

**OCCUPATIONAL HYGIENE SURVEYS AT TRANSNET ENGINEERING  
(TE) BLOEMFONTEIN INCLUDING PART OF CAPE ORE AND  
CONTAINER CORRIDORS**

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## 1. INTRODUCTION

TE business strives to conduct its business activities within the framework of a Safety, Health and Environmental Management based on ISO 14001, ISO 45001, National Railway Safety Regulator Act, 2002 (As amended), including SANS 3000-4:2001 (Human Factor Management) and OHS Act, 85 of 1993 as amended and other SHE related legislations. TE comprises of approximately hundred and thirty-two (132) Maintenance depots (inclusive of sub depots) and six (6) factories countrywide. The organisation is dedicated to in-service and out of service maintenance depots (en route maintenance of rolling stock), repair, upgrade, conversion, refurbishment and manufacturing of freight wagons, mainline and suburban coaches, diesel and electric locomotives as well as wheels, rotating machines, rolling stock equipment, castings, foundries, auxiliary equipment and support services.

Some of the activities like spray painting, shot blasting, cleaning of components with chemicals, gas burner operations, steam cleaning will require personal sampling and stack monitoring. AIA should identify such activities and sampling points / areas as well as accessibility to these areas.

For TE to comply with this monitoring it is a legislative and SANS requirement to conduct this monitoring. "Transnet Engineering in its policies has committed to the prevention and minimisation of hazards in the workplace. The planned monitoring is a legislative requirement".

**Transnet Engineering invites proposals from suitably Approved Inspection Authorities (AIA) to conduct Occupational hygiene monitoring at its business units across the Bloemfontein Region which includes Northern Cape region and Free State.**

## 2. LEGAL REQUIREMENTS

Transnet Engineering (TE) requires that Occupational Hygiene Surveys be carried out in line with the following, but not limited to, legal requirements:

- Occupational Health & Safety Act (Act 85 of 1993) as amended, and all regulations incorporated under this Act
- All applicable South African National Standards (SANS) referred to in the Occupational Health and Safety Act (Act 85 of 1993 as amended), as well as Railway Safety Legislation (SANS 3000-4:2011 (Section 5 Physical Environmental factors) and all regulations incorporated under this Act.
- Transnet Engineering SHE IMS Corporate Standards and Policies
- Compensation for Occupational Injuries and Diseases Act (Act 130 of 1993)
- TE code of practices
- International standards and best practices

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### 3. AIA COMPETENCY

- The service provider must be an Approved Inspection Authority (AIA), approved by the department of Labour. The valid Certificate of approval must accompany the quotation. TE will require a valid / recent copy of the certificate with each report supplied.
- Personnel involved in the services of the Approved Inspection Authority must be registered with the Southern African Institute of Occupational Hygiene (SAIOH). TE will require copies of the certificates with each report supplied.
- The Approved Inspection Authority must include at least one Occupational Hygienist.
- Assistant Occupational Hygienists must be under the direct supervision of the Occupational Hygienist if they are to conduct monitoring surveys.
- An Occupational Hygiene Technologist must be registered with SAIOH and hold a valid legal competency certificate. TE will require copies of the certificates with each report supplied.
- Site inspection by the AIA is imperative before submitting quotations so as to be familiar with the occupational health hazards and risks in the workplace.

### 4. MONITORING EQUIPMENT REQUIREMENTS

#### An AIA must: -

- Be in possession of technical equipment required for sampling.
- Be able to provide the valid calibration certificates for each piece of equipment used for sampling.
- Be accountable and responsible for the correct operation and calibration of all equipment used, whether it belongs to them or not.
- Be accountable and responsible for the result obtained if external accredited analytical laboratories (e.g. SANAS) are used for sample analysis.
- Instruct the laboratory on specific method of sampling analysis required (in accordance with legislation and SABS/SANS codes).
- Certify that the given method was used for the sampling analysis. Any deviation from the sampling method must be recorded and the reason for such deviation must be motivated.
- Give explanation, control measures and recommendations regarding findings and non-conformances as part of his report
- Compile and submit a comprehensive report which shall include, but not limited findings, control measures, non-conformances and recommendations.

