TRANSNET

freight rail

Transnet Freight Rail a Division of Transnet SOC Ltd. (Reg. No. 1990/000900/30), invites all interested parties to respond to a request for quotation (RFQ) as indicated below:

All tenders should be submitted on the appropriate tender forms in a sealed envelope. The envelope must indicate the RFQ number, full description and closing date and should be deposited in the tender box before 10h00 on the closing date of the tender/s.

If delivered by hand, the Tender submissions must be addressed to Supply Chain Services, Admin Support, Tender Box, Office No. 2, Real Estate Management Building, Austen Street, Beaconsfield, Kimberley.

ISSUE OF DOCUMENTS - RFQ document will only be available from **17 July 2015** until ***28 July 2015 [15:00]*** at Transnet Freight Rail, Supply Chain Services, Office No. 2, Real Estate Management Building, Austen Street, Beaconsfield, Kimberley. **Please note that RFQ document can be e-mailed or physically collected on request / arrangement prior to cut off time from Ms. Leonie Visagie.**

Tenders can be viewed on the website (http://www.transnetfreightrail.tfr.net/Supplier/Page.aspx

***Tenderers are advised to confirm their attendance beforehand with Leonie Visagie Tel: 053 838 3119 or E-mail: Leonie.Visagie@transnet.net respectively.**

RFQ NUMBER	**KBY/53698**
SCOPE OF WORK	**Supply and install post type current transformers at two (2) Substations for a period of one (1) month.**
REQUIRED AT	**Content (Beaconsfield-Transcape line) and Lime Acres (Kamfersdam-Hotazel line)**
	A COMPULSORY INFORMATION MEETING WILL BE HELD AT:
	Real Estate Management Building, Ground Floor Boardroom, Austen Street, Beaconsfield, Kimberley
BRIEFING DATE	**DATE: 29/07/2015 at 09:00 (Companies not attending the compulsory tender briefing / site meeting will be overlooked during the award process.)**
TENDER FEE	**NO CHARGE**
COMPULSORY	**Safety boots, reflective jackets and site visit to Content and Lime Acres after the meeting. CIDB grading of at least 1EE.**
CLOSING DATE	**Tuesday, 04 August 2015 at Kimberley**
CLOSING TIME	**10:00**
For technical queries contact:	Mr. Thabisho Moeng, Tel: 053-838 3385 / 073 661 6878 OR Mr. Thabang Tutubala, Tel: 053-838 3278 / 083 268 6852
	Ref. HJC

Transnet Freight Rail urges Clients & Suppliers to report fraud/corruption at Transnet to TIPOFFS ANONYMOUS: 0800 003 056

TRANSNET

freight rail

A Division of Transnet SOC Limited Registration number 1990/00900/30

REQUEST FOR QUOTATION

KBY/53698
KBC_18114

Senior Buyer
Supply Chain Services
TRANSNET FREIGHT RAIL
Austen Street
KIMBERLEY
8301

TRANSNET

Transnet Freight Rail, a division of

TRANSNET SOC LTD

Registration Number 1990/000900/30

[hereinafter referred to as **Transnet**]

REQUEST FOR QUOTATION [RFQ] No KBY/53698

FOR THE PROVISION OF: **SUPPLY AND INSTALL POST TYPE CURRENT TRANSFORMERS AT 2 SUBSTATIONS..**

FOR DELIVERY TO: **ELECTRICAL KIMBERLEY NORTH**

ISSUE DATE:	**17 JULY 2015**
CLOSING DATE:	**04 AUGUST 2015**
CLOSING TIME:	**10:00**
SITE MEETING:	**29 JULY 2015 AT 09:00**
VENUE:	**IN THE BOARDROOM OF THE REAL ESTATE MANAGEMENT BUILDING, AUSTEN STREET, BEACONSFIELD.**

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:	Tender Box
CLOSING VENUE:	Transnet Freight Rail, Real Estate Management Building, Office no. 2, Austen Street, Beaconsfield

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 the **80/20** system shall be applicable.

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.

3 Communication

Respondents are warned that a response will be liable for disqualification should any attempt be made by any 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: Herman Conradie Email: Herman.Conradie@transnet.net

Telephone: 053-8383483

Respondents may also, at any time after the closing date of the RFQ, communicate with the Chief Administrator at the Admin Support Office on any matter relating to its RFQ response:

Telephone 053-8383341 Email: Maggie.Pain@transnet.net

4 Legal Compliance

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

5 Changes to Quotations

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

6 Pricing

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

7 Prices Subject to Confirmation

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

8 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.

9 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 order/s 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 ; or
- 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.

Respondent's Signature

Date & Company Stamp

Safety Arrangements – Act 85 of 1993 and Regulations E4E

SAFETY ARRANGEMENTS AND PROCEDURAL COMPLIANCE WITH THE OCCUPATIONAL HEALTH AND SAFETY ACT (ACT 85 OF 1993) AND APPLICABLE REGULATIONS

1 General

1.1 The Contractor and Transnet Limited (hereinafter referred to as "Transnet") are individual employers, each in its own right, with their respective duties and obligations set out in the Occupational Health and Safety Act, Act 85 of 1993 (the Act) and applicable Regulations.

1.2 The Contractor accepts, in terms of the General Conditions of Contract and in terms of the Act, his obligations as an employer in respect of all persons in his employ, other persons on the premises or the Site or place of work or on the work to be executed by him, and under his control. He shall, before commencement with the execution of the contract work, comply with the provisions set out in the Act, and shall implement and maintain a Health and Safety Plan as described in the Construction Regulations, 2003 and as approved by Transnet, on the Site and place of work for the duration of the Contract.

1.3 The Contractor accepts his obligation to complying fully with the Act and applicable Regulations notwithstanding the omission of some of the provisions of the Act and the Regulations from this document.

1.4 Transnet accepts, in terms of the Act, its obligations as an employer of its own employees working on or associated with the site or place of work, and the Contractor and Technical Officer or his deputy shall at all times, co-operate in respect of the health and safety management of the site, and shall agree on the practical arrangements and procedures to be implemented and maintained during execution of the Works.

1.5 In the event of any discrepancies between any legislation and this specification, the applicable legislation will take precedence.

2 Definitions

2.1 In this Specification any word or expression to which a meaning has been assigned in the Construction Regulations, shall have the meaning so assigned to it, unless the context otherwise indicates: -

2.2 The work included in this Contract shall for the purposes of compliance with the Act be deemed to be "**Construction Work**", which, in terms of the Construction Regulations, 2003 means any work in connection with: -

(a) the erection, maintenance, alteration, renovation, repair, demolition or dismantling of or addition to a building or any similar structure;

(b) the installation, erection, dismantling or maintenance of fixed plant where such work includes the risk of a person falling;

(c) the construction, maintenance, demolition or dismantling of any bridge, dam, canal, road, railway, runway, sewer or water reticulation system or any similar civil engineering structure; or

(d) the moving of earth, clearing of land, the making of an excavation, piling, or any similar type of work;

2.3 **"competent person"** in relation to construction work, means any person having the knowledge, training and experience specific to the work or task being performed: Provided that where appropriate qualifications and training are registered as per the South African Qualifications Authority Act, 1995 these qualifications and training shall be deemed to be the required qualifications and training;

2.4 **"contractor"** means principal contractor and "subcontractor" means contractor as defined by the Construction Regulations, 2003.

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2.5 **"fall protection plan"** means a documented plan, of all risks relating to working from an elevated position, considering the nature of work undertaken, and setting out the procedures and methods applied to eliminate the risk;

2.6 **"health and safety file"** means a file, or other record in permanent form, containing the information required to be kept on site in accordance with the Act and applicable Regulations;

2.7 **"Health and Safety Plan "** means a documented plan which addresses the hazards identified and include safe work procedures to mitigate, reduce or control the hazards identified;

2.8 **"Risk Assessment"** means a programme to determine any risk associated with any hazard at a construction site, in order to identify the steps needed to be taken to remove, reduce or control such hazard;

2.9 **"the Act"** means the Occupational Health and Safety Act No. 85 of 1993.

3 Procedural Compliance

3.1 The Contractor who intends to carry out any construction work shall, before carrying out such work, notify the Provincial Director in writing if the construction work:

(a) includes the demolition of a structure exceeding a height of 3 meters; or

(b) includes the use of explosives to perform construction work; or

(c) includes the dismantling of fixed plant at a height greater than 3m,and shall also notify the Provincial Director in writing when the construction work exceeds 30 days or will involve more than 300 person days of construction work and if the construction work:-

(d) includes excavation work deeper than 1m; or

(e) Includes working at a height greater than 3 meters above ground or a landing.

The notification to the Provincial Director shall be on a form similar to Annexure A of the Construction Regulations, 2003, also shown in Annexure 1 of this Specification. The Contractor shall ensure that a copy of the completed notification form is kept on site for inspection by an inspector, Technical Officer or employee.

The Contractor shall, in accordance with the Act and applicable Regulations, make all the necessary appointments of competent persons in writing on a form similar to Annexure 2 of this Specification and deliver copies thereof to the Technical Officer. Copies should also be retained on the health and safety file.

Subcontractors shall also make the above written appointments and the Contractor shall deliver copies thereof to the Technical Officer.

In the case of a self-employed Contractor or any subcontractor who has the appropriate competencies and supervises the work himself, the appointment of a construction supervisor in terms of regulation 6.1 of the Construction Regulations, 2003 will not be necessary. The Contractor shall in such a case execute and sign a declaration, as in Annexure 3, by which he personally undertakes the duties and obligations of the "Chief Executive Officer" in terms of section 16(1) of the Act.

The Contractor shall, before commencing any work, obtain from the Technical Officer an access certificate as in Annexure 4 executed and signed by him, permitting and limiting access to the designated site or place of work by the Contractor and any subcontractors under his control.

Procedural compliance with Act and Regulations, as above, shall also apply to any subcontractors as employers in their own right. The Contractor shall furnish the Technical Officer with full particulars of such subcontractors and shall ensure that they comply with the Act and Regulations and Protekon's safety requirements and procedures.

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4 Special Permits

Where special permits are required before work may be carried out such as for hot work, isolation permits, work permits and occupations, the Contractor shall apply to the Technical Officer or the relevant authority for such permits to be issued. The Contractor shall strictly comply with the conditions and requirements pertaining to the issue of such permits.

5 Health and Safety Programme

5.1 The Tenderer shall, with his tender, submit a Health and Safety Programme setting out the practical arrangements and procedures to be implemented by him to ensure compliance by him with the Act and Regulations and particularly in respect of: -

(i) The provision, as far as is reasonably practical, of a working environment that is safe and without risk to the health of his employees and subcontractors in terms of section 8 of the Act;

(ii) the execution of the contract work in such a manner as to ensure in terms of section 9 of the Act that persons other than those in the Contractor's employment, who may be directly affected by the contract work are not thereby exposed to hazards to their health and safety;

(iii) ensuring, as far as is reasonably practical, in terms of section 37 of the Act that no employee or subcontractor of the Contractor does or omits to do any act which would be an offence for the Contractor to do or omit to do.

5.2 The Contractor's Health and Safety Programme shall be based on a risk assessment in respect of the hazards to health and safety of his employees and other persons under his control that are associated with or directly affected by the Contractor's activities in performing the contract work and shall establish precautionary measures as are reasonable and practical in protecting the safety and health of such employees and persons.

5.3 The Contractor shall cause a risk assessment contemplated in clause 5.2 above to be performed by a competent person, appointed in writing, before commencement of any Construction Work and reviewed during construction. The Risk Assessments shall form part of the Health and Safety programme to be applied on the site and shall include at least the following:

(a) The identification of the risks and hazards that persons may be exposed to;

(b) the analysis and evaluation of the hazards identified;

(c) a documented Health and Safety Plan, including safe work procedures to mitigate, reduce or control the risks identified;

(d) a monitoring and review plan.

5.4 The Health and Safety Plan shall include full particulars in respect of: -

(a) The safety management structure to be instituted on site or place of work and the names of the Contractor's health and safety representatives and members of safety committees where applicable;

(b) the safe working methods and procedures to be implemented to ensure the work is performed in compliance with the Act and Regulations;

(c) the safety equipment, devices and clothing to be made available by the Contractor to his employees;

(d) the site access control measures pertaining to health and safety to be implemented;

(e) the arrangements in respect of communication of health and safety related matters and incidents between the Contractor, his employees, subcontractors and the Technical Officer with particular reference to the reporting of incidents in compliance with Section 24 and General Administrative Regulation 8 of the Act and with the pertinent clause of the General Conditions of Contract forming part of the Contract and

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(f) the introduction of control measures for ensuring that the Safety Plan is maintained and monitored for the duration of the Contract.

5.5 The Health and Safety programme shall be subject to the Technical Officer's approval and he may, in consultation with the Contractor, order that additional and/or supplementary practical arrangements and procedures be implemented and maintained by the Contractor or that different working methods or safety equipment be used or safety clothes be issued which, in the Technical Officer's opinion, are necessary to ensure full compliance by the Contractor with his obligations as an employer in terms of the Act and Regulations. The Technical Officer or his deputy shall be allowed to attend meetings of the Contractor's safety committee as an observer.

5.6 The Contractor shall take reasonable steps to ensure that each subcontractor's Health and Safety Plan is implemented and maintained on the construction site: Provided that the steps taken shall include periodic audits at intervals mutually agreed to between them, but at least once every month.

5.7 The Contractor shall stop any subcontractor from executing any construction work, which is not in accordance with the Contractor's, and/or subcontractor's Health and Safety Plan for the site or which poses a threat to the health and safety of persons.

5.8 The Contractor shall ensure that a copy of the Health and Safety Plan is available on site for inspection by an inspector, Technical Officer, agent, subcontractor, employee, registered employee organization, health and safety representative or any member of the health and safety committee.

5.9 The Contractor shall consult with the health and safety committee or, if no health and safety committee exists, with a representative group of employees, on the development, monitoring and review of the Risk Assessment.

