1	Antra Substation	Substation Unit	1		
2	Overvaal Substation	Substation Unit	2		
C	TESTING OF 11KV DISTRIBUTION SUBSTATION PROTECTION	Substation Unit			
1	Langverwag 11KV Infeed	Substation Unit	1		
2	CTC 11KV Substation	Substation Unit	1		
	Diesel Depot 11KV Substation	Substation Unit	2		
4	Main 11KV Substation	Substation Unit	1		
5	Webbsrus 11KV Substation	Substation Unit	1		
6	Aberdeen 11KV Substation	Substation Unit	1		
7	Broodsneriersplaas pole mounted VCB	Substation Unit	1		

 Respondent's Signature

 Date & Company Stamp

8	Pullenshope 11KV Infeed	Substation Unit	1		
9	Rietkuil 11KV Infeed	Substation Unit	1		
10	Broodsneriersplaas 11 KV Substation	Substation Unit	1		
11	Blinkpan 11 KV Substation	Substation Unit	1		
12	Vandyksdrift 11KV Substation	Substation Unit	1		
13	Saaiwater Main 11KV Substation	Substation Unit	1		
14	Saaiwater Goods 11KV Substation	Substation Unit	1		
15	Ogies 11KV Substation	Substation Unit	1		
16	Ogies CTC 11 KV Substation	Substation Unit	1		
17	Blackhill 11KV Substation	Substation Unit	1		
18	Ermelo Yard 11KV Substation	Substation Unit	1		
D	EMERGENCY REPAIR WORK ON TRACTION SUBSTATIONS	Substation Unit	10		
E	EMERGENCY REPAIR WORK ON DISTRIBUTION SUBSTATIONS	Substation Unit	2		
F	P's and J's	Each	1		
Total Price (Excl. VAT) =			R		
VAT @ 14% =			R		
Gross Total (Incl. VAT)=			R		

 Respondent's Signature

 Date & Company Stamp

Delivery Lead-Time from date of purchase order : _____ **[days/weeks]**
(How long it will take the respondent to complete the whole project)

Notes to Pricing:

- a) All Prices must be quoted in South African Rand, exclusive of VAT
- b) To facilitate like-for-like comparison bidders must submit pricing strictly in accordance with this price schedule and not utilise a different format. Deviation from this pricing schedule could result in a bid being disqualified.

Please note that should you have offered a discounted price(s), Transnet will only consider such price discount(s) in the final evaluation stage if offered on an unconditional basis.

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Respondent's Signature

Date & Company Stamp

By signing this Quotation Form the Respondent is deemed to acknowledge that he/she has made himself/herself thoroughly familiar, and agrees, with all the conditions governing this RFQ, including those contained in any printed form stated to form part hereof, including but not limited to the documents stated below and Transnet SOC Ltd will recognise no claim for relief based on an allegation that the Respondent overlooked any such condition or failed properly to take it into account for the purpose of calculating tendered prices or otherwise:

1. Specifications and drawings included in this RFQ - if applicable; and
2. **The following documents all of which are available on Transnet’s website or upon request:**
 - 2.1. General Bid Conditions;
 - 2.2. Standard RFQ Terms and Conditions for the Supply of Goods or Services to Transnet;
 - 2.3. Supplier Integrity Pact;
 - 2.4. Non-disclosure Agreement; and
 - 2.5. Vendor Application Form and all supporting documents (first time vendors only)

Alternatively, for all existing vendors, please provide vendor number(s) here:

Transnet Operating Division	Unique Vendor Number	Yes / No
Transnet Group		
TFR, etc.		

In the Yes/No column above, please confirm that all the information e.g. company address and contact details, banking details etc are still correct as at the time of allocation of the vendor number(s). Alternatively, Respondents are required to provide the updated information with their bid submission.

SIGNED at _____ on this _____ day of _____ 20__

SIGNATURE OF WITNESSES

ADDRESS OF WITNESSES

1 _____
Name _____

2 _____
Name _____

SIGNATURE OF RESPONDENT’S AUTHORISED REPRESENTATIVE: _____

NAME: _____

DESIGNATION: _____

SECTION 4

RFQ DECLARATION AND BREACH OF LAW FORM

NAME OF ENTITY: _____

We _____ do hereby certify that:

1. Transnet has supplied and we have received appropriate responses to any/all questions [as applicable] which were submitted by ourselves for RFQ Clarification purposes;
2. we have received all information we deemed necessary for the completion of this Request for Quotation [RFQ];
3. we have been provided with sufficient access to the existing Transnet facilities/sites and any and all relevant information relevant to the Supply of the Goods as well as Transnet information and Employees, and has had sufficient time in which to conduct and perform a thorough due diligence of Transnet's operations and business requirements and assets used by Transnet. Transnet will therefore not consider or permit any pre- or post-contract verification or any related adjustment to pricing, service levels or any other provisions/conditions based on any incorrect assumptions made by the Respondent in arriving at his Bid Price.
4. at no stage have we received additional information relating to the subject matter of this RFQ from Transnet sources, other than information formally received from the designated Transnet contact(s) as nominated in the RFQ documents.
5. we are satisfied, insofar as our entity is concerned, that the processes and procedures adopted by Transnet in issuing this RFQ and the requirements requested from Bidders in responding to this RFQ have been conducted in a fair and transparent manner; and
6. furthermore, we declare that a family, business and/or social relationship **exists / does not exist** [delete as applicable] between an owner / member / director / partner / shareholder of our entity and an employee or board member of the Transnet Group including any person who may be involved in the evaluation and/or adjudication of this Bid.
7. In addition, we declare that an owner / member / director / partner / shareholder of our entity **is / is not** [delete as applicable] an employee or board member of the Transnet Group.
8. If such a relationship as indicated in paragraph 6 and/or 7 exists, the Respondent is to complete the following section:

FULL NAME OF OWNER/MEMBER/DIRECTOR/
PARTNER/SHAREHOLDER:

ADDRESS:

Indicate nature of relationship with Transnet:

[Failure to furnish complete and accurate information in this regard will lead to the disqualification of a response and may preclude a Respondent from doing future business with Transnet]

- 9. We declare, to the extent that we are aware or become aware of any relationship between ourselves and Transnet [other than any existing and appropriate business relationship with Transnet] which could unfairly advantage our entity in the forthcoming adjudication process, we shall notify Transnet immediately in writing of such circumstances.

BREACH OF LAW

- 10. We further hereby certify that *I/we have/have not been* [delete as applicable] found guilty during the preceding 5 [five] years of a serious breach of law, including but not limited to a breach of the Competition Act, 89 of 1998, by a court of law, tribunal or other administrative body. The type of breach that the Respondent is required to disclose excludes relatively minor offences or misdemeanours, e.g. traffic offences. This includes the imposition of an administrative fine or penalty.

Where found guilty of such a serious breach, please disclose:

NATURE _____ OF _____ BREACH: _____

DATE OF BREACH: _____

Furthermore, I/we acknowledge that Transnet SOC Ltd reserves the right to exclude any Respondent from the bidding process, should that person or entity have been found guilty of a serious breach of law, tribunal or regulatory obligation.

SIGNED at _____ on this _____ day of _____ 20____

For and on behalf of _____ _____	AS WITNESS:
duly authorised hereto	
Name:	Name:
Position:	Position:
Signature:	Signature:
Date:	Registration No of Company/CC _____
Place:	Registration Name of Company/CC _____

Section 5: SUPPLIER DECLARATION FORM

Respondents are to furnish the following documentation and complete the Vendor Application Form below:

1. **Original** cancelled cheque **OR** letter from the Respondent's bank verifying banking details [**with bank stamp**]
2. **Certified copy** of Identity Document(s) of Shareholders/Directors/Members [*where applicable*]
3. **Certified copies** of the relevant company registration documents from Companies and Intellectual Property Commission (CIPC)
4. **Certified copies** of the company's shareholding/director's portfolio
5. **Original** letterhead confirm physical and postal addresses
6. **Original** valid SARS Tax Clearance Certificate [RSA entities only]
7. **Certified copy** of VAT Registration Certificate [RSA entities only]
8. **A valid and original** B-BBEE Verification Certificate / sworn affidavit **or certified copy** thereof meeting the requirements for B-BBEE compliance as per the B-BBEE Codes of Good Practice, **Certified copy** of valid Company Registration Certificate [*if applicable*]

Note: No agreement shall be awarded to any South African Respondent whose tax matters have not been declared by SARS to be in order

Company Trading Name							
Company Registered Name							
Company Registration Number Or ID Number If A Sole Proprietor							
Form of entity	CC	Trust	Pty Ltd	Limited	Partnership	Sole Proprietor	
How many years has your company been in business							
VAT number (if registered)							
Company Telephone Number							
Company Fax Number							
Company E-Mail Address							
Company Website Address							
Bank Name				Branch & Branch code			
Account Holder				Bank account number			
Postal Address						Code	
Physical Address						Code	

Respondent's Signature

Date & Company Stamp

Contact Person					
Designation					
Telephone					
Email					
Annual Turnover Range (Last Financial Year)	< R5 Million		R5-35 million		> R35 million
Does Your Company Provide	Products		Services		Both
Area Of Delivery	National		Provincial		Local
Is Your Company A Public Or Private Entity			Public		Private
Does Your Company Have A Tax Directive Or IRP30 Certificate			Yes		No
Main Product Or Service Supplied (E.G.: Stationery/Consulting)					

BEE Ownership Details

% Black Ownership		% Black women ownership		% Disabled persons ownership	
Does your company have a BEE certificate		Yes		No	
What is your broad based BEE status (Level 1 to 9 / Unknown)					
How many personnel does the firm employ		Permanent		Part time	

Transnet Contact Person					
Contact number					
Transnet operating division					

Duly Authorised To Sign For and On Behalf Of Firm / Organisation

Name		Designation	
Signature		Date	

Stamp And Signature Of Commissioner Of Oath

Name		Date	
Signature		Telephone	

SECTION 6: CERTIFICATE OF ATTENDANCE OF SITE MEETING / RFQ BRIEFING

It is hereby certified that –

1. _____

2. _____

Representative(s) of _____ *[name of entity]*

attended the site meeting / RFQ briefing in respect of the proposed Services to be supplied in terms of
this RFQ on _____ 20____

TRANSNET'S REPRESENTATIVE

RESPONDENT'S REPRESENTATIVE

DATE _____

DATE _____

preview copy only

ANNEXURE A : B-BBEE PREFERENCE POINTS CLAIM FORM

This preference form contains general information and serves as a claim for preference points for Broad-Based Black Economic Empowerment [**B-BBEE**] Status Level of Contribution.