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## 5. SCOPE OF WORK

The following surveys or assessments will need to be conducted at TE:

### 5.1 Identification and Evaluation Occupational Health Stressors

For risk identification, AIA shall list all activities from the start of its process to the end and identify the following stressors: -

#### 5.1.1 Chemical Stressors

- Dust (e.g. Asbestos, Silica, etc.)
- Smoke (e.g. Smoke from stacks, etc.)
- Fumes (e.g. Exhaust emissions from Diesel Locomotives, metal fumes, etc.)
- Mist (e.g. Spray Painting)
- Gases (e.g. Hazardous chemicals) and
- Vapors (e.g. Lead of soldering processes)

**An AIA shall: -**

- Conduct **Hazardous Chemical Substance Risk** identification, assess and recommend control measures, and compile a Risk Register clearly indicating all the identified activities.
- Conduct air monitoring to determine the measurement of the airborne concentrations of the HCS to which employees are exposed and rate these in terms of the significance as outlined in the **HCS** Regulation. Refer to chemical stressors in 5.1.1 and consider other chemical substances not mentioned above.
- The **Hazardous Chemical Substance risk assessment** section of the assessment shall be undertaken in compliance and with due consideration to Section 8 of the Occupational Health and Safety Act (Act 85 of 1993), OHSAS 18001 section 4.3.1 and SANS 16001 section 4.3.1. This also to include train operators and shunting teams entering areas where HCS are used or other areas of exposure (SANS 3000-4:2011).
- All other **Hazardous Chemical Substance** risks of current activities, products and services and new activities (new developments, modified activities, services or new projects, non-routine, emergencies) shall also be identified during these assessments.
- Evaluation should be done in accordance with monitoring strategy Occupational exposure sampling strategy Manual (173-1973).
- Evaluate the exposure of critical grades such as shunters, yard officials, tractor operators and locomotives drivers to loco/ hunslet/funkey/tractor exhaust fumes in cab, dust areas, exposure to commodity in wagons and tankers and environment of shunting e.g. move into shot blasting/spray painting area

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- With regards to Ionizing and Non-Ionizing radiation, an AIA shall: identify sources of radiation i.e. Non-Ionizing Radiation from welding activities, laser machines and other sources and Ionizing radiation i.e. nuclear radiation (X-Ray machines)
- Consider regulation applicable for specific activities e.g. Asbestos and Lead.
- Provide practical recommendations and appropriate control measures, taking into consideration the hierarchy of controls.
- Conduct assessment to determine area that emit silica dust in accordance with OHS Act 85 of 1993

### 5.1.2 Physical Stressors

#### ILLUMINATION

##### Competent person shall: -

- Measure the illumination level and compare with statutory requirements as per environmental regulation for workplaces as well as Human Factor standard (SANS 3000-4:2011) (e.g. Inside Cabs of shunting equipment such as Traverser, Funkey Locomotives, Whiting, etc.) for each activity as well as yards where train activities are conducted and security perimeters.
- Provide practical recommendations and appropriate control measures, taking into consideration the hierarchy of controls.
- Schematic drawing indicating workshop layout in comparison to sampling points to be included in the report.

#### NOISE

##### An AIA shall: -

- Establish equivalent noise level from activities where the noise level is 85dB (A) or higher.
- Indicate all noise sources and area/zone on relevant maps and attach to the report.
- Take measurements at approximate position of the employee's ear who receives the higher noise level as contemplated in the South African Code of Practice for the measurement and assessment of occupational noise for hearing conservation purposes, SANS 083-1983 (as amended).
- The measured level must be representative of an 8-hour work period.
- Provide practical recommendations and appropriate control measures including noise zones, taking into consideration the hierarchy of controls i.e. Elimination, Substitution, Engineering Control, Administrative control and PPE as the last resort.
- Schematic drawing indicating workshop layout in comparison to sampling points to be included in the report as well as Human Factor standard (SANS 3000-4:2011) (e.g. inside Cabs of shunting equipment, employees working in in-service areas between rolling stock in yards, load box testing, exposure of Yard officials and wagon examiners, Tractor drivers, etc.). Including ambient,

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Environmental noise and the influence on wanted sounds which include warning signals and verbal commands that must be audible.

## VIBRATION

### An AIA shall: -

- Identify all sources of vibration and classify whether whole body vibration (WBV) is or **vibration** affecting the upper limbs or hand arm vibration syndrome.
- Comply with international standards for measuring WBV. Provide practical recommendations and appropriate control measures as well as Human Factor standard (SANS 3000-4:2011) (e.g. Inside Cabs and on shunting equipment, handling of controls and shunting staff hanging onto rolling stock during shunting movements, Testing air and vacuum brakes).
- Provide practical recommendations and appropriate control measures, taking into consideration the hierarchy of controls.

## THERMAL CONDITIONS

### An AIA shall: -

- Identify and evaluate thermal stressors in accordance with Environmental regulations for workplaces 1987 under OHS Act 85 of 1993, as well as Human Factor standard (SANS 3000-4:2011) (e.g. employees exposed to harsh environmental conditions in winter and working outside during shift work.)  
Bloemfontein Plant etc. inside cabins of shunting equipment. This must be conducted during winter months and during night shift duties).
- Provide practical recommendations and appropriate control measures, taking into consideration the hierarchy of controls.
- The thermal stress should be done twice to cover both results in two seasons which are during summer and winter (when it is too hot and it is too cold)

### (a) Heat stress

### An AIA shall: -

- Identify sources of heat to the body.
- Ensure measurement is carried out in accordance with ISO code of practice 7243 and Environmental Regulations for workplaces OHS Act 85, 1993.
- Provide a calibration certificate of the monitoring instrument.
- Provide practical recommendations and appropriate control measures, taking into consideration the hierarchy of controls.

