

MANDATORY CODE OF PRACTICE FOR AN OCCUPATIONAL HEALTH PROGRAMME ON PERSONAL EXPOSURE TO AIRBORNE POLLUTANTS

VOH-COP-006

Version: 8

**This Code of Practice is Drawn Up in Accordance with The Guideline DMR
Reference Number 16/3/2/4-A1 Issued by the Chief Inspector of Mines**

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**The Contents of this Document state the minimum requirements.
These requirements may be enhanced in the interest of Safety and Health.**

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OCCUPATIONAL HYGIENE PROGRAMME FOR AIRBORNE POLLUTANTS			

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1. PURPOSE

To have in place a Code of Practice for an Occupational Hygiene Programme for Personal Exposure to Airborne Pollutants.

2. SCOPE

This Code of Practice applies to the Black Mountain Mining Operation.

3. STATUS OF CODE OF PRACTICE

- 3.1 This COP was drawn up in accordance with Guideline Reference Number DME 16/3/2/4-A1 issued by the Chief Inspector of Mines
- 3.2 This is a mandatory COP in terms of section 9(2) and (3) of the MHSA
- 3.3 The COP may be used in an accident investigation/inquiry to ascertain compliance and also to establish whether the COP is effective and fit for purpose
- 3.4 The COP supersedes all previous relevant COP's
- 3.5 All managerial instructions, recommended procedures (voluntary COP's) and standards on the relevant topics must comply with the COP and must be reviewed to ensure compliance

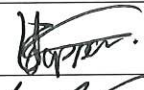
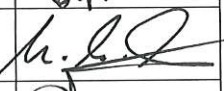
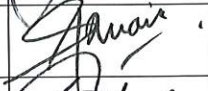
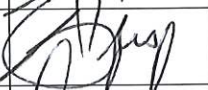
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4. MEMBERS OF THE DRAFTING\REVISION COMMITTEE

4.1 In terms of section 9(4) of the MHSA, the Health and Safety Committee was consulted on the preparation, implementation or revision of this COP.

4.2 I, **Xolani Qamata (4.1 Appointee)**, hereby appointed the members as listed below on the drafting/reviewing committee for this COP.

4.3 Members of the Drafting\Revision Committee.

NAME	DESIGNATION	QUALIFICATION	AFFILIATION	EXPERIENCE	SIGNATURE
Charles Kloppe	VOH Manager	Cert in Mine Environmental Control	Mine Ventilation Society (MVS)	25 years	
Marius Magerman	Sectional VOH Officer	Cert in Mine Environmental Control	Mine Ventilation Society (MVS)	20 years	
Realeboga Gaeilwe	Graduate: Occupational Hygiene	BSc Hons Occupational Hygiene	SAIOH	1 years	
Dr Andre Stoffels	Occupational Medical Practitioner	MB, ChB; DHM; DOM	HPCSA	27 years	
David Beukes	TMM Engineer	GCC Engineering, NDip. Mech Eng.		22 years	
Mbongani Mkheto	NUM Health & safety	Operator	NUM	16 years	
Wendell Freeman	Full Time H&S Rep	COMSOC 1 & 2		17 years	
Llewellyn Barry	Full Time H&S Rep	COMSOC 1 & 2		9 years	
Dumisani Mathebula	Mining Manager	BSc Mining	SAIMM	19 years	
Garth Boersma	HR Manager	P.G. Dip Management		28 years	
Erich Katzke	Training Manager	MSC HCM		32 years	
Marinus Hanekom	Plant Engineer	GCC, B.Eng, MBA	SAAMA	18 years	
Gary Ephraim	Commercial Manager	CIPS		29 years	
Shane Links	Engineering Manager (Act)	B-Tech Mechanical Engineering		13 years	
Kobus Nel	Production Manager			32 years	

 TOGETHER WE MAKE IT HAPPEN	Safety & Sustainable Development VENTILATION & OCCUPATIONAL HYGIENE	Doc #	VOH-COP-006
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Signed for on behalf of the Joint Health and Safety Committee:

Llewellyn Barry

Name

Signature

Date

Wendell Freeman

Name

Signature

Date

Approved: Xolani Qamata – General Manager (4.1 Appointee)

Signature:

Date:

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5. GENERAL INFORMATION

5.1 MINE DESCRIPTION & LOCATION

Black Mountain, coordinates -29.252929/18.817737, is an underground Base Metal mine situated near the town of Aggeneys, 70 km west of Pofadder and 110 km east of Springbok, consisting of the following major areas:

- Deeps section (situated 8 km west of Aggeneys)
- Swartberg section (situated 15 km west of Aggeneys)
- Concentration Plant (situated 10 km west of Aggeneys)

5.2 COMMODITIES PRODUCED

The following main concentrates are produced at Black Mountain:

- Lead; Zinc; Copper

5.3 MINING METHODS & POTENTIAL SOURCES OF POLLUTANTS

Black Mountain is a fully mechanized mine utilizing the Cut & Fill and Blast-Hole Mining Methods.

The main potential sources of airborne pollutants are as follows:

- Blasting operations
- Loading, Conveying, Tipping & Crushing
- Cutting and welding
- Trackless Mobile Machinery Exhaust emissions
- Handling, storage, transport and disposal of hazardous chemical agents

The main pathways, with possible exposure scenarios of airborne pollutants are as follows:

- Inhalation – Ineffective dust control systems; Not wearing appropriate Respiratory Protective Equipment (RPE)
- Ingestion – Eating, drinking or smoking without washing hands/face or eating, drinking and smoking in non-designated areas
- Direct Contact with Airborne Pollutants - Incorrect handling of chemicals/reagents; Not wearing appropriate PPE – cleaning of spillage, skin contact

5.4 GENERAL VENTILATION ARRANGEMENTS / CONTROLS

- Ventilation Arrangements
 - Deeps (and Broken Hill) Shaft
 - Intake air is down-casted via the Broken Hill decline and the Broken Hill & Deeps vertical shafts.
 - After ventilating the underground workings, the air is returned from the workings through a series of dedicated ventilation raise bore holes &/or return airways to the Deeps and Far Eastern up-cast (return) shafts. Total ventilating air is $\pm 600 \text{ m}^3/\text{s}$.

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- Swartberg Mine
 - Intake air enters the mine via the Swartberg decline and various raise systems. Air is then circulated through the workings either through dedicated ventilation raises in the workings (e.g. stopes) or through auxiliary ventilation fans and ducting in force ventilated workings (e.g. development ends). After ventilating the underground workings, the air is returned via an up-cast shaft to the Swartberg main fan installation, with a capacity of $\pm 220 \text{ m}^3/\text{s}$.
- b) General controls
 - Removal of personnel during blasting
 - Localized ventilation/extractions systems
 - Enclosed cabins with air-conditioner (primarily production equipment)
 - Watering down / water spray systems
 - Safe Operating Procedures
 - Training and awareness
 - Respiratory Protective Equipment (RPE) and Personal Protective Equipment (PPE)

5.5 OTHER RELEVANT COP'S, SOP'S, STANDARDS & PROCEDURES

The following documentation has relevance:

- a) Black Mountain Mining Occupational Health Baseline Risk Assessment & Health Improvement Plan
- b) VOH-SOP-006A Airborne Pollutant Procedure
- c) VOH-COP-005: Minimum Standard of Fitness to Perform Work at a Mine
- d) VOH-SOP-003: Occupational Medical Surveillance
- e) Occupational Risk Exposure Profiles
- f) VOH-COP-008: Risk Based Fatigue Management
- g) SS 0003A and B: Job Placement Medical Guide Matrix

5.6 UNIQUE FEATURES TO BLACK MOUNTAIN

The unique features of Black Mountain, in accordance with our Risk Assessment are as follows:

- Black Mountain is the only mine in South Africa to mine and concentrate lead
- Black Mountain is a highly mechanised mine
- Production and certain engineering personnel are on a rotating 12 hour shifts on a four day on – 4 day off (resting) cycle, with the majority of remaining personnel on a 5 day/8-hour shift cycle

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6. TERMS & DEFINITIONS.