1. INTRODUCTION

- 1.1 A total of 10 preference points shall be awarded for B-BBEE Status Level of Contribution.
- 1.2 Failure on the part of a Bidder to fill in and/or to sign this form and submit a B-BBEE Verification Certificate from a Verification Agency accredited by the South African Accreditation System [**SANAS**] or a Registered Auditor approved by the Independent Regulatory Board of Auditors [**IRBA**] or an Accounting Officer as contemplated in the Close Corporation Act [**CCA**] together with the bid will be interpreted to mean that preference points for B-BBEE Status Level of Contribution are not claimed.
- 1.3 Transnet reserves the right to require of a Bidder, either before a Bid is adjudicated or at any time subsequently, to substantiate any claim in regard to preferences, in any manner required by Transnet.

2. GENERAL DEFINITIONS

- 2.1 "**all applicable taxes**" include value-added tax, pay as you earn, income tax, unemployment insurance fund contributions and skills development levies;
- 2.2 "**B-BBEE**" means broad-based black economic empowerment as defined in section 1 of the Broad-Based Black Economic Empowerment Act;
- 2.3 "**B-BBEE status of contributor**" means the B-BBEE status received by a measured entity based on its overall performance using the relevant scorecard contained in the Codes of Good Practice on Black Economic Empowerment, issued in terms of section 9(1) of the Broad-Based Black Economic Empowerment Act;
- 2.4 "**Bid**" means a written offer in a prescribed or stipulated form in response to an invitation by Transnet for the provision of goods, works or services;
- 2.5 "**Broad-Based Black Economic Empowerment Act**" means the Broad-Based Black Economic Empowerment Act, 2003 [Act No. 53 of 2003];
- 2.6 "**comparative price**" means the price after the factors of a non-firm price and all unconditional discounts that can be utilised have been taken into consideration;
- 2.7 "**consortium or joint venture**" means an association of persons for the purpose of combining their expertise, property, capital, efforts, skills and knowledge in an activity for the execution of a contract;
- 2.8 "**contract**" means the agreement that results from the acceptance of a bid by Transnet;
- 2.9 "**EME**" means any enterprise with an annual total revenue of R5 [five] million or less as per the 2007 version of the B-BBEE Codes of Good Practice and means any enterprise with an annual total revenue of R10 [ten] million or less as per the Revised Codes of Good Practice issued on 11 October 2013 in terms of Government Gazette No. 36928;
- 2.10 "**firm price**" means the price that is only subject to adjustments in accordance with the actual increase or decrease resulting from the change, imposition, or abolition of customs and excise

duty and any other duty, levy, or tax, which, in terms of the law or regulation, is binding on the contractor and demonstrably has an influence on the price of any supplies, or the rendering costs of any service, for the execution of the contract;

- 2.11 **"functionality"** means the measurement according to predetermined norms, as set out in the bid documents, of a service or commodity that is designed to be practical and useful, working or operating, taking into account, among other factors, the quality, reliability, viability and durability of a service and the technical capacity and ability of a bidder;
- 2.12 **"non-firm prices"** means all prices other than "firm" prices;
- 2.13 **"person"** includes reference to a juristic person;
- 2.14 **"QSE"** means any enterprise with an annual total revenue between R5 [five] million and R35 [thirty five] million as per the 2007 version of the B-BBEE Codes of Good Practice and means any enterprise with an annual total revenue of between R10 [ten] million and R50 [fifty] million as per the Revised Codes of Good Practice issued on 11 October 2013 in terms of Government Gazette No. 36928
- 2.15 **"rand value"** means the total estimated value of a contract in South African currency, calculated at the time of bid invitations, and includes all applicable taxes and excise duties;
- 2.16 **"subcontract"** means the primary contractor's assigning or leasing or making out work to, or employing another person to support such primary contractor in the execution of part of a project in terms of the contract;
- 2.17 **"total revenue"** bears the same meaning assigned to this expression in the Codes of Good Practice on Black Economic Empowerment, issued in terms of section 9(1) of the Broad-Based Black Empowerment Act and promulgated in the Government Gazette on 9 February 2007;
- 2.18 **"trust"** means the arrangement through which the property of one person is made over or bequeathed to a trustee to administer such property for the benefit of another person; and

3. **"trustee"** means any person, including the founder of a trust, to whom property is bequeathed in

ADJUDICATION USING A POINT SYSTEM

- 3.1 The Bidder obtaining the highest number of total points for the evaluation criteria as enumerated in Section 2 of the RFP will be awarded the contract, unless objective criteria justifies the award to another bidder.
- 3.2 Preference points shall be calculated after prices have been brought to a comparative basis taking into account all factors of non-firm prices and all unconditional discounts.
- 3.3 Points scored will be rounded off to 2 [two] decimal places.
- 3.4 In the event of equal points scored, the Bid will be awarded to the Bidder scoring the highest number of preference points for B-BBEE.
- 3.5 However, when functionality is part of the evaluation process and two or more Bids have scored equal points including equal preference points for B-BBEE, the successful Bid will be the one scoring the highest score for functionality.
- 3.6 Should two or more Bids be equal in all respect, the award shall be decided by the drawing of lots.

4. POINTS AWARDED FOR B-BBEE STATUS LEVEL OF CONTRIBUTION

- 4.1 In terms of the Preferential Procurement Regulations, 2011, preference points shall be awarded to a Bidder for attaining the B-BBEE status level of contribution in accordance with the table below:

B-BBEE Status Level of Contributor	Number of Points [Maximum 10]	Number of Points [Maximum 10]
1	20	10
2	18	9
3	16	8
4	12	5
5	8	4
6	6	3
7	4	2
8	2	1
Non-compliant contributor	0	0

- 4.2 Bidders who qualify as EMEs in terms of the 2007 version of the Codes of Good Practice must submit a certificate issued by an Accounting Officer as contemplated in the CCA or a Verification Agency accredited by SANAS or a Registered Auditor. Registered auditors do not need to meet the prerequisite for IRBA's approval for the purpose of conducting verification and issuing EME's with B-BBEE Status Level Certificates.
- 4.3 Bidders who qualify as EMEs in terms of the Revised Codes of Good Practice issued on 11 October 2013 in terms of Government Gazette No. 36928 are only required to obtain a sworn affidavit on an annual basis confirming that the entity has an Annual Total Revenue of R10 million or less and the entity's level of Black ownership.
- 4.4 In terms of the 2007 version of the Codes of Good Practice, Bidders other than EMEs must submit their original and valid B-BBEE status level verification certificate or a certified copy thereof, substantiating their B-BBEE rating issued by a Registered Auditor approved by IRBA or a Verification Agency accredited by SANAS.
- 4.5 In terms of the Revised Codes of Good Practice issued on 11 October 2013 in terms of Government Gazette No. 36928, Bidders who qualify as QSEs are only required to obtain a sworn affidavit on an annual basis confirming that the entity has an Annual Total Revenue of R50 million or less and the entity's Level of Black ownership. Large enterprises must submit their original and valid B-BBEE status level verification certificate or a certified copy thereof, substantiating their B-BBEE rating issued by a Registered Auditor approved by IRBA or a Verification Agency accredited by SANAS.
- 4.6 A trust, consortium or joint venture will qualify for points for its B-BBEE status level as a legal entity, provided that the entity submits its B-BBEE status level certificate.
- 4.7 A trust, consortium or joint venture will qualify for points for their B-BBEE status level as an unincorporated entity, provided that the entity submits their consolidated B-BBEE scorecard as if they were a group structure and that such a consolidated B-BBEE scorecard is prepared for every separate

bid.

4.8 Tertiary institutions and public entities will be required to submit their B-BBEE status level certificates in terms of the specialised scorecard contained in the B-BBEE Codes of Good Practice.

4.9 A person will not be awarded points for B-BBEE status level if it is indicated in the Bid documents that such a Bidder intends subcontracting more than 25% [twenty-five per cent] of the value of the contract to any other enterprise that does not qualify for at least the same number of points that such a Bidder qualifies for, unless the intended subcontractor is an EME that has the capability and ability to execute the subcontract.

4.10 A person awarded a contract may not subcontract more than 25% [twenty-five per cent] of the value of the contract to any other enterprise that does not have an equal or higher B-BBEE status level than the person concerned, unless the contract is subcontracted to an EME that has the capability and ability to execute the subcontract.

4.11 Bidders are to note that in terms of paragraph 2.6 of Statement 000 of the Revised Codes of Good Practice issued on 11 October 2013 in terms of Government Gazette No. 36928, any representation made by an entity about its B-BBEE compliance must be supported by suitable evidence and documentation. As such, Transnet reserves the right to request such evidence or documentation from Bidders in order to verify any B-BBEE recognition claimed.

