Department of Employment & Labour Approved Inspection Authority (OH0036-CI04)

CONFIDENTIAL REPORT

HEALTH RISK ASSESSMENT (2025 REVIEW)

Project Number: GEO 06962_8

Issue Date: 5 May 2025

Prepared for:

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"THREE DECADES OF PROTECTING WORKPLACES, ELEVATING STANDARDS!"

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- *Noise Induced Hearing Loss Regulations (2003)*
- *Asbestos Abatement Regulations (2020)*
- *Hazardous Chemical Agents Regulations (2021)*

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EXECUTIVE SUMMARY

A comprehensive occupational health risk assessment was conducted at the Shongweni landfill site, with the objective of identifying, evaluating, and managing health risks faced by employees. This review considered a wide range of workplace hazards, including hazardous biological agents (HBA), hazardous chemical substances (HCA), ergonomic and noise hazards, thermal stress, illumination, non-ionising radiation, reproductive health concerns, and psychosocial stress.

Hazardous Biological Agents (HBA): The site continues to manage infectious waste streams and associated exposure risks through the use of FFP2 respirators, strategic work positioning, and strict hygiene protocols. Emphasis remains on hand hygiene, effective cleaning practices, staff education, and ongoing medical surveillance in line with HBA Regulations.

COVID-19 Precautions: Although not legislated, voluntary public health recommendations from the NICD are encouraged. These include self-isolation when symptomatic, and maintaining hygiene and ventilation standards. Employers may implement risk-based measures under the Occupational Health and Safety Act.

Hazardous Chemical Substances (HCA): PPE currently in use is effective, though regular training and supervision are critical. Continued air monitoring and the adoption of structured risk assessment protocols for specific disposal activities are recommended.

Ergonomics and Noise: Ergonomic conditions, while a lower priority, warrant attention—especially with regard to safe lifting and equipment seating. Noise exposure assessments must continue, with appropriate hearing protection provided where necessary.

Thermal Stress: High temperatures, particularly within operator cabins, present a risk. Functional ventilation systems, hydration, sun protection, and education on heat stress symptoms are essential. Work-rest cycles should be implemented during periods of extreme heat.

Illumination and Radiation: Routine monitoring of site lighting—especially at night—must be maintained. Outdoor workers must continue using sun protection to reduce the risk of UV-related health effects.

Reproductive Health: Pregnant and breastfeeding employees must be removed from hazardous roles and reassigned where possible. Medical surveillance and adherence to corporate reproductive health standards are essential.

Psychosocial Stress: Work-related stress remains a concern. Open communication, staff support, and informal psychological assessments can help mitigate its impact and maintain workforce wellbeing.

The recommendations provided remain aligned with national legislation and best practices. Their ongoing implementation will ensure a safe, healthy, and legally compliant working environment for all personnel at the Shongweni site.

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Tables:

LIST OF DEFINITIONS AND ABBREVIATIONS

Term	Definition
COVID-19	Coronavirus disease 2019
SANAS	South African National Accreditation System
SARS-CoV-2	Severe Acute Respiratory Syndrome (caused by Novel Coronavirus-2)

Abbreviation	Meaning
ACGIH	American Conference of Governmental Industrial Hygienists
BEI	Biological Exposure Index
DEL	Department of Employment and Labour
DPM	Diesel Particulate Matter
SDS	Safety Data Sheet
PNOC	Particulates not otherwise classified
RHR	Reproductive Health Risk
RHS	Reproductive Health Stressor
RSI	Repetitive Strain Injury
Sk	Skin notation (HCA may penetrate intact skin)
STEL	Short Term Exposure Limit (15 minutes)
TLV	Threshold Limit Value - ACGIH
TWA OEL-RL	Time Weighted Average Occupational Exposure Limit – Restricted Limit
TWA OEL-ML	TWA Occupational Exposure Limit - Maximum Limit
HBA	Hazardous Biological Agent
HEG	Homogenous Exposure Group
OHP	Occupational Hygiene Programme
OMP	Occupational Medicine Practitioner
OSHA	Occupational Safety and Health Administration (United States)
PPE	Personal Protective Equipment
RPE	Respiratory Protective Equipment
VOC	Volatile Organic Compound
WHO	World Health Organisation
NICD	National Institute for Communicable Diseases

1. PURPOSE

The purpose of this study was to conduct a review of the Worker Health Risk Assessment for the EnviroServ Shongweni Landfill Site. This was done in order to re-assess the risks to worker health associated with activities conducted on this site in accordance with statutory requirements.

2. PREMISES

The assessment review was conducted on the premises of the EnviroServ Waste management (Pty) Ltd, Shongweni Landfill Site, Shongweni, Kwazulu Natal, on 13 February 2025.

3. INTRODUCTION

Geozone Environmental (Pty) Ltd (Geozone), a SANAS accredited and Department of Employment and Labour Approved Inspection Authority (AIA), is contracted by EnviroServ Waste Management (EnviroServ) to perform occupational hygiene surveys and assessments at their landfill sites and waste management facilities. These surveys and assessments are performed in accordance with the requirements of the Occupational Health and Safety Act, 1993 (Act 85 of 1993). Geozone has compiled an Occupational Hygiene Programme (OHP) for the Shongweni landfill site which includes the following surveys and assessments:

- **Personal air sampling surveys:**
  Quantification of worker inhalation exposure to priority airborne contaminants including:
  - *volatile organic compounds (VOC)*
  - *inhalable particulates (dusts)*
  - *respirable particulates (fine dusts)*
  - *toxic metal compounds (chromium, nickel, lead, cadmium, mercury)*
  - *asbestos fibres*
  - *hydrogen sulphide*
  - *ammonia*

- **Thermal stress surveys:**
  Measurement and assessment of thermal stress conditions to which workers are exposed during the course of typical activities on site with priority being given to performing heat stress surveys during peak summertime conditions.

- **Illumination surveys:**
  Measurement and assessment of average daytime illuminance levels throughout all of the occupied buildings on site. Average night-time illuminance levels at all outdoor workplaces are also periodically measured.

3. INTRODUCTION…continued

- **Noise surveys:**
  Measurement and assessment of the noise rating levels to which workers are exposed during the course of typical activities on site. Both noise zoning and personal noise dosimetry sampling is performed.

- **Hazardous Biological Agents - surface swab sampling surveys**
  The site HBA Risk Assessment was last reviewed in 2025 in accordance with statutory requirements (Geozone Project No GEO 06962_3). Assessment of the extent of pathogenic micro-organism contamination of surfaces within the canteen and kitchen areas on the site is specifically performed with the aim of determining the risks which such contamination poses to worker health.

- **Local exhaust ventilation surveys:**
  Measurement and assessment of the functioning effectiveness of available local exhaust ventilation systems on site (laboratory fume cupboards).

- **Indoor air quality assessments:**
  Quantitative measurement of the quality if indoor air within occupied offices on site – i.e. measurement of ambient concentrations of carbon dioxide, carbon monoxide and fine particulate matter as well as relative humidity, ambient air temperatures and linear air movement.

Table 3.1: Frequencies of OH surveys and assessments performed at the Shongweni landfill site

Survey / assessment	Frequency	Legislative reference (OHSAct 85 of 1993)
Personal air sampling	6-12 months*	HCA Regulations
Noise surveys	6-12 months	Noise Induced Hearing Loss Regulations
Thermal stress surveys	12 months	Environmental Regulations for Workplaces
Illumination surveys	12 months	Environmental Regulations for Workplaces
Indoor air quality assessments	12 months	Environmental Regulations for Workplaces
Surface swab sampling	6 months	HBA Regulations
Local Exhaust Ventilation	12 months	HCA Regulations
HBA Risk Assessment	24 months	HBA Regulations
Health Risk Assessment	24 months	OHSA 85 of 1993
Ergonomics Risk Assessments	24 months	Ergonomics Regulations, 2019

** Additional personal air sampling is also performed whenever EnviroServ is tasked with the treatment and disposal of special waste streams such as mercury waste, pesticide waste etc – refer Annexure 1.*

3. INTRODUCTION…continued

Geozone is also responsible for compiling and managing an ambient air quality monitoring programme for the Shongweni landfill site. This programme entails the ongoing quantitative assessment of ambient concentrations of priority contaminant compounds both on the boundaries of the Shongweni site and at selected off-site monitoring locations.

In accordance with the requirements of the Occupational Health and Safety Act (Act 85 of 1993), Geozone reviews the Health Risk Assessment for the Shongweni landfill site every 24 months. The review entails the assimilation of all the quantitative data obtained by occupational hygiene surveys performed since the last review assessment. This data, together with qualitative observations made during the latest site visit, are used to compile a single document detailing the identified priority health risks associated with each activity performed on the Shongweni site.

During the course of the latest review assessment, the site manager as well as several supervisors and workers on the site were interviewed. For the purposes of this Health Risk Assessment review, activities on the site were divided into separate work categories, each representing workers at risk of exposure to similar occupational health stressors. These work categories, termed *Homogenous Exposure Groups* (HEGs) are detailed below:

Table 3.2: Homogenous Exposure Groups (HEGs) at the Shongweni landfill site

HEG No	Description
45	Weighbridge staff
46	Laboratory staff
47	Traffic controllers
48	Plant operators
49	Maintenance staff
52	Management staff
53	Supervisory staff
54	Administrative staff
55	Cleaning staff
55_1	Leachate Treatment Plant staff

3. INTRODUCTION…continued

The following should be noted:

- *Security staff are contracted in and are not employed by EnviroServ Waste Management directly and are purposely excluded from this Health Risk Assessment.*

As part of the risk assessment review process, the activities within each identified work category were again observed and re-assessed - i.e. qualitative assessments were made of the various *risks* to worker *health* posed by their execution of different activities on site.

The various work categories, activities and operations on site were assessed for both ***health hazards*** and corresponding ***health risks***. There is an important difference between a health ***Hazard*** and a health ***Risk****:*

- A ***Hazard*** is the potential for an activity to cause harm.
- ***Risk*** is the *likelihood* of this harm actually occurring.

It is possible that a chemical or biological substance or a physical activity may present a distinct hazard to an employee, but the associated risk of this employee suffering actual harm as a result of this substance or activity may be comparatively low - i.e. *low risk.*

For the purposes of this latest HRA review, the health hazards and associated risks associated with each work category on the Shongweni landfill site were divided into the following:

Stressor description	Details
Chemical stressors	Hazardous Chemical Agents (particulates, fumes, vapours, gases)
Physical stressors	Noise, Thermal stress, Illumination, Vibration, Non-ionizing radiation
Biological stressors	Hazardous Biological Agents including bacteria, viruses, fungi etc.
Ergonomic stressors	Manual materials handling, standing work, seated work, repetitive work
Reproductive health stressors	Mutagens, teratogens – stressors which can impact on the reproductive health of adults or unborn child
Psychosocial stressors	Performance pressure, excessive workloads, shift work, personal issues, social issues

4. STATUTORY REQUIREMENTS

Section 8(2) of the Occupational Health and Safety Act, 1993 (Act 85 of 1993) states, inter alia, that an employer shall 8(2)(d) establish as far as is reasonably practicable, what hazards to the health and safety of persons are attached to any work which is performed in his business, and he shall, as far as is reasonably practicable, further establish what precautionary measures should be taken with respect to such work in order to protect the health and safety of persons.

Also of relevance are:

Regulation 5(1) of the Regulations for Hazardous Chemical Agents (2021), promulgated under the OHSA states, inter alia, that "Every employer...shall, after consultation with the relevant health and safety representative or relevant health and safety committee, cause an immediate assessment to be made and thereafter at intervals not exceeding two years, to determine if any person may be exposed by any route of intake to a hazardous chemical agent (HCA)".

and

Regulation 6(1) of the Regulations for Hazardous Biological Agents (2022), promulgated under the OHSA states, inter alia, that "Every employer...shall, after consultation with the relevant health and safety representative or relevant health and safety committee, cause a risk assessment to be made and thereafter at intervals not exceeding two years, to determine if any person may be exposed to a hazardous biological agent (HBA)".

and

Section 87(1)(b) of the Basic Conditions of Employment Act, 1997 - Code of Good Practice on the Protection of Employees During Pregnancy and After the Birth of a Child. This Code is intended as a guide to employers and employees concerning the application of Section 26(1) of the BCEA which prohibits employers from requiring or permitting pregnant or breast feeding employees to perform work that is hazardous to the health of the employee or that of the child.

5. METHODOLOGY

Important Note: Due to a delay in the indoor air quality survey, all indoor air quality data in this report are referenced from the previous report (GEO06697_2). This report will be updated once the latest indoor air quality survey has been completed.

In order to assess the various health risks to workers, a semi-quantitative "value" for the health risk associated with each activity or operation was derived using the following factors:

5.1 Probability of exposure (P)

The chance that a person will be harmed or that damage will occur during an exposure period - according to the following table:

Table 5.1

Probability of exposure	Value (P)
* Almost certain	**5**
* Likely	**4**
* Possible	**3**
* Unlikely	**2**
* Rare / Remote	**1**

5.2 Period of exposure (T)

The length of time which a person may be exposed to an occupational stressor – according to the following table:

Table 5.2

Period of exposure	Value (T)
* Continuous exposure for entire shift	**5**
* Exposure for 2-4 hours per shift	**4**
* Short periods (several times per week)	**3**
* Unusual (a few times per month)	**2**
* Very infrequent (< once per month)	**1**

5. METHODOLOGY…continued

5.3 Consequence of exposure (C)

The consequence(s) of / impacts on worker health following exposure to a stressor:

Table 5.3

Consequence of exposure	Value (C)
* **Extreme** – Incident leading to death or major permanent incapacity	**5**
* **Major** – Injury leading to incapacity or disability	**4**
* **Moderate** – Significant injury requiring medical treatment >3 days absent	**3**
* **Minor** – Injury requiring first aid, <3 days absence from work	**2**
* **Negligible** – Minor injury not requiring first aid	**1**

In order to permit further refinement of the health risk assessment process, the *consequences of exposure to each of the potential occupational health stressors must be considered.* Reference was made to the following tables:

5.3.1 Chemical Stressors

Table 5.4

Consequence of exposure to HCA	Value (C)
* Materials which could cause death or major injury/permanent incapacity even though prompt medical treatment were given	**5**
* Materials which could cause serious injury/incapacity/disability even though prompt medical treatment were given	**4**
* Materials which on intense or continued exposure could cause temporary incapacitation or residual injury requiring medical treatment	**3**
* Materials which on exposure would cause only minor residual injury if first aid was given	**2**
* Materials which may cause irritation but are unlikely to cause any significant adverse health effects even if no treatment was given	**1**

5. METHODOLOGY…continued

5.3 Consequence of exposure (C)…continued

5.3.2 Noise

Table 5.5

8 hour noise rating level (dBA)	Value (C)
≥120	**5**
≥105	**4**
≥85 but <105	**3**
≥82 but <85	**2**
<82	**1**

5.3.3 Thermal Stress

*** Heat Stress**

Table 5.6

Wet Bulb Globe Temperature (WBGT)	Value (C)
WBGT ≥ 45	**5**
WBGT ≥ 40 < 45	**4**
WBGT ≥ 35 < 40	**3**
WBGT ≥ 30 <35	**2**
WBGT <30	**1**

5. METHODOLOGY…continued

5.3 Consequence of exposure (C)…continued

5.3.3 Thermal Stress

*** Cold Stress**

Table 5.7

Dry Bulb Temperature range (^{O}C)	Value (C)
≤ 0 < -15	**5**
≤ 6 < 0	**2**
>6 < 10	**1**

5.3.4 Biological Stressors

Table 5.8

Consequences of exposure to Hazardous Biological Agents	Rating (H)
* HBA that causes severe human disease and is a serious hazard to workers; it is likely to spread to the community and there is usually no effective prophylaxis or treatment available. Fatalities expected.	**5**
* HBA that can cause serious human disease, may be a very serious hazard to workers and may spread to the community but for which there is usually an effective prophylaxis / treatment available. Major disabilities may result	**4**
* HBA that can cause major illness and may be a hazard to workers and may spread to the community, but for which there is usually effective prophylaxis or treatment available (absent >14 days)	**3**
* HBA that can cause minor illness and may be a hazard to workers and may spread to the community, but for which there is usually effective prophylaxis or treatment available (absent <7 days)	**2**
* HBA which is unlikely to cause human disease	**1**

5. METHODOLOGY…continued

5.3 Consequence of exposure (C)...continued

5.3.5 Non ionising radiation

Non-ionising radiation is a form of electromagnetic radiation which may cause varying effects on the body depending in the particular wavelength of the radiation involved. Of potential concern in this instance is worker exposure to the Ultraviolet (UV) radiation in sunlight when engaged in outdoor activities as well as exposure to UV during welding activities. Solar UV causes sunburn and various forms of skin cancer, including malignant melanoma, a cancerous tumour which may arise in the skin, eye, mucous membrane or central nervous system. The tumour is malignant and often metastasises through the lymphatic or blood system - causing tumour formation at other locations. Survival depends on early diagnosis of the tumour. Welding UV may cause eye damage.

Table 5.9

Consequence of exposure to Non ionising radiation	Value (C)
* Death (malignant melanoma)	**5**
* Serious health effects (deep burns, carcinomas, corneal damage)	**3**
* Minor health effects (sunburn / erythema, corneal irritation)	**1**

5.3.6 Ergonomic stresses:

Table 5.10

Consequence of exposure to ergonomic stress	Value (C)
* Major injury	**4**
* Moderate injury	**3**
* Minor injury	**2**

5. METHODOLOGY…continued

5.3 Consequence of exposure (C)...continued

5.3.7 Vibration stress:

Table 5.11

Consequence of exposure to ergonomic stress	Value (C)
* Major injury	**4**
* Moderate injury	**3**
* Minor injury	**2**

5.3.8 Reproductive Health Stressors (RHS):

Reference was made to Section 87(1)(b) of the Basic Conditions of Employment Act, 1997 as well as the Code of Good Practice on the Protection of Employees During Pregnancy and After the Birth of a Child. Also referenced were the Occupational Health and Safety Act (Act 85 of 1993) and the EnviroServ corporate Management Guideline for Reproductive Health.