<i>Airborne Pollutant</i>	Any substance in the air that is harmful to health, including dust, fumes, aerosols, gases, fibres, vapours or mists
<i>Analysis Methodology</i>	Analysis techniques used to quantify a pollutant collected on or in sampling media
<i>As & When Required</i>	This COP will be reviewed and updated after every serious incident relating to the topic covered in the COP or if significant changes are introduced to procedures, mining and ventilation layouts, mining methods, plant or equipment and material (but not exceeding three years)
<i>BMM</i>	Black Mountain Mining
<i>COP</i>	Code of Practice
<i>DMR</i>	Department of Mineral Resource
<i>Dose</i>	The amount of pollutant to which a person is exposed
<i>Employee</i>	Includes both BMM and Contractor & Business Partner employees
<i>Employer</i>	Black Mountain Mining (Pty) Ltd (including Contractor & Business Partners)
<i>Exposure</i>	The subjection of a person to an airborne pollutant in the course of employment through any route of entry (e.g. Inhalation, ingestion, skin contact or absorption)
<i>Homogeneous Exposure Group (HEG)</i>	A group of employees whose exposures to a hazardous agent have been determined to be statistically similar enough that, by monitoring a small number of individuals in the group, the exposures of the remaining workers can be defined
<i>MHSA</i>	Mine Health & Safety Act, 1996 (Act No. 29 of 1996), as amended
<i>MHSC</i>	Mine Health & Safety Council
<i>MOHAC</i>	Mining Occupational Health Advisory Committee
<i>Monitoring</i>	The repetitive and continued observation, measurement and evaluation of health &/or environmental, or technical data according to pre-arranged schedules, using nationally or internationally acceptable methodologies
<i>OMP</i>	Occupational Medical Practitioner
<i>NIOSH</i>	United States National Institute for Occupational Safety and Health
<i>PPE</i>	Personal Protective Equipment
<i>Qualitative</i>	Observations or information characterised by measurement on a categorical scale (i.e. dichotomous or nominal scale) or, if the categories are ordered, an ordinal scale (e.g. Low, medium or high)
<i>Quantitative</i>	The data numerical quantities such as continuous measurements or counts (e.g. percentile or rates)
<i>OEL</i>	The TWA concentration for an 8-hour workday and a 40 -hour work week to which nearly all workers may be repeatedly exposed to without adverse health effects
<i>Risk</i>	The likelihood that occupational injury or harm to persons will occur
<i>Sampling Cycle</i>	The planned sampling program for the year, which must terminate at the end of each calendar year
<i>TWA</i>	Time Weighted Average
<i>VOH</i>	Ventilation & Occupational Hygiene
<i>90th Percentile</i>	The statistical value of exposure data which must be used to determine when HEG's needs to be re-classified

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7. RISK MANAGEMENT

7.1 RISK ASSESSMENT

Section 11 of the MSHA requires the employer to identify hazards, assess the health and safety risks to which employees may be exposed while they are at work and to record the significant hazards identified and risk assessed – refer to the Black Mountain Mining Occupational Health Baseline Risk Assessment & Health Improvement Plan. The risk assessment is conducted, systematically identifying the risk of all the processes and contributing factors and these risks is then prioritized. BMM Occupational Hygiene Baseline Risk Assessment is updated based on the information to have an integrated approach to health and hygiene risks. This COP, together with related documents, will address how the significant risks identified in the risk assessment process will be dealt with, having regard to the requirements of Section 11(2) and (3) that, as far as reasonable practicable, attempts are made to, in order of priority:

- Eliminate the risk at source
- Control the risk at source
- Minimize the risk
- Provide PPE insofar as the risk remains
- Monitor the risk via a formal programme

Types of Risk Assessments:

- **Baseline Risk Assessment:** conducted to systematically identify and prioritize the risks of all the processes. It covered all the underground mining sections & workshops as well as surface areas such as the plant and main workshops. The baseline could be updated through the use of one or more of other types of risk assessments used.
- **Issue Based Risk Assessments:** used to conduct a risk assessment in greater detail, due to the significance of the risk involved and the need for greater understanding of the causal factors. Issue-based Risk assessments can therefore be done in great variance / degree of detail and complexity – *depending on the degree of risk involved.*
- **Continued Risk Assessments:** used to identify (usually pre-defined) hazards of a restricted and specific work area or equipment, prompting immediate action – to the point of conclusion, by the person who identified the hazard – due to significance of the risk involved. Examples are: Occupational hygiene measurements and planned surveys/inspections.
- **“Smart Start Risk Assessments”:** Pre-task assessments conducted before a task is performed and recorded in a pocket-sized booklet designed specifically for that purpose.

The main purpose of the assessments is to identify and evaluate current control measures, provide recommendations for additional controls of risks in the workplace and obtain and provide detailed information, and to comply with the relevant Occupational Health and Safety Legislation.

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7.2 RELEVANT INFORMATION

In order to assist with the hazard identification and risk assessment process relevant information such as accident statistics, ergonomic studies, research reports, manufacturers specifications, approvals, design criteria and performance figure for all relevant equipment are being considered. This includes:

- Personal exposure monitoring results
- Area monitoring results
- Laboratory analysis results
- Occupational Environment survey information
- Design specifications from original equipment manufacturers

7.3 PERIODIC REVIEW

In addition to the periodic review required by Section 11(4) of the MHSa, this COP will be reviewed and updated after every emergency, altered circumstance, or if significant changes are introduced to procedures, mining and ventilation layouts, mining methods, plant or equipment and material. The periodic review will not exceed a period of three (3) years.

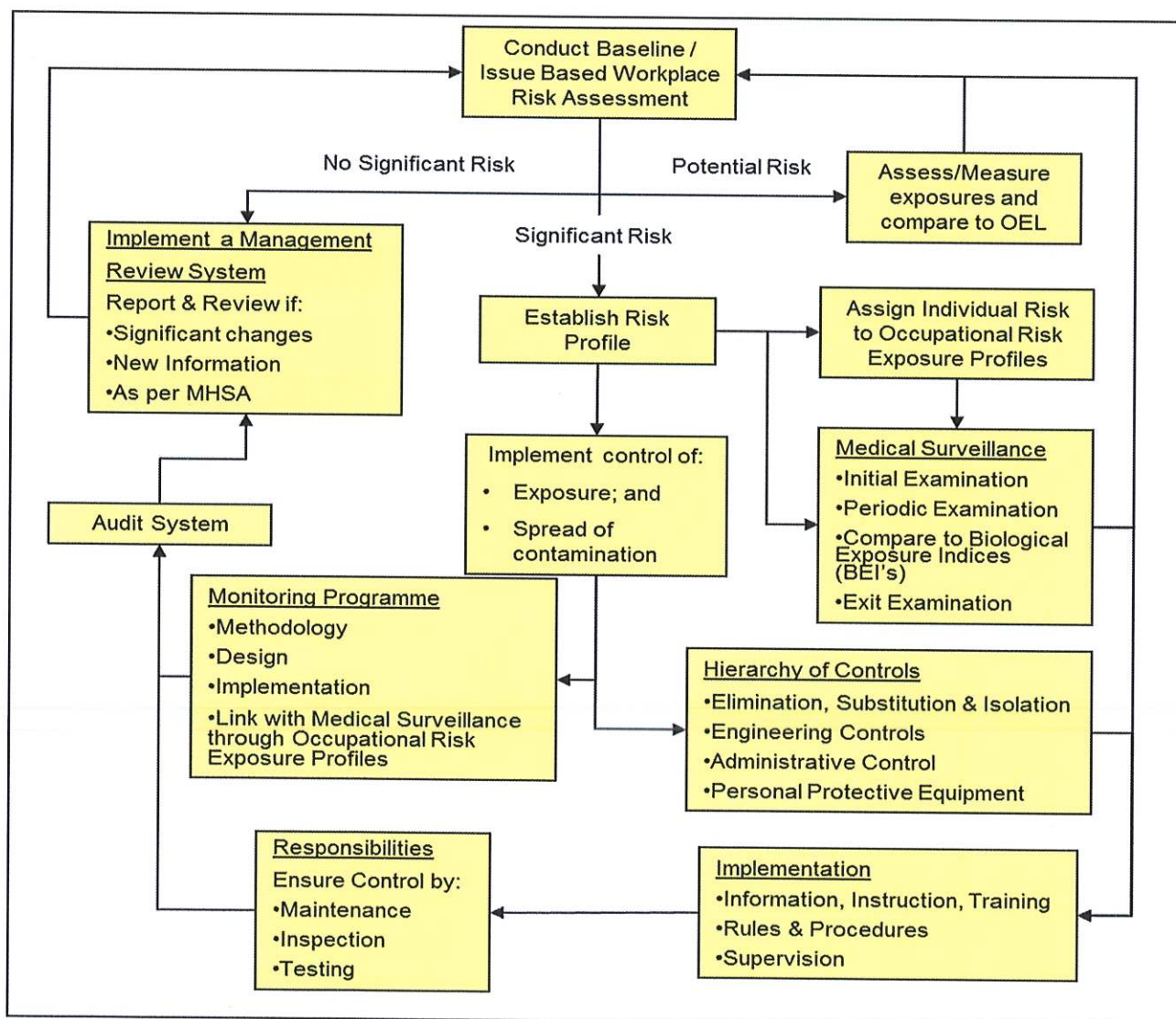
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8. KEY ELEMENTS ADDRESSED IN THE COP