5.10 The Contractor shall ensure that all employees under his control are informed, instructed and trained by a competent person regarding any hazard and the related work procedures before any work commences, and thereafter at such times as may be determined in the Risk Assessment.

5.11 The Contractor shall ensure that all subcontractors are informed regarding any hazard as stipulated in the Risk Assessment before any work commences, and thereafter at such times as may be determined in the Risk Assessment.

5.12 The Contractor shall ensure that all visitors to a construction site undergoes health and safety induction pertaining to the hazards prevalent on the site and shall be provided with the necessary personal protective equipment.

6 Fall Protection Plan

6.1 In the event of the risk and hazard identification, as required in terms of clause 5.3 of this Specification, revealing risks relating to working from an elevated position the contractor shall cause the designation of a competent person, responsible for the preparation of a fall protection plan;

6.2 The Contractor shall implement, maintain and monitor the fall protection plan for the duration of Contract. The Contractor shall also take such steps to ensure the continued adherence to the fall protection plan.

6.3 The fall protection plan shall include:-

(a) A Risk Assessment of all work carried out from an elevated position;

(b) the procedures and methods to address all the identified risks per location;

(c) the evaluation of the employees physical and psychological fitness necessary to work at elevated positions;

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(d) the training of employees working from elevated positions; and

(e) the procedure addressing the inspection, testing and maintenance of all fall protection equipment.

7 Hazards and Potential Hazardous Situations

The Contractor and the Technical Officer shall immediately notify one another of any hazardous or potentially hazardous situations which may arise during performance of the Contract by the Contractor or any subcontractor and, in particular, of such hazards as may be caused by the design, execution and/or location and any other aspect pertaining to the contract work.

8 Health and Safety File

8.1 The Contractor shall ensure that a health and safety file is opened and kept on site and shall include all documentation required as per the Act and applicable regulations, and made available to an inspector, the Technical Officer, or subcontractor upon request.

8.2 The Contractor shall ensure that a copy of the both his Health and Safety Plan as well as any subcontractor's Health and Safety Plan is available on request to an employee, inspector, contractor or the Technical Officer.

8.3 The Contractor shall hand over a consolidated health and safety file to the Technical Officer upon completion of the Construction Work and shall in addition to documentation mentioned in the Act and applicable Regulations include a record of all drawings, designs, materials used and other similar information concerning the completed structure.

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Railway Lines and High Voltage Equipment E7/1

E7/1 (July 1998)

SPECIFICATION FOR WORKS ON, OVER, UNDER OR ADJACENT TO RAILWAY LINES AND NEAR HIGH VOLTAGE EQUIPMENT

(This Specification shall be used in Transnet Contracts)

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Date & Company Stamp

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1 DEFINITIONS

The following definitions shall apply :

Authorised Person. A person whether an employee of Transnet or not, who has been specially authorised to undertake specific duties in terms of Transnet's publication SAFETY INSTRUCTIONS: HIGH-VOLTAGE ELECTRICAL EQUIPMENT, and who holds a certificate or letter of authority to that effect.

Barrier. Any device designed to restrict access to "live" high-voltage electrical equipment.

Bond. A short conductor installed to provide electrical continuity.

Contractor. Any person or organisation appointed by Transnet to carry out work on its behalf.

Dead. Isolated and earthed.

Electrical Officer (Contracts). The person appointed in writing by the responsible Electrical Engineer in Transnet as the person who shall be consulted by the Contractor in all electrical matters to ensure that adequate safety precautions are taken by the Contractor.

Executive Officer. The person appointed by Transnet from time to time as the Executive Officer to act according to the rights and powers held by and obligations placed upon him in terms of the Contract.

High-Voltage. A voltage normally exceeding 1 000 volts.

Live. A conductor is said to be "live" when it is at a potential different from that of the earth or any other conductor of the system of which it forms a part.

Near. To be in such a position that a person's body or the tools he is using or any equipment he is handling may come within 3 metres of live exposed high-voltage electrical equipment.

Occupation. An authorisation granted by Transnet for work to be carried out under specified conditions on, over under or adjacent to railway lines.

Occupation Between Trains. An occupation during an interval between successive trains.

Project Manager. The person or juristic person appointed by Transnet from time to time as the Project Manager, to administer the Contract according to the powers and rights held by and obligations placed upon him in terms of the Contract.

Responsible Representative. The responsible person in charge, appointed by a contractor, who has undergone specific training (and holds a certificate) to supervise staff under his control to work on, over, under or adjacent to railway lines and in the vicinity of high-voltage electrical equipment.

Technical Officer. The person or juristic person appointed by Transnet from time to time as the Technical Officer, to administer the Contractor's performance and execution of the Works according to the powers and rights held by and obligations placed upon the Technical Officer in terms of the Contract.

Total Occupation. An occupation for a period when trains are not to traverse the section of line covered by the occupation.

Work on. Work undertaken on or so close to the equipment that the specified working clearances to the live equipment cannot be maintained.

Work Permit. A combined written application and authority to proceed with work on or near dead electrical equipment.

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PART A - GENERAL SPECIFICATION

2. AUTHORITY OF OFFICERS OF TRANSNET

2.1 The Contractor shall co-operate with the officers of Transnet and shall comply with all instructions issued and restrictions imposed with respect to the Works which bear on the existence and operation of Transnet's railway lines and high-voltage equipment.

2.2 Without limiting the generality of the provisions of 2.1, any duly authorised representative of Transnet, having identified himself, may stop the work if, in his opinion, the safe passage of trains or the safety of Transnet assets or any person is affected. **CONSIDERATIONS OF SAFETY SHALL TAKE PRECEDENCE OVER ALL OTHER CONSIDERATIONS.**

3. CONTRACTOR'S REPRESENTATIVES

3.1 The Contractor shall nominate Responsible Representatives of whom at least one shall be available at any hour for call-out in cases of emergency. The Contractor shall provide the Technical Officer with the names, addresses and telephone numbers of the representatives.

3.2 The Contractor guarantees that he has satisfied himself that the Responsible Representative is fully conversant with this specification and that he shall comply with all his obligations in respect thereof.

4. OCCUPATIONS AND WORK PERMITS

4.1 Work to be done during total occupation or during an occupation between trains or under a work permit shall be done in a manner decided by the Technical Officer and at times to suit Transnet requirements.

4.2 The Contractor shall organise the Works in a manner, which will minimise the number and duration of occupations and work permits required.

4.3 Transnet will not be liable for any financial or other loss suffered by the Contractor arising from his failure to complete any work scheduled during the period of an occupation or work permit.

4.4 The Contractor shall submit to the Technical Officer, in writing, requests for occupations or work permits together with details of the work to be undertaken, at least 14 days before they are required. Transnet does not undertake to grant an occupation or work permit for any particular date, time or duration.

4.5 Transnet reserves the right to cancel any occupation or work permit at any time before or during the period of occupation or work permit. If, due to cancellation or change in date or time, the Contractor is not permitted to start work under conditions of total occupation or work permit at the time arranged, all costs caused by the cancellation shall be born by the Contractor except as provided for in clauses 4.6 to 4.8.

4.6 When the Contractor is notified less than 2 hours before the scheduled starting time that the occupation or work permit is cancelled, he may claim reimbursement of his direct financial losses caused by the loss of working time up to the time his labour and plant are employed on other work, but not exceeding the period of the cancelled occupation or work permit.

4.7 When the Contractor is notified less than 2 hours before the schedule starting time, or during an occupation or work permit, that the duration of the occupation or work permit is reduced, he may claim reimbursement of his direct financial losses caused by the loss of working time due to the reduced duration of the occupation or work permit.

4.8 Reimbursement the Contractor for any loss of working time in terms of 4.6 and 4.7, shall be subject to his claims being submitted within 14 days of the event with full details of labour and plant involved, and provided that the Technical Officer certifies that no other work on which the labour and plant could be employed was immediately available.

4.9 Before starting any work for which an occupation has been arranged, the Contractor shall obtain from the Technical Officer written confirmation of the date, time and duration of the occupation.

4.10 Before starting any work for which a work permit has been arranged, the Responsible Representative shall read and sign portion C of form No. T.1276 signifying that he is aware of the limits within which work may be undertaken. After the work for which the permit was granted has been completed, or when the work permit is due to be terminated, or if the permit is cancelled after the start, the same person who signed portion C shall sign portion D of the T.1276 form, thereby acknowledging that he is aware that the electrical equipment is to be made "live". The Contractor shall advise all his workmen accordingly.

5. **SPEED RESTRICTIONS AND PROTECTION**

5.1 When speed restrictions are imposed by Transnet because of the Contractor's activities, the Contractor shall organise and carry out his work so as to permit the removal of the restrictions as soon as possible.

5.2 When the Technical Officer considers protection to be necessary the Contractor shall, unless otherwise agreed, provide all protection including flagmen, other personnel and all equipment for the protection of Transnet's and the Contractor's personnel and assets, the public and including trains. Transnet will provide training free of charge of the Contractor's flagmen and other personnel performing protection duties. The Contractor shall consult with the Technical Officer, whenever he considers that protection will be necessary, taking into account the minimum permissible clearances set out in appendixes 1 to 4.

5.3 The Contractor shall appoint a Responsible Representative to receive and transmit any instruction, which may be given by Transnet personnel providing protection.

6. **ROADS ON TRANSNET PROPERTY**

The provision of clause 25 of the E.5, General Conditions of Contract, or clause 23 of the E.5 (MW), General Conditions of Contract for Maintenance Works, shall apply to the use of existing roads on Transnet's property.

7. **CLEARANCES**

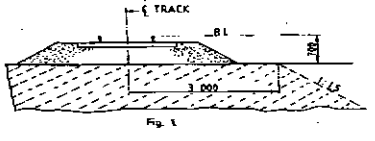
7.1 No temporary works shall encroach on the appropriate minimum clearances set out in Annexure 1 BE97-01 Sheets 1,2, 3 and 5 of 5.

8. **STACKING OF MATERIAL**

8.1 The Contractor shall not stack any material closer than 3 m from the centre line of any railway line without prior approval of the Technical Officer.

9. **EXCAVATION, SHORING, DEWATERING AND DRAINAGE**

9.1 Unless otherwise approved by the Technical Officer any excavation adjacent to a railway line shall not encroach on the hatched area shown in Figure 1.



Respondent's Signature

Date & Company Stamp

9.2 The Contractor shall provide at his own cost any shoring, dewatering or drainage of any excavation unless otherwise stipulated elsewhere in the Contract.

9.3 Where required by the Technical Officer, drawings of shoring for any excavation under or adjacent to a railway line shall be submitted and permission to proceed obtained, before the excavation is commenced.

9.4 The Contractor shall prevent ingress of water to the excavation but where water does enter, he shall dispose of it as directed by the Technical Officer.

9.5 The Contractor shall not block, obstruct or damage any existing drains either above or below ground level unless he has made adequate prior arrangements to deal with drainage.

10. **FALSEWORK FOR STRUCTURES**

10.1 Drawings of falsework for the construction of any structure over, under or adjacent to any railway line shall be submitted to the Technical Officer and his permission to proceed obtained before the falsework is erected. Each drawing shall be given a title and a distinguishing number and shall be signed by a registered professional engineer certifying that he has checked the design of the falsework and that the drawings are correct and in accordance with the design.

10.2 After the falsework has been erected and before any load is applied, the Contractor shall submit to the Technical Officer a certificate signed by a registered professional engineer certifying that he has checked the falsework and that it has been erected in accordance with the drawings. Titles and numbers of the drawings shall be stated in the certificate. Notwithstanding permission given by the Technical Officer to proceed, the Contractor shall be entirely responsible for the safety and adequacy of the falsework.

11. **PILING**

11.1 The Technical Officer will specify the conditions under which piles may be installed on Transnet property.

12. **UNDERGROUND SERVICES**

12.1 No pegs or stakes shall be driven or any excavation made before the Contractor has established that there are no underground services, which may be damaged thereby.

12.2 Any damage shall be reported immediately to the Technical Officer, or to the official in charge at the nearest station, or to the traffic controller in the case of centralised traffic control.

13. **BLASTING**

13.1 The provisions of clause 23 of the E.5, General Conditions of Contract or clause 21 of the E.5 (MW), General Conditions of Contract for Maintenance Work, shall apply to all blasting operations undertaken in terms of the Contract.

13.2 The Contractor shall provide proof that he has complied with the provisions of clauses 10.17.1 to 10.17.4 of the Explosives Regulations (Act 26 of 1956 as amended).

13.3 Blasting within 500m of a railway line will only be permitted during intervals between trains. A person appointed by the Technical Officer, assisted by flagmen with the necessary protective equipment, will be in communication with the controlling railway station.
Only this person will be authorised to give the Contractor permission to blast, and the Contractor shall obey his instructions implicitly regarding the time during which blasting may take place.

Respondent's Signature

Date & Company Stamp

13.4 The flagmen described in 13.3, where provided by Transnet, are for the protection of trains and Transnet property only, and their presence does not relieve the Contractor in any manner of his responsibilities in terms of Explosives Act or Regulations, or any obligation in terms of this Contract.

13.5 The person described in 13.3 will record in a book provided and retained by Transnet the dates and times -

(i) when each request is made by him to the controlling station for permission to blast;

(ii) when blasting may take place;

(iii) when blasting actually takes place; and

(iv) when he advises the controlling station that the line is safe for the passage of trains.

13.6 Before each blast the Contractor shall record in the same book, the details of the blast to be carried out. The person appointed by the Technical Officer and the person who will do the blasting shall both sign the book whenever an entry described in 13.5 is made.

13.7 The terms of clause 27 hereof shall be strictly adhered to.

14. **RAIL TROLLEYS**

14.1 The use of rail trolleys or trestle trolleys on a railway line for working on high voltage equipment will be permitted only if approved by the Technical Officer and under the conditions stipulated by him.

14.2 All costs in connection with such trolley working requested by the Contractor shall, unless otherwise agreed, be borne by the Contractor excluding the costs of any train protection services normally provided free of charge by Transnet.