Table 5.12

Consequence of exposure (C)	Value (C)
* **Extreme** – may cause death or major permanent incapacity	**5**
* **Major** – may cause incapacity or disability	**4**
* **Moderate** – may cause significant injury	**3**
* **Minor** – may cause minor injury	**2**
* **Negligible** – unlikely to impact on reproductive health	**1**

5. METHODOLOGY…continued

5.3 Consequence of exposure (C)...continued

5.3.8 Psychosocial stress:

Workers may experience occupational stress as a consequence of working shifts, working to meet deadlines or working to meet production targets. Social and personal issues may also impact significantly on the psychological health of workers. The consequence values were allocated as follows:

Table 5.13

Consequence of exposure to psychological stress	Value (C)
* **Extreme** – Permanent psychosocial functioning incapacity	**5**
* **Major** – Impaired psychosocial functioning >6 months	**4**
* **Moderate** – Impaired psychosocial functioning >1 month but <6 months	**3**
* **Minor** – Impaired psychosocial functioning >3 days but < 1 month	**2**
* **Negligible** – No impaired psychosocial functioning	**1**

5. METHODOLOGY…continued

5.4 Calculation of Health Risk Ratings

In accordance with the methodology, there are three parameters which are used to assess the worker health risks associated with exposure to occupational health stressors:

- Probability of exposure (P)
- Period of exposure (T)
- Consequence of exposure (C)

These parameters are used to calculate the Health Risk Rating (R) associated with each identified occupational health stressor using the following equation:

(Probability of exposure + Period) x Consequence = Health Risk Rating

i.e. (P + T) x C = R

Table 5.14

Health Risk Rating (R)	Risk classification	Action
>40	***Intolerable***	***Consider discontinuation***
31-40	**Very high**	**Immediate action required**
21-30	**High**	**Correction required**
10-20	**Medium**	**Attention necessary**
<10	Low	Monitor

6. ASSESSMENT OF HEALTH RISKS

HEG-45: WEIGHBRIDGE STAFF

ACTIVITY	HAZARD DESCRIPTION	P	T	C	R	Health Risk Description
Receiving of waste for disposal to active cell: clerks receive waste, check documentation and lock In loads. Issue disposal charts. Weigh out trucks following disposal	**HCA:** diesel exhaust emissions (inhalation exposure)	3	3	3	**18**	**MEDIUM**
	RHS: multiple HCA with reproductive health effects	2	3	3	**15**	**MEDIUM**
	HCA: multiple HCA (inhalation, dermal, eye exposure)	2	3	3	**15**	**MEDIUM**
	RHS: Ergonomics	2	3	3	**15**	**MEDIUM**
	HCA: inhalable/respirable particulates (inhalation exposure)	3	3	2	**12**	**MEDIUM**
	HBA: Type 3 HBA (SARS-CoV-2 – inhalation)	3	1	3	**12**	**MEDIUM**
	HBA: Type 2 HBA (*E.coli*, Bacillus sp. - ingestion/dermal)	2	3	2	**10**	**MEDIUM**
	Ergonomics stress: muscle and joint strain	2	3	2	**10**	**MEDIUM**
	Noise: diesel trucks	2	3	2	**10**	**MEDIUM**
	Illumination: night-time illumination levels	3	5	1	8	LOW
	Heat stress: summer	2	2	2	8	LOW
	Cold stress: winter nights/mornings	2	1	2	6	LOW
	Non-ionising radiation: solar UV (skin, eye exposure)	2	1	2	6	LOW
	Psychosocial stress: job demands / work pressures	2	2	1	4	LOW

Where: P = Probability of exposure; T = Period of exposure; C = Consequence of exposure; R = (P+T) x C = Health Risk Rating

6. ASSESSMENT OF HEALTH RISKS…continued

HEG-46: LABORATORY STAFF

ACTIVITY	HAZARD DESCRIPTION	P	T	C	R	Health Risk Description
Taking of verification samples for lab analysis. Receiving and analysis of samples, general laboratory activities	**RHS:** multiple HCA with reproductive health effects	3	4	4	28	HIGH
	HCA: multiple HCA (inhalation, dermal, eye exposure)	3	4	4	28	HIGH
	HCA: diesel exhaust emissions (inhal exp during sample taking)	3	2	3	15	MEDIUM
	Ergonomics stress: sample taking activities	3	3	2	12	MEDIUM
	HBA: Type 3 HBA (SARS-CoV-2 – inhalation)	3	1	3	12	MEDIUM
	HBA: endotoxins, bacteria, fungi (ingestion/dermal)	2	1	3	9	LOW
	Heat stress: summer (outdoor sample taking)	2	2	2	8	LOW
	Noise: trucks / lab equipment and processes	3	4	1	7	LOW
	Non-ionising radiation: solar UV (skin, eye exposure)	3	3	1	6	LOW
	Cold stress: winter mornings	2	1	2	6	LOW
	Illumination: daytime illumination levels	1	5	1	5	LOW
	HCA: inhalable/respirable particulates (inhalation exposure)	1	1	2	4	LOW
	Psychosocial stress: job demands / work pressures	2	2	1	4	LOW
Cleaning of laboratory equipment and laboratory work surfaces	**RHS:** multiple HCA with reproductive health effects	2	3	4	20	HIGH
	HCA: multiple HCA (inhalation, dermal, eye exposure)	2	3	4	20	HIGH
	HBA: Type 3 HBA (SARS-CoV-2 – inhalation)	3	1	3	12	MEDIUM
	Ergonomics stress: prolonged standing, musculo-skeletal stress	2	2	2	8	LOW
	HBA: endotoxins, bacteria, fungi (ingestion/dermal)	1	1	3	6	LOW
	HCA: diesel exhaust emissions (inhalation exposure)	1	1	3	6	LOW
	Heat stress: summer	2	1	2	6	LOW
	Noise: lab equipment and processes	2	2	1	4	LOW
	Psychosocial stress: job demands / work pressures	2	2	1	4	LOW
	Cold stress: winter mornings	1	1	2	4	LOW
	Non-ionising radiation: solar UV (skin, eye exposure)	1	1	1	2	LOW

Where: P = Probability of exposure; T = Period of exposure; C = Consequence of exposure; R = (P+T) x C = Health Risk Rating

6. ASSESSMENT OF HEALTH RISKS…continued

HEG-47: TRAFFIC CONTROLLERS

ACTIVITY	HAZARD DESCRIPTION	P	T	C	R	Health Risk Description
Directing vehicles to the correct disposal locations / areas. General overseeing of disposal activities on the active cell/s	**RHS:** multiple HCA with reproductive health effects	3	4	4	28	HIGH
	HCA: multiple HCA (inhalation, dermal, eye exposure)	3	4	4	28	HIGH
	Noise: landfill plant equipment, diesel trucks, disposal activities	5	4	3	27	HIGH
	HCA: volatile organic compounds (inhalation exposure)	3	4	3	21	HIGH
	HCA: asbestos fibres (inhalation exposure)	3	2	4	20	MEDIUM
	HCA: inhalable/respirable particulates (inhalation exposure)	5	4	2	18	MEDIUM
	HCA: toxic metal compounds (inhalation exposure)	3	3	3	18	MEDIUM
	HCA: diesel exhaust emissions (inhalation exposure)	3	3	3	18	MEDIUM
	RHS: ergonomics, heat stress	4	4	2	16	MEDIUM
	Ergonomics stress: prolonged standing, walking	4	4	2	16	MEDIUM
	HCA: hydrogen sulphide (inhalation exposure)	2	2	3	12	MEDIUM
	HCA: ammonia (inhalation exposure)	2	2	3	12	MEDIUM
	HBA: Type 2 HBA (*E.coli*, Bacillus sp. - ingestion/dermal)	3	2	2	10	MEDIUM
	Non-ionising radiation: solar UV (skin, eye exposure)	5	5	1	10	MEDIUM
	Heat stress: summer	3	2	2	10	MEDIUM
	HBA: Type 3 HBA (SARS-CoV-2 – inhalation)	2	1	3	9	LOW
	Illumination: night-time illumination levels	3	5	1	8	LOW
	Cold stress: winter nights / mornings	2	1	2	6	LOW
	Psychosocial stress: job demands / work pressures	2	2	1	4	LOW

Where: P = Probability of exposure; T = Period of exposure; C = Consequence of exposure; R = (P+T) x C = Health Risk Rating

6. ASSESSMENT OF HEALTH RISKS…continued

HEG-48: PLANT OPERATORS

ACTIVITY	HAZARD DESCRIPTION	P	T	C	R	Health Risk Description
Operation of landfill plant equipment (Compactors, Excavators, Front end loaders, Dozers)	**RHS:** multiple HCA with reproductive health effects	3	4	4	28	HIGH
	HCA: multiple HCA (inhalation, dermal, eye exposure)	3	4	4	28	HIGH
	HCA: volatile organic compounds (inhalation exposure)	3	4	3	21	HIGH
	HCA: asbestos fibres (inhalation exposure)	3	2	4	20	MEDIUM
	HCA: inhalable/respirable particulates (inhalation exposure)	5	4	2	18	MEDIUM
	HCA: toxic metal compounds (inhalation exposure)	3	3	3	18	MEDIUM
	HCA: diesel exhaust emissions (inhalation exposure)	3	3	3	18	MEDIUM
	RHS: ergonomics, heat stress	4	4	2	16	MEDIUM
	Ergonomics stress: prolonged seated work	4	4	2	16	MEDIUM
	HCA: hydrogen sulphide (inhalation exposure)	2	3	3	18	MEDIUM
	HCA: ammonia (inhalation exposure)	2	2	3	12	MEDIUM
	Noise: landfill plant equipment, diesel trucks, disposal activities	3	3	2	12	MEDIUM
	Vibration: whole body vibration (operator cabins)	3	3	2	12	MEDIUM
	HBA: Type 3 HBA (SARS-CoV-2 – inhalation, ingestion, dermal)	2	1	3	12	MEDIUM
	HBA: Type 2 HBA (*E.coli*, Bacillus sp. - ingestion/dermal)	3	2	2	10	MEDIUM
	Heat stress: summer (inside operator cabins)	3	2	2	10	MEDIUM
	HBA: Type 3 HBA (SARS-CoV-2 – inhalation)	2	1	3	9	LOW
	Illumination: night-time illumination levels	3	5	1	8	LOW
	Non-ionising radiation: solar UV (skin, eye exposure)	3	3	1	6	LOW
	Psychosocial stress: job demands / work pressures	3	2	1	5	LOW
	Cold stress: winter nights / mornings	1	1	2	4	LOW

Where: P = Probability of exposure; T = Period of exposure; C = Consequence of exposure; R = (P+T) x C = Health Risk Rating

6. ASSESSMENT OF HEALTH RISKS…continued

HEG-49: MAINTENANCE STAFF

ACTIVITY	HAZARD DESCRIPTION	P	T	C	R	Health Risk Description
Site maintenance activities: service and repair of pipes, inspection of dams, liners for signs of damage or erosion.	**RHS:** multiple HCA with reproductive health effects	3	2	4	**20**	**MEDIUM**
	Noise: pumps, vehicles, hammering, grinding	3	3	3	**18**	**MEDIUM**
	HCA: volatile organic compounds (inhalation exposure)	3	2	3	**15**	**MEDIUM**
	HCA: inhalable/respirable particulates (inhalation exposure)	2	2	3	**12**	**MEDIUM**
	HCA: diesel exhaust emissions (inhalation exposure)	2	2	3	**12**	**MEDIUM**
	RHS: ergonomics	3	3	2	**12**	**MEDIUM**
	Ergonomics stress: prolonged standing, musculo-skeletal strain	3	3	2	**12**	**MEDIUM**
	HBA: Type 2 HBA (*E.coli*, Bacillus sp. - ingestion/dermal)	3	2	2	**10**	**MEDIUM**
	HCA: hydrogen sulphide (inhalation exposure)	2	2	3	**12**	**MEDIUM**
	HCA: ammonia (inhalation exposure)	2	2	3	**12**	**MEDIUM**
	Heat stress: summer	3	2	2	**10**	**MEDIUM**
	HBA: Type 3 HBA (SARS-CoV-2 – inhalation, ingestion, dermal)	2	1	3	9	LOW
	Non-ionising radiation: solar UV (skin, eye exposure)	4	3	1	7	LOW
	Illumination: night-time illumination levels	2	2	1	4	LOW
	Psychosocial stress: job demands / work pressures	2	2	1	4	LOW
	Cold stress: winter mornings	1	1	2	4	LOW

Where: P = Probability of exposure; T = Period of exposure; C = Consequence of exposure; R = (P+T) x C = Health Risk Rating

6. ASSESSMENT OF HEALTH RISKS…continued

HEG-52: MANAGEMENT STAFF

ACTIVITY	HAZARD DESCRIPTION	P	T	C	R	Health Risk Description
General management activities with infrequent visits to the operational areas on site.	**RHS:** multiple HCA with reproductive health effects	3	1	4	**16**	**MEDIUM**
	HCA: multiple HCA (inhalation, dermal, eye exposure)	3	1	4	**16**	**MEDIUM**
	HCA: volatile organic compounds (inhalation exposure)	3	1	3	**12**	**MEDIUM**
	Psychosocial stress: job demands / work pressures	3	3	2	**12**	**MEDIUM**
	HCA: asbestos fibres (inhalation exposure)	2	1	4	**12**	**MEDIUM**
	HBA: Type 3 HBA (SARS-CoV-2 – inhalation)	3	1	3	**12**	**MEDIUM**
	HCA: inhalable/respirable particulates (inhalation exposure)	3	2	2	**10**	**MEDIUM**
	Noise: landfill plant equipment, diesel trucks, disposal actvities	3	2	2	**10**	**MEDIUM**
	HCA: hydrogen sulphide (inhalation exposure)	2	1	3	9	LOW
	HCA: ammonia (inhalation exposure)	2	1	3	9	LOW
	HCA: toxic metal compounds (inhalation exposure)	2	1	3	9	LOW
	HCA: diesel exhaust emissions (inhalation exposure)	2	1	3	9	LOW
	RHS: ergonomics	2	2	2	8	LOW
	Ergonomics stress: prolonged seated work, desk work	2	2	2	8	LOW
	Heat stress: summer	3	1	2	8	LOW
	HBA: endotoxins, bacteria, fungi (ingestion/dermal)	2	1	2	6	LOW
	Non-ionising radiation: solar UV (skin, eye exposure)	3	2	1	5	LOW
	Illumination: night-time illumination levels	3	2	1	5	LOW
	Cold stress: winter mornings	1	1	2	4	LOW

Where: P = Probability of exposure; T = Period of exposure; C = Consequence of exposure; R = (P+T) x C = Health Risk Rating

6. ASSESSMENT OF HEALTH RISKS…continued

HEG-53: SUPERVISORY STAFF

ACTIVITY	HAZARD DESCRIPTION	P	T	C	R	Health Risk Description
General supervisory activities with frequent / regular visits to the operational areas on site.	**RHS:** multiple HCA with reproductive health effects	3	3	4	24	HIGH
	HCA: multiple HCA (inhalation, dermal, eye exposure)	3	3	4	24	HIGH
	HCA: volatile organic compounds (inhalation exposure)	3	3	3	18	MEDIUM
	HCA: toxic metal compounds (inhalation exposure)	3	3	3	18	MEDIUM
	HCA: hydrogen sulphide (inhalation exposure)	2	2	3	12	MEDIUM
	HCA: ammonia (inhalation exposure)	2	2	3	12	MEDIUM
	HCA: diesel exhaust emissions (inhalation exposure)	3	3	2	12	MEDIUM
	Psychosocial stress: job demands / work pressures	3	3	2	12	MEDIUM
	HCA: asbestos fibres (inhalation exposure)	2	1	4	12	MEDIUM
	HCA: inhalable/respirable particulates (inhalation exposure)	3	3	2	12	MEDIUM
	Noise: landfill plant equipment, diesel trucks, disposal activities	3	3	2	12	MEDIUM
	RHS: ergonomics	3	3	2	12	MEDIUM
	HBA: Type 2 HBA (*E.coli*, Bacillus sp. - ingestion/dermal)	3	2	2	10	MEDIUM
	Heat stress: summer	3	2	2	10	MEDIUM
	HBA: Type 3 HBA (SARS-CoV-2 – inhalation)	2	1	3	9	LOW
	Ergonomics stress: prolonged seated work	2	2	2	8	LOW
	Non-ionising radiation: solar UV (skin, eye exposure)	4	3	1	7	LOW
	Illumination: night-time illumination levels	3	2	1	5	LOW
	Cold stress: winter mornings	1	1	2	4	LOW

Where: P = Probability of exposure; T = Period of exposure; C = Consequence of exposure; R = (P+T) x C = Health Risk Rating

6. ASSESSMENT OF HEALTH RISKS…continued

HEG-54: ADMINISTRATIVE STAFF

ACTIVITY	HAZARD DESCRIPTION	P	T	C	R	Health Risk Description
General administration activities, secretarial duties, personal assts, no visits to operational areas	**RHS:** ergonomics, indoor air quality	3	4	2	**14**	**MEDIUM**
	Ergonomics stress: repetitive work, prolonged seated work	3	4	2	**14**	**MEDIUM**
	HBA: Type 3 HBA (SARS-CoV-2 – inhalation)	3	2	3	**12**	**MEDIUM**
	HCA: inhalable/respirable particulates (inhalation exposure)	2	1	3	9	LOW
	HCA: volatile organic compounds (inhalation exposure)	2	1	3	9	LOW
	HCA: diesel exhaust emissions (inhalation exposure)	2	1	3	9	LOW
	HCA: indoor air quality	3	1	2	8	LOW
	Heat stress: summer	2	2	2	8	LOW
	HBA: endotoxins, bacteria, fungi (ingestion/dermal)	1	1	2	4	LOW
	Noise: outdoor vehicle noise	1	1	2	4	LOW
	Psychosocial stress: job demands / work pressures	2	2	1	4	LOW
	Cold stress: winter mornings	1	1	2	4	LOW
	Non-ionising radiation: solar UV (skin, eye exposure)	1	2	1	3	LOW

Where: P = Probability of exposure; T = Period of exposure; C = Consequence of exposure; R = (P+T) x C = Health Risk Rating

6. ASSESSMENT OF HEALTH RISKS…continued

HEG-55: CLEANING STAFF

ACTIVITY	HAZARD DESCRIPTION	P	T	C	R	Health Risk Description
Cleaning of ablutions and office areas	**RHS:** HCA, ergonomics	3	4	2	**14**	**MEDIUM**
	HCA: general cleaning products (dermal, eye exposure)	3	4	2	**14**	**MEDIUM**
	Ergonomics stress: musculo-skeletal strain	3	4	2	**14**	**MEDIUM**
	HBA: Type3 HBA (SARS-CoV-2 – inhalation)	3	2	3	**12**	**MEDIUM**
	HBA: Type 2 HBA (*E.coli*, Bacillus sp - ingestion/dermal)	3	2	2	**10**	**MEDIUM**
	HCA: diesel exhaust emissions (inhalation exposure)	2	1	3	9	LOW
	HCA: inhalable/respirable particulates (inhalation exposure)	2	2	2	8	LOW
	Heat stress: summer	2	2	2	8	LOW
	Noise: outdoor vehicle noise	2	1	2	6	LOW
	Non-ionising radiation: solar UV (skin, eye exposure)	2	2	1	4	LOW
	Psychosocial stress: job demands / work pressures	2	2	1	4	LOW
	Cold stress: winter mornings	1	1	2	4	LOW

Where: P = Probability of exposure; T = Period of exposure; C = Consequence of exposure; R = (P+T) x C = Health Risk Rating

6. ASSESSMENT OF HEALTH RISKS…continued

HEG-55_1: LEACHATE TREATMENT PLANT STAFF						
ACTIVITY	**HAZARD DESCRIPTION**	**P**	**T**	**C**	**R**	**Health Risk Description**
Overseeing the operation of the leachate treatment plant, inspection and control of the leachate treatment process	**RHS:** multiple HCA with reproductive health effects	3	3	4	**24**	**HIGH**
	HCA: acidic HCA (inhalation, dermal, eye exposure)	3	3	4	**24**	**HIGH**
	HCA: volatile organic compounds (inhalation exposure)	3	3	3	**18**	**MEDIUM**
	HCA: hydrogen sulphide (inhalation exposure)	3	3	3	**18**	**MEDIUM**
	RHS: ergonomics, heat stress	3	3	2	**12**	**MEDIUM**
	HCA: ammonia (inhalation exposure)	2	2	3	**12**	**MEDIUM**
	Ergonomics stress: manual handling of treatment chemicals	3	3	2	**12**	**MEDIUM**
	Noise: plant noise	3	3	2	**12**	**MEDIUM**
	HCA: diesel exhaust emissions (inhalation exposure)	3	2	2	**10**	**MEDIUM**
	Heat stress: summer	3	2	2	**10**	**MEDIUM**
	HBA: Type 2 HBA (*E.coli*, Bacillus sp.- ingestion/dermal)	3	2	2	**10**	**MEDIUM**
	HBA: Type 3 HBA (SARS-CoV-2 – inhalation)	3	1	3	9	LOW
	HCA: inhalable/respirable particulates (inhalation exposure)	2	2	2	8	LOW
	Illumination: night-time illumination levels	3	5	1	8	LOW
	Cold stress: winter nights / mornings	2	1	2	6	LOW
	Non-ionising radiation: solar UV (skin, eye exposure)	2	2	1	4	LOW
	Psychosocial stress: job demands / work pressures	2	2	1	4	LOW

Where: P = Probability of exposure; T = Period of exposure; C = Consequence of exposure; R = (P+T) x C = Health Risk Rating

7. DISCUSSION OF HEALTH RISKS

7.1 HEG-45: Weighbridge staff

7.1.1 Hazardous Biological Agents (HBA)

An initial HBA Risk Assessment was performed for the Shongweni site in May 2013 and review assessments were performed in 2015 (Geozone Project No GEO03859), 2019 (GEO04454_0), 2021 (GEO 05565_7), 2023 (refer GEO Project No. 06209_9) and 2025 (refer GEO Project No. 06962_9)

Weighbridge staff are primarily engaged in receiving waste for disposal at the active cells and may be at medium risk of exposure to Group 2 HBA contained within selected waste streams (animal waste, food waste, sewage waste). The vehicles transporting this waste are required to stop at the weighbridge office in order to complete the necessary paper work, both prior to, and following, disposal operations. Vector-borne transmission of HBA (flies) is likely to be the primary potential route of exposure although dermal contamination and subsequent accidental ingestion is also a risk. The weighbridge office windows are normally kept open when paper work is being completed and weighbridge staff do not typically make any use of any specialised Personal Protective Equipment (PPE).