8.1 OCCUPATIONAL HEALTH PROGRAMME

The key elements of the occupational health programme implemented at Black Mountain is given schematically below:



The Occupational Hygiene Programme includes the following elements:

- Risk assessment and control
- Personal exposure monitoring, which includes:
 - Determination/re-evaluation of HEG's

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- Sampling & analysis methodology and quality control
- c) Education & Training
- d) Hierarchy of controls
- e) Medical surveillance
- f) Reporting & Reviewing

8.2 COMPONENTS OF THE OCCUPATIONAL HEALTH PROGRAMME

The Occupational Health Programme has two components, namely:

- 8.2.1 Occupational Hygiene; and
- 8.2.2 Medical Surveillance

8.3 OCCUPATIONAL HYGIENE PROGRAMME

The Occupational Hygiene Programme for the mine includes the following steps:

- Risk Assessment
- Determination of Homogenous Exposure Groups (HEG's)
- Sampling and analysis methodology and quality control
- Personal exposure monitoring
- Linking of occupational exposure
- Hierarchy of control measures
- Reporting and recording

8.3.1 RISK ASSESSMENT & CONTROL

A team, with sufficient competent persons, is selected to conduct the risk assessment. Qualitative and quantitative methods will be used to conduct the risk assessment. This includes the activities, consequences and controls using existing information such as personal monitoring, area monitoring, walk-through surveys, any additional inputs, including consultation with the SIMRAC Handbook, are used to determine the risk within specified areas.

Procedures / safe work practices are compiled based on the above-mentioned outcomes. Assessments of compliance are developed to assess (compliance) against these procedures /safe work practices.

8.3.1.1 Baseline Risk Assessment

An initial Baseline Risk Assessment is conducted to assess exposure to airborne pollutants as contemplated in Section 12 (2) of the MHSA. Refer to Black Mountain Mining Occupational Health Baseline Risk Assessment & Health Improvement Plan

8.3.1.2 Baseline Risk Assessment Process

The Baseline Risk Assessment addresses the following:

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a) The Airborne Pollutants to which employees are exposed to (according to Chapter 22 of the MHSA airborne pollutants occupational exposure limits), including:

- Respirable Crystalline Silica (Quartz) dust
- Lead dust
- Diesel Particulate Matter
- Gases / fumes from plant and underground processes
- Hazardous Chemical Substances

b) The main route of entry and health effects that these individual airborne pollutants can have on employees:

Main Route of Entry

- Inhalation
- Ingestion
- Direct Contact

Health Effects

- Silicosis
- Pneumoconiosis
- Lead related diseases
- Cancers

c) Area where such pollutants may be present:

- Stope faces
- Development ends
- Crushers
- Tipping points
- Storage & Loading areas
- Process Plant
- Tailing storage facility
- Backfill plant
- Engineering Workshops

d) The nature of the airborne pollutants identified:

- Dust (Particulate)
- Gases / Fumes

e) The nature of the key workplace operations and activities that pose the greatest potential for exposure with identified airborne pollutants:

- Underground
 - Blasting operations (although employees are removed during this period)
 - Loading and tipping operations (LHD's used to load onto trucks)
 - Conveying (trucks and conveyor belts)

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- Crushing operations
 - Plant
 - Crushing operations
 - Conveying (conveyor belts and trucks)
 - Loading operations (off-loading of trucks / LHD's used to load)
 - Mixing/dosing area
 - Workshops (underground, plant and general surface areas)
- f) **Refer to Annexure B: Occupations Exposed to Airborne Pollutants** for the list and number of people per occupation, sub-divided into activities, that pose the greatest potential to be exposed to Airborne Pollutants
- g) The pattern, duration and frequency of employee exposure to the airborne pollutants identified:
- Potential exposure to the airborne pollutants is intermittent.
 - Potential exposure is during the following shift systems:
 - Rotating 12 hour shifts on a 4 day on (& 4 day off / resting cycle) – includes employees at the Process Plant, Deeps Mining & Engineering and Swartberg Mining & Engineering
 - 8 hour, 5-day workweek – includes employees from Enabling services and management.
- h) The actual exposure levels compared to the occupational exposure limits
- As these results vary from time to time, the table below only shows if a significant risk exists based on analysis of historic results. For more detail on actual exposure levels please consult the reports as required in terms of regulation 9.2.(7) of the MHSA: "Airborne Pollutants - Particulates Personal Exposure Report Form 21.9(2)(a)" as well as the Gravimetric Dust Sampling Results information. Figures depicted below is the range of laboratory analysis results:

Sampling Area	Code & Activity		Exposure TWA mg/m ³ (min-max)	
			Silica	Lead
02 Underground	12	Raise Boring / Dry Drilling	0.004	-
	13	Trackless Mining	0.003-0.100	0.006-0.171
	15	Ground Handling	0.003-0.167	0.003-0.095
	16	Shafts & Services	0.003-0.082	0.003-0.022
	17	Roving Underground	0.004-0.024	0.003-0.054
	18	Underground Workshops	0.003-0.069	0.003-0.022
01 Surface	24	Concentrating	0.004-0.031	0.011-0.111
	29	Final Product	0.004-0.019	0.006-0.115

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	30	Roving Plant	0.004-0.059	0.003-0.171
	31	Roving Surface	0.003-0.019	0.003-0.019
	32	Assay / Lab	0.003-0.021	0.003-0.017
	33	Surface Workshops	0.003-0.026	0.003-0.032
03 Swartberg	13	Trackless Mining	0.003-0.206	0.003-0.051
	16	Shafts & Services	0.003-0.017	0.003-0.009
	18	Underground Workshops	0.003-0.015	0.003-0.022

- i) The control measures in place, the additional control measures required to be instituted in order to reduce or maintain exposures to below the OEL's, and if applicable, the planned programme of implementation;

Control measures

- Engineering
 - Engineering controls are planned as part of the design phase of all new projects. In addition, means to improve and/or upgrade existing ventilation and/or airborne pollutant control systems to minimise exposure to best practicable conditions at all workplaces are continually investigated and thus forms part of the overall strategy. This includes maintaining of force quantities by minimising of column leakages, discharge distances of columns to the faces, air velocities and quantities, dust suppression by means of water sprays and/or watering down, extraction systems at the plant, etc.
- Administration
 - Occupational Hygiene surveys are conducted by the VOH department at intervals as follows: monthly, quarterly, six monthly and annually depending on the risk associated with the area. Reports of these surveys are circulated to the responsible supervisors/line management with the necessary recommendations, if any.
 - All employees are educated and trained on the potential dangers of working in dusty environments or other significant airborne pollutants and the measures or precautions to be taken by them as part of the mine's induction programme.
 - To assist with the principle of linking with medical surveillance, the Occupational Hygiene Risk Profiles are displayed in each individual's occupational medical record for the purpose of identifying those individuals that require special medical examination.
- PPE:
 - Appropriate respiratory protective equipment is supplied to employees.
- Additional controls to reduce or maintain exposures to below the OEL's:
 - When identified, it will be assessed and if viable, implemented.
- Planned programme of implementation
 - Please refer to "Part D: Implementation" of this COP.