15. **SIGNAL TRACK CIRCUITS**

15.1 Where signal track circuits are installed, the Contractor shall ensure that no material capable of conducting an electrical current makes contact between rails of a railway line/lines.

15.2 No signal connections on track-circuited tracks shall be severed without the Technical Officer's knowledge and consent.

16. **PENALTY FOR DELAYS TO TRAINS**

16.1 If any trains are delayed by the Contractor and the Technical Officer is satisfied that the delay was avoidable, a penalty will be imposed on the Contractor of R5 000 per hour or part thereof for the period of delay, irrespective of the number of trains delayed.

Respondent's Signature

Date & Company Stamp

PART B - ADDITIONAL SPECIFICATION FOR WORK NEAR HIGH-VOLTAGE ELECTRICAL EQUIPMENT

17. **GENERAL**

17.1 This specification is based on the contents of Transnet's publication SAFETY INSTRUCTIONS, HIGH-VOLTAGE ELECTRICAL EQUIPMENT, as amended, a copy of which will be made available on loan to the Contractor for the duration of the contract. These instructions apply to all work near live high-voltage equipment maintained and/or operated by Transnet, and the onus rests on the Contractor to ensure that he obtains a copy.

17.2 The Contractor's attention is drawn in particular to the contents of Part I, Sections 1 and 2 of the Safety Instructions : High-Voltage Electrical Equipment.

17.3 The Safety Instructions : High-Voltage Electrical Equipment cover the minimum safety precautions which must be taken to ensure safe working on or near high voltage electrical equipment, and must be observed at all times. Should additional safety measures be considered necessary because of peculiar local conditions, these may be ordered by and at the discretion of the Electrical Officer (Contracts).

17.4 This specification must be read in conjunction with and not in lieu of the Safety Instructions : High-Voltage Electrical Equipment.

17.5 The Contractor shall obtain the approval of the Electrical Officer (Contracts) before any work is done which causes or could cause any portion of a person's body or the tools he is using or any equipment he is handling, to come within 3 metres of any live high-voltage equipment.

17.6 The Contractor shall regard all high-voltage equipment as live unless a work permit is in force.

17.7 Safety precautions taken or barriers erected shall comply with the requirements of the Electrical Officer (Contracts), and shall be approved by him before the work to be protected is undertaken by the Contractor. The Contractor shall, unless otherwise agreed, bear the cost of the provision of the barriers and other safety precautions required, including the attendance of Transnet staff where this is necessary.

17.8 No barrier shall be removed unless authorised by the Electrical Officer (Contracts).

18. **WORK ON BUILDINGS OR FIXED STRUCTURES**

Before any work is carried out or measurements are taken on any part of a building, fixed structure or earthworks of any kind above ground level situated within 3 metres of live high-voltage equipment, the Electrical Officer (Contracts) shall be consulted to ascertain the conditions under which the work may be carried out.

18.2 No barrier erected to comply with the requirements of the Electrical Officer (Contracts) shall be used as temporary staging or shuttering for any part of the Works.

18.3 The shuttering for bridge piers, abutments, retaining walls or parapets adjacent to or over any track may be permitted to serve as a barrier, provided that it extends at least 2,5 metres above any working level in the case of piers, abutments and retaining walls and 1,5 metres above any working level in the case of parapets.

19. **WORK DONE ON OR OUTSIDE OF ROLLING STOCK, INCLUDING LOADING OR UNLOADING**

19.1 No person shall stand, climb or work whilst on any platform, surface or foothold higher than the normal unrestricted places of access, namely -

(i) the floor level of trucks;

(ii) external walkways on diesel, steam and electric locomotives, steam heat vans, etc. and

(iii) walkways between coaches and locomotives.

When in these positions, no person may raise his hands or any equipment or material he is handling above his head.

19.2 In cases where the Contractor operates his own rail mounted equipment, he shall arrange for the walkways on this plant to be inspected by the Electrical Officer (Contracts) and approved, before commencement of work.

19.3 The handling of long lengths of material such as metal pipes, reinforcing bars, etc should be avoided, but if essential they shall be handled as nearly as possible in a horizontal position below head height.

19.4 The Responsible Representative shall warn all persons under his control of the danger of being near live high-voltage equipment, and shall ensure that the warning is fully understood.

19.5 Where the conditions in 19.1 to 19.3 cannot be observed the Electrical Officer (Contracts), shall be notified. He will arrange for suitable safety measures to be taken. The Electrical Officer (Contracts), may in his discretion and in appropriate circumstances, arrange for a suitable employee of the Contractor to be specially trained by Transnet and at its costs, as an Authorised Person to work closer than 3 metres from live overhead conductors and under such conditions as may be imposed by the Senior responsible Electrical Engineer in Transnet.

20. **USE OF EQUIPMENT**

20.1 Measuring Tapes and Devices

20.1.1 Measuring tapes may be used near live high-voltage equipment provided that no part of any tape or a person's body comes within 3 metres of the live equipment.

20.1.2 In windy conditions the distance shall be increased to ensure that if the tape should fall it will not be blown nearer than 3 metres from the live high-voltage equipment.

20.1.3 Special measuring devices longer than 2 metres such as survey staves and rods may be used if these are of non-conducting material and approved by the responsible Electrical Engineer in Transnet, but these devices must not be used within 3 metres of live high-voltage equipment in rainy or wet conditions.

20.1.4 The assistance of the Electrical Officer (Contracts) shall be requested when measurements within the limits defined in 20.1.1 to 20.1.3 are required.

20.1.5 The restrictions described in 20.1.1 to 20.1.3 do not apply on a bridge deck between permanent parapets nor in other situations where a barrier effectively prevents contact with the live high-voltage equipment.

20.2 Portable Ladders

20.2.1 Any type of portable ladder longer than 2 metres may only be used near live high-voltage equipment under the direct supervision of the Responsible Representative. He shall ensure that the ladder is always used in such a manner that the distance from the base of the ladder to any live high-voltage equipment is greater than the fully extended length of the ladder plus 3 metres. Where these conditions cannot be observed, the Electrical Officer (Contracts) shall be advised, and he will arrange for suitable safety measures to be taken.

21. **CARRYING AND HANDLING MATERIAL AND EQUIPMENT**

21.1 Pipes, scaffolding, iron sheets, reinforcing bars and other material, which exceeds 2 metres in length, shall be carried completely below head height near live high-voltage equipment. For maximum safety two or more persons so as to maintain it as nearly as possible in a horizontal position should carry such material. The utmost care must be taking to ensure that no part of the material comes within 3 metres of any live high-voltage equipment.

21.2 Long lengths of wire or cable shall never be run out in conditions where a part of a wire or cable can come within 3 metres of any live high-voltage equipment unless the Electrical Officer (Contracts) has been advised and has approved appropriate safety precautions.

21.3 The presence of overhead power lines shall always be taken account of especially when communications lines or cables or aerial cables, stay wires, etc. are being erected above ground level.

22. **PRECAUTIONS TO BE TAKEN WHEN ERECTING OR REMOVING POLES, ANTENNAE, TREES ETC.**

22.1 A pole may be handled for the purpose of erection or removal near high-voltage equipment under the following conditions:

(i) If the distance between the point at which the pole is to be erected or removed and the nearest live high-voltage equipment is more than the length of the pole plus 3 metres, the work shall be supervised by the Responsible Representative.

(ii) If the distance described in (i) is less than the length of the pole plus 3 metres, the Electrical Officer (Contracts) shall be consulted to arrange for an Authorised Person to supervise the work and to ensure that the pole is earthed where possible. The pole shall be kept in contact with the point of erection, and adequate precautions shall be taken to prevent contact with live high-voltage equipment.

22.2 The cost of supervision by an Authorised Person and the provision of earthing shall, unless otherwise agreed, be borne by the Contractor.

22.3 The provisions of clauses 22.1 and 22.2 shall also apply to the erection or removal of columns, antennae, trees, posts, etc.

23. **USE OF WATER**

23.1 No water shall be used in the form of a jet if it can make contact with any live high-voltage equipment or with any person working on such equipment.

24. **USE OF CONSTRUCTION PLANT**

24.1 "Construction plant" entails all types of plant including cranes, piling frames, boring machines, excavators, draglines, dewatering equipment and road vehicles with or without lifting equipment.

24.2 When work is being undertaken in such a position that it is possible for construction plant or its load to come within 3 metres of live high-voltage equipment, the Electrical Officer (Contracts) shall be consulted. He will arrange for an Authorised Person to supervise the work and to ensure that the plant is adequately earthed. The Electrical Officer (Contracts) will decide whether further safety measures are necessary.

24.3 The cost of any supervision by an Authorised Person and the provision of earthing shall, unless otherwise agreed, be borne by the Contractor.

24.4 When loads are handled by cranes, non-metallic rope hand lines shall be used, affixed to such loads so as to prevent their swinging and coming within 3 metres of live high-voltage equipment.

24.5 Clauses 24.1 to 24.4 shall apply mutatis mutandis to the use of maintenance machines of any nature.

25. **WORK PERFORMED UNDER DEAD CONDITIONS UNDER COVER OF A WORK PERMIT**

25.1 If the Responsible Representative finds that the work cannot be done in safety with the high-voltage electrical equipment live, he shall consult the Electrical Officer (Contracts) who will decide on the action to be taken.

25.2 If a work permit is issued the Responsible Representative shall -

(i) before commencement of work ensure that the limits within which work may be carried out have been explained to him by the Authorised Person who issued the permit to him, and that he fully understands these limits;
(ii) sign portion C of the permit before commencement of work;
(iii) explain to all persons under his control the limits within which work may be carried out, and ensure that they fully understand these limits;
(iv) care for the safety of all persons under his control whilst work is in progress; and
(v) withdraw all personnel under his control from the equipment on completion of the work before he signs portion D of the work permit.

26. **TRACTION RETURN CIRCUITS IN RAILS**

26.1 DANGEROUS CONDITIONS CAN BE CREATED BY REMOVING OR SEVERING ANY BOND.

26.2 Broken rails with an air gap between the ends, and joints, at which fishplates are removed under "broken bond" conditions, are potentially lethal. The rails on either side of an air gap between rail ends on electrified lines shall not be touched simultaneously until rendered safe by Transnet personnel.

26.3 The Contractor shall not break any permanent bonds between rails or between rails and any structure. He shall give the Technical Officer at least 7 days written notice when removal of such bonds is necessary.

26.4 No work on the track which involves interference with the traction return rail circuit either by cutting or removing the rails, or by removal of bonds shall be done unless the Electrical Officer (Contracts) is consulted. He will take such precautions as may be necessary to ensure continuity of the return circuit before permitting the work to be commenced.

27. **BLASTING**

27.1 The Contractor shall obtain the permission of the Electrical Officer (Contracts) before blasting, and shall give at least 14 days notice of his intention to blast.

Respondent's Signature

Date & Company Stamp

27.2 No blasting shall be done in the vicinity of electrified lines unless a member of Transnet's electrical personnel is present.

27.3 The terms of clause 13 hereof shall be strictly adhered to.

28. **HIGH-VOLTAGE ELECTRICAL EQUIPMENT NOT MAINTAINED AND/OR OPERATED BY TRANSNET**

Where the work is undertaken on or near high-voltage electrical equipment which is not maintained and/or operated by Transnet, the Occupational Health and Safety Act No. 85 of 1993, and Regulations and Instructions, or the Mines Health and Safety Act (Act 29 of 1996), shall apply.

Such equipment includes: -

(i) Eskom and municipal equipment;

(ii) the Contractor's own power supplies; and

(iii) electrical equipment being installed but not yet taken over from the Contractor.

Respondent's Signature

Date & Company Stamp

ANNEXURE 1
SHEET 1 of 5
AMENDMENT

HORIZONTAL CLEARANCES :
1 065mm TRACK GAUGE

BE 97–01 Sht 1 of 5 DATE : JUNE 2000

RADIUS (m)	WITH CANT		NO CANT	WITH CANT	
	H (mm)	L (mm)	H & L	B (mm)	C (mm)
90	2 730	3 090	2 780	1 130	2 100
100	2 700	3 030	2 750	1 140	2 050
120	2 650	2 970	2 700	1 160	2 010
140	2 620	2 920	2 660	1 175	1 990
170	2 590	2 870	2 630	1 190	1 970
200	2 570	2 820	2 600	1 205	1 950
250	2 550	2 790	2 580	1 230	1 92[illegible]
300	2 540	2 760	2 560	1 250	[illegible]900
350	2 530	2 730	2 540	1 270	[illegible]890
400	2 520	2 710	2 530	1 290	1 875
500	2 510	2 680	2 520	[illegible]300	1 850
600	2 500	2 660	2 51[illegible]	[illegible]340	1 830
800	2 490	2 620	[illegible]500	[illegible]365	1 790
1 000	2 480	2 600	2 490	1 380	1 760
1 200	2 480	2 [illegible]80	2 [illegible]90	1 200	1 730
1 500	2 480	[illegible]	2 480	1 415	1 700
2 000	2 480	[illegible]	2 480	1 440	1 660
3 000	2 [illegible]70	2 470	2 470	1 500	1 600
>5 000	2 460	2 460	2 460	1 600	1 600

REMARKS:

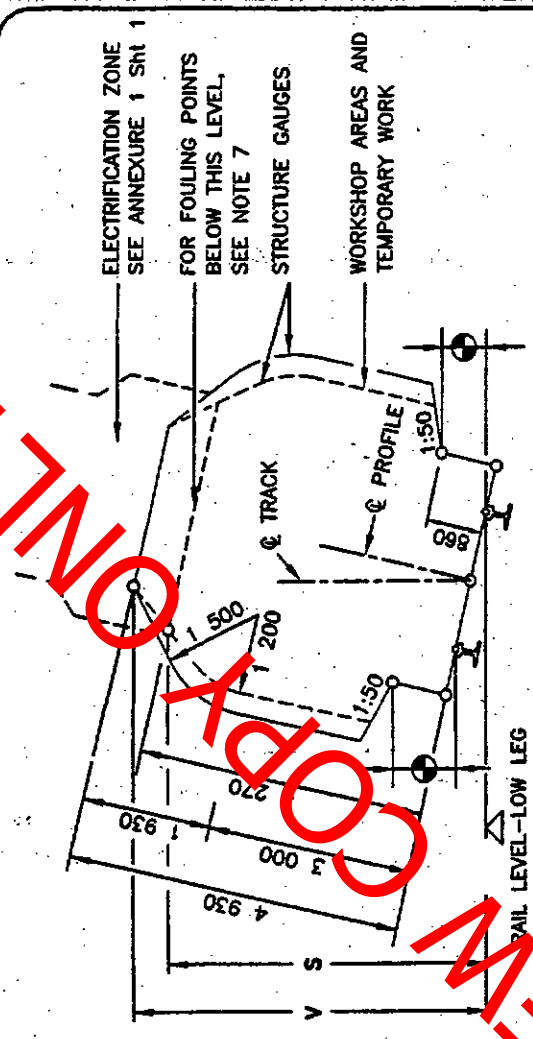
1. H AND B IS THE REQUIRED HORIZONTAL CLEARANCE ON THE OUTSIDE OF THE CURVE BASED ON MINIMUM CANT.
2. L AND C IS THE REQUIRED HORIZONTAL CLEARANCE ON THE INSIDE OF THE CURVE BASED ON MAXIMUM CANT.
3. INTERMEDIATE VALUES MAY BE INTERPOLATED BY THE ENGINEER IN CHARGE.
4. FOR WORKSHOP AREAS AND TEMPORARY WORK, CLEARANCES H AND L MAY BE REDUCED BY 300mm.
5. ⊕ SEE ANNEXURE 1 SHEET 3 FOR PLATFORM CLEARANCES.
6. ALSO REFER TO REMARKS 4 TO 8 OF ANNEXURE 1 SHEET 2.