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## (b) Cold Stress

### An AIA shall: -

- Determine areas, occupants or tasks that place workers at risk of Hypothermia or cold related incidents.  
Provide practical recommendations and appropriate control measures, taking into consideration the hierarchy of controls.
- Identify and evaluate cold stressors in accordance with Environmental regulations for workplaces 1987 under OHS Act 85 of 1993, as well as Human Factor standard (SANS 3000-4:2011)

## RADIATION (IONISING AND NON-IONISING)

### An AIA shall: -

- Identify sources of radiation i.e. Non-ionizing Radiation from welding activities, laser machines and other sources and Ionizing radiation i.e. nuclear radiation (X-Ray machines).
- Provide practical recommendations and appropriate control measures, taking into consideration the hierarchy of controls.

## VENTILATION AND INDOOR AIR QUALITY

### An AIA shall: -

- Measure air velocity to determine if the air breathed by employees does not endanger their health as determined by the Occupational Exposure Limit (OEL).
- Take into consideration the Carbon dioxide, Carbon monoxide, Nitrogen dioxide, Sulphur dioxide, Formaldehyde and Soot content of the air in line with Regulation 5(c) of the Environmental Regulations for Workplaces.
- Measure ventilation and efficiency of extractions systems in the spray-painting booths, shot blast booths and other similar systems.
- Apply best practices and legislative requirements.
- Provide practical recommendations and appropriate control measures, taking into consideration the hierarchy of controls.

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### 5.1.3 Ergonomics (Human Factors in Design)

#### **An AIA shall: -**

- Conduct assessment to consider human abilities and limitations in relation to work positions and machines.
- Identify and evaluate risks, also taking into consideration Human Factor standard (SANS 3000-4:2011) (e.g. Inside Cabs of shunting equipment, Operational equipment such as Point tumblers, Commode handles, Access to shunting equipment, walkways).
- Provide practical recommendations and appropriate control measures, taking into consideration the hierarchy of controls.

### 5.1.4 Health Risk Assessment

#### **Baseline Process**

- Determine the current state of the occupational health risks associated with TRE activities.
- Gather information about work and work practices e.g. identify raw products, additives added to the product involved.
- Obtain inventory of Hazardous chemicals and MSDS's.
- Determine number of employees exposed
- Identify control measures in place
- Determine Likelihood of exposure
- Determine frequency and duration of exposure
- Determine potential severity of exposure
- Provide quantitative ratings.
- Provide practical recommendations and appropriate control measures, taking into consideration the hierarchy of controls.

### **Biological Agents**

#### **As part of the health risk assessment, An AIA shall: -**

- Identify sources of hazardous biological agents.
- Take swabs and analyze them to test possible bacterial growth.
- Specific attention to be given to Wagon and Locomotive maintenance employees exposed to raw sewer coming from coach wagons under carriage as well as human and animal blood and flesh on rolling stock under carriages. These employees get exposed to amongst others Cholera, E coli, Enteritis, Anthrax, etc.
- Sample drinking water for bacteriological sampling, especially in the depots where water from boreholes and storage tanks is used for drinking purposes.

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Provide practical recommendations and appropriate control measures, taking into consideration the hierarchy of controls.

## 6. DELIVERABLES

A comprehensive Monitoring report with clear recommendations per Business. Final documents must be submitted in hard copies and in an electronic format.

## 7. WORK SCHEDULE

The Respondents are required to submit with their proposals a detailed schedule of the work to be undertaken as this will form part of the adjudication criteria. The schedule should also indicate time frames and be accompanied by a detailed budget breakdown per Business. The expected delivery date will be discussed with a successful tenderer.

## 8. GENERAL REQUIREMENTS

The Respondents must:

- **Clearly set out the proposed methodology for achieving the required objectives.** The detailed schedule/programme to be submitted with the proposal must include but not be limited to e.g.
  - Specific deliverable
  - key milestones
  - inter-relationships between activities,
  - Time for the completion of the entire project, etc.
- **Indicate the probable cost and time elements of their proposal.** The costs should be broken down per business and should include costs for travel, accommodation, sampling test, material and analysis.
- Submit an extensive company profile, providing details of similar or associated work done.
- Demonstrate a proven track record Curricula Vitae of all human resources to be deployed in the project; Show clear capacity for delivering adequate services.

Be able to commence work at short notice if successful.