All healthcare risk waste (HCRW) currently received on site must have been previously treated (incinerated, autoclaved or hydroclaved) in order to render the waste both unrecognizable and sterile. The risks of exposure to viable HBA contained in HCRW are therefore reduced.

SARS-CoV-2 (COVID-19)

The SARS-CoV-2 virus has been categorized as a Group 3 HBA following the availability of effective vaccines. Available evidence indicates that SARS-CoV-2 is spread primarily by respiratory droplets generated when an infected person coughs or sneezes. *All previous measures, including mask mandates, gathering limits, curfews, and travel restrictions, were repealed by June 2022, and the national state of disaster ended on April 5, 2022. South Africa now manages COVID-19 as a routine public health issue under the National Health Act, with no compulsory requirements for isolation, quarantine, contact tracing, or vaccination.*

7. DISCUSSION OF HEALTH RISKS

7.1 HEG-45: Weighbridge staff…continued

7.1.2 Hazardous Chemical Substances (HCA)

Under normal operating conditions, weighbridge staff are potentially exposed to airborne concentrations of the following priority contaminants:

- *Inhalable and respirable particulate matter (dusts)*
- *Diesel exhaust emissions*
- *Multiple chemical substances (contained in waste streams received on site)*

Dealing with each of these in turn:

Inhalable particulates:

HCA ingredient: Inhalable particulates - TWA OEL-RL = 10 mg/m^3

Physical form: particulate

Route(s) of entry: inhalation

Health Effect Rating = 1

Health Effects: No systemic health effects are likely but excessive exposure may cause localised irritation of upper respiratory tract as well as mechanical irritation of the eyes.

Respirable particulates:

HCA ingredient: respirable particulates - TWA OEL-RL = 5.0 mg/m^3

Physical form: particulate

Route(s) of entry: inhalation

Health Effect Rating = 2(3)

Health Effects: Respirable dusts are able to penetrate into the lower gaseous exchange areas of the lungs. Following excessive inhalation exposures, respirable dusts may cause pneumoconioses (lung obstruction) – dependant on their morphology.

Diesel exhaust emissions:

HCA ingredient: diesel particulate matter - TWA OEL-RL = 0.16 mg/m^3

HCA ingredient: carbon monoxide - TWA OEL-RL = 50 ppm

Physical form: particulate, gas

Route(s) of entry: inhalation

Health Effect Rating = 3

Health Effects: The major health concerns are the *carcinogenic effect* of diesel particulate matter in humans and the chemical asphyxiant effect of carbon monoxide gas (bonds to haemoglobin in the blood to form carboxyhaemoglobin which then starves tissues of oxygen). There may be some potential for weighbridge staff to be exposed to diesel exhaust emissions from trucks entering and leaving the site. Given the good natural ventilation in the area, such exposures are unlikely to pose a significant health risk.

7. DISCUSSION OF HEALTH RISKS

7.1 HEG-45: Weighbridge staff

7.1.2 Hazardous Chemical Substances (HCA) …continued

*** <u>Multiple chemical exposures</u>**

Weighbridge staff are not directly engaged in any waste inspection or sample taking activities. Under normal operating conditions there they are therefore at low risk of inhalation or dermal/eye exposure to HCA.

Weighbridge staff are currently issued with the following Personal Protective Equipment (PPE):

- *Acid resistant cotton overalls*
- *Safety shoes*
- *Safety glasses*
- *Rubber gloves*
- *Hard hats*
- *Type FFP2 half masks (for discretionary use)*

Provided that this PPE is diligently and correctly used it is capable of affording adequate protection against acute and chronic HCA exposures via all likely routes (inhalation, dermal and eye).

7.1.3 Ergonomic stresses

A baseline ergonomics risk assessment was performed on the Shongweni site in 2021 (Geozone Project No GEO5565_6) with a repeat survey in 2023 (GEO Project No 06209_8), 2024 (GEO Project No 06697_8) and 2025 (GEO Project No 06962_4). Computer workstation layout within the weighbridge office was found to be adequate and the risk of occupants suffering any musculo-skeletal strain or repetitive strain injury was deemed to be low.

7.1.4 Noise exposures

The only noise sources of any significance to which weighbridge staff are likely to be exposed are the vehicles (diesel trucks) entering and leaving the site. The enclosed weighbridge office ensures that occupants are minimally exposed to vehicle noise – i.e. investigations have revealed that typical worker exposures are unlikely to approach or exceed the statutory maximum 8 hour noise rating level (85 dBA). Similarly, workers who perform outdoor activities in the surrounds of the weighbridge are unlikely to be excessively exposed to noise during typical shifts.

7.1.5 Illuminance levels

During daytime, natural light entering through windows in the weighbridge office supplements the available electric light fittings. Daytime illuminance levels throughout the weighbridge offices were found to be well in excess of the relevant statutory minima during the latest site illumination survey (Geozone Project GEO06962_1).

7. DISCUSSION OF HEALTH RISKS

7.1 HEG-45: Weighbridge staff…continued

7.1.6 Thermal stress

Cold stress

Indoor activities present very little risk of exposure to cold stress conditions. The nature of the local climate (temperatures very seldom below 6^0C) ensures that there is little risk of any of the weighbridge staff suffering from any form of cold stress or strain. As such, the associated health risk is minimal.

Heat stress

The local climate (moderate-high humidity and moderate-high air temperatures during peak summer) may present some risk of weighbridge staff being exposed to heat stress conditions. Despite this, typical metabolic work rates (low) and exposure frequencies make it unlikely that such staff will experience any heat stress related ailments or illnesses.

7.1.7 Non-ionising radiation

The risk of weighbridge staff being exposed to excessive Ultraviolet (UV) radiation (in the form of direct sunlight) is low as they are largely engaged in indoor activities. Drum control and verification waste sampling activities do require some outdoor work to be performed but this is typically of short duration. South Africa does however have high levels of solar UV radiation and precautions need to be taken to protect workers against solar UV.

7.1.8 Reproductive Health Stress

Of primary concern from a RHS perspective is the risk of worker exposure to multiple chemical substances (several of which may have definite reproductive health effects). The Shongweni site is a H:h landfill site and weighbridge staff may therefore be potentially at risk of (acute) inhalation/dermal/ingestion exposure to HCA with confirmed reproductive health effects, including mercury and mercury compounds, polychlorinated biphenyl compounds (PCB), organic solvents and pesticides/herbicides. Worker exposure to such HCA, especially during early pregnancy (1^{st} Trimester) must be actively prohibited.

7.1.9 Psychosocial stress

Weighbridge staff are less likely to develop any psychosocial dysfunction as a consequence of work pressures or having to meet targets / deadlines.

As is the case with any workers, social and/or personal issues may impact on psychosocial wellbeing. Whilst only presenting a low health risk, cognisance must be taken of potential psychosocial stress factors to which staff may be exposed.

7. DISCUSSION OF HEALTH RISKS…continued

7.2 HEG-46: Laboratory staff

7.2.1 Hazardous Biological Agents (HBA)

The 2025 HBA risk assessment report should be referenced as part of this HRA (refer GEO Project No. 06962_9).

Laboratory staff are not required to sample or analyse any potentially infectious waste streams or healthcare risk waste (HCRW) received on site – i.e. are at low risk of exposure to viable HBA contained within such waste.

SARS-CoV-2 (COVID-19)

There may be some risk of Laboratory staff being exposed to SARS-CoV-2 when interacting with infected co-workers, as well as drivers and assistants who enter the site. Available evidence indicates that SARS-CoV-2 is spread primarily by respiratory droplets generated when an infected person coughs or sneezes. *All previous measures, including mask mandates, gathering limits, curfews, and travel restrictions, were repealed by June 2022, and the national state of disaster ended on April 5, 2022. South Africa now manages COVID-19 as a routine public health issue under the National Health Act, with no compulsory requirements for isolation, quarantine, contact tracing, or vaccination.*

7.2.2 Hazardous Chemical Substances (HCA)

*** <u>Multiple chemical exposures</u>**

Verification sampling of the waste presents laboratory staff with some risk of direct skin and/eye contact with a wide range of hazardous chemical substances. Many of these HCA may present an acute health hazard to exposed skin and eyes (i.e. irritant, corrosive). There may also be some risk of acute inhalation exposure to airborne contaminants (gases, fumes or vapours) during sample taking, some of which may present acute hazards to the respiratory tract (irritants, respiratory sensitisers/asthmagens).

Verification sample analysis activities are also likely to present laboratory staff with some significant risk of exposure to multiple hazardous chemical substances. Several of these HCA may present an acute hazard to skin and eyes (irritant or corrosive) or the respiratory tract (respiratory sensitisers, asthmagens). Numerous HCA may also present a chronic hazard to staff via all routes of exposure.

A fume cupboard is available within the laboratory and is functioning effectively (GEO Project No 06962_6). Volatile or corrosive compounds are however sometimes handled on the workbenches. Laboratory staff has been formally trained in the safe chemical handling procedures and are aware of the health hazards associated with exposure to HCA.

7. DISCUSSION OF HEALTH RISKS…continued

7.2 HEG-46 Laboratory staff

7.2.2 Hazardous Chemical Substances (HCA) …continued

Some concern is expressed about the risk of the laboratory cleaning employee being exposed to direct skin and eye contact with multiple HCA. Unlike the technician and assistant the cleaning staff has no formal training in chemistry or chemical safe handling procedures and may be unaware of the potential hazards associated with chemical compounds.

The risk of laboratory staff exposure to airborne particulate contaminants (total / respirable dust) is minimal. Employees engaged in waste sampling activities may be at a potential risk of exposure to diesel exhaust fumes.

Current issue Personal Protective Equipment includes:

- Laboratory coats
- Safety shoes
- Safety goggles
- Hard hats
- Acid resistant rubber gloves
- ABEK1 half mask respirators (discretionary use)

Provided that this PPE is diligently and correctly used it is capable of affording adequate protection against HCA exposures via all likely routes (inhalation, dermal and eye).

7.2.3 Ergonomic stresses

The risk of laboratory staff being exposed to significant ergonomic stresses is moderate, primarily when engaging in waste sampling activities which require them to manually climb up onto the trucks.

Frequent bending and reaching actions when conducting analytical tasks may also present some ergonomic risk to staff. Staff may also be required to stand for prolonged periods of time during analytical tasks.

7.2.4 Noise exposures

Average noise rating levels within the laboratory on site have been formally assessed and do not approach or exceed the Statutory 85 dBA limit. The risk of laboratory workers being exposed to an 8 hour average noise rating level in excess of the Statutory limit is minimal.

Laboratory staff are also required to engage in waste sampling activities which may cause them to be periodically exposed to elevated noise rating levels generated by diesel engines and exhaust systems. Such exposures are however unlikely to exceed the Statutory maximum 8 hour noise rating level (85 dBA) and are therefore unlikely to present a significant hazard to employee hearing ability.

7. DISCUSSION OF HEALTH RISKS…continued

7.2 HEG-46 Laboratory staff…continued

7.2.5 Thermal stress

Cold Stress

The laboratory environment is temperature controlled and the risk of laboratory workers being exposed to cold stress conditions during typical activities is therefore negligible.

Heat Stress

The risk of laboratory staff being exposed to heat stress conditions is similarly minimal.

7.2.6 Illuminance levels

Daytime illuminance levels throughout the laboratory were assessed during the recent site illumination survey (GEO Project No. 06962_1) and were found to be largely in excess of the relevant Statutory minima.

7.2.7 Non-ionising radiation

The risk of laboratory staff being exposed to excessive solar Ultraviolet (UV) radiation is minimal given that they engage largely in indoor activities. When conducting (outdoor) sampling activities, staff are exposed to solar UV. The duration and frequency of such exposures is however unlikely to present a significant health risk to laboratory staff.

7.2.8 Reproductive Health Risks

The primary concern from a Reproductive Health Stress perspective is the risk of worker exposure to multiple chemical substances (especially those which have definite reproductive health effects) when engaging in laboratory analysis tasks.

The Shongweni site is an H:h landfill site and laboratory staff may therefore be at risk of potential exposure to numerous HCA with confirmed reproductive health effects, including mercury and mercury compounds, polychlorinated biphenyl compounds (PCB), organic solvents and pesticides/herbicides. Any exposure to such HCA, especially during early pregnancy (1st Trimester) must be prohibited.

An additional concern is the potential risk of exposure to SARS-CoV-2 during pregnancy. The risks which SARS-CoV-2 present to pregnant women are at present still unknown with some studies suggesting that there are no increased risks vv normal population whilst others indicate that there is a higher risk both to mother and foetus.

7.2.9 Psychosocial stress

Laboratory staff are unlikely to develop any psychosocial dysfunction as a consequence of work pressures or targets. Social and/or personal issues may however impact on the psychosocial wellbeing of staff. Whilst only presenting a low health risk, cognisance must be taken of potential psychosocial stress factors.

7. DISCUSSION OF HEALTH RISKS…continued

7.3 HEG-47: Traffic controllers

7.3.1 Hazardous Biological Agents (HBA)

A review of the site's HBA Risk Assessment was performed in February 2025. The outcomes of this assessment were detailed in GEO Project No. 06296_9. This report should be referenced as part of this HRA review.

Staff who are engaged within the active operational areas on site are likely to be at some risk of exposure to viable HBA during the course of typical duties. HBA may include bacteria, fungi, moulds and viral organisms. Worker ingestion or inhalation of pathogenic gram negative bacteria may cause incidents of self limiting diarrheal diseases. A common occupational disease associated with exposure to sewage is Listeriosis - an infection caused by gram negative bacteria of the genus Listeria. Symptoms include upper respiratory disease, septicaemia and encephalitic disease. Workers may also be potentially exposed to endotoxins (gram negative bacteria) carried on aerosolised dust or vapours. Exposure to such endotoxins may cause an acute pulmonary response including a dry cough, shortness of breath, fever, malaise and dyspnea. Chronic exposures may cause chronic bronchitis and reduced lung function.

Group 2 HBA (e.g. E-coli and Bacillus species) may present a medium health risk to site workers. Workers are not however required to directly handle any waste streams and the risk of direct skin or eye contact is low provided that diligent use if made of available PPE.

SARS-CoV-2

There is some risk of Traffic controllers being exposed to SARS-CoV-2 when interacting with infected co-workers or infected drivers/assistants on-site. Available evidence indicates that SARS-CoV-2 is spread primarily by respiratory droplets generated when an infected person coughs or sneezes.

Traffic controllers are currently issued with the following PPE:

- Acid resistant cotton overalls
- Safety shoes / boots
- Rubber gloves
- Hard hats
- Safety glasses
- Type FFP2 half mask respirators

7. DISCUSSION OF HEALTH RISKS…continued

7.3 HEG-47: Traffic controllers…continued

7.3.2 Hazardous Chemical Substances (HCA)

Traffic controllers are engaged on the active cells for the majority of their shifts and are therefore potentially exposed to multiple chemical stressors.

Margot Saner & Associates / Geozone Environmental have been actively conducting personal air sampling surveys on the Shongweni site for more than 10 years. These surveys are aimed at quantifying worker exposure to the following priority airborne contaminants when engaged on the active cells:

- inhalable dusts
- respirable dusts
- toxic metallic compounds (cadmium, chromium, lead, mercury and nickel)
- volatile organic compounds
- asbestos fibres
- hydrogen sulphide
- ammonia

The health effects associated with exposure to these priority HCA include:

Inhalable nuisance dusts:

HCA ingredient: Nuisance dusts - TWA OEL-RL = 10 mg/m^3

Physical form: particulate

Route(s) of entry: inhalation

Health Effect Rating = 1

Health Effects: No systemic health effects but may cause localised irritation of upper respiratory tract and mechanical irritation of eyes.

Respirable dusts:

HCA ingredient: respirable dusts - TWA OEL-RL = 5.0 mg/m^3

Physical form: particulate

Route(s) of entry: inhalation

Health Effect Rating = 2

Health Effects: Respirable dusts are able to penetrate into the lower air gaseous exchange areas of the lungs and following excessive exposures may cause pneumoconioses - depending on morphology.

Cadmium:

HCA ingredient: Cadmium - TWA OEL-ML = 0.004 mg/m^3

Physical form: particulate

Route(s) of entry: inhalation

Health Effect Rating = 3

Health Effects: Excessive inhalation exposure to cadmium compounds typically causes irritation of the respiratory tract, headache and shortness of breath. Kidney damage may result from chronic exposure to high concentrations. Many cadmium compounds are suspected human carcinogens.