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- j) The frequency of any on-going monitoring to assess the effectiveness of the controls;
- All engineering controls are maintained and inspected as per the maintenance schedule.
 - The VOH department: Occupational hygiene surveys (monthly, quarterly, six monthly and annually), other visits and stratified sampling as required. The frequency of stratified personal sampling is as prescribed in the Annexures of the Guideline for the Compilation of a Mandatory Code of Practice for an Occupational Health Programme on Personal Exposure to Airborne Pollutants.
 - Line Management: Ad Hoc during visits and inspections
 - Refer to the Occupational Medical Surveillance programme that is summarised in this Code of Practice, with full details in the applicable documentation as part of the monitoring programme
- k) The relevant material safety data sheets as contemplated in Section 21 (4) (a), (b) and (c) of the MHSA.
- Relevant MSDS's will be available / displayed at all areas deemed necessary.
 - MSDS's control will be through the Supply Chain during the purchase / delivery phases
 - The requirements as set out in Annexure A of the Guideline for the Compilation of a Mandatory Code of Practice for an Occupational Health Programme on Personal Exposure to Airborne Pollutants are complied with.

8.3.1.3 Review of Risk Assessment

The Risk Assessment will be reviewed whenever there is a change at the mine or change of circumstances at the mine that could have impact on the original assessments. This includes:

- When the outcomes of medical surveillance indicate the need for it
- When a Section 11.5 investigation indicates the need for it
- When new or revised legislation is introduced
- When new mining methods are introduced
- When process changes are introduced
- When new types of machinery / equipment are introduced, or changes made to dust control systems

8.3.1.4 Post Risk Assessment

The risk of exposure will be assessed (continuous risk assessment & management) and reviewed on an Annual Basis based on the personal exposure monitoring data of the previous cycle.

Historical data will be maintained as per Section 15 (2)(a) of the MHSA.

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8.3.2 DETERMINATION OF HEG's

8.3.2.1 HEG Identification Process

HEG's were identified for the purpose of personal exposure monitoring, and are reviewed and updated annually based on exposure monitoring data:

- a) Step 1: The mine is subdivided into sampling areas
- b) Step 2: Mine ventilation district - Ventilation Arrangements:
 - Deeps and Broken Hill section
 - Intake air is down-casted via the Broken Hill decline, and the Broken Hill & Deeps vertical shafts.
 - After ventilating the underground workings, the air is returned from the workings through a series of dedicated ventilation raise bore holes &/or return airways to the Deeps and Far Eastern up-cast (return) shafts. Total ventilating air is $\pm 600 \text{ m}^3/\text{s}$.
 - Swartberg section
 - Intake air enters the mine via the Swartberg decline and various raise systems. Air is then circulated through the workings either through dedicated ventilation raises in the workings (e.g. stopes) or through auxiliary ventilation fans and ducting in force ventilated workings (e.g. development ends). After ventilating the underground workings, the air is returned via an up-cast shaft to the Swartberg main fan installation, with a capacity of $\pm 220 \text{ m}^3/\text{s}$
- c) Step 3: The sampling areas are subdivided into activity areas (Annexure A of the guideline has reference)
- d) Step 4: Adequate measurements of personal exposures are taken in line with the identified airborne pollutants for each activity area (conducted as per NIOSH methodologies)
- e) Step 5: A statistical analysis is conducted. The results of the identified airborne pollutants measured in the activity areas are compared to their respective OEL values. Activity areas are then categorized into classification bands for every pollutant to determine the various HEG's within each activity area (Annexure C of the guideline has reference)
- f) Step 6 - Single Pollutants (where no additive effects are known or considered likely): In areas where only single pollutants occur, each activity area are categorized into classification bands determined by the various HEG's
- g) Step 7 - Multiple Pollutants that have an additive effect: In activity areas where pollutants that have an additive effect have been identified, their combined effects must be used when classifying the activity area into their respective HEG's. The following formula will be utilized to assess the combined effects:

$C_1/L_1 + C_2/L_2 + C_3/L_3 \dots$ For compliance, the combined effect should be <1
 (where C_1, C_2 , etc. are the concentrations of constituents in air & L_1, L_2 , etc. are the corresponding OEL's)

Annexure C of the guideline has reference: Table C1 depicts exposures that can be considered as being additive or synergistic

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8.3.2.2 Reclassification & Statistical Analysis of HEG's

At the end of each cycle (annually; end of calendar year), sampling results for each HEG will be statistically analysed and re-classified, based on statistically recognised principles. 90% confidence limits will be used to test the homogeneity of HEG's

The total number of exposed employees is determined at the beginning of the annual reporting cycle and only changes if there is an increase in employees during the quarterly reporting cycle. A reduction in employees do not reduce the total number of exposed employees during the reporting cycle.

8.3.2.3 Re-Assessment of HEG's

HEG's will be re-assessed when inter-alia the following occurs:

- Exposure levels change due to controls being initiated & likewise when control deteriorate
- Employee complaints are received
- Processes are changed (procedures, mining & ventilation layouts, mining method, plant, equipment or material)
- Occupational illness occurs
- Change in exposure category occurs
- Other events warranting re-evaluation occurs:
 - New relevant technological data
 - New regulatory initiatives
- Should the review of the baseline assessment warrants it

8.3.3 SAMPLING, ANALYSIS AND QUALITY CONTROL

Personal exposure monitoring is conducted on an annual cycle period in compliance with regulation 9.2(7) and report form 21.9(2)(a).

8.3.3.1 Continuing Sampling Strategy

Continuing sampling is conducted to assess whether significant changes in trends have occurred and is added to accumulated data during statistical analysis re-classification of HEG's:

- Determining Sampling Size – Annexure C of the guideline has reference
The total number of samples is spread out over a twelve-month period for all categories that is A, B, C as below.

Airborne Pollutant (excluding gases & vapours) Classification Bands & Frequency of Sampling are determined as follows:

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CLASSIFICATION BANDS			
CATEGORY	PERSONAL EXPOSURE LEVEL	SAMPLING AMOUNT	SAMPLING PERIOD
A	Exposures $\geq$ the OEL or mixtures of exposures ≥ 1	5% or 5 samples per quarter	Quarterly
B	Exposures $\geq 50\%$ of the OEL and $<$ of the OEL or mixtures of exposures ≥ 0.5 or < 1	5% or 5 samples 6-monthly (evenly spread bi-annually)	6-monthly
C	Exposures $\geq 10\%$ of the OEL and $< 50\%$ of the OEL or mixtures of exposures ≥ 0.1 or < 0.5	5% or 5 samples per annum (evenly spread annually)	Annually
D	Exposures $< 10\%$ of the OEL	5% or 5 samples per annum (evenly spread annually)	Annually

Toxic Gases and Vapours

CLASSIFICATION BANDS			
CATEGORY	PERSONAL EXPOSURE LEVEL	SAMPLING AMOUNT	SAMPLING PERIOD
A	Exposures $\geq$ the OEL or mixtures of exposures ≥ 1	5% or 5 samples per quarter	Quarterly
B	Exposures $\geq 50\%$ of the OEL and $<$ of the OEL or mixtures of exposures ≥ 0.5 or < 1	5% or 5 samples 6-monthly (evenly spread bi-annually)	6-monthly
C	Exposures $\geq 10\%$ of the OEL and $< 50\%$ of the OEL or mixtures of exposures ≥ 0.1 or < 0.5	5% or 5 samples per annum (evenly spread annually)	Annually
D	Exposures $< 10\%$ of the OEL	No sampling plan for this category	Annually

- b) The section 12(1) appointee will use professional judgement to decide whether additional samples need to be taken in order to increase the confidence that HEG's are appropriately categorized

8.3.3.2 Sampling Strategy & Schedules

The sampling strategy, including a monitoring schedule for each HEG, is compiled for the sampling period.