Respondent's Signature

Date & Company Stamp

ANNEXURE 1
SHEET 2 of 5
AMENDMENT

VERTICAL CLEARANCES : 1 065mm TRACK GAUGE



LOCATION		NOT ELECTRIFIED	ELECTRIFIED (PRESENT OR FUTURE)	
			3kV & 25kV	50kV
	RADIUS (mm)	S (mm)	V (mm)	V (mm)
ALL AREAS OTHER THAN THOSE INDICATED BY * BELOW	100	4 470	5 050	5 400
	300	4 410	5 020	5 370
	600	4 370	5 000	5 350
	1 000	4 350	4 990	5 340
	1 500	4 310	4 960	5 310
	2 000	4 290	4 940	5 290
	>3 000	4 270	4 930	5 280
* OVER OR NEAR POINTS AND CROSSING IF REQUIRED BY ELECTRICAL IRRESPECTIVE OF RADIUS			5 650	6 000

REMARKS:

1. V IS THE REQUIRED VERTICAL CLEARANCE EXCEPT WHERE REDUCED CLEARANCE S APPLIES.
2. S IS THE MINIMUM VERTICAL CLEARANCE FOR STRUCTURES AND TEMPORARY WORK OVER NON–ELECTRIFIED LINES.
3. INTERMEDIATE VALUES MAY BE INTERPOLATED BY THE ENGINEER IN CHARGE.
4. FOR APPLICATION AT CURVES
   - 4.1 APPLY INCREASED CLEARANCES FOR CURVES TO POINTS 3m BEYOND THE ENDS OF THE CIRCULAR CURVE.
   - 4.2 REDUCE CLEARANCES AT A UNIFORM RATE OVER THE REMAINDER OF THE TRANSITION CURVE.
   - 4.3 FOR NON–TRANSITIONED CURVES REDUCE AT A UNIFORM RATE OVER A LENGTH OF 15m ALONG STRAIGHTS.
5. NEW STRUCTURES: SEE BRIDGE CODE.
6. TUNNELS: SEE DRAWING BE 82–35.
7. FOULING POINTS: SEE CLAUSE 8.1.
8. CLEARANCES ARE BASED ON 15m BOGIE CENTRES AND 21,2m VECHILE BODY LENGTH.
9. ◔ SEE ANNEXURE 1 SHEET 3 FOR PLATFORM CLEARANCES.

BE 97–01 Sht 2 of 5 DATE : JUNE 2000

Respondent's Signature

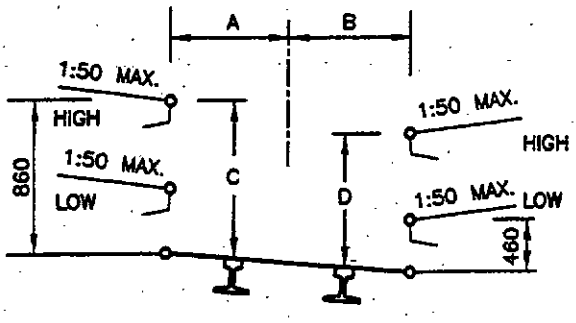
Date & Company Stamp

ANNEXURE 1
SHEET 3 of 5
AMENDMENT

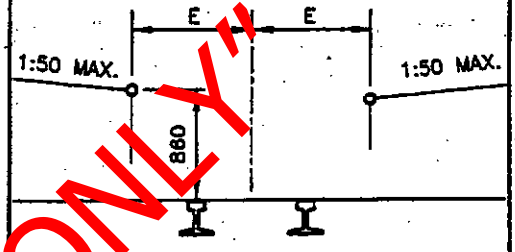
CLEARANCES : PLATFORMS

PLATFORMS : TRACK GAUGE 1 065mm

PASSENGERS



GOODS



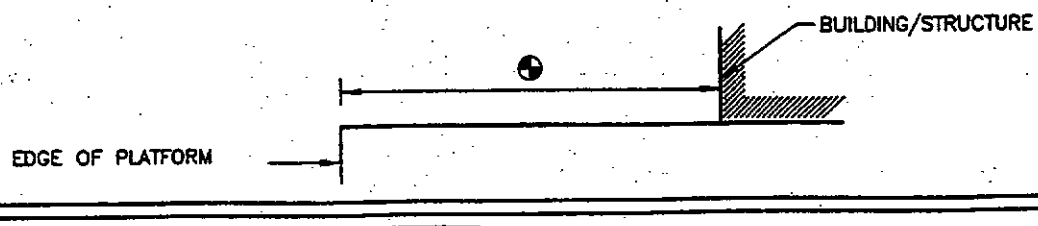
(NO CANT)

RADIUS (m)	A (mm)	B (mm)	C (mm)	D (mm)	E (mm)
90	1 690	1 820	890	810	1 840
100	1 650	1 790	890	810	1 810
120	1 610	1 740	890	810	1 760
140	1 580	1 700	890	810	1 720
170	1 550	1 660	890	810	1 690
200	1 530	1 630	890	820	1 670
250	1 520	1 600	890	820	1 640
300	1 520	1 580	890	830	1 620
350	1 520	1 560	880	830	1 600
400	1 520	1 550	880	840	1 590
500	1 520	1 540	880	850	1 580
600	1 520	1 530	870	850	1 570
800	1 520	1 520	860	860	1 560
1 200	1 520	1 520	860	860	1 550
2 000	1 520	1 520	860	860	1 540
3 000	1 520	1 520	860	860	1 530
STRAIGHT	1 520	1 520	860	860	1 520

REMARKS:

1. NO CANT TO BE APPLIED EXCEPT WHEN THE GOODS PLATFORM IS ON A RUNNING LINE.
2. INTERMEDIATE VALUES MAY BE INTERPOLATED BY THE ENGINEER IN CHARGE.
3. ⊕ 8m TO MAIN STATION-BUILDINGS AND 3m TO ALL OTHER STRUCTURES.
4. TOLERANCES : SEE CLAUSE 8.0.10.

STRUCTURES ON PLATFORMS : 1 065mm AND 610mm TRACK GAUGE



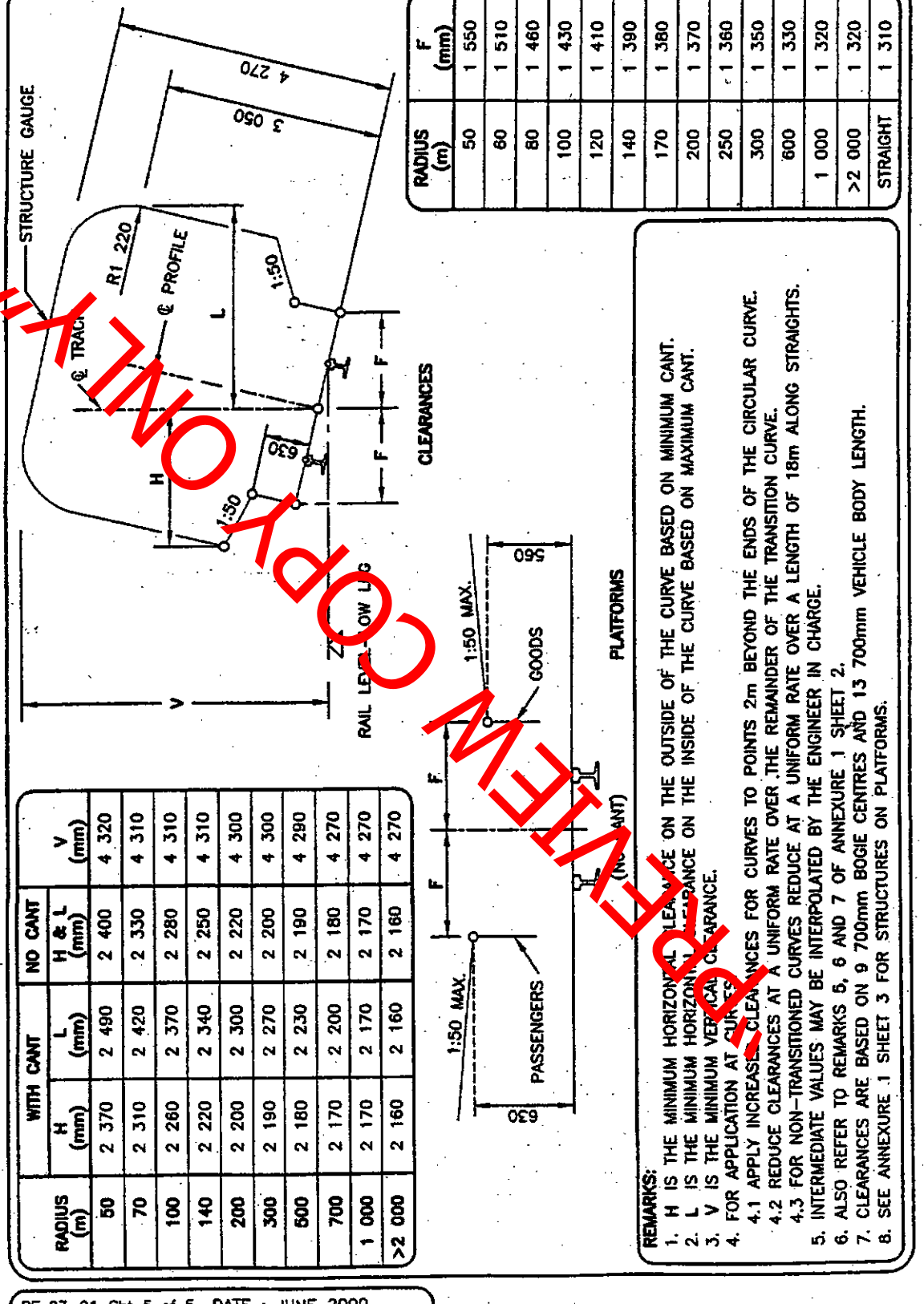
BE 97-01 Sht 3 of 5 DATE : JUNE 2000

Respondent's Signature

Date & Company Stamp

ANNEXURE 1
SHEET 5 of 5
AMENDMENT

CLEARANCES : 610mm TRACK GAUGE



RADIUS (m)	F (mm)
50	1 550
60	1 510
80	1 460
100	1 430
120	1 410
140	1 390
170	1 380
200	1 370
250	1 360
300	1 350
600	1 330
1 000	1 320
>2 000	1 320
STRAIGHT	1 310

RADIUS (m)	WITH CANT H (mm)	WITH CANT L (mm)	NO CANT H & L (mm)	V (mm)
50	2 370	2 490	2 400	4 320
70	2 310	2 420	2 330	4 310
100	2 260	2 370	2 280	4 310
140	2 220	2 340	2 250	4 310
200	2 200	2 300	2 220	4 300
300	2 190	2 270	2 200	4 300
500	2 180	2 230	2 190	4 290
700	2 170	2 200	2 180	4 270
1 000	2 170	2 170	2 170	4 270
>2 000	2 160	2 160	2 160	4 270

REMARKS:
1. H IS THE MINIMUM HORIZONTAL CLEARANCE ON THE OUTSIDE OF THE CURVE BASED ON MINIMUM CANT.
2. L IS THE MINIMUM HORIZONTAL CLEARANCE ON THE INSIDE OF THE CURVE BASED ON MAXIMUM CANT.
3. V IS THE MINIMUM VERTICAL CLEARANCE.
4. FOR APPLICATION AT CURVES
   4.1 APPLY INCREASED CLEARANCES FOR CURVES TO POINTS 2m BEYOND THE ENDS OF THE CIRCULAR CURVE.
   4.2 REDUCE CLEARANCES AT A UNIFORM RATE OVER THE REMAINDER OF THE TRANSITION CURVE.
   4.3 FOR NON–TRANSITIONED CURVES REDUCE AT A UNIFORM RATE OVER A LENGTH OF 18m ALONG STRAIGHTS.
5. INTERMEDIATE VALUES MAY BE INTERPOLATED BY THE ENGINEER IN CHARGE.
6. ALSO REFER TO REMARKS 5, 6 AND 7 OF ANNEXURE 1 SHEET 2.
7. CLEARANCES ARE BASED ON 9 700mm BOGIE CENTRES AND 13 700mm VEHICLE BODY LENGTH.
8. SEE ANNEXURE 1 SHEET 3 FOR STRUCTURES ON PLATFORMS.