7. DISCUSSION OF HEALTH RISKS…continued

7.3 HEG-47: Traffic controllers

7.3.2 Hazardous Chemical Substances (HCA) …continued

Chromium:

HCA ingredient: Chromium VI - TWA OEL-ML = 0.0004 mg/m^3

HCA ingredient: Chromium III – TWA OEL-ML = 0.006 mg/m^3

Physical form: particulate

Route(s) of entry: inhalation

Health Effect Rating = 3 / 4

Health Effects: Excessive inhalation exposure to chromium compounds will cause irritation of the nose and upper respiratory tract. Chromium compounds (especially in hexavalent form) are associated with causing an increased incidence of cancers in excessively exposed individuals. Chrome VI is also a recognised respiratory sensitiser / asthmagen.

Lead:

HCA ingredient: Lead - E8hEV = 0.15 mg/m^3 (From the Lead Regulations)

Physical form: particulate

Route(s) of entry: inhalation

Health Effect Rating = 3

Health Effects: Lead and its compounds are cumulative poisons which gradually build up within the body. Eventually concentrations become high enough to cause adverse health effects and symptoms including damage to red blood cells causing anaemia. Lead also causes damage to the kidneys, liver, nervous system and male gonads.

Mercury:

HCA ingredient: Mercury compounds- TWA OEL-RL = 0.05 mg/m^3

Physical form: particulate

Route(s) of entry: inhalation

Health Effect Rating = 4

Health Effects: Mercury and its compounds are toxic / poisons. Inorganic and elemental mercury may be absorbed through intact skin, the lungs and gastro-intestinal tract. After absorption it enters the blood stream and is stored in the liver, kidneys, spleen and bones. Typical symptoms in cases of industrial poisoning include tremors and psychic disturbances including loss of memory, impaired speech and vision, hallucinations.

7. DISCUSSION OF HEALTH RISKS…continued

7.3 HEG-47: Traffic controllers

7.3.2 Hazardous Chemical Substances (HCA) …continued

Nickel:

HCA ingredient: Nickel - TWA OEL-ML = 0.1 mg/m^3

Physical form: particulate

Route(s) of entry: inhalation

Health Effect Rating = 3

Health Effects: Although nickel and its compounds are not generally considered to be systemic toxins they are associated with causing an increased incidence of cancers in excessively exposed individuals. All nickel containing dusts are considered carcinogenic and inhalation exposures should therefore be minimised as far as possible.

Volatile organic compounds:

HCA ingredients: miscellaneous volatile organic compounds

Physical form: vapour

Route(s) of entry: inhalation, skin

Health Effect Rating = 2 / 3

Health Effects: Organic vapours are usually associated with causing narcotic effects and depression of the central nervous system. Many VOC are however known to cause systemic health effects including liver and kidney damage. Several organic solvent compounds are suspected (or confirmed) human carcinogens and others have been shown to cause damage to unborn foetuses – i.e. teratogenic effects. Some VOC (especially isocyanates) are also recognised respiratory sensitisers and may cause ashthma (asthmagens).

Asbestos:

HCA ingredient: Asbestos fibres - TWA OEL = 0.2 fibres/ml

Physical form: fibres

Route(s) of entry: inhalation

Health Effect Rating = 4

Health Effects: Asbestos fibres are known to cause asbestosis, lung cancers and mesothelioma.

Hydrogen sulphide:

HCA ingredients: Hydrogen sulphide – TWA OEL-RL = 2ppm / STEL = 10ppm

Physical form: gas

Route(s) of entry: inhalation

Health Effect Rating = 3

Health Effects: Exposure to hydrogen sulphide typically causes irritation to the eyes, nose and throat, headaches, poor memory, tiredness, and balance problems as well as difficulty in breathing in asthmatics. Respiratory distress and collapse may result from exposure to elevated concentrations. Hydrogen sulphide is not considered to be carcinogenic to humans.

7. DISCUSSION OF HEALTH RISKS…continued

7.3 HEG-47: Traffic controllers

7.3.2 Hazardous Chemical Substances (HCA) …continued

Ammonia:

HCA ingredients: Ammonia – TWA OEL-RL = 50ppm / STEL = 70ppm

Physical form: gas

Route(s) of entry: inhalation

Health Effect Rating = 3

Health Effects: Ammonia is an irritating and corrosive gas and exposure to high concentrations causes immediate burning of the nose, throat and upper respiratory tract. Inhalation may also cause oedema and airway destruction, resulting in respiratory distress or failure. Inhalation of lower concentrations may cause coughing, and nose and throat irritation. Whilst ammonia has a distinctive odour which provides adequate early warning of its presence, exposures may lead to olfactory fatigue which reduces awareness of prolonged exposure at low concentrations.

The results obtained by the worker air sampling programme in place at the Shongweni site, have consistently been well below the relevant Occupational Exposure Limits (OELs). These results indicate that traffic controllers are not at significant risk of chronic inhalation exposure to the above listed priority contaminants under normal operating conditions. Despite these results, *Geozone Environmental is of the opinion that there remains some risk of potential worker inhalation exposure to multiple chemical compounds when engaged on the active cells*.

Short-term exposures to chemicals which have acute health effects (irritant, corrosive, toxic, sensitisers) remain a very real possibility for all active cell personnel. The random and unpredictable nature of disposal activities makes accurate quantification of these exposures very difficult. It remains prudent therefore to recommend that all active disposal areas on site remain declared respirator zones – refer Recommendations.

Traffic controllers are currently issued with the following PPE:

- Acid resistant cotton overalls
- Safety shoes / boots
- Rubber gloves
- Hard hats
- Safety glasses
- Type FFP2 half mask respirators
- Type ABEK1 (for discretionary use when handling waste containing priority 1 or 2 HCA, could also be used during rainy conditions)

Provided that this PPE is diligently and correctly used it is capable of affording adequate protection against HCA exposures via all likely routes (inhalation, dermal and eye).

7. DISCUSSION OF HEALTH RISKS…continued

7.3 HEG-47: Traffic controllers…continued

7.3.3 Ergonomic stresses

Traffic controllers are obliged to spend virtually their entire shifts on the active cells / within the operational areas on site. As such they are required to walk significant distances as well as stand for prolonged periods of time. The ergonomic risks related to prolonged standing are mitigated by the frequent movement from one area to another – traffic controllers must move around the active cell in order to direct the trucks to the correct disposal areas.

Ergonomic risks are therefore deemed tolerable and are unlikely to present a significant health risk to traffic controllers under normal circumstances.

7.3.4 Noise exposures

Traffic controllers may be at some risk of exposure to elevated noise rating levels generated by both the disposal vehicles (diesel trucks) and the landfill plant equipment.

Based on a previous quantitative noise assessment during actual site activities (GEO Project No 06962_5), average 8 hour noise rating levels to which traffic controllers are exposed are likely to exceed the Statutory limit (85dBA). Typical noise exposures therefore present a low risk to worker health.

7.3.5 Thermal stress

Cold stress

A review of the 2023 meteorological data for the Shongweni site reveals that the lowest recorded air temperature was never below 6^0 Celsius. Minimum temperatures on site rarely fall below 10^0 Celsius and the risk of worker exposure to cold stress conditions is therefore low. A formal cold stress survey was last conducted on site during August 2014 (GEO Project No 03736).

Heat stress

Outdoor wet bulb globe temperatures (WBGT) on the Shongweni site may approach the Statutory limit (WGBT >=30 for 1 hour) during peak summertime.

A formal heat stress survey was performed on site during February 2025 (GEO Project No 06962_2). Comparing the results obtained during this survey to the Threshold Limit values (TLVs) published by the American Conference of Governmental Industrial Hygienists (ACGIH) revealed that workers who engaged in typical outdoor activities (low metabolic work rates) on the Shongweni site are at some risk of exposure to heat stress conditions in excess of the guideline values – i.e. are at a potential risk of developing heat stress related ailments as a consequence of exposure to heat stress conditions.

Workers who engage in moderate-heavy outdoor work (i.e. requiring moderate-high metabolic work rates) on site are also *likely to be at increased risk of developing heat stress related ailments* – refer Recommendations.

7. DISCUSSION OF HEALTH RISKS…continued

7.3 HEG-47: Traffic controllers…continued

7.3.6 Illuminance levels

During daytime, the outdoor work areas are adequately illuminated by available natural light.

The outcomes of the most recent (2023) night-time illumination survey (GEO Project No 06384) revealed that the majority of the outdoor work areas (active disposal areas) had average night-time illuminance levels in excess of the minimum Statutory requirements. Remedial actions were however recommended.

7.3.7 Non-ionising radiation

The risk of Traffic controllers being exposed to excessive Ultraviolet (UV) radiation (direct sunlight) is high given that they spend the majority of their shifts outdoors. There continues to be only sporadic use of head protection – i.e. peaked caps, however, hard hats are enforced. The hard hats are however not fitted with a brim for face and skin protection. Hot conditions typically present a high risk of UV exposure and the incidence of skin cancer amongst South Africans (of all colours) are high – refer Recommendations.

7.3.8 Reproductive Health Risks

Of primary concern from a Reproductive Health Stress perspective is the risk of worker exposure to multiple chemical substances during traffic control activities. The Shongweni site is an H:h landfill site and there is therefore a significant risk of worker exposure to chemical compounds with known reproductive health effects (mercury and mercury compounds, polychlorinated biphenyl compounds, organic solvents, pesticides/herbicides).

The primary route of exposure is likely to be inhalation although exposure via accidental ingestion and direct dermal contact cannot be excluded. Exposure of pregnant and/or breastfeeding workers to the above HCA must be prohibited.

Traffic controllers are also routinely exposed to ergonomic stresses although these are of generally low risk. Should any of these workers become pregnant however, there may be some increase in the health risks associated with exposure to ergonomic stresses. This in itself would not prevent pregnant workers from performing traffic controlling tasks until the 3rd Trimester of pregnancy – the overriding concern remains the potential for exposure to HCA – refer Recommendations.

An additional concern is the potential risk of exposure to SARS-CoV-2 during pregnancy. The risks which SARS-CoV-2 present to pregnant women are at present still unknown with some studies suggesting that there are no increased risks vv normal population whilst others indicate that there is a higher risk both to mother and foetus.

No females are currently engaged as Traffic controllers on site – refer Recommendations.

7. DISCUSSION OF HEALTH RISKS…continued

7.3 HEG-47: Traffic controllers…continued

7.3.9 Psychosocial stress

Traffic controllers are unlikely to develop any psychosocial dysfunction as a consequence of work pressures or performance targets. Social and/or personal issues may however impact on the psychosocial wellbeing of staff. Whilst only presenting a low health risk, cognisance must be taken of potential psychosocial stress factors.

7. DISCUSSION OF HEALTH RISKS…continued

7.4 HEG-48: Plant operators

7.4.1 Hazardous Biological Agents (HBA)

A review of the site's HBA Risk Assessment was performed in February 2025. The outcomes of this assessment were detailed in GEO Project No. 06962_8. This report should be referenced as part of this HRA review.

Operators are at some risk of exposure to Group 2 HBA when operating landfill plant equipment on the active cells. The risk of inhalation exposure to airborne HBA is likely to be reduced as a consequence of the enclosed nature of the operator cabins (provided that the doors and windows of these cabins remain closed).

The risk of exposure to HBA as well as to noxious odours increases during active disposal of any potentially infectious waste. Operators of Front-End Loaders and/or Excavators are likely to at a higher risk of exposure (vv Bomag) as this plant equipment is actively engaged in the addition of treatment chemicals.

SARS-CoV-2

There is some risk of Plant operators being exposed to SARS-CoV-2 when interacting with infected co-workers or infected drivers/assistants who enter the site. Available evidence indicates that SARS-CoV-2 is spread primarily by respiratory droplets generated when an infected person coughs or sneezes. *All previous measures, including mask mandates, gathering limits, curfews, and travel restrictions, were repealed by June 2022, and the national state of disaster ended on April 5, 2022. South Africa now manages COVID-19 as a routine public health issue under the National Health Act, with no compulsory requirements for isolation, quarantine, contact tracing, or vaccination.*

7.4.2 Hazardous Chemical Substances (HCA)

Plant operators are engaged within the operational areas for the duration of their shifts (apart from tea and lunch breaks) and are therefore potentially exposed to multiple chemical stressors for prolonged periods of time. As noted, in order to assess these risks, Geozone conducts periodic (biannual) personal air sampling of operator exposure to the following airborne contaminants (refer 7.2.2 for discussion of the health effects associated with each HCA):

- inhalable dusts
- respirable dusts
- toxic metallic compounds (chromium, nickel, cadmium, lead and mercury)
- volatile organic compounds
- hydrogen sulphide
- ammonia
- asbestos fibres

7. DISCUSSION OF HEALTH RISKS…continued

7.4 HEG-48: Plant operators

7.4.2 Hazardous Chemical Substances (HCA) …continued

The results obtained by the quantitative personal air sampling surveys conducted over the last 10 years have been consistently below the relevant Occupational Exposure Limits. This suggests that Plant operators are not at significant risk of chronic inhalation exposure to these contaminants under normal operating conditions. *Despite these minimal results, Geozone Environmental remains of the opinion that there remains some risk of worker inhalation exposure to multiple chemical compounds when engaged in any activities within the operational areas.*

Short-term exposures to chemicals which have acute health effects (irritant, corrosive, toxic, sensitisers/asthmagens) remains a very real possibility. Quantitative measurement of such short-term exposures remains difficult due to the random and unpredictable nature of the disposal activities. Because of these potential short-term exposures, it remains prudent to declare all active disposal areas respirator zones – refer Recommendations.

Plant operators are currently issued with the following PPE:

- Acid resistant cotton overalls
- Safety shoes / boots
- Hard hats
- Safety glasses
- Type FFP2 half mask respirators
- Type ABEK1 (for discretionary use when handling waste containing priority 1 or 2 HCA)

Provided that this PPE continues to be diligently and correctly used, it is capable of affording adequate protection against HCA exposures via all likely routes (inhalation, dermal and eye).

7.4.3 Ergonomic stresses

Plant operators spend extended periods of time within the cabins of the landfill plant equipment (Bomag, Front end loaders, Excavator). These cabins are ergonomically designed by the manufacturers and, provided that the seats and controls are maintained in good condition, should not present a significant ergonomic risk to operators. The risk of operator exposure to vibration stress (whole body and hand-arm) is similarly minimal provided that controls and (especially) seats are adequately maintained.

7. DISCUSSION OF HEALTH RISKS…continued

7.4.4 Noise exposures

Plant operators are at some risk of exposure to elevated noise rating levels generated within the cabins of the landfill plant equipment. Quantitative assessments conducted over numerous years have however shown that, provided the equipment (engines and exhaust systems) is adequately serviced/maintained and the operators keep the cabin windows and doors closed, average noise rating levels within the operator cabins remain below the Statutory limit.

Geozone has developed an Occupational Hygiene Specification Criteria for landfill equipment which requires that noise rating levels inside operator cabins not exceed 82 dBA – owing to the prolonged operator exposure periods (may exceed 8 hours).

7.4.5 Thermal Stress

Cold stress

A review of the 2023 meteorological data for the Shongweni site reveals that the lowest recorded air temperature was never below 6^0 Celsius. Minimum temperatures on site rarely fall below 10^0 Celsius and the risk of worker exposure to cold stress conditions is low. A formal cold stress survey was last conducted on site during August 2014 (GEO Project No 03736).

Unlike the traffic controllers and other outdoor staff, Plant operators are protected from wind chill by the operator cabins. The majority of the plant equipment also have functioning air conditioning units which further reduces the risk of operator exposure to cold stress conditions.

Heat Stress

Outdoor wet bulb globe temperatures (WBGT) on the Shongweni site may approach the Statutory limit (WGBT >=30 for 1 hour) during peak summertime. A formal heat stress survey was last performed on site during February 2024 (GEO Project No 06962_2).

Operators of the plant equipment may be at increased risk of exposure to elevated WBGT conditions due to the close confines of the operator cabins. Doors and windows of these operator cabins must remain closed so at to minimise the ingress of airborne contaminants generated on the active cells. As such, fully functioning air conditioning units are essential in order to maintain a comfortable working environment.

7. DISCUSSION OF HEALTH RISKS…continued

7.4 HEG-48: Plant operators...continued

7.5.6 Illuminance levels

During daytime, the outdoor work areas are adequately illuminated by available natural light.

The outcomes of the most recent (2018) night-time illumination survey (GEO Project No 04291_0) on the active disposal site, revealed that the majority of the outdoor work areas had average night-time illuminance levels in excess of the minimum Statutory requirements. Remedial actions were however recommended. The plant equipment is provided with their own lighting systems for use at night.

7.5.7 Non-ionising radiation

The risk of Plant operators being exposed to excessive Ultraviolet (UV) radiation (direct sunlight) is low given that they spend the majority of their shifts inside the operator cabins.

7.4.8 Reproductive Health Risks

Of primary concern from a Reproductive Health Stress perspective is the risk of worker exposure to multiple chemical substances during plant operations activities. The Shongweni site is a H:h landfill site and there is therefore a potentially significant risk of worker exposure to chemical compounds with known reproductive health effects (mercury and mercury compounds, polychlorinated biphenyl compounds, organic solvents, pesticides/herbicides).

The primary route of exposure is likely to be inhalation although exposure via accidental ingestion and direct dermal contact cannot be excluded. Exposure of pregnant and/or lactating workers to the above priority chemicals must be prohibited.

Plant operators may also be at risk of exposure to both ergonomic and vibration stresses.

An additional concern is the potential risk of exposure to SARS-CoV-2 during pregnancy. The risks which SARS-CoV-2 present to pregnant women are at present still unknown with some studies suggesting that there are no increased risks vv normal population whilst others indicate that there is a higher risk both to mother and foetus.

Although no females are currently employed as Plant operators on site, should any females be employed in these roles and subsequently become pregnant, there is likely to be a significant increase in the health risks associated with exposure to the above identified RHS.

7.4.9 Psychosocial stress

Plant operators may be at increased risk (vv other site workers) of developing psychosocial dysfunction as a consequence of work pressures or performance targets. Social and/or personal issues may also impact on the psychosocial wellbeing of plant operators.

7. DISCUSSION OF HEALTH RISKS…continued

7.5 HEG-49: Maintenance staff

7.5.1 Hazardous Biological Agents (HBA)

Maintenance staff who are required to conduct maintenance work on site (i.e. within the operational areas) may be at some risk of exposure to Group 2 HBA. All workers who engage in activities within the operational areas are at some risk of exposure to viable HBA during the course of typical duties. Such HBA may include bacteria, fungi, moulds and viral organisms. Exposure to Group 2 HBA (e.g. E-coli and Bacillus species) may present a medium health risk to Maintenance workers despite them not being required to directly handle any waste streams (i.e. direct skin contact with HBA and subsequent accidental ingestion is therefore unlikely).