- Appropriate sampling methodologies, complying with international best practice, is used for each significant pollutant. These include for example:
 - Airborne dusts (including lead and silica) – United States National Institute for Occupational Safety and Health (NIOSH)
 - The compiled BMM sampling schedules has reference
- Records thereof will be kept as prescribed in the MHSA (sections 12(3) & 15(2)(b))

8.3.3.3 Sampling Methodology

- Appropriate sampling methodologies is used for each pollutant identified:

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SAMPLING AND ANALYTICAL METHOD		
Airborne Pollutant	Sampling Method	Method Number
Respirable Crystalline Silica Quartz	NIOSH	7602 (IR)/7500 (XRD)
Inorganic Lead	NIOSH	7300
Diesel Particulate Matter	NIOSH	5040
Welding Fumes	NIOSH	7300
Trichloroethylene	NIOSH	1500/1
Volatile Organic Compounds (benzene)	NIOSH	1500/1
Inorganic Acid (sulphuric acid)	NIOSH	7903
Inorganic acid (hydrochloric acid)	NIOSH	7903
Bromine	NIOSH	6011
Sulphur Dioxide	NIOSH	6004
Carbon Disulphide	NIOSH	1600
Hydrogen Cyanide	NIOSH	6010

- b) A Quality Control Program is in place to ensure that the sampling methodology is developed and implemented - refer to the VOH-SOP-006A Airborne Pollutant Procedure. Quality control is ensured though applying applicable standards and assessments / audits by first, second and third parties.

8.3.3.4 Chemical Analysis Methodology

- Appropriate analysis methodologies, complying with international accepted practice, are selected for each pollutant identified – refer to table 8.3.3.4.1
- Sample analysis will be done by either Laboratories accredited in terms of the South African National Accreditation System (SANAS) or by laboratories participating in a proficiency testing program and that is in the process of obtaining SANAS accreditation (the latter laboratory will be requested to submit a proficiency test certificate to the mine prior to conducting any analysis). Proof of such accreditation / proficiency certificate will be kept on record at the mine.
- The minimum of samples taken as determined in accordance with section 8.3.3.1 (a) of this document will each be individually analysed

Note: The results from the analysis obtained in a HEG will be averaged and allocated to the specific HEG in which the samples were taken.

8.3.3.5 Gravimetric Weighing Facilities

The quality control program for the gravimetric weighing facility are detailed in VOH-SOP-006A Airborne Pollutant Procedure.

8.3.4 PERSONAL EXPOSURE MONITORING

Personal Exposure monitoring will be conducted to obtain reliable estimates of employee shift exposures in the workplace. Samples taken will be:

- Representative of all full working shifts

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- b) Measured and compared to Occupational Exposure Limits per working shift
- c) Randomly spread over the full sampling cycle period for each HEG; and
- d) Randomly spread across all occupations within the HEG

8.3.4.1 Training

Each individual conducting sampling are trained through on the job and accredited training on the following:

- a) Storage and maintenance of equipment
- b) Issuing of the sampling equipment
- c) Providing training to the "Wearer" (person wearing the dust sampling equipment) of the sampling equipment
- d) Handling of the sampling equipment
- e) Transportation of the sampling equipment
- f) Pre- and post-calibration of the sampling train checks

8.3.5 HIERARCHY OF CONTROL

- i) Elimination
 - The first aim is to eliminate the liberation of airborne pollutants at source. As this is not possible in all cases alternative means of controls are utilized as is listed below.
- ii) Engineering controls
 - Dilute &/or remove with ventilation
 - Total or partial enclosure
 - Exhaust systems
 - Filtration systems
- iii) Administrative controls / Minimising the risk
 - Removal of persons from the hazard by, e.g. screening; remote operating systems
 - Safe systems of work
 - Reducing exposure time (work-rest cycles)
 - Provision of hygiene facilities e.g. changing, washing and eating facilities.
- iv) Personal protective equipment (PPE)
 - Respiratory protective equipment

8.3.6 RECORDING & REPORTING

8.3.6.1 Records Keeping System

Record keeping system(s), recording the exposure history of each HEG, is kept at the mine and is readily available. Reasons for deviation of sample results will be recorded as part of the investigation process and could include:

- a) Controls not operating effectively

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- b) Events or factors which have influenced the results, for example: Sampling done on surface after high rainfall or during excessive winds.

8.3.6.2 Mandatory Reports

Reporting to the DMR will be done on a quarterly basis for all categories (A, B, C and D) – Annexure C of the guideline has reference:

- For categories A, B and C, the measurement results will be reported at the end of each quarter; the rolling average will be reported at the end of each sampling cycle
- The results in a HEG of which 90th percentile equates to less than 10% of the OEL will be classified under the D category
- Pollutant(s) that do not have an additive effect on the target organ(s) will be reported separately

8.4 OCCUPATIONAL MEDICAL SURVEILLANCE

Note: *The Occupational Medical Surveillance Programme will only be described briefly in the following section(s). The detailed Occupational Medical Surveillance Programme is described in “SOP 003: Occupational Medical Surveillance” – which should be read in conjunction with this COP.*

8.4.1 OCCUPATIONAL MEDICAL SURVEILLANCE PROGRAMME

8.4.1.1 Description of the Medical Surveillance Programme

- The Medical Surveillance Programme follows an integrated approach to ensure that a single test session could suffice for the surveillance of more than one hazard, thus avoiding duplication.
- All employees who are potentially exposed to occupational hygiene stressors undergo occupational medical testing to determine “fitness for work”. The intervals of testing are dependent on the assessment of occupation, work location, occupational stressors and the health risks it poses. The employee’s medical surveillance results, including the items mentioned above, are taken into account when determining “fitness for work”.
- As stated, the Occupational Medical Surveillance Programme is described in more detail in “SOP 003: Occupational Medical Surveillance”.

8.4.1.2 Occupational Hygiene / Medical Surveillance Link

The method used to link personal monitoring and the hygiene register to medical records as contemplated in terms of Section 12(3) of the MSHA are done by means of the Occupational Risk Exposure Profiles, kept on the Occupational Medical Record of each employee in the Occupational Medical facility in order for the OMP to identifying those individuals that require special medical examination based on airborne pollutant exposure.

Effective communication between the Occupational Hygiene Practitioner and the Occupational Medical Practitioner is also in place to ensure that exposure history and medical manifestation of systems are meaningful.

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8.4.1.3 Medical Examination Categories

The Occupational Medical Surveillance Programme for the categories below is described in more detail in "SOP 003: Occupational Medical Surveillance". Below is a summary of the surveillance:

- Initial examination in terms of Section 13(2)(c) of the MHSA – conducted to determine if an employee is fit to perform a specific occupation
- Periodic examination in terms of Section 13(2)(c) of the MHSA – based on exposure profile, taking into account an employee's medical surveillance results
- Exit examination in terms of Section 17 and 19(2) of the MHSA – conducted on termination of employment

8.4.2 METHODOLOGICAL STANDARDS FOR TEST TECHNIQUES FORMING PART OF MEDICAL SURVEILLANCE

8.4.2.1 Chest X-Rays

- Chest X-rays will be at least 35x43cm in size
- It is of a suitable quality for proper classification of pneumoconiosis and are in accordance with ILO 1980 which refers to radiological classification.
- Show the date, name of the individual and any unique form of personal identification, e.g. identity number, passport number, etc.

8.4.2.2 Lung Function Testing

Lung function testing is done in accordance with the "Guidance Note for Occupational Medical Practitioners: Lung Function Testing (25/5/P)". This testing is covered in more detail in "SOP 003: Occupational Medical Surveillance".

8.4.2.3 Tuberculosis Surveillance Programme

The Tuberculosis (TB) programme takes cognizance of the "Guidance Note for Occupational Medical Practitioners: Tuberculosis Control Programmes (25/5/P)" to ensure the burden of disease due to TB is minimised through proper management of those with TB, the prevention of new cases and the identification of employees at high risk. The detection and subsequent treatment form an integral part of the medical surveillance programme and includes:

- Medical examination / detection
- Treatment and the effectiveness of this treatment, in conjunction with the Aggeneys State Clinic
- The prevailing medical status as determined by special medical screening.

Note: Although medical surveillance is conducted at the on-site clinic, an employee may be sent for further testing to a recognised specialist for confirmation of classification, should the need arise.

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8.4.3 INCLUSIVE MEDICAL SURVEILLANCE

8.4.3.1 Medical Surveillance System

Risk-Based Medical Examinations (RBME), developed in consultation with the OMP and following an integrated approach, are in place to ensure that a single test session suffice for the surveillance of more than one hazard, and thus avoid duplication.

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PART D: IMPLEMENTATION.