BE 97–01 Sht 5 of 5 DATE : JUNE 2000

Respondent's Signature

Date & Company Stamp

FOR THE SUPPLY AND INSTALL POST TYPE CURRENT TRANSFORMERS AT 2 SUBSTATIONS FOR A PERIOD 1 MONTHS.

CLOSING VENUE: TENDER BOX

CLOSING DATE & TIME: 04 AUGUST 2015 AT 10:00

VALIDITY PERIOD: 90 Business Days

SECTION 2

EVALUATION CRITERA AND RETURNABLE DOCUMENTS

1 Evaluation Criteria

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

Criterion/Criteria	Explanation
Administrative responsiveness	Completeness of response and returnable documents
Substantive responsiveness	Prequalification criteria, if any, must be met and whether the Bid materially complies with the scope and/or specification given.
Final weighted evaluation based on 80/20 preference point	• 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.

2 Validity Period

Transnet desires a validity period of 90 [ninety] Business Days from the closing date of this RFQ.

This RFQ is valid until _____.

3 Disclosure of Prices Quoted

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

YES ☐ NO ☐

4 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]
SECTION 3 : Quotation Form	

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 list of 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]	
ANNEXURE A – B-BBEE Preference Points Claim Form	
ANNEXURE B – Project Specifications (7 Pages)	
Compensation for Occupational Injuries and Diseases Act 1993/Valid Letter of Good Standing	
CIDB: 1PE AND HIGHER	

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.

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 less favourable offer.

Price Schedule

I/We quote as follows for the service required, excluding VAT: See project specifications

Item	Description	Rate	Total
1	**Supply and install two current transformers at Beaconsfield – Transcape line**	**R**	
2	**Supply and install two current transformers at Lime Acres (Kamfersdam - Hotazel line)**	**R**	
		Tender Price:	**R**
		14% VAT:	**R**
		Total Tender Price:	**R**

Total Tender Price in Words: _____

_____

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:

Respondent's Signature

Date & Company Stamp

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. 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 Freight Rail		

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

1 _____

Name _____

2 _____

Name _____

ADDRESS OF WITNESSES

_____

_____

_____

_____

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]

Respondent's Signature

Date & Company Stamp

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

Respondent's Signature

Date & Company Stamp

Supplier Declaration Form

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
VAT number (if registered)						
Company Telephone Number						
Company Fax Number						
Company E-Mail Address						
Company Website Address						
Bank Name		Bank Account Number				
Postal Address			Code			
Physical Address			Code			

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 person/s 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 No.	

Respondent's Signature

Date & Company Stamp

FOR THE REPLACEMENT OF ROTATING LIGHTS WITH A 24V FLASHLIGHT SYSTEM (SIGNALING) AT MIDDELPLAATS.

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 20 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 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

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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

2.19 **"trustee"** means any person, including the founder of a trust, to whom property is bequeathed in order for such property to be administered for the benefit of another person.

3. 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 20]
1	20
2	18
3	16
4	12
5	8
6	6
7	4
8	2
Non-compliant contributor	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 The Department of Trade and Industry recently revised the Codes of Good Practice on 11 October 2013 [Government Gazette No. 36928]. The Revised Codes will replace the Black Economic Empowerment Codes of Good Practice issued on 9 February 2007. The Revised Codes provide for a transitional period ending 30 April 2015. During the transitional period, companies may elect to be measured in terms of the Revised Codes or the 2007 version of the Codes. Companies which are governed by Sector-specific Codes will be measured in terms of those Sector Codes.

4.6 As such, Transnet will accept B-BBEE certificates issued based on the Revised Codes. Transnet will also continue to accept B-BBEE certificates issued in terms of the 2007 version of the Codes

Respondent's Signature

Date & Company Stamp

provided it was issued before 1 May 2015. Thereafter, Transnet will only accept B-BBEE certificates issued based on the Revised Codes.

4.7 In terms of the Revised Codes of Good Practice, Bidders who qualify as QSEs must comply with all the elements of B-BBEE for the purposes of measurement. QSEs that are at least 51% or 100% Black owned 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.

4.8 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.

4.9 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.

4.10 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.

4.11 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.

4.12 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.

4.13 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 or 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 20 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:**

Respondent's Signature

Date & Company Stamp

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.....

B-BBEE DECLARATION

I/We, the undersigned, who warrants that he/she 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:

1. .....

2. .....

SIGNATURE OF BIDDER

DATE: .....

COMPANY NAME: .....

ADDRESS: .....

ANNEXTURE B

Respondent's Signature

Date & Company Stamp

Project Specification installation of current transformers for 3kv dc Traction Substation

Transnet Freight Rail

Project specification for installation of current transformers for 3kV traction substation under the control of the Depot Manager Kimberley North(Lesiba Ramatladi).

1. Scope of work

Supply and install the two current transformers per substation, at 2 substation namely Content (Beaconsfield –transcape line) and Lime acres (Kafersdam – Hotazel line) at Kimberley Infra Depot North as per TFR specification BBB0937.

Work to be done by contractor:

- *Supply and install post type current transformers according to specification BBB0937.*
- *The contractor shall use the existing structure and foundations*
- *The contractor shall do the ratio, resistance and mag curve tests*
- *All CTs to have be attached with the work shop tests certificate*
- *Install new cables same as to the existing ones.*
- *Supply new aluminum flying bus bar same as the existing one (same size)*
- *Do pre-inspection of all equipment's for any installation can be done.*
- *The contractor to do the testing of the CTs according to specification BBB0937.*
- *Accidental spills must be cleaned up immediately.*
- *The Contractor shall take oil temperature readings prescribed in engineering instruction GI.012. (Infra-red thermometer)*
- *All oil samples shall be tested for di electric strength, acidity and insulation before CTs can be installed and certificate of compliance must be issued.*
- *The sample shall be analyzed by TSI only.*

3. Special conditions:

- *Samples shall be tested for following:*
- *Fuel dissolved gas analysis*
- *Dielectric strength*
- *Acidity*
- *Moisture*
- *Contractor to supply all necessary plant, material, tools equipment and labels for the execution of work.*
- *A TFR representative will be available on site for the full duration of the Project.*
- *Work must be done as soon as an order has been issued.*
- *The contractor shall submit project schedule for planning purposes.*
- *Oil analysis to be performed by SANAS accredited laboratories only.*
- *Sample result shall display transfomer manufacture name, serial number and quantity of oil.*

TRANSNET
freight rail

TECHNOLOGY MANAGEMENT

SPECIFICATION

REQUIREMENTS FOR OUTDOOR POST TYPE CURRENT TRANSFORMERS FOR TRACTION AND DISTRIBUTION SUBSTATIONS.

Author:	Chief Engineering Technician Technology Management	D.O.Schulz	.....
Approved:	Senior Engineer Technology Management	L.O.Borchard	.....
Authorised:	Principal Engineer Technology Management	W.A.Coetzee	pp .....

Date: 21st September 2009

Circulation Restricted To:

Transnet Freight Rail – Chief Engineer Infrastructure
- Technology Management

INDEX

1.0 SCOPE.

1.1 This specification covers Transnet Freight Rail's requirements for the design, manufacture, testing and supply of outdoor post type current transformers for use with electrical measuring instruments and electrical protection devices.

1.2 The current transformers shall be suitable rated for nominal system phase to phase r.m.s voltages ranging from 22 kV up to 220 kV.

2.0 STANDARDS, PUBLICATIONS AND DRAWINGS

Unless otherwise specified this specification must be read in conjunction with the current edition of the relevant SANS and Transnet Freight Rail's specifications.

The following publications are referred to in this specification:

2.1 SOUTH AFRICAN NATIONAL STANDARDS (SANS)

SANS 60044-1:	Instrument Transformers. Part 1: Current Transformers.
SANS 121:	Hot dip galvanized coatings on fabricated iron and steel articles. – Specifications and test methods.
SANS 1019:	Standard voltages, currents and insulation levels for electricity supply.
SANS 60529:	Degrees of protection provided by enclosures. (IP code)

3.0 TENDERING PROCEDURE

3.1 Tenderers shall indicate clause-by-clause compliance with this specification as well as the relevant equipment specifications. This shall take the form of a separate document listing all the specifications clause numbers indicating on individual statement of compliance or non-compliance.

3.2 The tenderer shall motivate a statement of non-compliance.

3.3 Tenderers shall complete Appendix 2. " Information to be provided by tenderers".

3.4 Tenderers shall submit detailed technical literature of the current transformers offered together with drawings showing general constructional details and principal dimensions.

3.5 Any items offered in accordance with other standards will be considered at the sole discretion of Transnet Freight Rail. The tenderer shall supply full details stating where the item differs from these specifications as well as supplying a copy (in English) of the recognised specification(s) with which it complies.

3.6 Failure to comply with clauses 3.1, 3.2, 3.3, 3.4 and 3.5 could preclude a tenderer from consideration.

4.0 APPENDICES

The following appendices form an integral part of this specification and shall be read in conjunction with it.

4.1 Appendix 1 -"Schedule of Requirements".

This appendix details the specific requirements for this application.

4.2 Appendix 2 - " Information to be provided by tenderers".

This appendix calls for specific technical information to be furnished by tenderers.

5.0 SERVICE CONDITIONS

5.1 ATMOSPHERIC CONDITIONS

The equipment shall be designed and rated for installation and continuous operation under the following conditions:

Altitude:	0 to 1800m above sea level.
Ambient temperature:	-5°C to +45 °C.
Relative humidity:	10% to 90%.
Lightning Conditions:	12 ground flashes per square kilometre per annum.
Pollution:	Heavily salt laden or polluted with smoke from industrial sources.
Wind pressure on equivalent projected area normal to direction of wind:	750Pa.

5.2 ELECTRICAL CONDITIONS

5.2.1 Supply voltage: The incoming AC voltage can vary ± 5% of the nominal system r.m.s voltage.

5.2.2 Frequency: The frequency of the supply voltage is 50 ± 2.5 Hz.

5.2.3 The high voltage system shall be treated as effectively earthed unless otherwise specified.

6.0 REQUIREMENTS FOR CURRENT TRANSFORMERS

6.1 GENERAL REQUIREMENTS

6.1.1 The current transformers shall be designed, manufactured and tested in accordance with the requirements of specification SANS 60044-1.

6.1.2 The current transformers shall be suitable for operation under the nominal phase to phase voltages or phase to neutral voltages specified in Appendix 1.

6.1.3 The current transformers shall be of the oil insulated freestanding post type designed for outdoor use.

6.1.4 The current transformer shall be the bar primary type.

6.1.5 The current transformers shall be provided with measuring and protection cores as specified in Appendix 1.

6.1.6 For certain applications dual measuring cores as specified in Appendix 1 shall be provided for the purpose of ESKOM metering.

6.2 INSULATION LEVELS AND CREEPAGE DISTANCES

6.2.1 CREEPAGE DISTANCES

6.2.1.1 The standard creepage distance between phase and earth shall be in accordance with table 7 of SANS 60044-1.

6.2.1.2 For coastal areas and very heavy polluted inland areas the standard creepage distance shall be the very heavy polluted level, i.e. 31mm/kV of the highest r.m.s phase to phase voltage U_m for equipment.

6.2.1.3 For inland areas the standard creepage distance shall be the heavy polluted level, i.e. 25mm/kV of the highest r.m.s phase to phase voltage U_m for equipment.

6.2.2 INSULATION LEVELS

The rated insulation levels of the current transformers shall comply with the requirements specified in Table 1.

6.2.2.1. Table 1 lists the nominal system voltages present on Transnet Freight Rail and the required insulation levels as specified in accordance with SANS 1019.

Highest phase-to-phase r.m.s voltage for equipment. (Um)	Nominal system phase-to-phase r.m.s. voltage	Rated lightning impulse withstand voltage peak.	Rated short duration power- frequency withstand r.m.s voltage.
24 kV	22 kV	150kV	50 kV
36 kV	33 kV	200 kV	70 kV
52 kV	44 kV	250 kV	95 kV
72,5 kV	66 kV	350 kV	140 kV
100 kV	88kV	380 kV 450 kV	150 kV 185 kV
145 kV	132 kV	550 kV 650kV	230 kV 275 kV
245 kV	220 kV	550 kV 650kV	360 kV 395 kV
Insulation levels for highest voltage for equipment U_m < 100 kV are based on an earth fault factor equal to $\sqrt{3}$ and for U_m > 100 kV an earth fault factor equal to $0{,}8\sqrt{3}$. Where more than one insulation level is given per voltage system, the higher level is appropriate for equipment where the earth fault factor is greater than 1,4.			

TABLE 1: Standard Voltages and insulation levels in accordance with SANS 1019:2008 [1]

6.2.2.2 For the 25 kV and 50 kV single phase ac traction systems the ac high voltage circuit breakers shall be designed for the following nominal system phase to phase r.m.s voltages and withstand insulation levels.

- For the 25 kV (phase to earth) ac traction systems the ac high voltage circuit breakers current transformer shall be rated for a nominal system phase to phase r.m.s voltage of at least 44 kV and designed to withstand the required insulation level for that nominal system voltage.
- For the 50 kV (phase to earth) ac traction systems the ac high voltage circuit breakers shall be rated for a nominal system phase to phase r.m.s voltage of at least 88 kV and designed to withstand the required insulation level for that nominal system voltage.

6.3 CONSTRUCTIONAL DESIGN

6.3.1 The current transformers shall be of the oil insulated post type.

6.3.2 The insulating oil shall be certified free from polychlorinated biphenyls.

6.3.3 Facilities for oil draining and filling shall be provided.

6.3.4 The oil insulated current transformers shall be hermetically sealed.

6.3.5 The current transformers shall be fitted with an oil level sight glass, which shall be readable from ground level. The sight glass shall be resistant to ultraviolet radiation.

6.3.6 The primary terminals shall be of approved type material i.e. aluminium or electroplated copper and shall be able to carry the rated short circuit current of the current transformer.