SARS-CoV-2

There is also some risk of maintenance staff being exposed to SARS-CoV-2 when interacting with infected co-workers or infected drivers/assistants on-site. Available evidence indicates that SARS-CoV-2 is spread primarily by respiratory droplets generated when an infected person coughs or sneezes.

A review of the site's HBA Risk Assessment was performed in February 2025. The outcomes of this assessment were detailed in GEO Project No. 06962_8. This report should be referenced as part of this HRA review.

When entering any active operational areas, Maintenance workers are issued with the following PPE for compulsory use:

- Acid resistant cotton overalls
- Safety shoes / boots
- Safety glasses
- Hard hats
- Type FFP2 half masks
- Type ABEK1 half mask respirators (for discretionary use / during rainy conditions)

This PPE is capable of affording adequate protection against likely HBA exposures via the inhalation route, provided that is diligently and correctly used and stored.

7.5.2 Hazardous Chemical Substances (HCA)

Maintenance staff are engaged throughout the site (including the operational areas) and are therefore potentially exposed to multiple chemical stressors (periodically) for prolonged periods of time. Annual personal air sampling of active site worker exposure to priority airborne contaminants has indicated that the risk of excessive exposures are minimal under normal operating conditions.

7. DISCUSSION OF HEALTH RISKS…continued

7.5 HEG-49: Maintenance staff

7.5.2 Hazardous Chemical Substances (HCA) …continued

Despite these minimal results, Geozone Environmental remains of the opinion that there remains some risk of worker inhalation exposure to multiple chemical compounds when engaged in any activities on the active cells.

Short-term exposures to chemicals which have acute health effects (irritant, corrosive, toxic, sensitisers/asthmagens) remains a real possibility. Quantitative measurement of such short-term exposures remains difficult due to the random and unpredictable nature of the disposal activities. Because of these potential short-term exposures, it remains prudent to declare all active disposal area respirator zones – refer Recommendations.

When engaged within the operational areas on site, Maintenance staff are issued with the following Personal Protective Equipment:

- Cotton overalls
- Safety shoes
- Safety glasses
- Hard hats
- Type FFP2 half masks
- Type ABEK1 half mask respirators (for discretionary use)
- Life jackets (leachate dams)

Provided that this PPE is diligently and correctly used it is capable of affording adequate protection against HCA exposures via all likely routes (inhalation, dermal and eye).

7.5.3 Ergonomic stresses

Maintenance staff are not required to routinely engage in strenuous physical activities. On-site maintenance may however require occasional lifting of heavy equipment (pumps etc). Generally, ergonomic risks to which Maintenance staff are exposed are low and are unlikely to present a significant health risk.

7.5.4 Noise exposures

When engaged in active operational areas on site, Maintenance staff may be at some risk of exposure to elevated noise rating levels generated by both the disposal trucks and the landfill plant equipment. Based on quantitative assessments, the average 8 hour noise rating levels associated with such exposures are unlikely to approach or exceed the Statutory limit (85dBA) – i.e. present a low risk to worker health.

Maintenance workers are at increased risk of exposure to excessive noise rating levels when using power tools such as grinders or when engaging in hammering or similar noisy activities. Such exposures are however infrequent and of short duration – i.e. present a relatively low risk to worker hearing ability. Despite this, it is recommended that all workers who engage in grinding or hammering activities make compulsory use of approved hearing protective devices – refer Recommendations.

7. DISCUSSION OF HEALTH RISKS…continued

7.5 HEG-49: Maintenance staff…continued

7.5.5 Thermal Stress

Cold stress

A review of the 2023 meteorological data for the Shongweni site reveals that the lowest recorded air temperature was never below 6^0 Celsius. Minimum temperatures on site rarely fall below 10^0 Celsius and the risk of worker exposure to cold stress conditions is low. A formal cold stress survey was last conducted on site during August 2014 (GEO Project No 03736).

Heat stress

Outdoor wet bulb globe temperatures (WBGT) on the Shongweni site may approach the Statutory limit (WGBT >=30 for 1 hour) during peak summertime.

A formal heat stress survey was performed on site during February 2025 (GEO Project No 06962_2) and results confirmed that workers who engage in typical outdoor activities (low metabolic work rates) on the Shongweni site are at some risk of exposure to heat stress conditions – i.e. are at low relative risk of developing heat stress related ailments as a consequence of exposure to heat stress conditions.

Workers who engage in moderate-heavy outdoor work (i.e. requiring moderate-high metabolic work rates) on site are *likely to be at increased risk of developing heat stress related ailments* – refer Recommendations.

7.5.6 Illuminance levels

During daytime, the outdoor work areas are adequately illuminated by available natural light. Maintenance activities are largely restricted to daytime hours unless a breakdown occurs.

7.5.7 Non-ionising Radiation

The risk of Maintenance staff being exposed to excessive Ultraviolet (UV) radiation (direct sunlight) is highly variable, depending on how much time they are required to spend outdoors.

South African conditions typically present a high risk of UV exposure and the incidence of skin cancer amongst all race groups is high. There is only sporadic use of head protection at present – refer Recommendations.

7. DISCUSSION OF HEALTH RISKS…continued

7.5 HEG-49: Maintenance staff…continued

7.5.8 Reproductive Health Risks

Given that Maintenance staff are periodically required to perform repair/maintenance work within the operational areas on site, the primary concern from a Reproductive Health Stress perspective is the risk of worker exposure to multiple chemical substances.

The Shongweni site is a H:h landfill site and there is therefore a significant risk of worker exposure to chemical compounds with known reproductive health effects (mercury and mercury compounds, polychlorinated biphenyl compounds, organic solvents, pesticides/herbicides).

The primary route of exposure is likely to be inhalation although exposure via accidental ingestion and direct dermal contact cannot be excluded. Exposure of pregnant and/or lactating workers to the above priority chemicals should be prohibited.

An additional concern is the potential risk of exposure to SARS-CoV-2 during pregnancy. The risks which SARS-CoV-2 present to pregnant women are at present still unknown with some studies suggesting that there are no increased risks vv normal population whilst others indicate that there is a higher risk both to mother and foetus. There are no female maintenance workers employed on site.

Maintenance staff may also be exposed to ergonomic stresses – especially when engaging in work within the operational areas. Should any of these workers become pregnant there may be some additional increase in the health risks associated with exposure to these stresses but this in itself would not prevent workers from conducting their activities until the 3rd Trimester of pregnancy – as is the case for other site workers, the overriding concern remains potential exposure to HCA with known reproductive health effects – refer Recommendations.

7.5.9 Psychosocial stress

Maintenance staff are at little risk of developing psychosocial dysfunction as a consequence of work pressures or performance targets. Social and/or personal issues may however impact on the psychosocial wellbeing of staff.

Whilst only presenting a low health risk, cognisance must be taken of potential psychosocial stress factors.

7. DISCUSSION OF HEALTH RISKS…continued

7.6 HEG-52: Management staff

7.6.1 Hazardous Biological Agents (HBA)

The latest HBA Risk Assessment report (GEO Project No 06692_8) conducted in 2025 should be referenced as part of this HRA review.

Although Management staff only make infrequent visits to the active work areas on site, they may be at some (limited) risk of exposure to HBA contained in foodstuff contaminated waste. Ingestion/inhalation of pathogenic gram-negative bacteria may potentially cause isolated incidents of self-limiting diarrheal diseases.

SARS-CoV-2

There is also some risk of Management staff being exposed to SAR-CoV-2 when interacting with infected co-workers and/or members of the general public. Available evidence indicates that SARS-CoV-2 is spread primarily by respiratory droplets generated when an infected person coughs or sneezes.

7.6.2 Hazardous Chemical Substances (HCA)

Management staff typically spend <10% of their time within the operational areas on site. Despite these limited exposure times, they remain potentially exposed to multiple chemical stressors.

Annual personal air sampling of active site worker exposure to priority airborne contaminants has indicated that the risk of excessive exposures are minimal under normal operating conditions.

Despite these minimal results, Geozone Environmental remains of the opinion that there remains some risk of worker inhalation exposure to multiple chemical compounds when engaged in any activities within the operational areas on site.

Short-term exposures to chemicals which have acute health effects (irritant, corrosive, toxic, sensitisers/asthmagens) remains a possibility. Quantitative measurement of such short-term exposures remains difficult due to the random and unpredictable nature of the disposal activities. Because of these potential short-term exposures, it remains prudent to recommend the compulsory use of appropriate RPE whenever Management staff enter any of the disposal areas on site - refer Recommendations.

The following PPE is recommended when accessing operational areas on site:

7. DISCUSSION OF HEALTH RISKS…continued

7.6 HEG-52: Management staff…continued

7.6.2 Hazardous Chemical Substances (HCA)…continued

- Acid resistant cotton overalls
- Safety shoes / boots
- Safety glasses
- Hard hats
- Leather gloves
- Type FFP2S half mask respirators

Provided that this PPE continues to be diligently and correctly used, it is capable of affording adequate protection against HCA exposures via all likely routes (inhalation and dermal).

7.6.3 Ergonomic stresses

Management staff are unlikely to be exposed to any significant ergonomic stresses during the course of typical activities.

7.6.4 Noise exposures

When within the operational areas on site, Management staff may be at some risk of exposure to elevated noise rating levels generated by disposal trucks and landfill plant equipment. Given their typical exposure patterns (infrequent and of short duration), it is very unlikely that their personal 8 hour noise rating levels will approach or exceed the Statutory limit (85dBA).

7.6.5 Thermal Stress

Cold Stress

The risk of Management staff being exposed to air temperatures below the Statutory limit (6^0 Celsius) when visiting the active cells or other outside locations is minimal due to the moderate local climate and the infrequent / short duration of these visits – i.e. minimal health risk.

Heat Stress

Outdoor wet bulb globe temperatures (WBGT) may approach the Statutory limit (WGBT >=30 for 1 hour). The metabolic work rates experienced by Management staff during typical activities are however very low (little strenuous physical activity or manual labour). The risk of Management staff being exposed to heat stress conditions or suffering any heat stress related illness is therefore minimal.

7. DISCUSSION OF HEALTH RISKS…continued

7.6 HEG-52: Management staff…continued

7.6.6 Illuminance levels

A recent site illumination survey revealed that average daytime illuminance levels within the office areas are adequate (GEO Project No 06962_1).

Management staff rarely visit the operational areas at night unless a breakdown or accident occurs.

7.6.7 Non-ionising Radiation

The risk of Management staff being exposed to excessive Ultraviolet (UV) radiation is minimal given that they spend the majority of their time indoors. Outdoor activities will however present a risk of acute exposure to excessive solar UV.

7.6.8 Reproductive Health Risks

As noted, the primary concern from a Reproductive Health Stress perspective is the risk of worker exposure to multiple chemical substances (especially those which have definite reproductive health effects such as mercury/mercury compounds, polychlorinated biphenyl compounds (PCB), organic solvents and pesticides/herbicides.

Management staff may be at (limited) risk of exposure to such HCA when making periodic visits to the active work areas. Diligent and correct use of appropriate PPE would however effectively prevent/control such exposure risks – refer Recommendations.

An additional concern is the potential risk of exposure to SARS-CoV-2 during pregnancy. The risks which SARS-CoV-2 present to pregnant women are at present still unknown with some studies suggesting that there are no increased risks vv normal population whilst others indicate that there is a higher risk both to mother and foetus.

7.6.9 Psychosocial stress

Management staff are likely to be at increased risk of developing psychosocial dysfunction as a consequence of work pressures or having to meet performance targets. Social and/or personal issues may further impact on their psychosocial wellbeing.

Work stress arising from having to constantly meet deadlines and targets whilst managing staff (having to deal with both their work-related and personal matters), is recognised as being one of the single most important causes of ill health amongst management staff – refer Recommendations.

7. DISCUSSION OF HEALTH RISKS…continued

7.7 HEG-53: Supervisory staff

7.7.1 Hazardous Biological Agents (HBA)

The latest HBA Risk Assessment report (GEO Project No 06962_8) conducted in 2025 should be referenced as part of this HRA review.

Although Supervisory staff make less frequent visits to the operational areas on site they remain at some risk of exposure to viable HBA contained in sewage and/or foodstuff contaminated waste. Ingestion/inhalation of pathogenic gram-negative bacteria may potentially cause isolated incidents of self-limiting diarrheal diseases.

SARS-CoV-2

There is also some risk of Supervisory staff being exposed to SAR-CoV-2 when interacting with infected co-workers or members of the general public. Available evidence indicates that SARS-CoV-2 is spread primarily by respiratory droplets generated when an infected person coughs or sneezes. *All previous measures, including mask mandates, gathering limits, curfews, and travel restrictions, were repealed by June 2022, and the national state of disaster ended on April 5, 2022. South Africa now manages COVID-19 as a routine public health issue under the National Health Act, with no compulsory requirements for isolation, quarantine, contact tracing, or vaccination.*

7.7.2 Hazardous Chemical Substances (HCA)

Supervisory staff typically spend ~60-70% of their time within the operational areas on site. Because of this they are potentially exposed to multiple chemical stressors.

Personal air sampling of landfill worker exposure to the priority airborne contaminants has indicated that the risk of chronic inhalation exposure to these contaminants is low under normal operating conditions. Given the reduced amount of time which Supervisory staff spend on the active cells, the associated risk of exposure to airborne contaminants is further minimised.

Despite this, Geozone Environmental remains of the opinion that the risk of acute inhalation exposure to multiple chemical compounds is high within the active disposal areas. Short-term exposure to chemicals which have acute health effects (irritant, corrosive, toxic, respiratory sensitisers/asthmagens) remains of special concern and for this reason the active cell must continue to be a declared respirator zone in the interests of employee health – refer Recommendations.

Short-term exposures to chemicals which have acute health effects (irritant, corrosive, toxic, sensitisers/asthmagens) remains a possibility. Quantitative measurement of such short-term exposures remains difficult due to the random and unpredictable nature of the disposal activities. Because of these potential short-term exposures, it remains prudent to recommend the compulsory use of appropriate RPE whenever Supervisory staff enter any of the disposal areas on site - refer Recommendations.

7. DISCUSSION OF HEALTH RISKS…continued

7.7 HEG-53: Supervisory staff…continued

7.7.2 Hazardous Chemical Substances (HCA)…continued

The following PPE is recommended when accessing operational areas on site:

- Acid resistant cotton overalls
- Safety shoes / boots
- Safety glasses
- Hard hats
- Type FFP2 half mask respirators

Provided that this PPE is diligently and correctly used, it is capable of affording adequate protection against HCA exposures via all likely routes (inhalation/dermal).

7.7.3 Ergonomic stresses

Supervisory staff are unlikely to be exposed to any significant ergonomic stresses during the course of typical activities.

7.7.4 Noise exposures

When within the operational areas on site, Supervisory staff may be at some risk of exposure to elevated noise rating levels generated by disposal trucks and landfill plant equipment. Given their typical exposure patterns, it is unlikely that their personal 8 hour noise rating levels will exceed the Statutory limit (85dBA).

7.7.5 Thermal Stress

Cold Stress

The risk of Supervisory staff being exposed to air temperatures below the Statutory limit (6^0 Celsius) when visiting the active cells or other outside locations is minimal due to the moderate local climate.

Heat Stress

Outdoor wet bulb globe temperatures (WBGT) may approach the Statutory limit (WGBT >=30 for 1 hour). The metabolic work rates experienced by Supervisory staff during typical activities are however very low (little strenuous physical activity or manual labour). The risk of Supervisory staff being exposed to heat stress conditions or suffering any heat stress related illness is therefore low.

The metabolic work rates experienced by Supervisory staff during typical activities are also very low (little strenuous physical activity or manual labour). The risk of Management staff being exposed to heat stress conditions or suffering any heat stress related illness is therefore minimal.

7. DISCUSSION OF HEALTH RISKS…continued

7.7 HEG-53: Supervisory staff…continued

7.7.6 Illuminance levels

A recent site illumination survey revealed that average daytime illuminance levels within the office areas are adequate (GEO Project No 06962_1).

Supervisory staff typically make only infrequent visits to the operational areas at night unless a breakdown or accident occurs.

7.7.7 Non-ionising Radiation

The risk of Supervisory staff being exposed to excessive Ultraviolet (UV) radiation is low given that they spend the majority of their time indoors. Outdoor activities will however present a risk of acute exposure to excessive solar UV.

7.7.8 Reproductive Health Risks

As noted, the primary concern from a Reproductive Health Stress perspective is the risk of worker exposure to multiple chemical substances (especially those which have definite reproductive health effects such as mercury/mercury compounds, polychlorinated biphenyl compounds (PCB), organic solvents and pesticides/herbicides.

Supervisory staff are likely to be at some risk of exposure to such HCA when making visits to the active work areas. Diligent and correct use of appropriate PPE would however effectively prevent/control such exposure risks – refer Recommendations.

An additional concern is the potential risk of exposure to SARS-CoV-2 during pregnancy. The risks which SARS-CoV-2 present to pregnant women are at present still unknown with some studies suggesting that there are no increased risks vv normal population whilst others indicate that there is a higher risk both to mother and foetus.

7.7.9 Psychosocial stress

Supervisory staff are likely to be at increased risk of developing psychosocial dysfunction as a consequence of work pressures or having to meet performance targets. Social and/or personal issues may further impact on the psychosocial wellbeing of Supervisory staff.

7. DISCUSSION OF HEALTH RISKS…continued

7.8 HEG-54: Administrative staff

7.8.1 Hazardous Biological Agents (HBA)

Administrative staff are not required to make any visits to operational areas and are therefore not at risk of exposure to viable HBA contained in sewage and/or foodstuff contaminated waste.

SARS-CoV-2

There is also some risk of Administrative staff being exposed to SAR-CoV-2 when interacting with infected co-workers or members of the general public. Available evidence indicates that SARS-CoV-2 is spread primarily by respiratory droplets generated when an infected person coughs or sneezes. *All previous measures, including mask mandates, gathering limits, curfews, and travel restrictions, were repealed by June 2022, and the national state of disaster ended on April 5, 2022. South Africa now manages COVID-19 as a routine public health issue under the National Health Act, with no compulsory requirements for isolation, quarantine, contact tracing, or vaccination.*

7.8.2 Hazardous Chemical Substances (HCA)

Administrative staff are not exposed to any hazardous chemical substances within the office environments.

Based on the accumulated results of the ongoing ambient air quality monitoring on the Shongweni site, ambient concentrations of priority HCA at the office areas are very unlikely to present any risk to the health of office occupants.

7.8.3 Ergonomic stresses

Administrative staff are routinely required to engage in the prolonged use of computer workstations. There is therefore some risk of them being exposed to repetitive stress injuries such as carpal tunnel syndrome. Prolonged word processing activities are frequently associated with such ailments/conditions.

Current desk and chair set-ups are however deemed adequate to prevent excessive strain on administrative staff and the risk of them suffering from ergonomic related ailments is therefore minimal.

7.8.4 Noise exposures

Administrative staff are not exposed to any excessive noise rating levels during typical activities.

7. DISCUSSION OF HEALTH RISKS…continued

7.8 HEG-54: Administrative staff…continued

7.8.5 Thermal Stress

Cold Stress

The risk of the administrative staff being exposed to cold stress conditions is minimal given the moderate local climate and the fact that they are engaged indoors within air conditioned office environments.