5. B-BBEE STATUS AND SUBCONTRACTING

5.1 **Bidders who claim points in respect of B-BBEE Status Level of Contribution must complete the following:**

B-BBEE Status Level of Contributor _____ = _____ [maximum of 10 points]

Note: Points claimed in respect of this paragraph 5.1 must be in accordance with the table reflected in paragraph 4.1 above and must be substantiated by means of a B-BBEE certificate issued by a Verification Agency accredited by SANAS or a Registered Auditor approved by IRBA or a sworn affidavit in the case of an EME or QSE.

5.2 **Subcontracting:**

Will any portion of the contract be subcontracted? YES/NO [delete which is not applicable]

If YES, indicate:

- (i) What percentage of the contract will be subcontracted?%
- (ii) The name of the subcontractor
- (iii) The B-BBEE status level of the subcontractor
- (iv) Is the subcontractor an EME? YES/NO

5.3 Declaration with regard to Company/Firm

- (i) Name of Company/Firm.....
- (ii) VAT registration number.....
- (iii) Company registration number.....
- (iv) Type of Company / Firm [TICK APPLICABLE BOX]

Partnership/Joint Venture/Consortium

One person business/sole propriety

Close Corporations

Company (Pty) Ltd

(v) Describe Principal Business Activities

.....
.....

(vi) Company Classification [TICK APPLICABLE BOX]

Manufacturer

Supplier

Professional Service Provider

Other Service Providers, e.g Transporter, etc

(vii) Total number of years the company/firm has been in business.....

BID DECLARATION

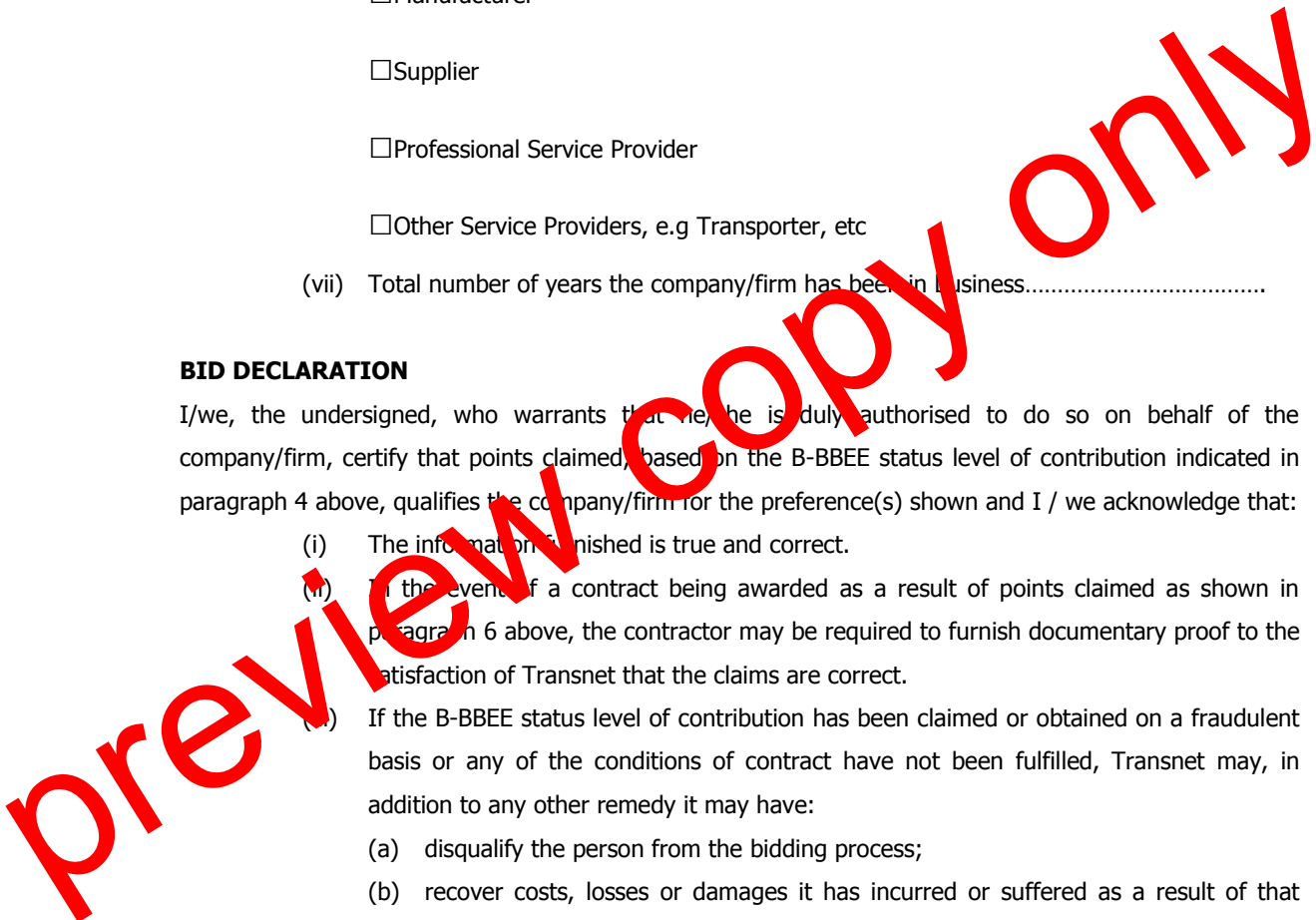
I/we, the undersigned, who warrants that we/he is duly authorised to do so on behalf of the company/firm, certify that points claimed, based on the B-BBEE status level of contribution indicated in paragraph 4 above, qualifies the company/firm for the preference(s) shown and I / we acknowledge that:

- (i) The information furnished is true and correct.
- (ii) In the event of a contract being awarded as a result of points claimed as shown in paragraph 6 above, the contractor may be required to furnish documentary proof to the satisfaction of Transnet that the claims are correct.
- (iii) If the B-BBEE status level of contribution has been claimed or obtained on a fraudulent basis or any of the conditions of contract have not been fulfilled, Transnet may, in addition to any other remedy it may have:
 - (a) disqualify the person from the bidding process;
 - (b) recover costs, losses or damages it has incurred or suffered as a result of that person's conduct;
 - (c) cancel the contract and claim any damages which it has suffered as a result of having to make less favourable arrangements due to such cancellation;
 - (d) restrict the Bidder or contractor, its shareholders and directors, and/or associated entities, or only the shareholders and directors who acted in a fraudulent manner, from obtaining business from Transnet for a period not exceeding 10 years, after the *audi alteram partem* [hear the other side] rule has been applied; and/or
 - (e) forward the matter for criminal prosecution.

WITNESSES:

Respondent's Signature

Date & Company Stamp



1.

SIGNATURE OF BIDDER

2.

DATE:.....

COMPANY NAME:

ADDRESS:.....

preview copy only

ANNEXURE B : SCHEDULE OF PLANT, EQUIPMENT AND TEAMS

Schedule of major plant and equipment to be used in the execution of this agreement in terms of the Agreement Conditions and specifications. The respondent must state which plant is immediately available and which will be ordered for and plant to be acquired for.

(i) **Plant immediately available for work tendered for :**

(ii) **Plant on order and which will be available for work tendered for :**

(iii) **Plant to be acquired for the work tendered for :**

preview copy only

ANNEXURE C- REFERENCES

Please indicate below the company names and contact details of existing customers whom Transnet may contact to seek third party evaluations of your current service levels:

Company Name	Nature of work	Value of work	Contact person	Contact details e.g. telephone numbers	Year completed

preview copy only

Respondent's Signature

Date & Company Stamp

ANNEXURE D**MINIMUM CONTENTS FOR SAFETY HEALTH/RISK AND ENVIRONMENTAL PLAN AND THE EQUIPMENTS RELEVANT TO THE PROJECT**

The Respondents are required to submit the Health/Risk and Safety Plan relevant for Cleaning and Gardening project and shall take note of the following when compiling Health/Risk and Safety Plan.

INDEX**1. Contractor SHEQ Policy Statement**

2. List of Contractor Employees

3. Project Management

3.1. Notification of Construction Work (Construction Regulation 3, Annexure A)

3.2 Registration with WCC

3.4. SHEQ Plan Review

3.5. Agreement with Mandataries (Section 37(2) of OHS Act)

3.6. Appointments of Contractor

3.7. Site Organisation

3.7.1. Assignment of Duties

3.7.2. Construction Work Supervisor (Construction Regulation 6)

3.7.3. Subordinate Construction Work Supervisor (Construction Regulation 6)

3.7.4. Construction Safety Officer (Construction Regulation 6(7))

3.7.5. List of sub-contractors already appointed - List to be revised at least monthly

3.7.6. Health and Safety Representative (Section 17 of OHS Act)

3.7.7. Scaffold Inspector (Construction Regulation 8)

3.7.8. Portable Fire Equipment Inspector

4. Incident Management

4.1. Health, Safety and Environmental Performance Statistics

4.2. Incidents and or injuries

4.2.1. Reporting

4.2.2. Recording

4.2.3. Investigation

4.2.4. Medical Surveillance and certificate of fitness

4.2.5. Occupational Diseases

5. Audits

- 5.1. Legal Compliance Audits
 - 5.1.1. Audit Report
 - 5.1.2. Frequency of Audits
 - 5.1.3. Findings and Analysis
 - 5.1.4. Corrective Action

6. Substance Abuse Testing

- 6.1 Proof of testing

7. Logbooks and Registers

- 7.1. Electric Equipment / Tools Register - Portable
- 7.2. Fire fighting appliance Register - Portable
- 7.3. Personal Protective Equipment and Clothing
- 7.4 Schedule of Plant (E4D)
- 7.5 Other

8. Risk Management

- 8.1. Task descriptions
- 8.2. Risk Identification, Analysis, Mitigating Steps, Monitoring Steps and Review Plan
- 8.3. Risk Assessment (Construction Regulation 7)
- 8.4 Occupational Hygiene Survey e.g Noise, Dust etc