6.3.7 The orientation of the terminals shall be horizontal and shall be suitable marked P1and P2 in accordance with SANS 60044-1.

6.3.8 The secondary terminals shall be mounted in a metal terminal box suitable for the termination of the current transformer secondary windings to the outgoing external circuits for the protection relays, metering and indicating instruments.

6.3.9 The secondary winding connections shall be brought out through the tank into the terminal box by means of bushings.

6.3.10 Links shall be provided for shorting out the secondary windings when not in use.

6.3.11 A rail mounted terminal strip shall be provided inside the terminal box for the termination of the current transformer secondary connections to the external circuits. The terminals shall be of the screw clamp type or spring-loaded insertion type.

6.3.12 The secondary winding terminal box shall be provided with a weatherproof cover and bottom entry cable entries. The degree of protection shall be at least IP 54 in accordance with SANS 60529.

6.3.13 An earthing stud of at least 6mm shall be provided inside the terminal box for the earthing of the secondary windings.

6.3.14 The tank or base of each current transformer shall be fitted with an earthing terminal suitable to accommodate a cable lug for a 95mm² copper conductor or copper busbar for the earthing of the current transformer.

6.3.15 Provision shall be made that the current transformers can be bolted to the support structure.

6.3.16 Unless otherwise approved all ferrous parts of the current transformer shall be galvanised in accordance with SANS 121.

6.3.17 Rating plates shall be manufactured of corrosion resistant material and shall be fixed to the main body of the current transformer.

6.3.17.3 The rating plate shall have the following information clearly and indelibly engraved on it:

- Manufactures name or mark.
- Serial number and type designation.
- Rated primary and secondary current.
- Rated frequency.
- Rated output and accuracy class.
- Highest voltage for equipment.
- Rated insulation level.
- Rated short time thermal current and dynamic current.
- Class of insulation.
- The corresponding terminals of each winding.

6.4 CURRENT TRANSFORMER RATINGS

6.4.1 MEASURING CURRENT TRANSFORMERS

6.4.1.1 The transformation ratio(s) shall comply with the requirements of Appendix1.

6.4.1.2 The secondary current rating shall be 1 Ampere unless otherwise specified in Appendix 1.

6.4.1.3 The minimum rated output burden shall be 10 VA unless otherwise specified in Appendix 1.

6.4.1.4 The accuracy class shall be as follows:

6.4.1.4.1 For metering purposes the class of accuracy shall be 0.5 for current transformers with ratios up to 400/1 and class 0.2 for ratios greater than 400/1.

6.4.1.4.2 For Indication or measuring purposes the accuracy class shall be 0.5.

6.4.2 PROTECTION CURRENT TRANSFORMERS

6.4.2.1 The transformation ratio(s) shall comply with the requirements of Appendix.1.

6.4.2.2 The secondary current rating shall be 1or 5 Ampere. Refer to Appendix 1.

6.4.2.3 The rated output burden shall comply with the requirements of Appendix 1 but shall not be less than 10 VA.

6.4.2.4 The accuracy limit factor shall be as specified in Appendix 1.

6.4.2.5 The accuracy class shall be as specified in Appendix 1.

6.4.2.6 The protection core shall be provided with a 10 ampere test winding.

CLASS PX CURRENT TRANSFORMERS

6.4.2.7 Class PX protection current transformers shall be provided where specified in Appendix1.

7.0 TEST CERTIFICATES.

9.1 The manufacture shall make available type test certificates for the equipment (as specified in SANS 60044-1 when required. Routine test certificates shall be supplied with each circuit breaker.

8.0 DRAWINGS

8.1 The drawings shall comply with the requirements of Transnet Freight Rail's specification CEE.0224.

8.2 Drawings showing details of construction and outline dimensions of the currents transformers shall be submitted with the tender documents.

8.3 The drawings shall give the following details:

- Outline dimensions.
- Mounting details
- Main terminal and clamps.
- Main terminal markings.
- Secondary terminal box with covers.
- The arrangement of the secondary terminals and secondary earthing terminal.
- Connection diagram showing the terminal markings and relative polarity and physical arrangement of windings with respect to the primary winding.
- Drawings of the rating and diagram plates.

9.0 GUARANTEE AND DEFECTS.

9.1 The contractor shall guarantee the satisfactory operation of the current transformers supplied and accept liability for maker's defects, which may appear in design, materials and workmanship.

9.2 The guarantee period shall expire after: -

A period of 12 months commencing on the date of energising of the current transformers.

9.2 Any specific type of fault occurring three times within the guarantee period and which cannot be proven to be due to other faulty equipment not forming part of this contract, shall automatically be deemed an inherent defect. Such inherent defect shall be fully rectified to the satisfaction of the maintenance manager of the depot and at the cost of the Supplier.
If urgent repairs have to be carried out by Transnet Freight Rail's staff to maintain supply during the guarantee period the supplier shall inspect such repairs to ensure that the guarantee period is not affected and should they be covered by the guarantee, reimburse Transnet Freight Rail the cost of material and labour.

10.0 INSPECTION.

10.1 Transnet Freight Rail reserves the right to carry out inspection and any tests on the equipment at the works of the supplier/ manufacture.

10.2 Arrangements must be made timecusly for such inspections to be carried out before delivery of the equipment to the client.

11.0 PACKAGING AND TRANSPORT.

11.1 The tenderer shall ensure that the equipment be packed in such a manner that it will be protected during handling and transport.

11.2 The tenderer shall provide transport for the delivery of the equipment to the site where required.

12.0 BIBLIOGRAPHY

[1] SANS 1019: 2008. Edition 2.6

END

APPENDIX 1

SCHEDULE OF REQUIREMENTS
(To be completed by client)

1.0 SYSTEM DETAIL

1.1 Current transformers required for: _____ substation/location.

1.2 Pollution level: Heavy_____ Very Heavy _____

1.2 Quantity of current transformers required. _____

1.2 Nominal phase to phase voltage for 3 phase system: _____ kV.

1.3 Nominal phase to neutral voltage for single phase systems: _____ kV.

1.4 Frequency: _____ Hz

2.0 DETAIL OF CURRENT TRANSFORMER.

MEASURING CURRENT TRANSFORMERS

2.1 Measuring current transformer required: Yes / No

2.1.1 Purpose: Metering / Measuring

2.2 Number of measuring cores required: _____

2.3 Transformation ratio: Primary _____ Ampere, Secondary _____ Ampere.

2.4 Rated primary current: _____ Ampere. Rated secondary current: _____ Ampere

2.5 Rated burden: _____ VA

2.6 Accuracy class: _____

2.7 Rated short-time current: _____ kA for _____ seconds

PROTECTION

2.6 Protection current transformers required: Yes / No

2.8 Number of protection cores required: _____

2.9 Rated primary current: _____ Ampere. Rated secondary current: _____ Ampere.

2.10 Rated burden: _____ VA

2.11 Accuracy class: _____

2.12 Accuracy limit factor: _____

2.13 Rated short-time current: _____ kA for _____ seconds

CLASS PX PROTECTION CURRENT TRANSFORMERS

2.14 Class PX protection cores required: Yes / No

2.15 Number of Class PX protection cores required: _____

2.16 Transformation ratio: Primary _____ Ampere, Secondary _____ Ampere.

2.17 Rated primary current: _____ Ampere. Rated secondary current: _____ Ampere.

2.18 Rated turns ratio: _____

2.19 Rated knee point e.m.f: _____

2.20 Maximum secondary winding resistance: _____Ohms at _____° C

END

APPENDIX 2

TECHNICAL DATA SHEET
(To be completed by tenderer)

1.0 DESIGN DETAIL

1.1 Manufacturers name: _____

1.2 Highest voltage for equipment: _____ kV

1.3 Nominal r.m.s voltage: _____ kV

1.4 Rated insulation level: _____ kV

1.5 Rated frequency: _____ Hz

2.0 DETAIL OF CURRENT TRANSFORMERS.

MEASURING CURRENT TRANSFORMERS

2.1 Transformation ratio: _____

2.2 Rated primary current: _____ Ampere. Rated secondary current: _____ Ampere

2.3 Accuracy class: _____

2.4 Rated Burden: _____ VA

2.5 Rated short-time current: _____kA for _____ seconds

PROTECTION CURRENT TRANSFORMERS

2.6 Transformation ratio: _____

2.8 Rated primary current: _____ Ampere. Rated secondary current: _____ Ampere

2.9 Accuracy class: _____

2.10 Accuracy limit factor: _____

2.11 Rated Burden: _____ VA

2.12 Rated short-time current: _____kA for _____ seconds

CLASS PX PROTECTION CURRENT TRANSFORMERS

2.13 Rated primary current: _____ Ampere. Rated secondary current: _____ Ampere.

2.14 Rated turns ratio: _____

2.15 Rated knee point e.m.f: _____

2.16 Maximum secondary winding resistance: _____ Ohms at _____ ° C

2.17 Rated short-time current: _____kA for _____ seconds

END

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1.0 SCOPE

Note: All references to "oil" in this instruction shall mean mineral insulating oil.

1.1 This instruction covers the procedure for storage, handling, testing and maintenance of oil used in electrical equipment.

1.2 This instruction does not cover insulating liquids containing Polychlorinated Biphenols (PCB). These are toxic and should be handled strictly in accordance with Engineering Instruction G.009.

1.3 This instruction does not cover other synthetic dielectric fluids which should be maintained as per suppliers instructions.

2.0 STORAGE OF OIL IN DRUMS

2.1 Drums of insulating oil shall be stored indoors, or under cover.

2.2 Drums shall be stored upside down, i.e. with bungs at the bottom.

2.3 Before use, oil stored in drums shall be tested for compliance with clause 14.1.1 (Dielectric strength).

3.0 PUMPING OF OIL

3.1 When pumping oil into electrical equipment, the following precautionary measures shall be taken:

3.1.1 A 0,5 micron paper filter shall always be installed between the pump and the equipment.

3.1.2 Pumps shall not have metal-to-metal friction which can release conductive metal particles into the oil.

4.0 FILTERING TO RESTORE DIELECTRIC STRENGTH OF OIL

Note: It is not possible to reduce the acidity of insulating oil by filtration. Therefore, if the acidity exceeds the permissible upper limit laid down in clause 14.1.2 the oil must be reclaimed, or replaced (See clause 6.0).

4.1 To maintain a high dielectric strength it is important that the oil should be free of impurities such as water and solid particles.

4.2 To restore dielectric strength to a permissible level as per clause 14.1.1, one of the following methods shall be used to remove moisture and solid particles from the oil:

4.2.1 Heat-vacuum process

4.2.1.1 This method requires an external heating system, with a suitable oil filter for removal of solid particles and a vacuum-type drier capable of providing a vacuum of 5 mm Hg (5 mm Hg = 5 Torr).

4.2.1.2 The advantage of the vacuum process in contrast to heat alone, lies in the de-gasification effect, which removes dissolved water and other gasses from the oil. This does not occur with other methods of filtering the oil.

4.2.2 Cartridge filter press

The traditional filter press or cartridge filter cannot remove dissolved water from the oil but is effective in removing solid impurities and thereby improving the dielectric strength.

Note: Only plants of the heat-vacuum type shall be purchased in the future due to the shortcomings of the traditional filter presses as mentioned above.

5.0 TRANSFORMER DRY-OUT

Note: In the event of the acidity of oil being in excess of the permissible level (clause 14.1.2) the oil shall be reclaimed or replaced as per clause 6.0 prior to proceeding with the dry-out process.

5.1 Any moisture present in the transformer will be partly in the oil and partly deposited in the layers of insulation. It has been established that more than 95 percent of moisture in a transformer is trapped in the insulation, and less than 5 percent in the oil.

5.2 To determine the water content of oil in a transformer, the test method as described in Appendix 2, clause 3.2 shall be used. Should the water content exceed the values indicated in Appendix 3, one of the following procedures shall be used to remove the water from the transformer:

5.2.1 Transformer on site and de-energised

5.2.1.1 This procedure requires a filter with vacuum-type drier plus a heater, as per clause 4.2.1.1. This is a slow process due to the slow rate of diffusion of moisture between the insulation and the oil. Depending on the amount of moisture present in the core, this process can take up to 6 weeks to complete.

5.2.1.2 The effectiveness of the dry-out process can be monitored by measuring the rate of water extraction by the plant. During filtration the oil shall be tested periodically and the dry-out process terminated when the moisture content of the oil leaving the transformer is not more than 3 parts per million (ppm). A check must be carried out 2 weeks after termination of the process to ensure that moisture content is still within permissible levels as per Appendix 3.

5.2.1.3 Should the withdrawal of a transformer from service for lengthy periods be undesirable, the alternative method as per clause 5.2.2 should be considered.

5.2.2 Transformer on site and on load

This method requires an on-load filtration plant, using Fullers earth as filter medium and which is equipped with suitable safety devices. Depending on the amount of water present, the dry-out process can last from 8 to 20 weeks. On site dry-out with a transformer on load can only be carried out by suitably qualified contractors.

5.2.3 Oven dry-out

If the dry-out is being done in a workshop, the core may be removed from the tank and dried in an oven. Larger units may be dried in their tanks inside a suitable enclosure.

Note: During dry-out the temperature of the transformer shall not exceed 140 degrees Celsius to prevent degradation of the insulation.

6.0 RECLAIMING OR REPLACING OF OIL

Note: In the event of the acidity of the oil being in excess of the permissible level (clause 14.1.2) the oil shall be reclaimed or replaced.

6.1 Reclaiming is a process which uses Fullers earth as a medium to remove the acidic and colloidal contaminants and other products of oil deterioration from the oil. This process produces clean dry oil which complies with the specification for new oil.

6.2 The choice of whether oil should be reclaimed or replaced with new oil shall depend upon practical and economic considerations for a given situation.