Heat Stress

The risk of exposure to heat stress conditions is similarly minimal given that wet bulb globe temperatures (WBGT) within the air-conditioned offices are very unlikely to exceed the Statutory limit (WGBT >=30 for 1 hour).

7.8.6 Illuminance levels

Daytime illuminance levels throughout the office areas on site are all well in excess of the relevant Statutory requirements (refer GEO Project No 06962_1). The offices are closed at night.

7.8.7 Non-ionising Radiation

The risk of Administrative staff being exposed to excessive Ultraviolet (UV) radiation (direct sunlight) is low given that they spend their shifts indoors.

7.8.8 Reproductive Health Risks

As noted, Administrative staff do not visit any of the active operational / work areas on site. Based on the accumulated results of the ongoing ambient air quality monitoring on the Shongweni site, ambient concentrations of priority HCA at the office areas are very unlikely to present any risk to the health of office occupants.

As such, the risk of Administrative staff being exposed to Reproductive Health Stresses (HCA) is deemed minimal – i.e. unlikely to impact on their ability to perform required tasks when pregnant and/or lactating.

An additional concern is the potential risk of exposure to SARS-CoV-2 during pregnancy. The risks which SARS-CoV-2 present to pregnant women are at present still unknown with some studies suggesting that there are no increased risks vv normal population whilst others indicate that there is a higher risk both to mother and foetus.

7.8.9 Psychosocial stress

Administrative staff are at little risk of developing psychosocial dysfunction as a consequence of work pressures or performance targets. Social and/or personal issues may however impact on the psychosocial wellbeing of staff.

Whilst only presenting a low health risk, cognisance must be taken of potential psychosocial stress factors.

7. DISCUSSION OF HEALTH RISKS…continued

7.9 HEG-55: Cleaning staff

7.9.1 Hazardous Biological Agents (HBA)

The latest HBA Risk Assessment report (GEO Project No 06962_8) conducted in 2025 should be referenced as part of this HRA review.

Cleaning staff may be at some risk of exposure to HBA when engaging in cleaning of toilets, kitchens and canteens. Routine microbiological surveys conducted within these areas have periodically yielded moderate to extreme growth of non-pathogenic and potentially pathogenic micro-organisms which present a potential risk to employee health.

Exposure to E.coli and similar faecal coliforms may however be occasionally significant within the ablution areas. Accidental ingestion (via contaminated hands) of such pathogenic bacteria may potentially cause isolated incidents of self-limiting diarrheal diseases amongst exposed Cleaning staff.

SARS-CoV-2

There is also some risk of Cleaning staff being exposed to SAR-CoV-2 when interacting with infected co-workers or members of the general public. Available evidence indicates that SARS-CoV-2 is spread primarily by respiratory droplets generated when an infected person coughs or sneezes.

7.9.2 Hazardous Chemical Substances (HCA)

Cleaning staff are required to make use of various commercial cleaning chemicals during the course of their work. Such chemicals typically present only a minor irritant risk to exposed skin and eyes. Systemic health effects are only likely following deliberate ingestion (unlikely).

Cleaning staff are currently required to wear the following Personal Protective Equipment (PPE):

- Acid resistant cotton overalls
- Safety shoes
- Hard hats
- Safety glasses
- Rubber gloves
- Type FFP2 dust masks

Provided that this PPE is diligently worn it is capable of affording adequate protection against all likely HCA exposures. Given the limited risk of eye contact with cleaning chemicals, it is not necessary to issue staff with safety glasses. Special care should instead be taken to prevent eye splashes by careful handling of chemicals – especially concentrated forms.

7. DISCUSSION OF HEALTH RISKS…continued

7.9 HEG-55: Cleaning staff…continued

7.9.3 Ergonomic stresses

Cleaning staff are not required to routinely engage in any physical activities which place them at significant risk of musculo-skeletal injury or strain.

7.9.4 Noise exposures

Cleaning staff are not exposed to any significant noise sources.

7.9.5 Thermal Stress

Cold Stress

The risk of the Cleaning staff being exposed to cold stress conditions is minimal given the moderate local climate and the fact that they are engaged indoors for the majority of their shifts.

Heat Stress

The risk of exposure to heat stress conditions is similarly minimal given that wet bulb globe temperatures (WBGT) within the offices, ablutions and canteen are unlikely to exceed the Statutory limit (WGBT >=30 for 1 hour).

7.9.6 Illuminance levels

Daytime illuminance levels throughout the office areas on site are all well in excess of the relevant Statutory requirements (refer GEO Project No 06962_1). The offices are closed at night.

7.9.7 Non-ionising Radiation

The risk of Cleaning staff being exposed to excessive Ultraviolet (UV) radiation (direct sunlight) is low given that they spend the majority of their shifts indoors.

7.9.8 Reproductive Health Risks

Cleaning staff are not required to visit any of the active operational / work areas on site. Based on the accumulated results of the ongoing ambient air quality monitoring on the Shongweni site, ambient concentrations of priority HCA at the office areas are very unlikely to present any risk to the health of office occupants (including Cleaning staff).

As such, the risk of Cleaning staff being exposed to Reproductive Health Stresses (HCA) is deemed minimal – i.e. unlikely to impact on their ability to perform required tasks when pregnant and/or lactating.

Of some concern however is the potential risk of cleaning workers' exposure to SARS-CoV-2 during pregnancy. The risks which SARS-CoV-2 present to pregnant women are at present still unknown with some studies suggesting that there are no increased risks vv normal population whilst others indicate that there is a higher risk both to mother and foetus.

7. DISCUSSION OF HEALTH RISKS…continued

7.9 HEG-55: Cleaning staff…continued

7.9.9 Psychosocial stress

Cleaning staff are at little risk of developing psychosocial dysfunction as a consequence of work pressures or performance targets. Social and/or personal issues may however impact on the psychosocial wellbeing of staff.

Whilst only presenting a low health risk, cognisance must be taken of potential psychosocial stress factors.

7. DISCUSSION OF HEALTH RISKS…continued

7.10 HEG-55_1: Leachate Treatment Plant (LTP)

7.10.1 Hazardous Biological Agents (HBA)

The latest HBA Risk Assessment report (GEO Project No 06962_8) conducted in 2025 should be referenced as part of this HRA review.

Staff who are engaged in activities at the LTP are unlikely to be at risk of exposure to viable HBA during the course of typical duties. Employees at the plant are not required to directly handle any waste streams or leachate and the risk of direct skin or eye contact is low provided that diligent use if made of available PPE.

SARS-CoV-2

There is also some risk of LTP staff being exposed to SAR-CoV-2 when interacting with infected co-workers. Available evidence indicates that SARS-CoV-2 is spread primarily by respiratory droplets generated when an infected person coughs or sneezes. *All previous measures, including mask mandates, gathering limits, curfews, and travel restrictions, were repealed by June 2022, and the national state of disaster ended on April 5, 2022. South Africa now manages COVID-19 as a routine public health issue under the National Health Act, with no compulsory requirements for isolation, quarantine, contact tracing, or vaccination.*

LTP operators are currently issued with the following PPE:

- Acid resistant cotton overalls
- Safety shoes / boots
- Hard hats
- Safety glasses
- Rubber gloves
- Latex gloves
- Safety glasses
- Winter jackets

7.10.2 Hazardous Chemical Substances (HCA)

LTP operators are required to handle various chemicals during leachate sampling and treatment activities and are therefore potentially exposed to multiple chemical stressors. In addition, employees may also be exposed to the gases, vapours or odours emitted from the leachate storage tanks, located next to the treatment plant. These emissions may include Volatile Organic Compounds, Hydrogen sulphide and Ammonia. In addition, the leachate sampling employee (performs sampling once per day) may also be directly exposed to the leachate itself in addition to airborne contaminants (eye, dermal and respiratory exposure).

The LTP has been included in the formal air sampling programme for hazardous chemicals. The following priority chemicals are used at the plant:

7. DISCUSSION OF HEALTH RISKS…continued

7.10 HEG-55_1: Leachate Treatment Plant…continued

7.10.2 Hazardous Chemical Substances (HCA)…continued

- Hydrogen peroxide
- Nitric acid
- Sodium hypochlorite
- Sodium hydroxide
- Hydrochloric acid

The Hydrogen peroxide is automatically dosed into the leachate tanks without any direct contact. Approximately 25L of Hydrochloric acid is pumped into the system every 2 hours during pH adjustments. The 60% Nitric acid is diluted to 40% by the supervisor as a temporary measure once a day whereafter it is added to the water.

The caustic soda, Sodium hydroxide and Nitric acid used for CIP are all stored in 25 litre polycans and a dosing pump is used to transfer the chemicals into the system. Direct handling of the chemicals is therefore minimal which reduces the operator exposure risk.

In addition, employees may be at some risk of exposure to diesel exhaust emissions from the generator.

The health effects associated with exposure to these priority HCA include:

Inhalable nuisance dusts:
HCA ingredient: Nuisance dusts - TWA OEL-RL = 10 mg/m^3
Physical form: particulate
Route(s) of entry: inhalation
Health Effect Rating = 1
Health Effects: No systemic health effects but may cause localised irritation of upper respiratory tract and mechanical irritation of eyes.

Respirable dusts:
HCA ingredient: respirable dusts - TWA OEL-RL = 5.0 mg/m^3
Physical form: particulate
Route(s) of entry: inhalation
Health Effect Rating = 2
Health Effects: Respirable dusts are able to penetrate into the lower air gaseous exchange areas of the lungs and following excessive exposures may cause pneumoconioses - depending on morphology.

7. DISCUSSION OF HEALTH RISKS…continued

7.10 HEG-55_1: Leachate Treatment Plant…continued

7.10.2 Hazardous Chemical Substances (HCA)

Diesel exhaust emissions:

HCA ingredient: diesel particulate matter - TWA OEL-RL = 0.16 mg/m^3

HCA ingredient: carbon monoxide - TWA OEL-RL = 50 ppm

Physical form: particulate, gas

Route(s) of entry: inhalation

Health Effect Rating = 3

Health Effects: The major health concerns are the *carcinogenic effect* of diesel particulate matter in humans and the chemical asphyxiant effect of carbon monoxide gas (bonds to haemoglobin in the blood to form carboxyhaemoglobin which then starves tissues of oxygen). There may be some potential for weighbridge staff to be exposed to diesel exhaust emissions from trucks entering and leaving the site. Given the good natural ventilation in the area, such exposures are unlikely to pose a significant health risk.

*** Hydrochloric acid:**

HCA ingredient: Hydrogen chloride - STEL = 5 ppm

Physical form: liquid

Route(s) of entry: dermal, eyes, ingestion, inhalation

Health Effect Rating = 3

Health Effects: Hydrochloric acid is highly irritant and corrosive to all tissue. Dermal and eye contact will cause immediate tissue damage and burns - the primary hazard within the industrial setting. Inhalation exposure to mists and fume will cause irritation of the upper respiratory tract. Very excessive inhalation of mists may cause pulmonary oedema.

Recommended PPE: Acid resistant gloves and aprons, face shields. A half mask respirator fitted with Type E1 filter cartridges is recommended in poorly ventilated areas.

*** Hydrogen peroxide:**

HCA ingredient: Hydrogen peroxide – TWA OEL-RL = 2 ppm

Physical form: colourless, heavy liquid, or at low temperature, a crystalline solid

Route(s) of entry: inhalation, dermal, ingestion

Health Effect Rating: 2

Health Effects: Highly irritant to the skin, eyes and mucus membranes and via the oral and inhalation routes. Hydrogen peroxide its solutions, vapours and mists are irritant to the body tissue. This irritation can vary from mild to severe depending upon the concentration. Blistering of the skin can also occur.

Recommended PPE: Acid resistant gloves and aprons, face shields. A half mask respirator fitted with Type ABE1 filter cartridges is recommended for use when there is a risk of exposure to excessive concentrations of airborne mists.

7. DISCUSSION OF HEALTH RISKS…continued

7.10 HEG-55_1: Leachate Treatment Plant…continued

7.10.2 Hazardous Chemical Substances (HCA)

Hydrogen sulphide:

HCA ingredients: Hydrogen sulphide – TWA OEL-RL = 2ppm / STEL = 10ppm
Physical form: gas
Route(s) of entry: inhalation
Health Effect Rating = 3
Health Effects: Exposure to low concentrations of hydrogen sulphide causes irritation to the eyes, nose and throat, headaches, poor memory, tiredness, and balance problems as well as difficulty in breathing in asthmatics. Respiratory distress and collapse may result from exposure to elevated concentrations. Hydrogen sulphide is not considered to be carcinogenic to humans.

*** Nitric acid:**

HCA ingredient: Nitric acid - TWA OEL-RL = 4ppm / STEL = 8 ppm
Physical form: liquid
Route(s) of entry: dermal, eyes, ingestion, inhalation
Health Effect Rating = 4
Health effects: Nitric acid is highly irritant and corrosive to the skin, eyes and mucous membranes. Upon contact with tissue it causes immediate destruction and corrosion, with burns and staining. Inhalation of acid fume will cause irritation of the upper respiratory tract which may clear up only to return more severely at a later stage. Severe lung damage may result from excessive inhalation exposure. Due to the good warning properties chronic exposures to elevated concentrations is unlikely.
Recommended PPE: Acid resistant gloves and aprons, face shields. A half mask respirator fitted with Type ABE1 filter cartridges is recommended for use when there is a risk of exposure to excessive concentrations of airborne mists.

*** Sodium hydroxide:**

HCA ingredient: Sodium hydroxide - STEL = 4 mg/m^3
Physical form: pellets
Route(s) of entry: inhalation, dermal, oral
Health Effect Rating: 3
Health Effects: Highly corrosive to all body tissue - especially in presence of moisture. Symptoms of irritation occur rapidly after exposure (inhalation, dermal or oral). Highly toxic via the oral route. Inhalation of dust can cause irritation and damage to the respiratory tract and lung tissue. Repeat contact with dilute solutions may cause dermatitis.
Recommended PPE: Acid resistant gloves and aprons, face shields. A half mask respirator fitted with Type ABE1 filter cartridges is recommended for use when there is a risk of exposure to excessive concentrations of airborne mists.

7. DISCUSSION OF HEALTH RISKS…continued

7.10 HEG-55_1: Leachate Treatment Plant…continued

7.10.2 Hazardous Chemical Substances (HCA)

Ammonia:

HCA ingredients: Ammonia – TWA OEL-RL = 50ppm / STEL = 70ppm
Physical form: gas
Route(s) of entry: inhalation
Health Effect Rating = 3
Health Effects: Ammonia is an irritating and corrosive gas and exposure to high concentrations causes immediate burning of the nose, throat and upper respiratory tract. Inhalation may also cause oedema and airway destruction, resulting in respiratory distress or failure. Inhalation of lower concentrations may cause coughing, and nose and throat irritation. Whilst ammonia has a distinctive odour which provides adequate early warning of its presence, exposures may lead to olfactory fatigue which reduces awareness of prolonged exposure at low concentrations.

Volatile organic compounds:

HCA ingredients: miscellaneous volatile organic compounds
Physical form: vapour
Route(s) of entry: inhalation, skin
Health Effect Rating = 2 / 3
Health Effects: Organic vapours are usually associated with causing narcotic effects and depression of the central nervous system. Many VOC are however known to cause systemic health effects including liver and kidney damage. Several organic solvent compounds are suspected (or confirmed) human carcinogens and others have been shown to cause damage to unborn foetuses – i.e. teratogenic effects. Some VOC (especially isocyanates) are also recognised respiratory sensitisers and may cause ashthma (asthmagens).

Plant operators are currently issued with the following PPE:

- Acid resistant cotton overalls
- Safety shoes / boots
- Rubber gloves
- Hard hats
- Latex gloves
- Safety glasses / face shields
- Winter jackets
- Type ABEK1 half mask respirators (discretionary use)

Provided that this PPE is diligently and correctly used it is capable of affording adequate protection against HCA exposures via all likely routes (dermal and eye).

7. DISCUSSION OF HEALTH RISKS…continued

7.10 HEG-55_1: Leachate Treatment Plant…continued

7.10.3 Ergonomic stresses

Operators are mostly required to inspect the automated treatment process. This activity poses minimal risk to the employees. Operators are able to sit on chairs within the plant for the majority of their shifts – pending relocation to a permanent office. Manual handling of chemical containers (>25kg) may cause operators to experience some musculo-skeletal strain. Pallet trolleys are also manually pulled or pushed to transfer the chemical containers. These activities are conducted infrequently during a shift.

Ergonomic risks are therefore deemed tolerable and are unlikely to present a significant health risk to traffic controllers under normal circumstances.

7.10.4 Noise exposures

Based on the quantitative noise survey (GEO Project No 06962_5), average 8 hour noise rating levels to which plant operators are exposed are very unlikely to exceed the Statutory limit (85dBA). Typical noise exposures therefore present a low risk to worker health.

7.10.5 Thermal stress

Cold stress

A review of the 2023 meteorological data for the Shongweni site reveals that the lowest recorded air temperature was never below 6^0 Celsius. Minimum temperatures on site rarely fall below 10^0 Celsius and the risk of worker exposure to cold stress conditions is low. A formal cold stress survey was last conducted on site during August 2014 (GEO Project No 03736).

Operators are issued with thermal jackets for use during the winter season.

Heat stress

Outdoor wet bulb globe temperatures (WBGT) on the Shongweni site may approach the Statutory limit (WGBT >=30 for 1 hour) during peak summertime.

A formal heat stress survey was performed on site during February 2025 (GEO Project No 06962_2). The outcome of this study revealed that workers who engage in typical outdoor activities (low metabolic work rates) on the Shongweni site are at low risk of exposure to heat stress conditions in excess of these guideline values – i.e. are at low relative risk of developing heat stress related ailments as a consequence of exposure to heat stress conditions.

The Leachate Treatment Plant is located under cover and is not in direct sunlight. The plant is well ventilated. Employees are not engaged in manual hard work and their risk of exposure to heat stress conditions are therefore low.

7. DISCUSSION OF HEALTH RISKS…continued

7.10 HEG-55_1: Leachate Treatment Plant…continued

7.10.6 Illuminance levels

During daytime, the outdoor work areas are adequately illuminated by available natural light.

The outcomes of the most recent (2023) night-time illumination survey (GEO Project No 06384) revealed that several areas of the plant were found to be marginally illuminated and remedial actions were recommended.

7.10.7 Non-ionising radiation

The risk of LTP operators being exposed to excessive Ultraviolet (UV) radiation (direct sunlight) is low given that the plant is situated underneath a covered area, i.e. not in direct sunlight.

7.10.8 Reproductive Health Risks

Of primary concern from a Reproductive Health Stress perspective is the risk of worker exposure to multiple chemical substances during plant operation activities. The leachate may contain trace chemical compounds with known reproductive health effects (mercury and mercury compounds, polychlorinated biphenyl compounds, organic solvents, pesticides/herbicides).