9. Education and Training

- 9.1. Induction training (Construction Regulation 7(9))
- 9.2. Site Specific Training
- 9.3. Certificates of Competence e.g operator licences, welding certificates, etc
- 9.4 First Aid training and Equipment

10. Emergency Planning – Evacuation plan

- 10.1. Client procedure
- 10.2. Site Procedure
- 10.3. Emergency response numbers

11. SHE Communications

- 11.1 Safety/Toolbox talks
- 11.2 Incident Recall

12. Safe Working Procedures

- 12.1 Method Statements
- 12.2 Safe Operating Procedures
- 12.3 Task/Job observations

13. Fall Protection Plan

- 13.1 Documented fall protection plan
- 13.2 Rescue Plan
- 13.3 Training/Certification
- 13.4 Fall arrest and protection equipment

14. Personal Protective Equipment and Clothing

- 14.1 PPE required
- 14.2 PPE proof of issue

15. Project security

- 15.1 Security risks identified
- 15.2 Access control

16. Environmental Management Plan

Note: TFR will obtain Environmental authorisation (EIA and EMP) and permits from the relevant authority (when necessary) prior to commencement of the project (e.g Construction)

Provide procedure of the following:

1. Control of Dust
2. Noise Pollution Control
3. Waste management
4. Environmental Incident Management (Sect 30 NEMA)
5. Contamination of surface and underground water
6. Soil Contamination
7. Storm Water Drainage
8. Environmental Cleanup and Rehabilitation
9. Environment monitoring
10. Environmental training and awareness

THE LIST OF PLANT AND EQUIPMENT

3 Phase Generator, Hand tools, Extension leads, Test Leads,

- Water container and Petrol container
- Null Balance Digital Earth Megger
- 10kV Digital Megger
- 4 kV DC Hi Pot Test Set
- 25 kV AC Hi Pot Test Set
- Primary Injection Test set variable 500/1000 Amps.
- Secondary Injection Test set, variable from 0 to 100 Amps
- AC / DC Injection Test Set, 200A, variable 0 to 250V
- LCR Meter
- Digital Millisecond Timer, 999 seconds
- Multimeter Analog (A.V.O.)
- 2 x Multimeters Digital (R.M.S.)
- DC Millivolt Injection Set, 100mV
- Bucholtz Pump (air compressed pump or bicycle pump)
- Heating Apparatus (Oil heating)
- Thermometer
- Emergency Lighting

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ANNEXURE E - CLAUSE BY CLAUSE COMPLIANCE WITH SPECIFICATION

11. Description of Work

Complies / does not comply

11.1 Routine Testing Requirements

- 11.1.1 Complies / does not comply
- 11.1.2 Complies / does not comply
- 11.1.3 Complies / does not comply
- 11.1.4 Complies / does not comply
- 11.1.5 Complies / does not comply
- 11.1.6 Complies / does not comply
- 11.1.7 Complies / does not comply
- 11.1.8 Complies / does not comply
- 11.1.9 Complies / does not comply
- 11.1.10 Complies / does not comply
- 11.1.11 Complies / does not comply

11.2 DC Traction substation

- 11.2.1 Complies / does not comply
- 11.2.2 Complies / does not comply
- 11.2.3 Complies / does not comply
- 11.2.4 Complies / does not comply

11.3 AC Traction substation

- 11.3.1 Complies / does not comply
- 11.3.2 Complies / does not comply
- 11.3.3 Complies / does not comply
- 11.3.4 Complies / does not comply

11.4 Signal supply and Distribution Substation

- 3.4.1 Complies / does not comply
- 3.4.2 Complies / does not comply

preview copy only

3.4.3 Complies / does not comply

12. Guarantee and Defects

12.1 Complies / does not comply

12.2 Complies / does not comply

12.3 Complies / does not comply

12.4 Complies / does not comply

12.5 Complies / does not comply

12.6 Complies / does not comply

12.7 Complies / does not comply

12.8 Complies / does not comply

13. Quality and Inspection

13.1 Complies / does not comply

13.2 Complies / does not comply

13.3 Complies / does not comply

13.4 Complies / does not comply

14. Specifications

14.1 South African National Standards

14.1.1 Complies / does not comply

14.2 Transnet Freight Rail

14.2.1 Complies / does not comply

14.2.2 Complies / does not comply

14.2.3 Complies / does not comply

14.2.4 Complies / does not comply

14.2.5 Complies / does not comply

14.2. Electrical test sheets

Complies / does not comply

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Infrastructure (Maintenance)

BBB0342 Version 1

**Electrical Test Laboratory
Traction Substation
Test Sheet**



Location / Name:

Date: Nature: Unit:

4 kA DC Ammeter				4 kV DC Voltmeter			AC Earth leakage	
Shunt:	A	mV		Indication	Sub standard	% Error	CT Ratio:	
Indication	mV	Amps	% Error	1000 V			Volt	Amp
500 A				2 000 V				
1 000 A				2 500 V				
2 000 A				3 000 V				
2 500 A				3 500 V				
3 000 A				4 000 V				
Main O/L:				Aux. O/L:			Relay Make & Type:	
CT Ratio:				CT Ratio:			Relay set at:	
V	R Amp	Y Amp	B Amp	V	R Amp	Y Amp	B Amp	Relay setting:

Relay Make & Type: _____				Relay Make & Type: _____				Relay checks for parallel path: <input type="checkbox"/>	
Full Load: = _____ A				Full Load: = _____ A				Yes / No <input type="checkbox"/>	
Thermal O/L.				Thermal O/L.				Connect to AC E/L: <input type="checkbox"/>	
Relay was tested by prim. / sec. / Tw.				Relay was tested by prim. / sec. / Tw.				Main X/F tank: <input type="checkbox"/>	
Injection to operate at:				Injection to operate at:				OCB structure: <input type="checkbox"/>	
x (FL) = _____ Amp.				x (FL) = _____ Amp.				CT's structure: <input type="checkbox"/>	
Phase	R	Y	B	Phase	R	Y	B	Aux. X/F fence: <input type="checkbox"/>	
Time (sec)				Time (sec)				Relay trip and lock-out OCB: <input type="checkbox"/>	
Current Set.				Current Set.				Yes / No <input type="checkbox"/>	
Time Set.				Time Set.				Indication: Yes / No <input type="checkbox"/>	
Instantaneous O/L.				Instantaneous O/L.					
Relay was tested by prim. / sec. / Tw.				Relay was tested by prim. / sec. / Tw.					
Injection to operate at:				Injection to operate at:					
x (FL) = _____ Amp.				x (FL) = _____ Amp.					
Phase	R	Y	B	Phase	R	Y	B		
Time (sec)				Time (sec)					
Current Set.				Current Set.					
Time Setting				Time Setting					
Relay Trip OCB				Relay Trip OCB					

Indication				Indication			
Bucholz Relay cc				Bucholz Relay cc			
Relay trip, lock-out OCB:				Relay trip, lock-out OCB:			
Indication:				Indication:			
Temperature Relay							
Oil °C				Winding °C			
Relay trip, lock-out OCB: U/B				Relay trip, lock-out OCB: U/B			
Indication				Indication			

Preview Copy Only

Infrastructure (Maintenance)

BBB0343 Version 1

**Electrical Test Laboratory
Traction Substation
Test Sheet**



EARTH & INSULATION RESISTANCE			NAME:				
EARTH RESISTANCE:		Measure	Acceptable	DATE:			
Test spike			<2000 Ω	NATURE:			
Test spike - Sub earth			<5 Ω	DC. EARTH LEAKAGE RELAY			
Test spike - Rail			>5 Ω				
Test spike - DC E/L			>25 Ω				
Test spike - Neg. busbar			>3000 Ω				Make & Type:
Test spike - RUA AC E/L			>10 Ω				Relay operate at:
Test spike - RUB AC E/L			>10 Ω				Relay Setting:
Test spike - RUC AC E/L			>10 Ω				Checked for parallel path:
Test spike - Track switch earth			<5 Ω				
INSULATION RESISTANCE:							
DC. E/L – Sub. Earth			>25 Ω				Connected to DC. E/L
DC. E/L – Neg. Busbar			>3000 Ω	Rectifier frame			
DC. E/L – Rail			>30 Ω	Reactor frame			
DC. E/L – RUA AC E/L			>35 Ω	Wall bushing plate			
DC. E/L – RUB AC E/L			>35 Ω	Control panels			
DC. E/L – RUC AC E/L			>35 Ω	Wavefilter room ear			
Sub. Earth – Neg. busbar			>3000 Ω				
Sub. Earth - Rail			>5 Ω	Aux. X/F earpoint			
Sub. Earth – RUA AC E/L			>10 Ω	Battery hall			
Sub. Earth – RUB AC E/L			>10 Ω	Telecontrol panel			
Sub. Earth – RUC AC E/L			>10 Ω	DC. Voltage relay			
Neg. Busbar - Rail			>3000 Ω	Track breaker cells			
Neg. Busbar – RUA AC E/L			>3000 Ω	Checker plates			
Neg. Busbar – RUB AC E/L			>3000 Ω	Tubing in sub.			
Neg. Busbar – RUC AC E/L			>3000 Ω	Operation of relay results in:			
Rail – RUA AC E/L			>15 Ω	Relay L/O. OCB.			
Rail – RUB AC E/L			>15 Ω	Relay L/O U/B.			
Rail – RUC AC E/L			>15 Ω	Relay L/O T/B.			
RUA AC E/L – RUB AC E/L			>20 Ω	Fault indication			
3 kV DC UNDERVOLTAGE RELAY				110 V BATTERY UNDERVOLTAGE			
RUA		RUB		Make &Type:			
Make &Type:		Make &Type:		Make &Type:			
Pick-Up:	V	Pick-Up:	V	Pick-Up:		V	
Drop-Out:	V	Drop-Out:	V	Drop-Out:		V	
Drop-Out delay:	Sec.	Drop-Out delay:	Sec.				
Relay drop-out results:		Relay drop-out results:		Relay drop-out results:			
Trip all T/B		Trip all T/B					
Counter operation		Counter operation		Trip and lock-out of OCB:			
Fault indication		Fault indication					