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## 9. ADJUDICATION PROCESS

Transnet Engineering reserves the right to:

- Adjudicate proposals in terms of Transnet procurement procedures.
- To approve sub-contractors or joint venture partners. If deemed necessary, a short presentation and or interview may be required from candidates, for which adequate notice will be given.
- To cancel this project at any time.
- To decide to call for a second round of specific and detailed submissions should it deem appropriate.
- Not accept any proposal in part or in full.

**Note:** Refer to Attached **Annexure A** for Transnet Engineering's Regions and Businesses to be included in this scope. (Free State / Northern Cape)

## 10. EVALUATION CRITERIA

Refer to tender document.

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## ANNEXURE A

### 1. BLOEMFONTEIN REGION

**TOTAL COST = R** \_\_\_\_\_

WAGON MAINTENANCE DEPOTS				
Region	Business / Depot / Sub-depot	Number of employees	Physical Address	Price
Bloemfontein	Beaconsfield Main Depot	28	Wagons Maintenance, Oliver Road, Beaconsfield, Kimberley	
Bloemfontein	Bloemfontein Sub depot	35	CO Maselspoort and Ntanstreet	
Bloemfontein	DE AAR Sub Depot	10	No street address, came in on Britstown road - turn left to depot	
Bloemfontein	Upington Sub Depot	1		
Bloemfontein	Postmasburg Sub Depot	22	Transnet Road, Postmasburg	
Bloemfontein	Limes Acres Sub Depot	6		

**TOTAL COST = R** \_\_\_\_\_

Support Service Depots				
Region	Business / Depot / Sub-depot	Number of employees	Physical Address	Price
Bloemfontein	Beaconsfield sub depot	16 this number may vary due to the number of students leaving the course and new recruitment		
Bloemfontein	Beaconsfield sub depot	9		

**TOTAL COST = R** \_\_\_\_\_

<b>Wagons Maintenance Sishen and Hotazel</b>				
Region	Business / Depot / Sub-depot	Number of employees	Physical Address	Price
Bloemfontein	Sishen	45 (3 Shifts)		
Bloemfontein	Hotazel	6 (3 Shifts)		

**TOTAL COST = R** \_\_\_\_\_

<b>Locomotive Maintenance Sishen</b>				
Region	Business / Depot / Sub-depot	Number of employees	Physical Address	Price
Bloemfontein	Sishen	9 (2 Shifts)		

**TOTAL COST = R** \_\_\_\_\_

<b>LOCOMOTIVES MAINTENANCE DEPOTS</b>				
Region	Business / Depot / Sub-depot	Number of employees	Physical Address	Price
Bloemfontein	Bloemfontein Main Depot	49	Sats road, East end, Bloemfontein 9301	
Bloemfontein	Beaconsfield Main Depot	84	Off Study Street, Beaconsfield, Kimberley	
Bloemfontein	Postmansburg Sub Depot	10	Transnet road, Postmansburg	
Bloemfontein	Kroonstad	8		
Bloemfontein	Bethlehem	10		
Bloemfontein	De Aar Sub Depot	8		

**TOTAL COST = R** \_\_\_\_\_

## 2. BLOEMFONTEIN CENTRE

BUSINESSES IN THE MAIN PLANT				
Region	Business / Depot / Sub-depot	Number of employees	Physical Address	Price
Bloemfontein	Locomotives	112	Transnet Engineering, Transnet Road, Hilton, Bloemfontein	
Bloemfontein	Wheels	61	Transnet Engineering, Transnet Road, Hilton, Bloemfontein	
Bloemfontein	Foundry	48	Transnet Engineering, Transnet Road, Hilton, Bloemfontein	
Bloemfontein	Wagon Manufacturing	327	Transnet Engineering, Transnet Road, Hilton, Bloemfontein	
Bloemfontein	RM	17	Transnet Engineering, Transnet Road, Hilton, Bloemfontein	
Bloemfontein	FoE	120 (Including students)	Transnet Engineering, Transnet Road, Hilton, Bloemfontein	
Bloemfontein	PD	20	Transnet Engineering, Transnet Road, Hilton, Bloemfontein	
Bloemfontein	PEMM	75	Transnet Engineering, Transnet Road, Hilton, Bloemfontein	
Bloemfontein	Support Services	52	Transnet Engineering, Transnet Road, Hilton, Bloemfontein	

**TOTAL COST = R\_\_\_\_\_**

**Technical Specifications compiled by:**

**Name:** Vivian Seotlolla

**Designation:** Health and Safety Manager: Bloemfontein

**Date:** 2025/06/ 20

**Signature:** MV Seotlolla

**Technical Specifications approved by:**

**Name:** Johan Mans

**Designation:** SHE Manager: Bloemfontein

**Date:** 2025/07/ 01

**Signature:** 