The primary route of exposure is likely to be inhalation although exposure via accidental direct dermal contact cannot be excluded. Exposure of pregnant and/or breastfeeding workers to the above HCA must be prohibited.

An additional concern is the potential risk of exposure to SARS-CoV-2 during pregnancy. The risks which SARS-CoV-2 present to pregnant women are at present still unknown with some studies suggesting that there are no increased risks vv normal population whilst others indicate that there is a higher risk both to mother and foetus. There is female LTP operators employed on site.

Plant operators may also routinely be exposed to ergonomic stresses although these are of low risk. Should any of these workers become pregnant however, there may be some increase in the health risks associated with exposure to ergonomic stresses. This in itself would not prevent pregnant workers from performing LTP operation activities until the 3rd Trimester of pregnancy – the overriding concern remains the potential for exposure to HCA – refer Recommendations.

7.10.9 Psychosocial stress

Plant operators are unlikely to develop any psychosocial dysfunction as a consequence of work pressures or performance targets. Social and/or personal issues may however impact on the psychosocial wellbeing of staff.

8. RECOMMENDATIONS

8.1 Hazardous Biological Agents (HBA)

A review of the site's HBA Risk Assessment was performed in February 2025. The outcomes of this assessment were detailed in GEO Project No. 06962_9. The recommendations made in this report included:

- The various potentially infectious waste streams received on site should continue to be treated and covered as soon as possible following arrival on site.

- Traffic controllers must, as far as reasonably practicable, remain upwind of the disposal activities in order to minimise their exposure risk to airborne HBA. These workers must continue to make compulsory use of Type FFP2 half mask respirators when engaged in activities within the operational areas on site.

- Vehicle operators must continue to operate their vehicles with closed windows and doors when engaged within the operational areas on site. These operators should continue to be issued with Type FFP2 half masks for use whenever infectious waste streams are disposed off on site.

- Workers must be informed of the potential routes and sources of bacterial contamination. The importance of good personal hygiene practices (thoroughly washing hands after ablutions, covering nose when sneezing etc) and effective cleaning procedures must continue to be made clear to staff. Reminders to thoroughly wash hands both before and (especially) after using the ablutions should continue to be posted in all toilet/ablution areas. Workers must *not be permitted to wash their hands in kitchen basins* in order to prevent contaminating the kitchen environment with bacteria contained within faecal matter.

- Special priority should continue to be given to ensuring that workers wash their hands thoroughly prior to entering the canteen. *Anti-bacterial soap solutions along with disposable paper toweling / hand dryer* must be provided, especially within the bathrooms and at the outdoor basin area.

- Cleaning regimens must target those areas most vulnerable to contamination and subsequent transfer of pathogenic organisms to workers:

- tap bases (warm, moist conditions)
- counter surfaces (especially joins between counter and sinks / basins)
- cutting boards
- toilet seats, flush handles and toilet paper dispensers
- urinal flush control buttons
- hand soap dispensers
- toilet door handles

8. RECOMMENDATIONS…continued

8.1 Hazardous Biological Agents (HBA) …continued

- Use of a *dilute sodium hypochlorite solution (2-3%) or commercial anti-bacterial cleaning* agent would be adequate to control most instances of bacterial contamination. Commercial dishwashing liquid should be used in conjunction with a dilute sodium hypochlorite solution or anti-bacterial solution e.g. commercial bleach / JIK.

- The cleaning staff / tea lady / kitchen staff must be specifically instructed to thoroughly wash their hands before and after using ablutions. Use of an anti-bacterial soap solution is recommended along with disposable paper toweling rather than cotton towels which frequently harbor bacteria. In addition, the cleaning lady should also continue to make use of rubber gloves when cleaning the various ablution areas.

- All cleaning materials (sponges, cloths) must be replaced at regular intervals in order to prevent the accumulation and growth of microorganisms. Such materials must also be subject to regular washing/rinsing in a sodium hypochlorite solution. Different cleaning materials must continue to be used for bathrooms and kitchens – i.e. there must be no sharing of cleaning clothes/sponges between these two areas.

- All minor cuts incurred during work must be immediately cleaned, disinfected and treated and promptly reported to management for further assessment. Cuts must remain covered at all times when engaged in waste cell activities and/or cleaning activities.

- EnviroServ employees should continue to receive formal training and instruction in the health risks associated with their activities. Employees should also continue receiving formal training the correct use and storage of their PPE.

- It is recommended that all EnviroServ employees, including administration staff, continue to be subject to appropriate medical surveillance in accordance with Regulation 8 of the Hazardous Biological Agents Regulations - Occupational Health and Safety Act (Act No 85 of 1993).

8. RECOMMENDATIONS…continued

SARS-CoV-2

While no regulations are enforced, the NICD and the National Department of Health provide voluntary recommendations to reduce the spread of COVID-19, particularly for individuals with respiratory symptoms or confirmed infections. These guidelines are not legally binding but are promoted as best practices:

For Individuals with Symptoms or Positive Tests:

- Mask-Wearing: Wear a mask when interacting with others for at least 5 days from the date of a positive test or symptom onset to reduce transmission risk.
- Avoid Gatherings: Refrain from attending social gatherings (defined as groups of three or more people) for 5 days.
- Limit Indoor Socializing: Avoid indoor social interactions, especially with high-risk groups such as the elderly (over 60 years) or individuals with comorbidities (e.g., diabetes, lung disease, heart disease, kidney disease, cancer, uncontrolled HIV, or immunocompromised conditions), for 5 days.
- Hygiene Practices: Practice regular handwashing, cover coughs and sneezes, and sanitize surfaces to minimize transmission.

General Public Health Advice:

- The NICD encourages vaccination, particularly for high-risk groups, as a preventive measure, though it is not mandatory. Booster doses are recommended based on individual health needs.
- Maintain good ventilation in indoor spaces to reduce the risk of respiratory infections.
- Seek medical advice for severe symptoms, especially for those with underlying health conditions. The NICD emphasizes consulting healthcare providers for personalized guidance.

Workplaces may implement their own policies under the Occupational Health and Safety Act (No. 85 of 1993) to manage risks associated with infectious diseases:

1. Employer Discretion: Employers may require measures such as mask-wearing, regular sanitization, or health screenings based on workplace-specific risk assessments. For example, healthcare facilities or settings with vulnerable populations (e.g., nursing homes) may enforce stricter protocols.
2. Workplace Guidelines: The National Institute for Occupational Health (NIOH) provides resources for workplace safety, including ventilation recommendations and infection prevention strategies, but these are advisory. Employers are encouraged to consult www.nioh.ac.za for guidance.
3. No Mandatory Vaccination: There are no government requirements for employees to be vaccinated against COVID-19. However, some private employers may request proof of vaccination or regular testing as part of their internal policies, particularly in high-risk industries.

8. RECOMMENDATIONS…continued

8.2 Hazardous Chemical Substances (HCA)

- An air sampling survey to assess the risks of worker exposure to airborne inorganic acid vapours should be considered for the Leachate Treatment Plant during the next sampling period.

- Current issue Personal Protective Equipment (PPE) for the various activities conducted at the Shongweni site is capable of affording adequate protection against exposures to HCA via all routes. The diligent and correct use of PPE by all workers within the various areas must continue to be actively enforced.

- All workers who are engaged in activities with the operational areas on site must continue to receive formal training and instruction detailing the health effects associated with excessive exposure to priority HCA as well the importance/benefits of diligently wearing appropriate PPE.

- All workers must continue to be instructed in the correct use and care of their PPE. Suppliers of PPE currently provide periodic training in this regard. A register of all such training must be kept and regular refresher courses must be provided.

- All of the recommendations made as part of the ongoing personal air monitoring surveys remain relevant and must continue to receive due consideration.

- All site operations which fall outside of the scope of this Health Risk Assessment, including tank cleaning and tank cutting activities (if applicable) must be subject to stand-alone health risk assessments.

- It is again recommended that consideration be given to formally adopting the proposed procedure for identifying HCA disposal activities / jobs which require specific HRAs and/or air sampling surveys to be conducted – refer Annexure 1.

8. RECOMMENDATIONS…continued

8.3 Ergonomic hazards:

- Whilst the ergonomic environments/hazards on the Shongweni site continue to be of lower priority within the context of identified health risks, it is again recommended that consideration be given to conducting a formal ergonomics risk assessment for the site.

- The seats within the operator cabins of all landfill plant machinery must be regularly inspected and promptly repaired in the event of any breakage.

- All site workers would benefit from some instruction in correct lifting techniques – i.e. aimed at minimising the risk of lower back injuries or other musculo-skeletal stresses and strains.

- All site workers would benefit from some instruction in correct lifting techniques – i.e. aimed at minimising the risk of lower back injuries or other musculo-skeletal stresses and strains.

- The recommendations made in the Ergonomics Risk Assessment report remain relevant and should be referenced as part of this report (GEO 06962_4).

8.4 Noise hazards:

- The periodic assessment of noise rating levels within the operator cabins of all landfill plant equipment and other production activities must continue as part of the ongoing Occupational Hygiene Programme.

- The recommendations made in the most recent site noise survey (Geozone Project No GEO 06962_5) remain valid and must be consulted as part of this HRA review.

- The assessment of average noise rating levels to which traffic controllers are routinely exposed must also continue.

- The assessment of average noise rating levels at the Leachate Treatment Plant should continue to be conducted as part of the ongoing OHP. No remedial actions are deemed necessary based on the outcome of the latest noise survey.

- All maintenance who are required to engage in grinding or hammering operations or who may be required to operate any hand tools which generate excessive noise rating levels, must be issued with and required to wear approved hearing protective devices.

8. RECOMMENDATIONS…continued

8.5 Thermal stress:

- The periodic monitoring of thermal stress conditions within the Plant operator cabins as well as at outdoor work areas must continue as part of the established Occupational Hygiene Programme (OHP) for the site. These surveys must continue to be performed in accordance with Environmental Regulation 2 of the Occupational Health and Safety Act (Act 85 of 1993).

- In the interim, the following recommendations made in the latest thermal (cold/heat) stress survey reports remain valid and must continue to receive attention:

  - All site workers and plant operators must be instructed to drink at least 600 ml water per hour in order to keep themselves adequately hydrated. The current practice of plant operators keeping a supply of (clean) drinking water in their cabins should be encouraged. Outdoor workers must also keep a supply of drinking water with them on the site or have ready access to clean drinking water on the site itself (portable tanker).

  - The functioning efficiency of all ventilation systems (air conditioning units and fans) installed within plant equipment in use on site must be regularly checked according to a set maintenance schedule. Any malfunctions in these ventilation systems must be promptly rectified. *No plant equipment should be permitted to operate on site without a fully functional air conditioning system*. Under summertime conditions, air temperatures within operator cabins regularly exceed 30^0C and there is a real risk of plant operators being exposed to adverse heat stress conditions within their cabins if air conditioning systems are not operational. Opening of cabin windows and doors to improve airflow does not provide a viable solution as this increases the risk of operator exposure to airborne contaminants.

  - All site workers *should be instructed in the hazards associated with working* in potentially hot conditions. All workers engaged on site should be made to be aware of the early warning signs of impending heat stress conditions (heat syncope, heat exhaustion and heat stroke) so that they may easily recognise them in themselves and in colleagues and be able to take appropriate remedial action.

  - All workers required to engage in outdoor activities must continue to be issued with and encouraged to wear some form of effective head protection – e.g. brimmed hard hats. The dangers associated with prolonged exposures to direct sunlight (Ultraviolet light) should be made clear to all such employees (including the security company) in an effort to encourage voluntary wearing of such protection.

8. RECOMMENDATIONS

8.5 Thermal stress…continued

- Should any workers be required to engage in manual labour on site under summertime conditions (air temperatures >30^{0}C), particularly work requiring a moderate-high metabolic work rate, a formal work:rest regimen must be drafted and implemented (25%:75% or 50%:50% - dependant on the prevailing WBGT and the nature of the work performed).

- All site workers must continue to be subject to appropriate medical surveillance as per the established company protocol. Priority must be given to ensuring that all site workers (including plant operators) are medically fit to engage in manual work within potentially hot environments.

8.6 Illumination:

- The periodic assessment of site illuminance levels (daytime and night-time) must continue as part of the established Occupational Hygiene Programme (OHP) for the site. These surveys must continue to be performed in accordance with Environmental Regulation 3 of the Occupational Health and Safety Act (Act 85 of 1993). Another assessment of the night-time illuminance levels throughout the operational areas on site should be scheduled.

- In the interim, the recommendations made in the latest site illumination survey report (Geozone Project No GEO 06962_1) remain valid and must be consulted.

8.7 Non ionising radiation:

- All outdoor workers must be issued with some form of head protection against direct sun exposure. Brimmed hard hats and UV protected safety glasses are recommended in order to prevent acute sunburn and chronic sun damage (including skin cancers).

- The hazards associated with prolonged exposure to sunlight (UV) should be explained to all workers. Whilst the risks of skin damage and possible carcinomas as a result of sun exposure are higher in the white population group, persons of other racial groups are also susceptible.

8.8 Reproductive Health Risks

Reference must continue to be made to the following documents:

- EnviroServ corporate Management Guideline for Reproductive Health
- EnviroServ SHEQ Standard for Reproductive Health Management SHEQ-HS-05
- EnviroServ Human Resources Department Document POL-14

8. RECOMMENDATIONS…continued

8.8 Reproductive Health Risks…continued

Of special relevance to the Shongweni landfill site are the following:

- *Both male and female workers must be encouraged to report any reproductive health concerns that they may have*
- *Female workers must be encouraged to inform their supervisor as soon as they become aware that they are pregnant*
- *Appropriate training and instruction and counselling related to reproductive health issues should be available to workers*

All workers on site (irrespective of workplace) who become pregnant or who are breastfeeding *must be subject to appropriate medical surveillance.*

In view of the (largely uncontrollable) risks of exposure to hazardous chemical substances which may cause reproductive health effects, it is recommended that *female workers of child-bearing age be considered ineligible for the following job categories (homogenous exposure groups) on the Shongweni site:*

HEG-47: Traffic controllers
HEG-48: Plant operators
HEG-49: Maintenance staff

It is further recommended that female workers who are engaged in the following job categories and who subsequently fall pregnant, *be instructed to inform their supervisors/managers as soon as the pregnancy is confirmed*:

HEG-45: Weighbridge staff
HEG-46: Laboratory staff
HEG-54: Supervisory staff
HEG-55_1: Leachate Treatment Plant staff

Pregnant female workers within the above HEGs *must be removed from these work environments with immediate effect and provided with alternative work in non-operational areas on site* - pending initiation of their allotted pregnancy leave. Should no suitable alternative work be available then the affected workers must be granted leave in accordance with the conditions detailed in the corporate Management Guideline for Reproductive Health and HR POL-14.

Management staff who are pregnant or who are breast-feeding, must be instructed to limit the amount of time spent in operational areas on site as far as practicable. During such site visits there must be strict adherence to all personal protective equipment requirements.

No special precautionary measures are deemed necessary for pregnant females engaged in administrative and/or office cleaning activities. Similarly, no special precautionary measures are advised for male workers on site apart from routine instruction in the potential health effects associated with exposure to HCA.

8. RECOMMENDATIONS…continued

8.9 Psychosocial stress:

The Canadian Mental health Association (CMHA) defines workplace stress as *"the harmful physical and emotional responses that can happen when there is a conflict between job demands on the employee and the amount of control an employee has over meeting these demands. In general, the combination of high demands in a job and a low amount of control over the situation can lead to stress".*

Workplace or occupational stress can have many specific origins including:

- fear of job redundancy
- fear of being laid off due to an uncertain economy
- increased demands for overtime due to staff cutbacks
- conflict with management or co-workers
- working long or variable / changeable shifts
- lack of control over the work environment
- having to meet unrealistic deadlines and performance targets

Workers may begin to feel pressured to perform and could potentially become trapped in a downward spiral of increasing effort to meet the rising expectations of management with no increase in job satisfaction. As noted by the CMHA, the relentless requirement to perform at optimum performance levels eventually takes its toll and impacts on levels of job dissatisfaction, worker turnover, reduced efficiency, illness and even death. Absenteeism, illness, alcoholism, "petty internal politics", bad or snap decisions, indifference and apathy, lack of motivation or creativity are all by-products of an over stressed workplace.

There are numerous ways to deal with workplace psychological stress. Workers should be actively encouraged to report any signs or symptoms of stress to their supervisors or managers so that the matter can be speedily resolved. These signs and symptoms typically include:

Physical: headaches, grinding teeth, clenched jaws, chest pain, shortness of breath, pounding heart, high blood pressure, muscle aches, indigestion, constipation or diarrhoea, increased perspiration, fatigue, insomnia, frequent illness.

Psychosocial: anxiety, irritability, sadness, defensiveness, anger, mood swings, hypersensitivity, apathy, depression, slowed thinking or racing thoughts; feelings of helplessness, hopelessness, or of being trapped, lower motivation.

Cognitive: decreased attention, narrowing of perception, forgetfulness, less effective thinking, less problem solving, reduced ability to learn; easily distracted.

8. RECOMMENDATIONS

8.9 Psychosocial stress: …continued

Behavioural: overeating or loss of appetite, impatience, quickness to argue, procrastination, increased use of alcohol or drugs, increased smoking, withdrawal or isolation from others, neglect of responsibility, poor job performance, poor personal hygiene, change in religious practices, change in close family relationships.

Worker training in all aspects of their jobs will help to assure them of the effectiveness of existing company health and safety protocols and lend a more balanced perspective to their perception of the risks associated with their work environment.

An informal assessment of the psychological well-being of workers could form part of the established medical surveillance protocols – at the discretion of the company appointed OMP. This could be as simple as having the medical staff pose questions to workers in order to elicit a voluntary response pertaining to their experience of psychological stress in the workplace.

9. CONCLUSION

This report presents a detailed evaluation of occupational health risks at the Shongweni site, covering a range of hazards including biological and chemical exposures, ergonomic and noise risks, thermal stress, illumination, radiation, reproductive health concerns, and psychosocial stress. The recommendations outlined are aimed at reducing health risks, ensuring legal compliance, and fostering a safe and supportive working environment.

Hazardous Biological Agents (HBA)

The site must continue strict hygiene and infection control practices. These include the prompt covering of infectious waste, upwind positioning of traffic controllers, and mandatory use of FFP2 respirators in operational areas. Workers should remain informed of infection risks and proper hygiene practices, especially handwashing. Anti-bacterial soap and disposable paper towels must be provided, and handwashing signage maintained in ablution areas. Cleaning regimens should target high-contact surfaces, using effective disinfectants. Distinct cleaning materials must be used for ablution and kitchen areas to prevent cross-contamination. Training on PPE use and biological risks must continue, alongside ongoing medical surveillance as required by Regulation 8 of the HBA Regulations.

SARS-CoV-2

Although not legally mandated, COVID-19 precautions remain advisable. Symptomatic individuals should isolate, wear masks, and avoid indoor gatherings. Hygiene practices and good ventilation must be encouraged. Employers may adopt internal policies under the Occupational Health and Safety Act, with reference to NIOH guidance. Vaccination remains voluntary but is encouraged for high-risk individuals.