6.3 Reclaiming of oil can either be carried out on site, with the transformer/equipment de-energised or alternatively in the factory or workshop. On site reclaiming is carried out using specialised equipment and can only be carried out by suitably qualified contractors. See Specification CEE.0229 to be used for contract purposes

6.4 Oil that has been reclaimed or replaced shall be tested after 6 months and should the acidity have increased by more than 0,03 mg Potassium Hydroxide (KOH)/g oil, the transformer shall be de-sludged as described in clause 7.0.

7.0 TRANSFORMER DE-SLUDGE

7.1 Transformers must be desludged as soon as the permissible sludge limit as per clause 14.1.3 is exceeded; or when accelerated deterioration sets in after reclaiming or replacing the oil as per clause 6.4.

7.2 This procedure has two requirements to accomplish effective de-sludging of a transformer:

7.2.1 The oil must be heated to the temperature at which the sludge will dissolve (i.e. 72 degrees Celsius to 82 degrees Celsius).

7.2.2 The oil must be clean.

7.3 The sludge deposited on the interior of the transformer will, in the presence of the clean hot oil, go from a solid into a solution, re-entering the oil. This oil is then filtered through Fullers earth where the dissolved sludges are stripped out by adsorption and the clean oil is returned to the transformer.

7.4 For successful de-sludging the hot oil must penetrate into all parts of the transformer, i.e. the insulating panels, the cooling radiators, through the cooling ducts and in between the windings. The transformer must be subjected to multiple passes of hot oil throughout the entire structural system, so that the sludge is exposed to the hot oil for sufficient time in order to effectively remove the sludge from the inside of the transformer. The complete de-sludging process normally requires 40 to 80 re-circulations of hot oil through the transformer.

7.5 This process requires specialised equipment, and can at present only be carried out by suitably qualified contractors. The process is carried out only on site with the transformer energised. See Specification CEE.0229 to be used for contract purposes.

8.0 PREVENTION OF OIL CONTAMINATION IN TRANSFORMERS BY MOISTURE

8.1 To avoid moisture contamination of oil in transformers fitted with dehydration type breathers, the silica-gel charge shall be replaced when approximately 50 percent of crystals have turned pink.

8.2 Inspection vents, caps or plugs on the conservator tank and breathers shall at the same time be checked for leaks.

8.3 The following precautions must be taken when replacing gaskets on a transformer tank:

8.3.1 The work is to commence as soon as possible after de-energising the transformer so that the oil is as hot as possible when the tank is opened to atmosphere.

8.3.2 The tank is to be sealed overnight and a vacuum is to be drawn, if possible.

8.3.3 The work is to be completed without undue delay.

9.0 SWITCH-GEAR

9.1 Routine tests shall be carried out on switch-gear oil in accordance with clause 12.2 and should the test be failed, the oil shall be filtered or replaced.

9.1.1 In the case of oil filtering, the appropriate procedure described in clause 4.0 shall be used.

9.1.2 After filtration, the oil shall be re-tested.

9.1.3 On complete overhaul of switch-gear, the oil shall be filtered or replaced with new oil.

10.0 OIL COOLED RECTIFIERS

10.1 No tests are prescribed for oil in oil cooled rectifiers.

10.2 In the event of flash-overs occurring inside the rectifier, the oil shall be replaced.

11.0 OIL TO BE TESTED BEFORE USE

11.1 New oil in tanks and drums shall be tested for dielectric strength before use, as per Appendix 2, clause 2.0.

11.2 Oil in equipment that has been decommissioned for longer than 3 months shall be tested for dielectric strength and water content in accordance with Appendix 2, clauses 2.0 and 3.0 before commissioning.

11.3 The results shall be recorded in the test book used by electrical laboratory personnel. See Engineering Instruction GI.008.

12.0 ROUTINE TESTING OF OIL

12.1 Oil in transformers shall be tested as per Appendix 2 on a routine basis as follows:

12.1.1 A schedule for tests shall be drawn up. The intervals between tests shall be determined in accordance with the operating conditions of the individual equipment, but shall not exceed the following:

12.1.1.1 Transformers of 500 kVA and greater, 4 yearly except dissolved gas analysis (DGA).

12.1.1.2 Dissolved gas analysis must be performed annually on all traction transformers above the age of 25 years. In addition, all transformers classified as strategic, as recommended in section 5 of publication CEE EP.005 (Condition Monitoring of Network Transformers), must be monitored on an annual basis. If the gas content exceeds the limits as per clause 14.1.5, more regular monitoring should take place as specified in the same clause.

12.1.1.3 Should sufficient historical data on transformer failures be available, economic and risk analysis must be carried out on all transformers other than traction, before a routine DGA is introduced. If justified, DGA should be carried out annually.

12.2 Oil in switch-gear shall be tested annually for dielectric strength in accordance with Appendix 2, clause 2.0.

12.2.1 In the event of switch-gear not having operated during the 12 months since the last test, the test may be postponed for another year.

13.0 OIL PROPERTIES TO BE TESTED FOR

13.1 Dielectric strength

13.1.1 This test serves to indicate the presence of conductive contaminants such as free water, dirt, cellulosic fibres, filter dust, metallic cuttings or splinters but not dissolved water under 80 percent saturation, acids, or sludge.

Note: A good dielectric strength (i.e. 35 kV or higher) can disguise a dissolved water problem.

13.1.2 This test shall be carried out as per Appendix 2, clause 2.0 and the oil shall be deemed acceptable if complying to the limits as per clause 14.1.1.

13.2 Neutralisation number (Acidity)

13.2.1 The neutralisation number of an oil is a measure of the acid content of the oil. It may be used as a guide for determining when oil should be replaced or reclaimed.

13.2.2 The acid content is expressed as the number of milligrams of potassium hydroxide (KOH), a base, that is required to neutralise the acid in a one gram sample of oil. Appendix 2, clause 4.0 describes the test method and is used for both new and used oil.

Note: This method is not very sensitive and cannot be used for determining neutralisation numbers below 0,005 mg KOH/g oil (effect of one drop of 0,1 N mg KOH/g oil). A more accurate method for determining neutralisation number below 0,005 is to use potentiometric titration equipment and involves specialised laboratory procedures.

13.2.3 The results of routine tests carried out on a particular item of equipment shall be plotted in graphical form. The neutralisation number should increase linearly with time within the accuracy of the test method used. Should a significant non-linearity occur in the graph the test shall be repeated and if confirmed as correct, the office of the Chief Engineer (Electrical) must be consulted for further action to be taken. The neutralisation number shall in any event not be allowed to exceed the value given in clause 14.1.2.

13.3 Dissolved gas analysis

13.3.1 Faults caused by partial electrical discharges or localised overheating and arcing inside the transformer leads to decomposition (breakdown) of the oil and insulation materials (paper, barrier board, resin, etc.). This decomposition of insulation causes gas generation which will generally dissolve in oil.

13.3.2 The Buchholtz relay is a gas collector relay in the transformer and operates on a large release of gas or on the accumulation of approximate 250 cc volume gas. However, it does not respond to breakdowns which produce gas at a very slow rate.

13.3.3 The technique of gas-chromatography has been developed which makes it possible to separate a mixture of gases dissolved in oil to identify the various types of gases present. If the gases are generated slowly, they are quantitively dissolved in the oil and if these faults are not discovered, they can slowly attack the insulation to a point where serious damage results to the transformer. For this reason there is a general trend, especially with larger transformers, to monitor the oil for degenerated gases in the solution. The amounts and quantity of gases in the oil can identify the severity and type of faults. The magnitude of the normal concentrations of gas depends on the age and loading of the transformers but limiting values for the concentrations for various decomposition gases can be determined empirically. The permissible concentrations of various types of gases are given in clause 14.1.5.

13.3.4 In the event of Buchholtz relay operation, it is recommended that oil samples be taken for dissolved gas analysis, rather than analysing the trapped gas in the relay.

13.3.5 The dissolved gas analysis can only be done by suitably equipped laboratories providing this service.

13.4 Water content

13.4.1 Moisture in oil may emanate from either the atmosphere via the breather or leaking gaskets, or is produced by deterioration of paper and oil in transformers and equipment.

13.4.2 Water, even in minute quantities is harmful in power equipment because it is attracted to the places where electrical stress is highest. Concentration of moisture in those areas may result in ultimate failure of the insulation.

13.4.3 Water also accelerates the deterioration of the insulating material (paper etc.) and more water is produced during this process. This is a continuous cycle and once the paper has been degraded it can never (unlike the oil) be returned to its original condition.

13.4.4 It is therefore essential that the moisture content of the oil in transformers be measured accurately, using the Karl Fischer method as per Appendix 2, clause 3.0. The maximum permissible moisture content is shown in Appendix 3.

13.5 Sludge

13.5.1 Oil in service is subject to deterioration due to oxidation reactions which are accelerated by elevated temperature and the presence of metals or organometallic compounds or both, acting as oxidation promoters. Change in colour, formation of acid compounds and at an advanced stage of oxidation, separation of sludge may occur which in turn will result in the dielectric properties being impaired.

13.5.2 The sludge content of oil must be tested according to the method described in Appendix 2, clause 5.0. Where sludge is detected (see clause 14.1.3) the oil must be reclaimed or replaced as per clause 6.0 and the transformer must be desludged.

Note: Precipitable sludge occurs only when oxidation is sufficiently advanced. Experience shows that the sludge test is not needed as long as the neutralisation number (NN) is below 0,4 mg KOH/g oil.

14.0 PERMISSIBLE LIMITS FOR PROPERTIES TESTED

14.1 The following values for the various tests shall be considered as being the permissible limits

14.1.1 Dielectric breakdown strength:
New oil - not less than 35 kV.
Oil in service - not less than 30 kV.

14.1.2 Neutralisation number (acidity):
New oil - not more than 0,03 mg KOH/g oil.
Oil in service - not more than 0,50 mg KOH/g oil.

Note: The neutrality number for new oil may be increased to 0,05 mg KOH/g oil when phenolphthalein indicator is used instead of alkali blue.

14.1.3 Sludge content:

Oil in service - not more than 0,02 percent.

Note: A sludge test must be carried out only when the neutralisation number (NN) exceeds 0,4 mg KOH/g oil.

14.1.4 Water content:
New oil - Not more than 10 ppm.
Oil in service - See Appendix 3.

Note: Dielectric strength, neutralisation number, sludge and water content values are based on IEC 422, tables 1 and 2.

14.1.5 Dissolved gas analysis (DGA)

If any one of the gas concentrations indicated in the first column below is exceeded, the gas analysis must be performed every six months and every three months for the concentrations indicated in the second column:

	6 monthly level	3 monthly level
Hydrogen	150 ppm	1 000 ppm (V/V)
Methane	25 ppm	80 ppm (V/V)
Ethane	10 ppm	35 ppm (V/V)
Ethylene	20 ppm	100 ppm (V/V)
Acetylene	15 ppm	70 ppm (V/V)

Where: ppm (V/V) = parts per million volume / volume of specific gas in oil.

Note: The above values are based on DE GRIJP M.H.B.(Dissolved Gas Analysis and its interpretation).

14.1.5.1 The transformer must be de-energised when the average total gas content (including CO and CO_2) increases at a rate of more than 10 percent per month, or when recommended by the laboratory.

15.0 ENVIRONMENTAL PRECAUTIONS

When mineral oil has to be disposed of, certain precautions are necessary to avoid risk of environmental pollution, and legal requirements may apply. Normally, if the precautions and regulations applicable to the handling and disposal of industrial and other lubricants (e.g. automobile crank case oil) are applied to mineral insulating oils, no problems should arise. See Guide to Legislation Concerning Hazardous Substance Act (Act 15 of 1973) and the Environmental Conservation Act (Act 73 of 1989).

16.0 ASSOCIATED DOCUMENTS, SPECIFICATIONS, ENGINEERING INSTRUCTIONS AND APPENDICES

16.1 The following documents are referred to in this instruction:

16.1.1 Guide to Legislation Concerning Hazardous Substance Act (Act 15 of 1973).

16.1.2 DE GRIJP M.H.B. Dissolved Gas Analysis and its interpretation, Hogeschool West-Brabant, Sector Technical Science, Department Electrical Heavy Current, Report 1. October 1989 - Transformer Department ESKOM.

16.1.3 The Environmental Conservation Act (Act 73 of 1989).

16.1.4 Condition Monitoring of Network Transformers, CEE EP.005.

16.2 The following specifications are referred to in this instruction:

16.2.1 ASTM D 1553/79: Standard Test Method for Water in Insulating Liquids. (Karl Fischer Method).

16.2.2 BS 148 : Unused Mineral Insulating Oils for Transformers and Switch-gear.

16.2.3 CEE 0229: Reclamation of Insulating Oil and De-sludging of Transformers.

16.2.4 IEC 156: Method for the Determination of the Electric Strength of Insulating Oils.

16.2.5 IEC 422: Supervision and Maintenance Guide for Mineral *Insulating Oils in Electrical Equipment.*

16.2.6 IEC 567: Guide for the sampling of gases and oil from oil-filled electrical equipment and for the analysis of free and dissolved gases.

16.3 The following Engineering Instructions are referred to in this instruction:

16.3.1 G.009: Electrical Equipment Containing Askarels (Polychlorinated Biphenyls).

16.3.2 GI.008: "Toerusting wat in Elektriese Substasies en algemene Masjienkamers voorsien moet word".

16.4 The following appendices form part of this instruction:

16.4.1 APPENDIX 1: Procedure to be Followed for Sampling of Electrical Insulating Oil.

16.4.2 APPENDIX 2: Procedures to be Followed for Routine Testing of Electrical Insulating Oils.

16.4.3 APPENDIX 3: Maximum Permissible Water Content of Oil in Transformers Versus Temperature of Top Oil Sample Under Equilibrium Conditions.