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Infrastructure (Maintenance)

BBB0344 Version 1

**Electrical Test Laboratory
Traction Substation
Test Sheet**



SUBSTATION:

DATE:

MAIN/AUX TRANSFORMER PROTECTION

TRAFOGAURD T100

LIST OF AVAILABLE ADJUSTMENTS

- *SET NOMINAL TRFO CURRENT, ITN (30% - 100%) OF IN1 RATED CT PRIMARY CURRENT
- *SET INSTANTANEOUS OVERCURRENT TRIP LEVEL, I>> (200% - 500%) OF IT 400%
- *SET INVERSE – TIME CURVE CURRENT THRESHOLD, I> (100% - 400%) OF IT 200%
- *SET INVERSE – TIME CURVE TIME MULT.KT (10MIN – 60MIN) NB: 30MIN

EXAMPLE:

CT RATIO 150/5

NOMINAL EXPECTED CT PRIMARY CURRENT ITN = 105AMP (FULL LOAD OF TRAFO)

THUS ITN/IN1 = 105/150
= 70%

ITN SETTING = 70%

NOTE: AFTER THE SYSTEM IS ENERGISED, 105 AMP IN THE CT PRIMARY CIRCUIT NOW CORRESPOND TO A 100% READING WHEN THE CONTINUOUS DISPLAY IS SELECTED. INDICATING FULL LOAD CURRENT

- 200% WILL TRIP OCB/SF6 IN 1800 SEC
- 300% WILL TRIP OCB/SF6 IN 118 SEC
- 400% WILL TRIP OCB/SF6 IN 30 MILLISECONDS

TEST AND CALIBRATION OF TRAFOGAURD T100

CT RATIO	R PHASE	Y PHASE	B PHASE
MARKED			
MEAS.			

ITN SETTING

*FULL LOAD OF TRAFO = AMP		
CT RATIO =		
*IN = F/L DEVIDED BY CT PRIMARY TIMES 100%		
THUS ITN=	=	%

SETTINGS

KT = 30 MINUTES
I>> = 400%
I> = 200%

BITT SWITCHES

1 = OFF
2 = OFF (STANDARD CURVE)
3 = ON (30 MILLISECONDS)
4 – 8 = OFF

TEST RELAY BY PRIM/SEC INJECTION AS FOLLOWS:


300%	R PHASE	Y PHASE	B PHASE
TIME:	S	S	S
TRIP OCB			

400%	R PHASE	Y PHASE	B PHASE
TIME:	M/S	M/S	M/S
TRIP OCB			

TESTED BY: _____

Infrastructure (Maintenance)

BBB0345 Version 1

Electrical Test Laboratory Traction Substation (Brown Boveri) Test sheet		
Name:	_____	
Date:	_____	
Nature: R/C	_____	
Relay Type:	Red Phase: _____	Blue Phase: _____
Full Load Current: Primary:	_____ A	Secondary: _____ A
Current Transformer Ratio:	_____	
Relay Tested: Prim/ Sec/ TW/Injection		

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Respondent's Signature

Date & Company Stamp

Relay Trip OCB: Yes / No Relay Indication: Yes / No

Instantaneous O/L: Blue Phase Setting: _____

Inject 3,75 X Full load = _____ A

Relay Trip OCB: Yes / No Relay Indication: Yes / No

Tested By: _____ Date: _____

Approved By: _____ Date: _____

Thermal O/L: Red Phase Setting: _____

Preheat Relay At 2 X Full load = _____ A to 22 °C

Inject 3 X Full load = _____ A Relay Operate In _____ Seconds

Relay Trip OCB: Yes / No Relay Indication: Yes / No

Instantaneous O/L: Red Phase Setting: _____

Inject 3,75 X Full load = _____ A

Relay Trip OCB: Yes / No Relay Indication: Yes / No

Thermal O/L: Blue Phase Setting: _____

Preheat Relay At 2 X Full load = _____ A to 22 °C

Inject 3 X Full load = _____ A Relay Operate In _____ Seconds

Infrastructure (Maintenance)

BBB0346

**Electrical Test Laboratory
F.L & T Substation
Test Sheet**



NAME :

DESIGNATION : OCB No. :

PANEL NO. : DATE : NATURE : R/C

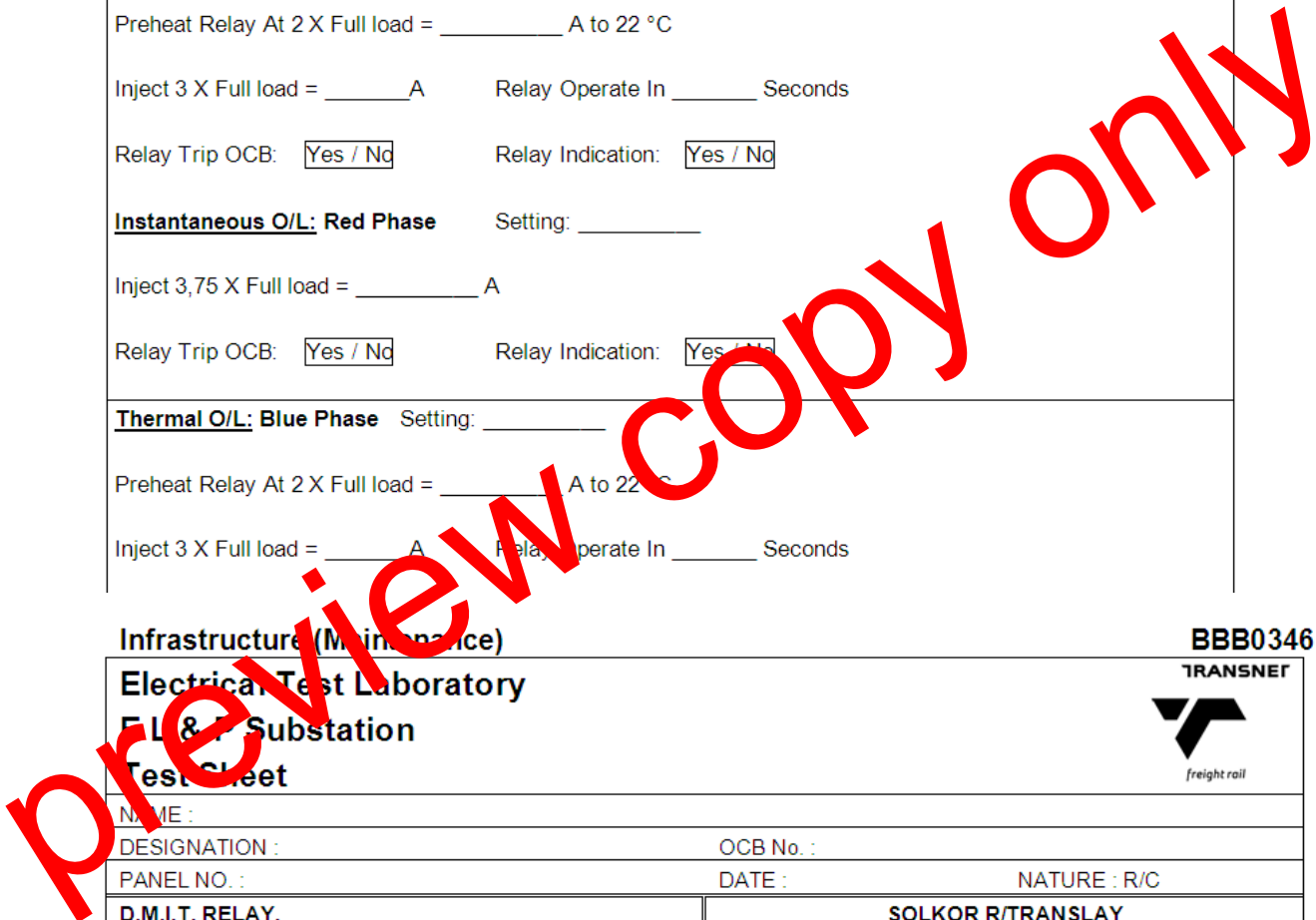
D.M.I.T. RELAY. **SOLKOR R/TRANSLAY**

CT RATIO : CT RATIO :

V	R Amp	Y Amp	B Amp	V	R Amp	Y Amp	B Amp

POLARITIES : PILOT CABLE

O/L SETTING : A/% T.M.S. : Loop resistance :



Respondent's Signature

Date & Company Stamp

E/L SETTING :		A/%		T.M.S. :		Insulation resistance :										
RELAY TESTED PRIM/ SEC/ TW. INJECTION										T1 – E :						
MULTIPLE	O/L R ph.	O/L Y ph.	O/L B ph.	E/L						T2 – E :						
Of P.C.S.	A	Sec	A	Sec	A	Sec	A	Sec	T1 – T2 :							
2									OVERALL FAULT SETTING							
4									FAULT	T.W./	A	B	AC	OPERA-		
6										Sec. A	mA	mA	mA	TION %		
INSTANTANEOUS RELAY										R – E						
O/L Setting					E/L Setting					Y – E						
R ph. Trips at					A					B – E						
Y ph. Trips at					A					Relay trips at		A				
B ph. Trips at					A					R – Y						
BUCHOLZ RELAY					cc					R – B						
Relay trip & lock-out OCB. Give indication.										CURRENT BETWEEN		RELAY OUTPUT				
TEMPERATURE RELAY										C		R – E		1.10A		
Relay trip OCB. Give indication.										Y – E		1.40A				
FRAME LEAKAGE RELAY:										B – E		2.00 A				
V	1A	2A	3A	ZONE	1	2	3	R – Y		4.50 A						
				TYPE				B – Y		4.50 A						
				PLUG				R – B		2.25 A						
				P / Amp				RELAY TYPE :								
				TRIPS				SETTING :								
				RATIO				RESISTANCE MEASUREMENTS								
								ZONE	1	2	3					
								E								
				TEST SPIKES :	Ohm	1										
				EARTH MAT :	Ohm	2										