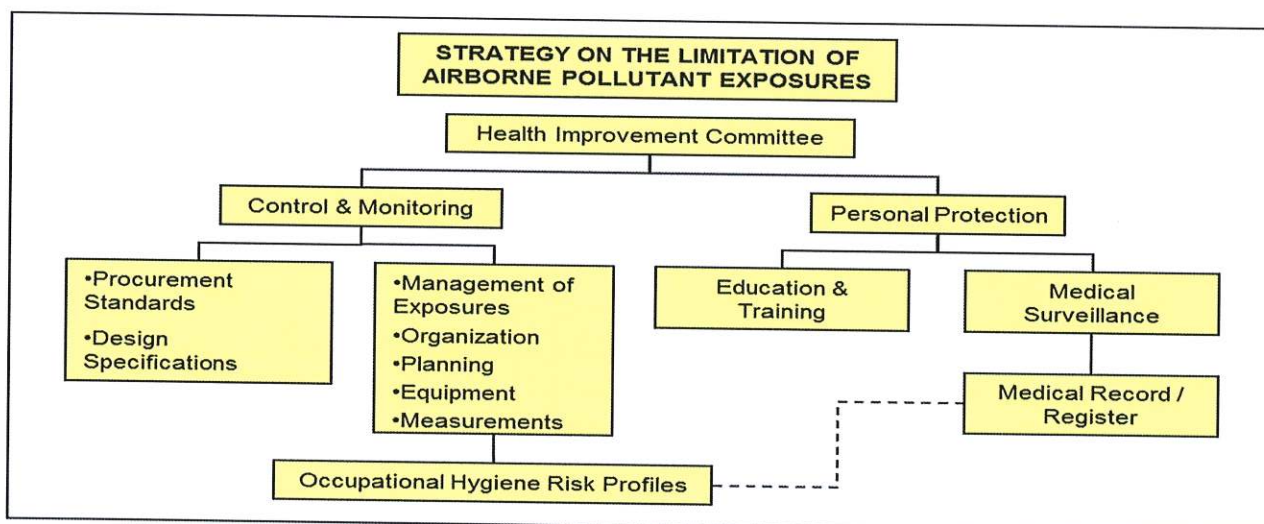
1. IMPLEMENTATION PLAN.

1.1 IMPLEMENTATION

The implementation plan for this COP covers the following: Organizational structures, responsibilities of functionaries and programs and schedules for the COP that will enable proper implementation of the COP

1.1.1 Strategy on the Limitations of Airborne Pollutant Exposure

The overall programme on limiting airborne pollutant exposures is depicted schematically below. This is an integrated approach that requires planning, co-ordination and co-operation between various departments:



The main focus is the control of airborne pollutant levels in the workplace and medical surveillance to provide the necessary assurance on the success of the control programme. Emphasis is therefore placed on the maintenance of standards and design specifications of equipment and processes used in the mining and concentrating processes.

Protection of employees exposed to airborne pollutants will be as follows:

- Airborne Pollutants (excluding toxic gases and vapours): levels equal to, or in excess of 10 % of the Occupational Exposure Limit (OEL)
- Toxic gases and vapours: levels equal to, or in excess of 50 % of the OEL

The effects of exposure will be protected against by:

- The hierarchy of controls as described in this document
- Induction and refresher training on control and the requirements of the programme on the limitation of exposures,
- The use of personal protection devices and Medical surveillance

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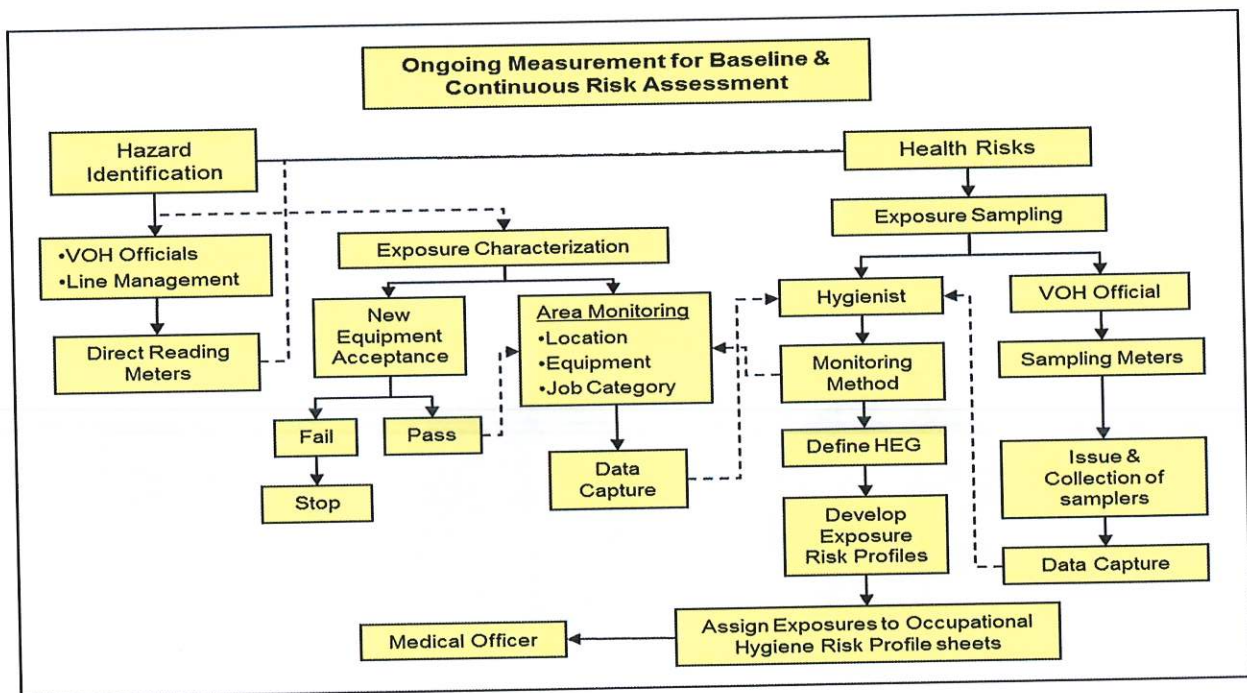
a) Airborne Pollutant Risk Profile

The risk profiles of Homogeneous Exposure Groups are established through analysis of relevant airborne pollutant information available to the mine. Those profiles so established will be:

- Used to identify and define HEGs,
- Used as the basis for the airborne pollutant limitation programme and Black Mountain's standards on the generating characteristics of acquired equipment and sources of airborne pollutants,
- Used to define and review, from time to time, the programme on limitation of exposure,
- Used to assign individual worker exposure levels and linking those exposure levels with the system for medical surveillance conducted by the medical department, and
- Reviewed annually.

b) Continuous Risk Assessment on Airborne Pollutant Exposure

The risk profiles mentioned above will be reviewed on the basis of information gathered through the programme for continuous risk assessment on airborne pollutants depicted schematically below:



c) Measurement Procedures

- All personal measurements are scheduled, co-ordinated and managed by the VOH department.
- Personal exposure measurements are conducted by the use of personal gravimetric sampling trains capable of maintaining a constant volume within 5 % during sampling of a 16-hour shift. The sampling trains are deployed on the person of individuals selected in accordance with a defined programme of stratified sampling, representing the respective HEG's. The sampling

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programme caters for variations in exposure levels between different working locations and day-to-day variations. The programme is also reviewed annually.

- Workplace monitoring is conducted using the personal gravimetric sampling system and direct reading instruments. This type of monitoring constitutes part of a strategic programme aimed at delineating and understanding the causes of suspected high exposure identified through the personal monitoring programme.
- Results are categorised and analysed. Measurements in excess of the respective exposure limits are investigated and control or corrective action defined, recorded and implemented.
- All measurements, including the calibration of equipment, are conducted by persons trained and competent in the respective measurements.
- Validation and acceptability of results used for analysis and interpretation purposes are the responsibility of the VOH Department.

d) Measurement Instrumentation

- Measuring instrumentation is calibrated in accordance with the manufacturer's instructions to ensure measurement accuracy.
- Ensuring instrumentation is checked before and after each series of measurements.
- Each measurement conducted for the purpose of dose assessment shall be associated with its calibration checks in quality-controlled format.

e) Demarcation of Areas Requiring the Use of Respirators

- Areas associated with potential airborne pollutant exposures are listed in association with the records on HEG's.
- Areas (zones) requiring the use of Personal Protective Equipment (respiratory protection/dust masks) are identified by affixing, and keeping affixed in a conspicuous place, the appropriate mandatory symbolic sign indicating the need for respiratory protection. Examples of the respiratory warning sign for the demarcation of zones is depicted below (the registered sign is white on a blue background):



f) Control of Airborne Pollutant Levels

- The principle approach to be taken with respect of the control of exposure is to control at source. Section 21 of the MSHA is applicable in this regard. It should be noted that, if an exposure hazard is associated with equipment supplied to mines, the supplier can only relinquish its responsibility with regard to risks of exposures, if exposure generation characteristics of the equipment are specified, the necessary precautions are stipulated and the mine management has accepted, in writing, the responsibility of implementing those precautionary measures.