Hazardous Chemical Substances (HCA)

Airborne chemical exposure, requires continued monitoring. PPE in current use is adequate, but correct usage must be enforced. Workers must receive ongoing training on chemical hazards and PPE care. A formal process for identifying activities needing special assessments or sampling should be adopted. All health and safety measures recommended in prior HCA reports remain valid.

Ergonomic Hazards

Though lower in priority, ergonomic risks such as poor seating and manual handling injuries must still be addressed. Operator cabin seats should be regularly checked, and workers trained in safe lifting techniques. Recommendations from the ergonomics risk assessment (GEO 06962_4) should continue to guide improvements.

Noise Hazards

Periodic monitoring of noise levels—particularly for operators, maintenance staff, and traffic controllers, must continue. Workers involved in high-noise activities must use hearing protection. Previous site noise surveys (e.g., GEO 06962_5) remain applicable and should be referenced during risk reviews.

9. CONCLUSION…continued

Thermal Stress

Regular monitoring of thermal stress conditions must continue. Functional air conditioning in plant cabins is essential, as is ready access to drinking water. Education on heat stress symptoms must be provided, and sun protection (e.g., brimmed hats) issued. Formal work-rest schedules must be implemented during high-heat conditions. All site workers should undergo medical surveillance to ensure fitness for work in hot environments.

Illumination

Illumination levels must be regularly assessed, with attention to both daytime and night-time conditions. Recommendations from the latest illumination survey (GEO 06962_1) remain valid. These assessments are essential to ensure visibility and reduce accident risks.

Non-Ionising Radiation

All outdoor workers should continue to be issued UV-protective gear, including brimmed hard hats and safety glasses. Training on the risks of prolonged UV exposure should be provided to all workers, as all skin types are susceptible to sun damage.

Reproductive Health Risks

Company guidelines and policies on reproductive health must continue to be applied. Pregnant and breastfeeding employees must be reassigned to non-operational roles where possible and enrolled in medical surveillance. Workers in certain high-risk groups (e.g., traffic controllers, plant operators, maintenance staff) should not be assigned if they are of childbearing age or become pregnant. Leave should be granted in line with internal HR policies when alternative roles are unavailable.

Psychosocial Stress

Workplace stress can stem from long shifts, high workloads, or interpersonal conflict. Training, support, and open communication are essential in identifying and resolving stress-related concerns. Symptoms should be monitored, and informal psychological assessments may be included as part of medical surveillance. A proactive approach will improve worker wellbeing, motivation, and performance.

10. MEDICAL SURVEILLANCE

It is recommended that all workers engaged on the Shongweni site continue to be subject to appropriate medical surveillance in accordance with Regulation 7 of the Regulations for Hazardous Chemical Substances - Occupational Health and Safety Act, Act No 85 of 1993.

EnviroServ has an established formal procedure for the compilation of appropriate Medical Surveillance Protocols for workers engaged on its sites (EnviroServ Occupational Health Management System – Document EWM-OHP-NAT-008 dated 2018/05/01).

In accordance with the above document, workers who are engaged at the Shongweni site are divided into the following Medical Surveillance Categories:

HEG No.	HEG Description	Medical Surveillance Category
45	Weighbridge staff	**B1**
46	Laboratory staff	**B1**
47	Traffic controllers	**B1**
48	Plant operators	**B1**
49	Maintenance staff	**B1**
52	Management staff	**B1**
53	Supervisory staff	**B1**
54	Administrative staff	**C**
55	Cleaning staff	**C**
55_1	Leachate Treatment Plant staff	**B1**

Document EWM-OHP-NAT-008 further provides detailed Medical Surveillance Protocols for each worker category- i.e. listing details of required medical examinations and tests.

The recommended medical surveillance protocols for the worker categories relevant to the Shongweni landfill site are detailed overleaf:

10. MEDICAL SURVEILLANCE…continued

Category B1 (HEGs: 45, 46, 47, 48, 49, 52, 53 and 55-1)	
FREQUENCY:	Baseline examination, Annual examination, Exit examination
PHYSICAL EXAMINATION	Occupational and medical history including exposure history Complete general examination including: • height, weight • peripheral pulses • blood pressure • respiratory system • cardiovascular system • musculo-skeletal system • neurological • mini-mental state examination • Urine dipstix (Combur 4) • Blood glucose (glucometer)
LUNG FUNCTION TESTS	Annually
CHEST X-RAY:	Every 5 years or as requested by OMP
LABORATORY TESTS:	Haemoglobin (HB) White Cell Count (WCC) Blood glucose (only if indicated by glucometer / dipstix) AST, GGT (if GGT >100 exclude medical conditions and medication causing elevation – proceed with CDT)
BIOLOGICAL MONITORING:	As per exposure requirements and notifiable substances list
IMMUNISATION:	Hepatitis B screening and, if necessary, immunisation
VISION:	Visual acuity, night and colour blindness
AUDIOMETRY:	Annual
REPRODUCTIVE HEALTH: *Reference must be made to requirements of the EnviroServ Management Guideline for Reproductive Health (Document HS-05) and the latest Health Risk Assessment for the site.*	

10. MEDICAL SURVEILLANCE…continued

Category C (HEGs 54 and 55)	
FREQUENCY:	Baseline examination and Exit examination
PHYSICAL EXAMINATION	Occupational and medical history Complete general examination including: • height, weight • peripheral pulses • blood pressure • respiratory system • cardiovascular system • musculo-skeletal system • neurological • Urine dipstix (Combur 4) • Blood glucose (glucometer)
LABORATORY TESTS:	Blood glucose (only if indicated by glucometer / dipstix)
CHEST X RAY:	Only if requested by the OMP for a work related condition
IMMUNISATION:	Hepatitis B immunisation
VISION:	Visual acuity - Snellens
REPRODUCTIVE HEALTH: *Reference must be made to requirements of the EnviroServ Management Guideline for Reproductive Health (Document HS-05) and the latest Health Risk Assessment for the site.*	

11. REFERENCES

11.1 Hazardous Materials Toxicology - Clinical Principles of Environmental Health, Sullivan and Krieger, Publ. Williams and Wilkins, 1992.

11.2 Occupational Medicine, Joseph La Dou, Publ. Appelton & Lange. 1990.

11.3 Sax, N.I. 1992. Dangerous Properties of Industrial Materials. (5th ed.)

11.4 South Africa (Republic). 1993. Occupational Health and Safety Act No. 85 of 1993 Regulations for Hazardous Chemical Substances. Pretoria. Govt Printer.

11.5 American Conference of Governmental Industrial Hygienists (ACGIH) - Threshold Limit Values (TLVs) for Chemical Substances and Physical Agents. 2011 ed.

11.6 EnviroServ Waste Management (Pty) Ltd – SHEQ Integrated Management Occupational Health Standards: Document HS-01 – Occupational Health Management.

11.7 EnviroServ Waste Management (Pty) Ltd – Occupational Health Management System: Occupational Health Program: Document No OHSP-NAT-050.

11.8 EnviroServ Waste Management (Pty) Ltd – SHEQ Integrated Management Occupational Health Standards: Document EWM-OHP-NAT-008 (May 2018) – Medical Surveillance Protocols.

11.9 EnviroServ Waste Management (Pty) Ltd - SHEQ Integrated Management Occupational Health Standards: Document HS-05 – Reproductive Health Management.

11.10 EnviroServ Waste Management (Pty) Ltd – Human Resources Department Document POL-15: Employment of pregnant women in risk areas.

11.11 Geozone Environmental (Pty) Ltd Project No 06384. Night-time illumination survey. May 2023.

11.12 Geozone Environmental (Pty) Ltd Project No 06962_1. Daytime Illumination survey. February 2025.

11.13 Geozone Environmental (Pty) Ltd Project No 06962_2: Thermal stress survey (heat). February 2025.

11.14 Geozone Environmental (Pty) Ltd Project No 06962_3: Surface swab sampling survey. February 2025.

11.15 Geozone Environmental (Pty) Ltd Project No 06962_4. Ergonomics Risk Assessment. February 2025.

11. REFERENCES…continued

11.16 Geozone Environmental (Pty) Ltd Project No 06962_5. Site noise survey. February 2025.

11.17 Geozone Environmental (Pty) Ltd Project No 06962_6: LEV survey. February 2025.

11.18 Geozone Environmental (Pty) Ltd Project No 06962_7: Personal Air Sampling. February 2025.

11.19 Geozone Environmental (Pty) Ltd Project No 06962_9: Hazardous Biological Agents Risk Assessment. February 2025.

11.20 Geozone Environmental (Pty) Ltd Project No 06697_9: Health Risk Assessment. May 2024.

Annexure A

Proposed procedure for determining which waste streams require specific occupational health risk assessments and/or biological monitoring to be performed on exposed workers at Enviroserv WDS

Occupational health comprises:

- Occupational hygiene
- Occupational medicine

In terms of the Regulations for Hazardous Chemical Substances, as promulgated under the Occupational Health and Safety Act (Act 85 of 1993), an employer is obliged to meet the following requirements:

Regulation 5: Assessment of potential exposure – an immediate risk assessment must be performed in order to assess the risk of worker exposure to hazardous chemical substances (HCS)

Regulation 6: Air monitoring – If the risk assessment indicates that workers may be at risk of inhalation exposure to HCS then air monitoring of such exposure(s) must be performed.

Regulation 7: Medical surveillance – workers must be subject to appropriate medical surveillance in the event of:

- exposure to any HCS which have been allocated Biological Exposure Indices (BEI) under Table 3 of the HCS Regulations
- exposure to HCS known to cause identifiable disease and/or adverse health effects
- the occupational health practitioner recommending such surveillance

Workers engaging in the collection, transport and disposal of hazardous waste materials are potentially exposed to any number of hazardous chemical substances contained in this waste. The majority of such exposures do not require specific Health Risk Assessments or Air Monitoring to be performed as they are adequately covered by the existing (ongoing) Occupational Hygiene Programme originally devised and implemented by Margot Saner & Associates (Pty) Ltd (now Geozone Environmental).

There are however some potential exposures which must be subject to specific assessment - based on the toxicity or quantity of HCS ingredients. These exposures require specific risk assessments, air monitoring and medical surveillance to be performed in the interests of worker health.

There is currently no procedure in place at Enviroserv Waste Management for determining which waste sources require specific risk assessments to be performed. In order to address this matter, During the course of 2008, Margot Saner & Associates was requested (by Dr Carlos de Nobrega – Enviroserv's appointed Occupational Medicine Practitioner) to draft a guideline document aimed at setting up such a procedure. This guideline document is detailed below:

At the outset, it was MS&A's opinion, that any risk assessment / air monitoring or medical surveillance procedure should be simplified as far as possible in order to allow for easy interpretation by all parties concerned. To this end, the guideline document was intended to ensure ease of use and ready inclusion into any existing (related) procedures.

* Table 1 of Annexure 1 of the Regulations for Hazardous Chemical Substances lists those chemical substances which have been allocated Occupational Exposure Limit – Control Limits (OEL-CL). These substances are considered to be highly toxic and are known to cause serious and potentially irreversible health effects in exposed persons. Several of the Control Limit substances are either confirmed human carcinogens (known to cause cancer) or suspected carcinogens. In accordance with Statutory Requirements, worker exposures to Control Limit substances must be reduced as far below the OEL as practicably possible – i.e. controlling exposures to meet the OEL is not deemed sufficient.

* Table 2 of Annexure 1 of the HCS Regulations lists those chemical substances which have been allocated Occupational Exposure Limit – Recommended Limits (OEL-RL). These substances remain hazardous but are not generally considered to be highly toxic or strongly carcinogenic. In accordance with Statutory Requirements, worker exposures to Recommended Limit substances must be controlled to at least meet the OEL.

* Table 3 of Annexure 3 of the HCS Regulations lists those chemical substances which have been allocated Biological Exposure Indices (BEI). These chemical substances (or their metabolites) can be detected in blood or urine and compared to established reference standards or BEI. An advantage of Biological Monitoring is that it allows for the assessment of exposure to chemical substances via all routes of exposure (inhalation, ingestion, skin absorption, etc.).

It is recommended that priority be given to the following HCS:

Priority 1 HCS: these HCS have been allocated both an Occupational Exposure Limit – Control Limit (OEL-CL) and a Biological Exposure Index (BEI) and present a high risk to worker health. In some instances, excessive exposures have been shown to cause an increased incidence of cancers in exposed persons. The list of Priority 1 HCS is detailed in Table 1.

Table 1: Priority 1 HCS:

No	Substance	TWA OEL (mg/m^3)	STEL (mg/m^3)	BEI	Notes
1	Arsenic compounds	0.1*	-	Yes – refer Table 3	
2	Asbestos compounds	0.2 f/ml	-	-	
3	Benzene	16*	-	Yes – refer Table 3	
4	Cadmium compounds	0.05*	0.05	Yes – refer Table 3	
5	Chromium VI compounds	0.05*	-	Yes – refer Table 3	
6	Lead compounds	0.15	-	-	
7	Mercury compounds	0.05	0.15	Yes – refer Table 3	

* Control Limit substances (Table 1 of Annexure1: HCS Regulations)

TWA OEL = Time Weighted Average Occupational Exposure Limit

STEL = Short Term Exposure Limit (15 minutes)

BEI = Biological Exposure Limit (Table 3 of Annexure 1: HCS Regulations)

* In the event of Enviroserv being approached to handle (collect, transport or dispose of) any wastes (of any volume or quantity) containing HCS listed in Tables 1, 2 or 3, it is recommended that the following persons be informed as soon as possible:

- Occupational Hygienist
- Occupational Medical Practitioner

* It is strongly recommended that any work involving waste containing these HCS be subject to an initial Health Risk Assessment. This would allow for the assessment of the risks which the waste would potentially pose to workers engaged in any handling activities. In addition, the need to initiate appropriate personal and/or ambient air sampling during these activities would also be assessed along with the need to implement a medical surveillance programme/biological monitoring.

Priority 2 HCS: these HCS have been allocated both an Occupational Exposure Limit (Control Limit or Recommended Limit) *and a Biological Exposure Index* (BEI) and which present a moderate risk to worker health. In some instances, excessive exposures have been shown to cause an increased incidence of cancers in exposed persons. The list of Priority 2 HCS is detailed in Table 2.

Table 2: Priority 2 HCS:

No	Substance	TWA OEL (mg/m^3)	STEL (mg/m^3)	BEI	Notes
1	Aniline	10	20	Yes	Skin absorption
2	Carbon disulphide	30*	-	Yes	Skin absorption
3	Chlorobenzene	230	-	Yes	
4	N,N-Dimethyleformamide	30	60	Yes	Skin absorption
5	Ethyl benzene	435	545	Yes	
6	Fluoride compounds	2.5	-	Yes	
7	Furfural	8	40	Yes	
8	Methanol	260	310	Yes	Skin absorption
9	Methylene chloride	350*	-	Yes	
10	Methyl chloroform	1900	2450	Yes	
11	Methyl ethyl ketone	590	885	Yes	
12	Methyl isobutyl ketone	205	300	Yes	Skin absorption
13	Nitrobenzene	5	10	Yes	Skin absorption
14	Pesticides - organophosphorus	1 (dichlorvos)	3	Yes	Skin absorption
15	Parathion	0.1	0.3	Yes	Skin absorption
16	Pentachlorophenol	0.5	1.5	Yes	Skin absorption
17	Perchloroethylene	335	1000	Yes	
18	Phenol	19	38	Yes	Skin absorption
19	Styrene	420*	1050	Yes	
20	Toluene	188	560	Yes	Skin absorption
21	Trichloroethylene	535*	802	Yes	Skin absorption
22	Xylene	435	650	Yes	Skin absorption

* Control Limit substances (Table 1 of Annexure1: HCS Regulations)

TWA OEL = Time Weighted Average Occupational Exposure Limit

STEL = Short Term Exposure Limit (15 minutes)

BEI = Biological Exposure Limit (refer Table 3 of Annexure 1: HCS Regulations)

* In the event of Enviroserv being approached to handle (collect, transport or dispose of) wastes containing >500kg of the listed HCS, it is recommended that the following persons be informed:

- Occupational Hygienist
- Occupational Medical Practitioner

* The Occupational hygienist can then make an informed decision about whether or not the work should be subject to an initial Health Risk Assessment.

* In accordance with the requirements of the HCS Regulations all persons who are at risk of significant exposure to these HCS must be under medical surveillance, including appropriate biological monitoring. The decision to initiate biological monitoring should be made by the Occupational medical practitioner with input from the Occupational hygienist.

Annexure B

Certificates

employment & labour

Department:
Employment and Labour
REPUBLIC OF SOUTH AFRICA

National Department of Employment and Labour
Republic of South Africa

APPROVED INSPECTION AUTHORITY

Registered in accordance with the provisions of the Occupational Health and Safety Act, Act 85 of 1993, as amended.

This is to certify that:

GEOZONE ENVIRONMENTAL (PTY) LTD

has been approved by the Department of Employment & Labour as a Type A, Approved Inspection Authority: Occupational Health and Hygiene under the following regulations:

- Asbestos Abatement Regulations 4(2), 5(7), 13, 15(2)(c), 16 & 22
- Hazardous Chemical Agents Regulations 6 & 12.
- Lead Regulations 7 & 14.
- Noise Induced Hearing Loss Regulation 7

CHIEF INSPECTOR

Valid from: **15 July 2022**
Expires: **14 July 2026**
Certificate Number: OH0036 – CI 04

The Southern African Institute for Occupational Hygiene

This is to certify that

Mariné Steyn

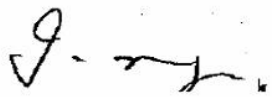
ID Number: 9506080176081

Has satisfied the requirements of
the Constitution of the Institute
and on recommendation of the Professional Certification Committee
is registered as an

Occupational Hygiene Technologist (OHT)

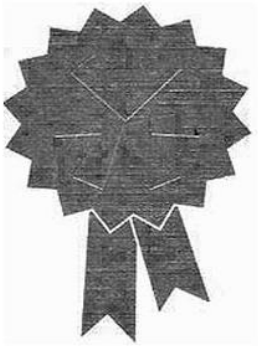
Member Number: 1813

Valid until: 31 January 2026



Dr Ivan Niranjan

Chairperson: Professional Certification Committee



Member ID: 60359257

Certificate ID: 60359257-29892

Issued by the Southern African Institute for Occupational Hygiene

SAQA Professional Body ID: 844

IOHA Recognised Certification Scheme

IOHA

The Southern African Institute for Occupational Hygiene

This is to certify that

Maritza Visser

ID Number: 7812310020087

Has satisfied the requirements of
the Constitution of the Institute
and on recommendation of the Professional Certification Committee
is registered as an

Occupational Hygienist (OH)

Member Number: 0434

Valid until: 31 January 2026

Dr Ivan Niranjan

Chairperson: Professional Certification Committee

Member ID: 33914641

Certificate ID: 33914641-29893

Issued by the Southern African Institute for Occupational Hygiene

SAQA Professional Body ID: 844

IOHA Recognised Certification Scheme

IOHA