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TESTED BY

APPROVED BY

DATE

Infrastructure (Maintenance)
 Electrical Test Laboratory
SUL DEFECT REPORT

BBB0347 Version 1



GRADE: SENIOR ENGINEERING TECHNICIAN
 ADDRESS:

TO: MAINTENANCE MANAGER

DEPOT:

DATE:

OUR REF.:

PROTECTION DEFECT REPORT

The following DEFECTS were found during commissioning / routine testing:

At : E.L.&P. /TRACT. Sub-, Tie station:

TESTED BY : _____

SIGNATURE : _____

*Please attend to these defects and complete bottom portion of this form within two months after receiving report and send back to **TEST LAB**.*

TO: SENIOR ENGINEERING TECHNICIAN

FROM : MAINTENANCE MANAGER

DEPOT: _____

YOUR REF: _____

CORRECTION ACTION REPORT

The following REPAIRS were done for:

At :

E.L.&P. / TRACT. Sub-, Tie-station :

These defects were repaired by :

Technician : _____

Technical Supt. : _____

And reported to TECHNICAL MANAGER/SUPT.

Date : _____

Checked by
Chief Eng. Technician : _____

*If any assistance needed to solve or repair a defect and re-testing is necessary, please contact Senior Engineering Technician. Before the Final correction report is sent through.
THANK YOU FOR YOUR CO-OPERATION.*

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Infrastructure (Maintenance)

BBB0348 Version 1

**Electrical Test Laboratory
Traction / E L & P Substation
Test Sheet**



SUBSTATION: _____ **DATE:** _____

TRANSFORMER: _____

MAKE: _____ KVA: _____

SERIAL NO.: _____ VOLTAGE: _____

DATE OF MANUFACTURE: _____ VECTOR: _____

INSULATION RESISTANCE TEST: 2 500 V MEGGER (2 mΩ/kV = Good norm)

EARTH TO HT: _____ HT TO LT1: _____

EARTH TO LT1: _____ HT TO LT2: _____

EARTH TO LT2: _____ HT TO AUX.: _____

EARTH TO AUX.: _____ LT1 TO LT2: _____

LT2 TO AUX.: _____ LT1 TO AUX.: _____

VOLTAGE RATIO TEST 3 PHASE GENERATOR

SUPPLY VOLTAGE (3 phase) _____ V

	Primary	Secondary	TAP 1	TAP 2	TAP 3	TAP 4	TAP 5
LT1:			V	V	V	V	V
			V	V	V	V	V
			V	V	V	V	V
LT2:			V	V	V	V	V
			V	V	V	V	V
			V	V	V	V	V

AUXILIARY:			V	V	V	V	V
			V	V	V	V	V

AT TAP No. 3: CALCULATED RATIO = HT/LT = _____ / _____ = _____

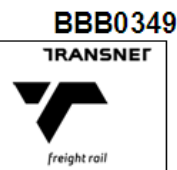
MEASURED VALUE = SUPPLY V / MEASURED V = _____ / _____ = _____

TESTED BY: _____ DATE: _____

APPROVED BY: _____ DATE: _____

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Infrastructure (Maintenance)
Electrical Test Laboratory
TEST CERTIFICATE



SUBSTATION: _____

DATE: _____

OIL TEST REPORT

	DESCRIPTION
SUBSTATION	
TRANSFORMER	
MAKE	
DATE OF MANUFACTURE	
SERIAL No.	
KVA RATING	
VOLTAGE HV/LV	
DATE OF SAMPLE	
OIL VOLUME GAL/LITRE	

	TEST RESULTS	ACTION REQUIRED
	BOTTOM SAMPLE	
OIL TEMPERATURE DEG. C		
WATER CONTENT/KARL FISCHER (ppm)		
APPEARANCE/COLOUR OF OIL		
N.N. ACIDITY mg KOH/g OIL		
DIELECTRIC BREAKDOWN STRENGTH AVR. (KV)		
RECOMMENDATION		

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- A** THE SAMPLE COMPLIES WITH THE REQUIREMENTS.
- B** THE OIL MUST BE FILTERED IN ORDER TO IMPROVE ITS DIELECTRIC BREAKDOWN STRENGTH.
- C** THE OIL MUST BE FILTERED WITH HEAT AND VACUUM IN ORDER TO REMOVE THE EXCESS MOISTURE.

Respondent's Signature

Date & Company Stamp


- D OIL MUST BE REGENERATED/REPLACED AND A SAMPLE SUBMITTED AFTER 6 MONTHS. (SHOULD THE ACIDITY HAVE INCREASE BY MORE THAN 0,03mg KOH/g OIL, THE TRANSFORMER SHALL BE DE-SLUDGED).
- E A SLUDGE TEST MUST BE CARRIED OUT. PLEASE SUBMIT SAMPLE FOR TEST.

TESTED BY: _____

Rail Network Maintenance												BBF9000 Version 3							
3 kV DC Traction Substations Test Sheet: Main and Auxilliary Transformer protection. Current transformers Ratio and Magnetisation Curves. Overload relays:Thermal & Instantaneous. AC earth Leakage Protection. Buchholtz, Overtemperature, Pressure Relief Device.																			
Substation: Single / A / B Unit Routine : Commissioning:																			
CT Ratios																			
Main Overcurrent/Metering I _{FL} =				Auxilliary Overcurrent I _{FL} =				AC earth Leakage				Winding Overtemp							
Marked		Measured		Marked		Measured		Marked		Measured		Marked		Measured					
Magnetization curves																			
Main Overcurrent				Main Metering				Auxilliary Overcurrent				AC earth Leakage		Winding Overtemp					
Volts	Red	White	Blue	Volts	Red	Blue	Volts	Red	Blue	Volts	Amps	Volts	Amps						
Overcurrent Relay elements Relay makes and types. Main Auxilliary : AC Earh Leakage:																			
Main thermal		I _{set} = xI _n		T _{set} =		Main Instantaneous		I _{set} = xI _n		T _{set} = 0		AC Earth Leakage		I _{set} T _{set}					
Operating time in seconds	Multiple	Amps	Specified	Actual	Operating time in seconds	Multiple	Amps	Specified	Actual	Relay Trips Primary Circuit Breaker to Lockout and indication from PCB & CT bases,Main transformer Tank & Auxilliary Transformer fence.			Primary trip amps						
	2 x I _{FL}					3.5 x I _{FL}													
	3 x I _{FL}					4 x I _{FL}													
Trip PCB giving indication:				Yes/No		Trip PCB giving indication:				Yes/No									
Auxilliary thermal		I _{set} = xI _n		T _{set} =		Auxilliary Instantaneous		I _{set} = xI _n		T _{set} = 0		Test for parallel paths to main earth from:		PCB structure					
Operating time in seconds	Multiple	Amps	Specified	Actual	Operating time in seconds	Multiple	Amps	Specified	Actual	CT structure									
	2 x I _{FL}					3.5 x I _{FL}				Main Transformer									
	3 x I _{FL}					4 x I _{FL}				Aux transformer fence									
Trip PCB giving indication:				Yes/No		Trip PCB giving indication:				Yes/No									
Main Transformer Protection																			
Buchholtz: Relay trips PCB giving Lockout & Indication with _____cc of air. Pressure Relief Device: Simulation trips PCB giving Lockout & Indication: Yes/No																			
Oil Over temp: Relay trips PCB giving Indication at _____ °C dail setting. Winding Over temp: Relay trips PCB giving Lockout & Indication at _____ °C dail setting.																			
Auxilliary Transformer Protection																			
Buchholtz: Relay trips PCB giving Lockout & Indication with _____cc of air.																			
Tested by: Name:				Signature:				Witnessed by: Name:				Signature:				Date:			

Respondent's Signature


Date & Company Stamp

Rail Network Maintenance											BBF9001 Version 3			
3 kV DC Traction Substations Test Sheet: 3 kV DC Protection														
DC Earth Leakage, Metering, Wave Filter Equipment, Diode & Rectifier Overtemperature. 3 kV DC Undervoltage Relay. Battery Undervoltage Relay. Phase Fail relay.														
Substation:				Routine :				Commissioning:						
DC Earth Leakage Protection				Tested by DC current injection										
Relay tested to operate at _____ amps tripping PCB and HSCB's to lockout with indication from the following:														
Control Panels	Rectifier screen	Rectifier Base	Anode Wall Plates	Positive Isolator	LV Distribution board	Wave Filter Room	Chequer plates	HSCB Cells	Battery charger	Telecontrol Panel	3 kV DC UVR Base	3 kV DC Busbar Chamber		
4 kV DC Voltmeters				4 kA DC Ammeter				Wave Filter Equipment						
Substandard	Rectifier	% Error	Pos.Isolator	% Error	Indication	Mv	% Error	Harmonic	6 th	12 th	18 th	24 th		
1000					1000			Frequency	(300 hz)	(600 hz)	(900 hz)	(200 hz)		
2000					2000			Capacitance uF						
3000					3000			Inductance mH						
4000					4000			Coil Spacing mm						
Discharge Resistor:										kOhm		Fuse:		
Rectifier Protection														
Rectifier Pressure tested on Commissioning at 10.5 kV AC for 60 sec.								Passed/Failed						
Rectifier diode Monitoring				Tested by fibre optic simulation test										
Diode failure indication switch on with PCB trip to lockout with indication:								Yes/No						
Rectifier temperature control				Tested by fibre optic simulation test										
Fans switch on at 50 ° C:							Yes/ No		Primary Circuit Breaker trip on 50 ° C with indication:				Yes/No	
Fan failure trip Primary Circuit Breaker to lockout with indication :							Yes/No		Fan failure trip on at 70 amps load current @ _____ mVolt injection				Yes/No	
Rectifier Attenuation Protection:				PCB trips to lockout with indication by simulating triker pin fuse operation on both 1.5 kV and 3kV circuits								Yes/No		
3kV DC Undervoltage Protection				Tested by applied DC High Voltage										
Relay tested to pick up at _____ volts and drop out at _____ volts tripping HSCB's with indication.														
Battery undervoltage protection: Relay tested to pickup at _____ volts and dropout at _____ volts tripping PCB and HSCB's with indication and Lockout.														
Phase Fail Protection: Relay tested to trip PCB giving lockout and indication on simulation phase fail.										Yes / No				
Tested by: Name:			Signature:			Witnessed by: Name:			Signature:			Date:		