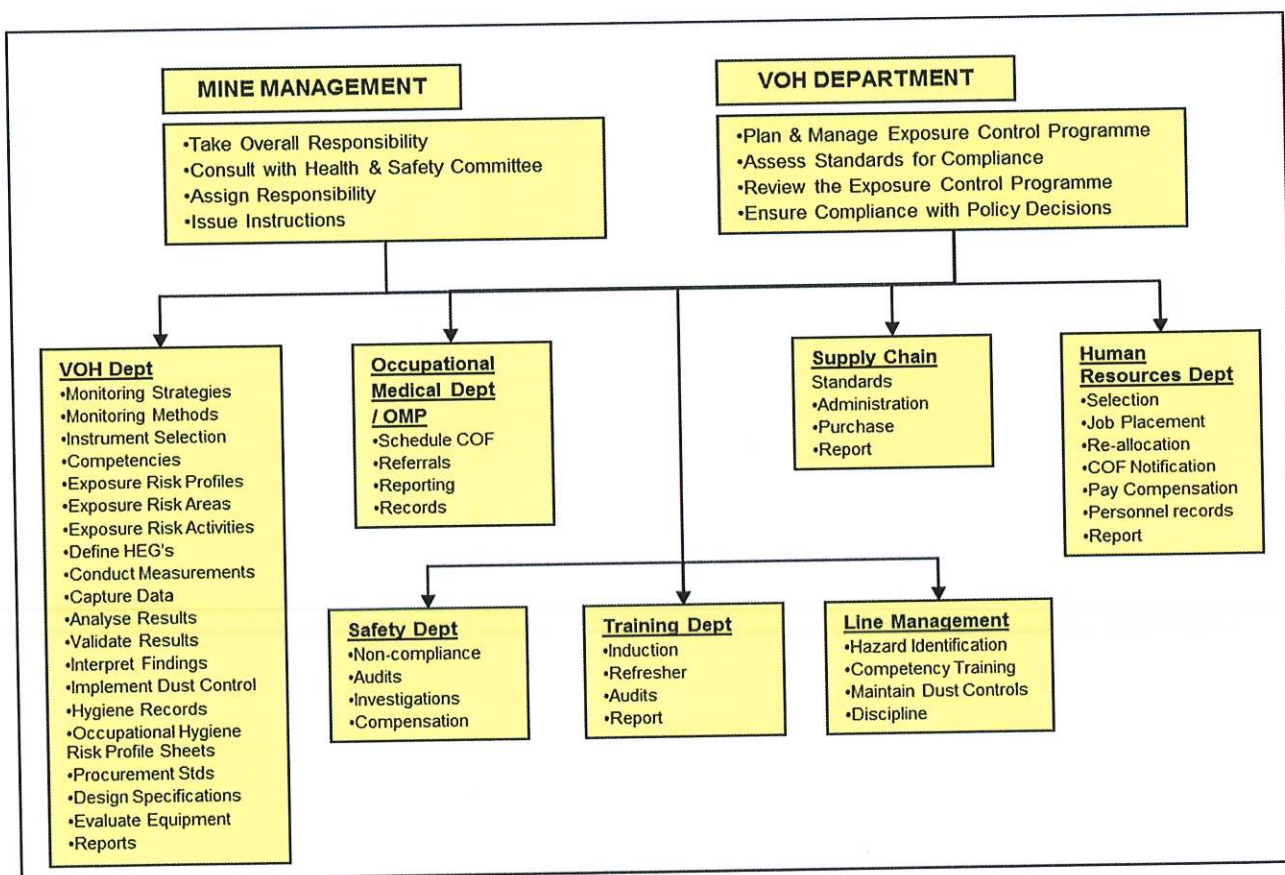
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- In addition to the above approach, and where necessary, the generation characteristics (for example inhalable and respirable dust) associated with installed plants, processes and equipment in use on the mine must be established and documented in a quality control format for reference and inspected in terms of the Act. A database is maintained on the exposure characteristics of equipment, activities and processes implemented. This information is vital for establishing and maintaining standards on the supply of equipment.

g) FUNCTIONS & RESPONSIBILITIES

The functions and responsibilities of departments, committees and disciplines are depicted schematically below (see text for details):



➤ Mine Management

The owners of the mine must take responsibility for health and safety in terms of the Act. The management of this responsibility is delegated to Mine Management. The Act also requires that a health and safety committee be established for consultation on health and safety issues, including protection against airborne pollutant exposure. This role is fulfilled by the "Joint Health and Safety Committee", which is represented by management and employees.

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Other responsibilities relating to the limitation of exposure programme include:

- The compilation and implementation of the mine's health and safety policy
- Approval of specific limitation procedures and the issuing of instructions relating to the implementation of the limitation programme
- The delegation of responsibilities

➤ VOH Department

The main function of this department with regards to airborne pollutant exposure is the planning, co-ordination and control of the reduction programme. In that respect it is important that all departments involved in the limitation programme be represented on the health and safety committee. Specific duties include:

- Assessment of standards for compliance, including international benchmarks, local regulatory standards or mine standards (procurement, monitoring, etc.)
- Review of the reduction programme and, on that basis, recommend to management the actions that may be taken
- Ensuring compliance with policy decisions

From the hygiene perspective the specific duties include:

- The deployment of personal sampling equipment including the selection and parading of individuals and instruction on the wearing of the sampling equipment
- Conducting of measurements associated with various areas and equipment
- Data capturing into the prescribed format (defined by the Occupational Hygienist)
- The implementation of control procedures

➤ Occupational Hygienist

The main function of the Occupational Hygienist is the anticipation and recognition of exposure risks coupled with the assessment of design, control and protection strategies. Specific responsibilities include:

- The design of the monitoring strategies for personal monitoring, area measurements and for the assessment of equipment
- The selection of suitable monitoring methods and procedures for measurement
- The selection of suitable instrumentation for measurement
- The analysis and validation of results collated by the VOH department
- The interpretation of findings emanating from the analysis of the results
- Compilation and maintenance of the Occupational Hygiene Risk Profiles
- Defining of homogeneous exposure groups for the purpose of representative sampling
- The description/definition of risk areas
- Provision of exposure levels of HEGs in such a way that it could be ascribed to individuals through the Occupational Hygiene Risk Profile sheets

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- Defining the required competencies and training needs in respect of the hygiene and monitoring functions
- Compilation of procurement standards in respect of acceptable exposure levels
- Evaluation of equipment and design specifications of various operations
- Exposure control engineering
- Define the requirements for related personal protection (PPE), in collaboration with worker representative bodies, on the basis of the exposure risk profiles and the levels emitted from equipment and processes
- Prepare records and reports on the limitation programme for the purpose of routine reporting (quarterly), review and formal reporting (legal)

➤ **Safety Department**

From a safety perspective the responsibilities include:

- Audits and reporting of non-conformances
- The administration of compensation for exposure related diseases

➤ **Line Management**

The main function of Line Management is to create a culture of limiting exposures by:

- Inclusion of control and protection in their normal competency training programme
- Implementing the process of continuous risk identification and reporting potential exposure risks to the VOH Department for assessment
- The implementation and maintenance of exposure control engineering procedures and systems
- The deployment of personal protective equipment/procedures
- Taking disciplinary action through the normal disciplinary routes against employees who are guilty of non-compliance

➤ **Occupational Medical Practitioner (OMP)**

The main function of Occupational Medical Practitioner is protection, cure, rehabilitation and compensation for occupational injury and diseases, and includes:

- Occupational Medical Surveillance
- Referring employees with occupational exposure related impairment for treatment and compensation
- Prepare records and reports on airborne pollutant related illnesses for the purpose of routine reporting (quarterly), review and formal reporting (legal)
- Ensure that Occupational Hygiene Risk Profile sheets are displayed in each employee Occupational Medical Record

➤ **Training Department: Education & Training**

Education & Training is a fundamental prerequisite to the success of the airborne pollutant control programme, which is addressed at all levels through the induction process and other relevant training courses. The purpose is to improve employees' awareness of airborne pollutant hazards and its

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consequences, and to motivate them towards active participation on controlling the risks according to their position and function within Black Mountain.