16.4.4 APPENDIX 4: Procedure to be Followed for Preparation of Chemicals for Oil Testing.

17.0 AMENDMENTS

17.1 This instruction has undergone a general change in format.

17.2 Reference to Dissolved Gas Analysis (DGA) made throughout instruction.

17.3 This instruction supersedes Engineering Instruction GI.012 (Issue 1) of August 1992.

END

CHIEF ENGINEER (INFRASTRUCTURE)
(ELECTRICAL)

DISTRIBUTION	ENGINEERING INSTRUCTION	GENERAL
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PROCEDURE TO BE FOLLOWED FOR SAMPLING OF ELECTRICAL INSULATING OIL

1.0 SAMPLING INSULATING OIL:

Note: The oil sampling procedure is of the utmost importance, as incorrect sampling can result in wrong analysis/diagnosis.

1.1 A thief for obtaining oil samples from 200 litre drums is shown in figure 1. It can be made either of metal or a piece of glass tubing 1 m long to drain or to siphon samples from the drum.

1.2 The sample shall be taken with the thief in contact with the bottom of the drum.

1.3 To reduce absorption of moisture from the air, samples should not be drawn from containers until the oil is at least as warm as the surrounding air.

1.4 Notwithstanding the requirements for storage as per clause 2.1 of this instruction, samples shall never be taken while it is raining.

1.5 To take a sample from a drum using the thief method, the top hole shall be closed with the thumb and the open end quickly thrust to the bottom of the drum. The thumb must then be removed. When the thief is filled, the top hole must again be closed by means of the thumb, the thief quickly withdrawn from the drum and the sample of oil drained into the clean sample container.

1.6 The free hand shall not be used to block the bottom of the tube or guide the stream of oil.

1.7 Care shall be taken when obtaining and handling samples to avoid contamination to ensure accurate test results.

Note: If the sample does come into contact with the sampler's hands or breath, the sample must be retaken.

1.8 For most samples the container may be dark amber glass or plastic of at least 1 litre capacity but for gas analysis, aluminium or tin vessels shall be used. The oil samples shall not be exposed to strong light. An oil resistant seal shall be used in the screw caps to seal the sample against loss of gas or ingress of moisture.

1.9 The container shall be cleaned by rinsing with nheptane, iso-propane or trichloroethylene, dried and capped.

1.10 Sampling flanges and valves must be cleaned with lint-less cloths before taking samples.

1.11 When a sample is taken from drain valves at the bottom of transformers, other electrical equipment or road/rail tank cars, a sufficient amount of oil shall be discarded initially (at least 1 litre). This is to ensure that the sample taken is not the liquid which was trapped in the drain valve or pipe.

1.12 The container must be rinsed with the next approximately 200 ml of oil and the valve adjusted to give a steady flow. The valve must not be operated again until the sampling is complete. The container must be filled to the top, the cap secured immediately and taken to the laboratory for test.

1.13 When taking samples for water content tests, the operating temperature of the transformer oil must be recorded. If the water content of the first sample exceeds the permissible limit as indicated in appendix 3, a further sample must be taken and the average temperature of the oil in the transformer over the 24 hour period prior to taking the sample, must be taken for the purpose of passing/failing the oil. The oil temperature must be taken by using a glass thermometer held at the opening of the drain valve while taking the sample.

Note: In the case of transformers, the sample shall not be taken within 24 hours after energising or de-energising the transformer.

1.14 Free gases in transformer oil could cause operation of the Buchholtz relay and an alarm trip. After the occurrence of a Buchholtz relay operation, the electrical maintenance staff must contact the Senior Engineering Technician (Electrical) of the Regional Test Laboratory to take samples of the oil for analysis of gas content.

1.15 The sampling point on the transformer must be chosen to obtain a representative sample of oil. It is thus essential to take a top and bottom sample from the transformer main tank, if possible.

1.16 Sampling containers must be properly labelled and suitably packed. The containers must not be opened until the sample is ready for analysis.

1.17 The date, type and location of the equipment, and in case of transformers, the oil temperature must be recorded on the label.

1.18 The sample shall be analysed within one week after being taken.

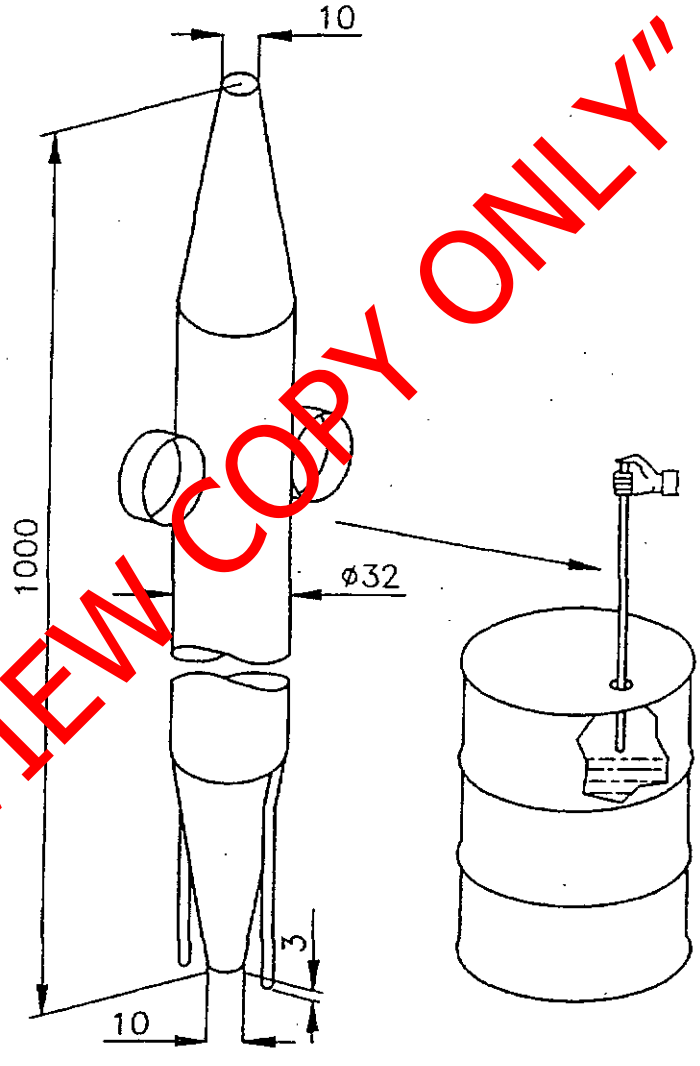

FIG. 1: DRUM THIEF AND METHOD OF SAMPLING

END

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PROCEDURES TO BE FOLLOWED FOR ROUTINE TESTING OF ELECTRICAL INSULATING OILS

1.0 VISUAL EXAMINATION

1.1 The colour and odour of the oil can provide valuable information regarding condition of the oil and these aspects must be recorded. This examination must be used to control the validity of the individual tests described in clauses 2.0 to 5.0 of this Appendix.

1.2 Cloudiness may be due to suspended moisture, or solid matter such as iron oxide or sludge.

1.2.1 Dark brown oil is indicative of dissolved asphaltene.

1.2.2 Green oil indicates the presence of copper soap and further deterioration of the oil can be expected to be rapid.

1.2.3 An acid smell is indicative of volatile acids.

2.0 DIELECTRIC STRENGTH

2.1 Test instrument

Dielectric strength shall be measured with a test cell complying with the latest edition of IEC 156 recommendation and shall have spherical electrodes.

2.2 Test method

2.2.1 The sphere gap shall be set to 2,5 plus minus 0,1 mm.

2.2.2 The cell and oil shall initially stand for 5 minutes and shall be covered during this period.

2.2.3 The voltage applied shall be raised at a uniform rate of 2 kV/s until breakdown occurs. This voltage shall be recorded.

2.2.4 After each breakdown test, the oil shall be gently stirred using a clean, dry glass rod or an automatic stirrer if provided, and then be allowed to stand for one minute.

2.2.5 Six breakdown tests shall be carried out on the same cell filling.

2.2.6 The dielectric strength is deemed to be the arithmetic mean of the six tests.

Note: Complete breakdown is indicated by the operation of the circuit breaker protecting the test set. This may be automatically recorded by some of the newer oil test sets.

2.3 Dielectric strength tests must be undertaken in a temperature controlled room and the oil samples must have attained a fixed room temperature of 25 plus minus 2 degrees Celsius.

3.0 *WATER CONTENT*

3.1 The crackle method is a crude method of detecting water in oil and only indicates presence of free water and may therefore only be used to test oil in switch-gear.

3.2 To test the moisture content of oil in transformers it is essential to make use of the Standard Test Method for testing for water in insulating liquids ASTM D 1553/79 method B (Karl Fischer Method). This method can determine water content of insulating liquids in the range 0 to 75 ppm.

3.2.1 The Coulometric automatic Karl Fischer titration instrument shall be used for this test.

4.0 NEUTRALISATION NUMBER (ACIDITY)

4.1 Apparatus

4.1.1 25 ml pipette.

4.1.2 4 or 5 litre beaker.

4.1.3 100 ml graduated cylinder, with 1 ml divisions.

4.1.4 250 ml beaker.

4.1.5 10 ml burette with 0,1 ml graduations and 0,02 ml division.

4.2 Solutions

4.2.1 Sufficient volume of normalised solution of potassium hydroxide in alcohol (Alcohol KOH) prepared as per Appendix 4 (Normality [N]).

4.2.2 Carrier-solution

Use 4760 ml isopropyl alcohol, add 240 ml distilled water, stir this mixture thoroughly. Add 5 litres of white spirits to the first mixture and stir well.

Note: Always add the distilled water to the isopropyl alcohol and not vice versa.

4.3 Indicators

Phenolphthalein or Paranaphtholbenzene or Alkali Blue (See note clause 14.1.2 of Instruction).

4.4 Test method

4.4.1 Take approximately 100 ml of carrier-solution, add three drops of phenolphthalein indicator and stir thoroughly using a clean glass rod.

4.4.2 Fill the 10 ml burette with alcohol KOH and titrate against the above colourless solution until the colour changes to pink (not crimson). This should take between one and five drops of KOH. Note the burette reading (X).

4.4.3 Pipette 25 ml of oil and add this to the titrated solution obtained in clause 4.4.2.

4.4.4 Titrate KOH against the solution of clause 4.4.3 until the colour changes and note the burette reading (A). The colour change will be dependent upon the original solution colour. If phenolphthalein indicator is used the change could be to an orange colour. With colourless oil the change would be to a pink colour. With light green oil the change would be to a light brown colour. If alkali blue indicator is used, the colour change will be from blue/blue green to a strong red colour.

4.4.5 Calculate the acid content of the oil using the following formula:

(A-X) x 2,65 x N mg KOH/g oil

Where: N = Normality of KOH.
A = First titration KOH.
X = Second titration oil.

4.4.6 **In some instances oil is a very dark red-amber colour, and when diluted with carrier-solution it may still mask the indicator change to pink. To overcome this situation either:**

4.4.6.1 Use the alternative indicator (paranaphtholbenzene) or

4.4.6.2 Neutralise 300 ml carrier-solution and add 25 ml of the oil under test. Phenolphthalein indicator may be used unless the solution still has a definite red tint.

Note: Paranaphtholbenzene will change from an amber colour to green or green-brown.

5.0 DETERMINATION OF SEDIMENT AND SLUDGE

5.1 To determine the content of sludge in the oil, the method described in IEC 422, Appendix A, or BS 148 must be used.

5.2 This test requires specialised apparatus and can only be carried out by specially equipped laboratories.

6.0 DISSOLVED GAS ANALYSIS

To determine the gas content in oil, the method described in IEC 567 must be used.

Note: The dissolved gas analysis can only be done by suitably equipped laboratories providing this service.

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MAXIMUM PERMISSIBLE WATER CONTENT OF OIL IN TRANSFORMERS VERSUS TEMPERATURE OF TOP OIL SAMPLE UNDER EQUILIBRIUM CONDITIONS

TEMP. OIL Deg. Celsius	MOISTURE ppm	TEMP. OIL Deg. Celsius	MOISTURE ppm
10	8	31	24
11	9	32	26
12	9	33	27
13	10	34	29
14	10	35	30
15	11	36	31
16	11	37	32
17	12	38	34
18	12	39	36
19	13	40	38
20	13	41	40
21	14	42	43
22	15	43	46
23	16	44	50
24	17	45	53
25	18	46	57
26	19	47	60
27	20	48	64
28	21	49	67
29	22	50	71
30	23		

Note 1: If the water content exceeds 50 ppm, irrespective of temperature, the office of Chief Engineer (Electrical) must be notified.

Note 2: This table is based on values being used by ESKOM for moisture content of 5 percent in the paper insulation.

END

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PROCEDURE TO BE FOLLOWED FOR PREPARATION OF CHEMICALS FOR OIL TESTING

1.0 INDICATORS

These are made by dissolving approximately 1 g of the indicating material (solid) in 100 ml carrier-solution.

Note: Alkali blue does not readily dissolve and should be refluxed in the carrier-solution.

2.0 ALCOHOL KOH

Note: KOH pellets must be kept in sealed bottles. This material absorbs water which will affect weight.

2.1 Dissolve 15 g KOH in plus minus 15 ml of distilled water. When completely dissolved, add the solution to 5 litres isopropyl alcohol. Allow the final solution to stand for 1 week and shake the final mixture every day for ten minutes, then decant clear liquid from the residue. Store in a dark amber bottle at approximately constant temperature in a dark place for 3 months before use.

2.2 Normalisation and storage:

2.2.1 Take approximately 0,5 g of potassium hydrogen phthalate and determine the mass accurately (W g).

2.2.2 Dissolve the potassium hydrogen phthalate in 100 ml distilled water. Add three drops phenolpthalein indicator.

2.2.3 Titrate alcohol KOH from a 10 ml burette into the above solution until the colour of the solution changes to pink. Record the volume of KOH used (V ml).

2.2.4 The KOH normality is calculated from the formula:

$$\text{Normality KOH} = \frac{W}{V} \times \frac{1000}{204,23}$$

$$= \frac{W}{V} \times 4,9$$

Where: N = Normality of KOH.
W = Mass potassium hydrogen phthalate.
V = Volume KOH pellets.

2.2.5 Always store alcohol (KOH) in amber bottles at constant temperature in a dark place.

END