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Respondent's Signature

Date & Company Stamp


Rail Network Maintenance										BBF9296 Version2			
Signal and Distibution Substations Test Sheet Bus coupler VCB													
Frame Leakage Protection. Current Transformer Ratio and Mag Curves. Zone Relay intertripping. Insulation Resistance and Pressure Tests. Voltage Transformer and Indication tests. Battery Undervoltage Protection. Earth Resistance Measurement													
Substation:			Panel No:		Designation:			Routine :		Commissioning:			
Current Transformers		Zone 1	Zone 2	Zone 3	Frame Leakage		Make/Type of relay: _____ / _____			Tested by Pri/Sec/TW			
CT Ratio	Marked				Zones			Zone 1	Zone 2	Zone 3	Parallel paths test	Zone 1 to Zone 2	
	Measured				I set =							at Iset amps	Zone 1 to Zone 3
Mag curves		Volts	Amps	Amps	Amps	I trip (amps)						Zone 2 to Zone 3	
											Insulation Resistance	Zone 1 to Main Earth	
					Intertripping tests							Zone 2 to Main Earth	
					Zone 1 tripping			Zone 1	Zone 2	Zone 3		Zone 3 to Main Earth	
					Zone 2 tripping			Zone 1	Zone 2	Zone 3		Zone 1 to Zone 2	
					Zone 3 tripping			Zone 1	Zone 2	Zone 3		Zone 1 to Zone 3	
												Zone 2 to Zone 3	
Insulation Resistance Tests													
Megger tests at 2500 volts						HiPot test @ 18 kV for 60 sec (VT's out) V and KV Meter reading at 11kV							
	Red	Earth			Red	White		Red	White+Blue+Earth	mA	Red	White+Blue+Earth	
	White	Earth			White	Blue		White	Red+Blue+Earth	mA	White	Red+Blue+Earth	
	Blue	Earth			Blue	Red		Blue	White+Red+Earth	mA	Blue	White+Red+Earth	
Battery undervoltage protection:		Relay tested to pickup at _____ and dropout at _____ Volts tripping all VCB with indication and Lockout											
Earth Resistance test:		Resistance between spikes: _____ ohms			Resistance between spikes and Substation Earth _____ ohms								
General Remarks													
Tested by: Name _____ Signature: _____ Witnessed by: Name _____ Signature: _____ Date: _____													

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Rail Network Maintenance													BBF 9297 Version 2							
Signal and Distribution Substations Test Sheet Ring, Transmission Line and Transformer Feeder VCB's																				
Current Transformers: Ratio, Magnetisation curves and Polarity tests.																				
Protection Relays: Overload, Earth fault, Sensitive Earth Fault and Cable Protection. Transformer Protection																				
Substation:			Panel No:			Designation:			Routine :			Commissioning:								
Protection Class 10P10			Metering Class 0.5			SOLKOR/TRANSLAY Class X			LED Configuration											
Red White Blue			Red White Blue			Red White Blue														
CT Ratio	Marked				Marked				Marked				LED 1							
	Measured				Measured				Measured				LED 2							
Mag curves	Volts	Red A	White A	Blue A	Volts	Red A	White A	Blue A	Volts	Red A	White A	Blue A	LED 3							
													LED 4							
													LED 5							
													LED 6							
													LED 7							
													LED 8							
													LED 9							
Polarities																				
Protection Relays: Make/Type: _____ / _____																				
Overcurrent Elements			Tested by Pri/Sec/TW			Tested by Pri/Sec/TW			Output relay Configuration											
IDMT (NI)			I set=			T set=			Instantaneous			I set =			T set =					
Operating time in seconds	Multiple	Amps	R to W	R to B	B to W	Operating times in seconds	Multiple	Amps	R to W	R to B	B to W	Operating times in seconds	Multiple	Amps	R to E	W to E	B to E	B01		
	1.25 x Iset						4.00 x Iset							1.00 x Iset						B02
	2.00 x Iset						6.00 x Iset						1.25 x Iset					B03		
																		B04		
Earth Fault Elements			Tested by Pri/Sec/TW			Tested by Pri/Sec/TW			Tested by Pri/Sec/TW											
IDMT (NI)			I set=			T set=			Instantaneous			I set=			T set=			Sensitive Earth Fault		
Operating time in seconds	Multiple	Amps	R to E	W to E	B to E	Operating times in seconds	Multiple	Amps	R to E	W to E	B to E	Operating times in seconds	Multiple	Amps	R to E	W to E	B to E			
	1.25 x Iset						4.00 x Iset							1.00 x Iset						
	2.00 x Iset						6.00 x Iset						1.25 x Iset							
Feeder Protection			Solkor:Overall Fault setting			Tested by Pri/Sec/TW			Translay:Overall Fault setting			Tested by Pri/Sec/TW								
Pilot Cable			Phases	Expected %	Local sub Trip Amps	Local sub. m Amps	Distant sub. Trip Amps	Distant sub. m Amps	Fault	Current	Relay Output	Pilot mAmps								
Loop Resistance			T1+T2	Ohm	R-E	22			R-E											
Insulation Resistance			T1-E	MOhm	W-E	27.5			W-E											
			T2-E	MOhm	B-E	37			B-E											
			T1-T2	MOhm	R-W	110			R-W											
					W-B	110			W-B											
		B-R	55			B-R														
			Stability test by Primary injection Red to White in Local sub. Short circuit in Distant sub.																	
			Current injected:			Amps	mAmps	pilot wire	conf. to zero	Yes	No									
Transformer Protection			Transformer No: _____									Buccholtz: Relay trips VCB giving Lockout & Indication with _____ cc of air			Oil Over temperature: Relay trips VCB giving Trip & Indication at _____ °C dial setting.					
												Winding Over temperature: Relay trips VCB giving lockout & Indication at _____ °C dial setting								
Tested by: Name			Signature:			Witnessed by: Name			Signature:			Date:								


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Rail Network Maintenance											BBF8995 Version 2												
25 kV AC Traction Substations Test Sheet: Main Transformer Protection. Current transformers:Ratio and Magnetisation Curves Protection Relays Main Overload- and Restricted/Duo Biased Earth Fault Protection. Buchholtz, Overtemperature & PRD. Battery Undervoltage Relay. Earth Resistance measurement.																							
Substation: _____ Single- / A- / B Unit Routine : _____ Commissioning: _____																							
											Main Transformer InL		Primary: A	Secondary	A								
HV Overcurrent		LV Overcurrent		HV REF/Duo Bias Ph 1		HV REF/Duo Bias Ph 2		LV REF/Duo Bias Ph 1		LV REF/Duo Bias Ph 2		Winding Overtemp											
Magnetization curves																							
HV Overcurrent		LV Overcurrent		HV Restr. E/Fault Ph 1		HV Restr. E/Fault Ph 2		LV Restr. E/F Ph 1		LV Rest. E/F Ph 2		Winding Overtemp											
Volts		m Amps		Volts		mAmps		Volts		mAmps		Volts											
Overcurrent Relay elements				Relay makes and types				Overcurrent:				Restricted E/F:		Duo Biased:									
HV IDMTL (NI)		Iset= xIn		Tset=		HV Instantaneous		Iset= xIn		T set= 0		Restricted Earth Fault V/I set =											
Operating time		Multiple		Amps		Specified		Actual		Operating time		Multiple		Amps		Specified		Actual		Operating voltage/current		Phase to I	
in seconds		1.25 x Iset								in seconds		4.00 x Iset								HV Secondary voltage/current			
		2.00 X Iset										6.00 x Iset								LV Secondary voltage/current			
LV IDMTL (NI)		Iset= xIn		Tset=		LV Instantaneous		Iset= xIn		T set=		Duo Biased Fault I set = LV set =											
Operating time		Multiple		Amps		Specified		Actual		Operating time		Multiple		Amps		Specified		Actual		Operating current		Phase to N	
in seconds		1.25 x Iset								in seconds		4.00 x Iset								HV secondary injected current			
		2.00 X Iset										6.00 x Iset								LV secondary injected current			
Trip PCB giving indication:				Yes/No				Trip PCB giving indication:				Yes/No				Trip PCB to lockout indication:				Yes/No			
Main Transformer Protection																							
Buchholtz: Relay trips PCB giving Lockout & Indication with _____ cc of air. Pressure Relief Device: Signal on trip PCB giving Lockout & Indication. Yes/No																							
Oil Over temp: Relay trips PCB giving Indication at _____ °C dial setting. Winding Over temp: Relay trips PCB giving Lockout & Indication at _____ °C dial setting.																							
Battery undervoltage protection: Relay tested to pickup at _____ and dropout at _____ Volts tripping PCB with indication and Lockout																							
Phase Fail Protection: Relay tested to trip PCB giving lockout and indication on simulated phase fail. Yes / No																							
Earth resistance test: Resistance between spikes= _____ ohms Resistance from spikes to main earth= _____ ohms																							
Tested by: Name:				Signature:				Witnessed by Name:				Signature:				Date:							