- a) The objectives of employee induction and education with regards to airborne pollutants are to:
 - i) Promote a comprehensive understanding of the nature, the cause and the consequences of airborne pollutant exposure, and motivate employees to take steps towards limiting exposure and thus preventing exposure & occupational disease
 - ii) Ensure that employees are capable of recognizing dangerous airborne pollutant sources and are encouraged to contribute to risk assessments and the implementation of appropriate control measures
 - iii) Promote positive employee attitudes towards respiratory protection (e.g. dust masks) and encourage effective utilization
 - iv) Ensure employees' ability to effectively utilize respiratory protection (e.g. dust masks), by demonstrating their proper use & care and develop employees' competence through supervised, hands-on training in the fitting of respiratory protection
- b) Target groups for training with regards to airborne pollutant exposure:
 - i) Every person in the workplace (i.e. employers, senior managers, line managers, supervisors, health and safety representatives/committee members and all exposed employees) will be given an overview of the legislation relating to airborne pollutant exposure, the process of hazard identification and risk assessment, as well as how risk management systems and procedures will be implemented in the workplace
 - ii) Persons responsible for formulating and implementing risk management systems and procedures relating to airborne pollutants (i.e. managers, line managers, supervisors and health and safety representatives/committee members) will be required to develop their competence in hazard identification, risk assessment and risk management systems
- c) Main topic areas for an overview or general training course:
 - i) Legislation relating to airborne pollutants and means of compliance, including codes of practice and risk management systems
 - ii) Risk of loss resulting from exposure to airborne pollutants, including possible impact on work, family and social life
 - iii) Hazard identification, risk assessment (including dust and other airborne pollutant measurements) and risk management procedures
 - iv) The need for communication and consultation with all concerned in formulating and implementing measures aimed at managing risk and complying with legislation
 - v) Workplace strategies for the management of risks associated with airborne pollutants
 - vi) Occupational hygiene monitoring and medical surveillance
- d) Main topic areas for those responsible for implementing measures to comply with the requirements of legislation:
 - i) Legislated requirements for codes of practice and risk assessment

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- ii) Hazard identification, risk assessment (including measurements) and risk management procedures within the context of airborne pollutants
- iii) Communication and consultation with employees regarding the implementation of systems and procedures to comply with legislated requirements
- iv) Workplace strategies and procedures for the management of risks associated with occupational exposures
- v) Legislated requirements for occupational hygiene monitoring and medical surveillance programmes
- vi) Record-keeping and administrative requirements
- vii) Duty of care responsibilities for manufacturers, importers and suppliers of equipment

➤ Supply Chain

The contribution of the Supply Chain to the airborne pollutant limitation programme is to:

- Implement the mine specifications on exposure control (developed in consultation with the hygiene discipline) in the tendering and purchasing process
- Administer the specifications and standards during the purchasing of equipment and protection.
- Report, for review purposes, on procurement statistics

In addition to the above, the Supply Chain plays a major part in the acquisition of new equipment with regards to Manufacturers / Suppliers as is shown below.

➤ Original Equipment Manufacturers (OEM's) / Suppliers

The contribution of the OEM's / Suppliers to the airborne pollutant limitation programme is as follows:

- The principle approach to be taken is to control the exposure levels of the equipment supplied to the mine. Section 21 of the MH&S Act is applicable in this regard.
- It should be noted that, if an exposure hazard is associated with equipment supplied to mines, the supplier can only relinquish its responsibility with regard to risks if the exposure characteristics of the equipment are specified, the necessary precautions against exposure control are stipulated and the mine management has accepted, in writing, the responsibility of implementing those precautionary measures
- Therefore, equipment can only be accepted after the relevant documentation of acceptance has been duly completed

➤ Human Resources

The main functions of the HR department in respect of the airborne pollutant limitation programme are:

- The notification of individuals on the schedule for medical testing (established by the Medical Department) in respect of job placement and the re-allocation of employees to different jobs
- The maintenance of personnel records such as job category, work area, occupational career and job restrictions placed on employees as a result of their medical status

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- Reporting on demographic information for the purpose of routine reporting (quarterly), review and formal reporting (legal) on health and safety

h) Occupational Hygiene Exposure Profiles

The VOH department defines, log and maintains the airborne pollutant exposure levels associated with the different HEGs. From this exposure information, the Occupational Hygiene Exposure Profile sheets are then updated, of which a copy is kept on the Occupational Medical Record of each employee in the Occupational Medical facility, serving as the link between Occupational Hygiene & medical information. This also then enables the OMP to identify those individuals that require special medical examination based on airborne pollutant exposure.

1.1.2 Graphical Representation

Graphical representations are being utilized to facilitate easy interpretation of data and to highlight trends. This is reported on at the Health & Safety Meeting.

2. COMPLIANCE WITH THE COP.

Measures to ensure compliance is instituted through auditing from first, second- and third-party auditors.

3. ACCESS TO THE COP & RELATED DOCUMENTS.

- 3.1 A complete electronic COP, with related documents, is kept readily available at the mine for examination by any affected person. Hard copies, when printed, are treated as uncontrolled copies. Line supervisors and management have direct access to these electronic copies and can distribute it to affected employees when required. On written request to the Manager, any other affected person will be supplied with copies. A register will be kept of such persons or institutions to facilitate updating.
- 3.2 The registered Trade Unions and Full Time Health and Safety Representative will be supplied with copies of this COP on written request to the Manager. A register will be kept of such persons or institutions to facilitate updating.
- 3.3 The employer will ensure that all employees are fully conversant with those sections of this COP relevant to their respective areas of responsibility.

4. Distribution and Access

- The latest revision of this document is available as a read only document on the Intranet. The Compliance Officer shall maintain an authorised hard copy of this policy/procedure in the relevant location.
- Line Managers, who have staff reporting to them that do not have access to the Intranet, shall ensure that these personnel are adequately guided and informed.

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Annexure A: Revision History

Revision History	Date	Brief Description or Comment
Revision 6	2022/05/06	Updated: 5.4 General Ventilation Arrangements / Controls, a) Swartberg Mine information 8.3.1.2 Baseline Risk Assessment, h): Exposure Levels Table

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Annexure A: Occupations Exposed to Airborne Pollutants

Activity Area	Occupation code	Occupation	Numbers
02/13 Trackless Mining	20704	Multi-task worker Underground production	31
	20704	Multi-task Worker: Mission, Solo	29
	20305	Miner (Production)	4
	20305	Miner (Backfill, Blasthole, etc)	9
	20302	Shiftboss (Production)	6
	20302	Shiftboss (Backfill)	2
	20805	Backfill Worker (Operator - Underground)	10
	21599	Road building: Mine Construction Worker	8
	21599	Construction: Mine Construction Worker	10
	21599	Mine Construction worker	6
	20805	Backfill Worker (Construction Underground)	7
	20805	Backfill Worker (Gunnite)	10
02/16 Shaft & Services	21304	Onsetter / Banksman (incl learners)	9
	20301	Shaft foreman	4
	21502	Shaft timberman	8
	21503	Shaft timberman worker (assistant)	11
02/18 Underground Workshops	40447	Boilermaker (incl TMM)	8
	40452	Boilermaker serviceman	7
	40314	Electrician	11
	40317	Electrician serviceman	11
	40315	Electrician apprentice	1

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	40434	Fitter (incl TMM)	11
	40435	Fitter serviceman	14
	40429	Fitter: apprentice	2
01/24 Concentrating	30299	Plant worker	61
01/30 Roving Plant	40452	Boilermaker	4
	40450	Boilermaker serviceman	6
	40314	Electrician	4
	40317	Electrician serviceman	3
	40428	Fitter	8
	40435	Fitter serviceman	7
	40429	Fitter apprentice	2