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Rail Network Maintenance								BBF8996 Version 2							
25 kV AC Traction Substations Test Sheet Incomer and Track Feeder VCB's: Current Transformer Ratio and Mag. curves. Battery Undervoltage Relays. Protection Relays: IDMT, Reverse power, Thermal Overload and Distance Protection.															
Substation:				Single- / A- / B Unit		Routine :		Commissioning:							
Panel No															
Designation		Incomer													
CT Winding		P1/1S		P1/1S Dist. Prot		P1/2S Therm O/load		P1/1S Dist. Prot		P1/2S Therm O/load					
CT Ratio Marked		1200/1		1200/1		1200/1		1200/1		1200/1					
CT Ratio Measured															
Magnetisation curves		Volts	Amps		Volts	Amps	Volts	Amps	Volts	Amps	Volts	Amps			
Time delay Overcurrent Protection Relays		IDMTL Relay:				Thermal Relay:				Thermal Relay :					
		(NI) I _{set} = xIn		t _{set} =		I _{th} >set= xIn		Tset =		I _{th} >set= xIn		Tset =			
Operating time in seconds to trip VCB's with indication.		Multiple	Amps	Specified	Actual	Multiple	Amps	Specified	Actual	Multiple	Amps	Specified	Actual		
		2 x Iset				2.00 x Iset				2.00 x Iset					
Instantaneous Overcurrent Protection Relays:		IDMT Relay:				(1)IDMT				(1)IDMT					
		(NI) I _{inst} set= xIn		t _{set} =		(2)Backup Relay:		(1)IDMTset= xIn		t _{set} =		(1)IDMTset= xIn		t _{set} =	
Operating time in seconds to trip VCB's with indication.		Multiple	Amps	Specified	Actual	Multiple	Amps	Specified	Actual	Multiple	Amps	Specified	Actual		
		4 x Iset				(1)2 x Iset				(1)2 x Iset					
						(2)4 x Iset				(2)4 x Iset					
Reverse power and Distance Protection Relays: Make & Type:		Reverse power:				Distance Protection:				Distance Protection:					
		Current direction		Tripping Amps		Zone	R	X	Specified	Operating	Zone	R	X	Specified	Operating
Operating values to trip VCB's with indication.		Forward				1					1				
		Reverse				2					2				
		Voltage applied				3					3				
						4					4				
						5					5				
Battery undervoltage protection relays		Set to pickup at _____ and dropout at _____ volts tripping VCB to lockout				Set to pickup at _____ and dropout at _____ volts tripping VCB to lockout				Set to pickup at _____ and dropout at _____ volts tripping VCB to lockout					
Tested by: Name:		Signature:				Witnessed by: Name:				Signature:				Date:	

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Rail Network Maintenance															BBF8997 Version 2							
25 kV AC Traction Substations Test Sheet: Line Feeder VCB's																						
Protecta Relay Setting Calculation Sheet																						
Substation: Single- / A- / B Unit										Routine : Commissioning:												
Impedance Characteristic Parameters																						
Feeding Mode 1			Total line length				Line Resistance (Ω)			Line Reactance(Ω)			Line Impedance (Ω)		0.00		Line Angle°		#DIV/0!			
Feeding Mode 2			Total line length				Line Resistance (Ω)			Line Reactance(Ω)			Line Impedance (Ω)		0.00		Line Angle°		#DIV/0!			
Zones	Direction	Rp	Xp	Rs	Xs	Load Cut off Angle (X /	R/X	U (%) Setting	U (%) To Relay	R (mΩ) Setting	R (mΩ) To Relay	X (mΩ) Setting	X (mΩ) To Relay	R/X (%) Setting	R/X (%) To Relay	X/R (%) Setting	X/R (%) To Relay	TD (ms) Setting	TD (ms) To Relay			
1	F (0)	0.00	0.00	0.00	0.00	53.13	26.57	35	35	0	0	0	0	0	0	0	0	0	0			
2	F (0 or 2)	0.00	0.00	0.00	0.00	53.13	26.57			0	0	0	0	0	0	0	0	0	0			
3	F (0 or 2)	0.00	0.00	0.00	0.00	53.13	26.57			0	0	0	0	0	0	0	0	0	0			
4	F (0 or 2)	0.00	0.00	0.00	0.00	53.13	26.57			0	0	0	0	0	0	0	0	0	0			
5	R (1 or 3)	0.00	0.00	0.00	0.00	26.57	26.57			0	0	0	0	0	0	0	0	0	0			
Overhead line Parameters																						
Xn (x10xCuXCl)		0.00		Length		CT Primary nominal		1200		VT Primary nominal		25000		VT Supply MCB Setting		Low		Low gas input latched		No		
Thermal Overload Parameters																						
Thermal O/C Trip setting		213%		Thermal Pre Alarm setting		150%		Line Nominal Current		100%		Line Temp Rise		40 °C		Time Constant		207 sec				
Over-and Undervoltage parameters																						
Undervoltage setting U< (/Un (VT)) =				76%		Time Delay		60000 sec		Overvoltage setting U> (/Un (VT)) =				115%		Time Delay		60000sec.				
IDMT Parameters																						
IDMT Type		0		Ibasic/CT nom*100		80%		IDMT M Constant		2		Circuit breaker parameters										
												t (CB failure)		60000ms		t (CB discrepancy)		60000ms		t Coil supervision		
Autoreclosure function parameters					Equation time parameters					Miscellaneous Parameters					Communication parameters							
Z1< stage initiates auto reclosure		Yes			1. User equation timer delay		2000 ms			Disable op. messages on LCD		No			Station code							
Z2< stage initiates auto reclosure		Yes			1. User time mode		Resetting			Disable trip and close coil test		No			Code							
Z3< stage initiates auto reclosure		Yes			2. User equation timer delay		20 ms			2nd Trip coil involved in coiltes		No			Baud rate		9600					
Z4< stage initiates auto reclosure		No			2. User time mode		Resetting			1. LED latched		No			Fiber opt. loop		0					
IDMT initiates auto reclosure		No			3. User equation timer delay		20 s			2. LED latched		No			Com. Port		opto					
Autoreclosure disabled to ext.reset		No			3. User time mode		Resetting			3. LED latched		No			Com. Port		RS232					
Manual close input generates close coil		Yes									4. LED latched		No									
Dead time 1		2 s									5. LED latched		No									
Dead time 2		0 s									6. LED latched		No									
Close command duration		500 ms																				
Manual trip and protection min.duration		500 ms																				
Reclaim time		10000 ms																				
Calculated by:					Settings done by:					Tested by:					Witnessed by:		Date:					

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Rail Network Maintenance						BBF8998 Version 2	
AC Traction Supply Substations Test Sheet							
Primary Circuit Breakers: Contact Resistance and Operational Timing tests. Secondary Circuit Breakers(VCB's): Contact Resistance and Operational Timing tests.							
Substation:		Single- / A- / B unit		Commissioning:		Routine:	
Primary Circuit Breakers							
Contact Resistance Test		Red		White		Blue	
Test current applied: 100 Amps DC	mVolt Specified	3.5 ± 0.3mV		3.5 ± 0.3mV		3.5 ± 0.3mV	
	mVolt Measured						
Operational Timing tests							
Make of Test Instrument applied: _____ Operating Time mSec		Red		White		Blue	
	Closing time Specified	56 ± 5mS		56 ± 5mS		56 ± 5mS	
	Closing time Actual						
	Opening time Specified	33 ± 3mS		33 ± 3mS		33 ± 3mS	
	Opening time Actual						
Secondary Circuit Breakers							
Contact Resistance Test		Incomer VCB No.:		Feeder VCB No.:		Feeder VCB No.:	
Test current applied: 100 Amps DC	Contact No	1 2		1 2		1 2	
	mVolt Specified	< 6 mV		< 6 mV		< 6 mV	
	mVolt Measured						
Operational Timing tests							
Make of Test Instrument applied: _____ Operating Time mSec		Incomer VCB No.:		Feeder VCB No.:		Feeder VCB No.:	
	Contact No	1 2		1 2		1 2	
	Closing time Specified	60 ± 5mS		60 ± 5mS		60 ± 5mS	
	Closing time Actual						
	Opening time Specified	35 ± 3mS		35 ± 3mS		35 ± 3mS	
	Opening time Actual						
Tested by: Name:		Signature:		Witness by: Name:		Signature:	
						Date:	

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Rail Network Maintenance				BBF8998 Version 2	
3 kV DC Traction Supply Substations Test Sheet Primary Circuit Breakers: Contact Resistance and Operational Timing tests. Secondary Circuit Breakers(HSCB's): Contact Resistance and Operational Timing tests.					
Substation:		Commissioning:	Routine:		
Primary Circuit Breakers					
Contact Resistance Test			Red	White	Blue
Test current applied: 100 Amps DC		mVolt Specified	3.5 ± 0.3mV	3.5 ± 0.3mV	3.5 ± 0.3mV
		mVolt Measured			
Operational Timing tests					
Make of Test Instrument applied:			Red	White	Blue
Operating Time mSec		Closing time Specified	56 ± 5mS	56 ± 5mS	56 ± 5mS
		Closing time Actual			
		Opening time Specified	33 ± 3mS	33 ± 3mS	33 ± 3mS
		Opening time Actual			
Secondary Circuit Breakers					
Contact Resistance Test					
Test current applied: 100 Amps DC		HSCB No			
		mVolt Specified			
		mVolt Measured			
Operational Timing tests					
		HSCB No			
		Closing time Specified			
		Closing time Actual			
		Opening time Specified			
		Opening time Actual			
Tested by: Name:		Signature:	Witnessed by: Name:	Signature:	Date:

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