1. PURPOSE

To ensure that personnel and management understand the requirements of the Environmental Management System, the personnel involved in activities which may create a significant impact on the environment, are competent on the basis of appropriate education, training and / or experience. To ensure that training needs are identified and appropriate training is supplied.

2. SCOPE

- The importance of conformance with the Environmental Policy, procedures and with other requirements of the Environmental Management System.
- The significant environmental impacts and risks of their work activities and the environmental benefits of improved personnel performance.
- Their roles and responsibilities in achieving aims of the Environmental Policy and the objectives and conformance with the MS and procedure, including emergency preparedness and resource.
- The potential consequences of not complying with the procedures.
- Examples of non-conformance and the causes of non conformances in an Environmental Management System.

This procedure contains the undertaking of competency training for all personnel whose work may create a significant impact on the environment or is involved in the maintenance of the system.

3. ABBREVIATIONS

Responsibilities

TD = Training Department
GM = General Manager
RP = Responsible Person for environmental issues in the area.
EC = Environmental Co-ordinator
AD = Auditor

Actions

D = Do
U = Understand / assist
V = Verify
A = Approve
R = Record

4. DEFINITIONS

5. PROCEDURE

See procedure matrix below.

PROCEDURE MATRIX

ACTION	No	DESCRIPTION OF ACTIONS	D	U	V / A	A	R	WHEN OR FREQUENCY	REFERENCE
TRAINING NEEDS ARE HIGHLIGHTED	1	Training needs are highlighted by the Environmental Risk Assessment and by the assessment of environmental training competencies and environmental awareness during audits, reviews and non-conformances	EC	TD	GM	AD	EC	As required	EMS Database Audit Reports Environmental incident reports
COMMUNICATE HIGHLIGHTED NEEDS TO THE TRAINING DEPARTMENT	2	The highlighted training needs are communicated to the Training Department by means of e-mail.	EC	TD				As required	ISO.QS.01
THE TRAINING OF PERSONNEL	3	The process which is followed to implement and review the effectiveness of internal courses, external courses and induction training is defined in the HUMAN RESOURCES AND DEVELOPMENT QUALITY MANUAL The following requirements are addressed by the training materials and procedures: **Competency** Personnel, whose work may create a significant impact on the environment, will receive sufficient training. **Awareness** All new personnel and those returning from leave, undergo environmental awareness training, which includes an introduction to the Environmental Management System or any additional training need which was identified during the induction programme.	 TD TD		 EC EC		 TD TD	As defined in standard training operating procedures.	ISO.QSM.01 Standard Training Operating Procedures Training Course Material Training Records

6. RECORDS

Identify	Collect	Index	Access	File	Store	Maintain	Dispose	Retain
EMS database	Env. Co-ord.	-	Env. Co-ord./HOD/ Env. Dept	EMS Database	Intranet	Electronic	Env. Co-ord.	Current data
Internal Audit Reports	Env. Co-ord.	Internal Audit	-	Reports/ Various operating unit files/EMS Database	Intranet	Electronic/File	Env. Co-ord.	Indefinite
Training records -Personal -Course attendance register	Training Department	-	-	Files	Files/network	Electronic	Training Department	Indefinite

MARULA PLATINUM MINE

ENVIRONMENTAL EMERGENCY PROCEDURES

Emergency procedures apply to incidents that are unexpected and that may be sudden, and which lead to serious danger to the public and/or potentially serious pollution of, or detriment to the environment (immediate and delayed). Emergency environmental situations that have been identified for Marula Platinum Mine are shown in Table 1.

1.1. General Emergency Procedure

The general procedure that should be followed in the event of all emergency situations is as follows.

- Applicable operational managers must be notified of an incident upon discovery;
- Area to be cordoned off to prevent unauthorised access and tampering of evidence;
- If residue facilities/dams, storm water diversions, etc., are partially or totally failing and this cannot be prevented, the emergency siren is to be sounded (nearest one available). After hours the Plant Manager on shift must be notified;
- Take photographs and samples as necessary to assist in investigation;
- Report the incident to the responsible person of the Safety, Health, Environment and Quality (SHEQ) department (or equivalent);
- The SHEQ department must comply with Section 30 of the National Environmental Management Act (107 of 1998) such that:
    - The SHEQ department must immediately notify the Director-General (DEAT, DME and Inspectorate of Mines as appropriate), the South African Police Services, the relevant fire prevention service, the provincial head of DEDET, the head of the local municipality, the head of the regional DWAF office and any persons whose health may be affected of;
        - The nature of the incident;
        - Any risks posed to public health, safety and property;
        - The toxicity of the substances or by-products released by the incident; and
        - Any steps taken to avoid or minimise the effects of the incident on public health and the environment.
    - The SHEQ department must as soon as is practical after the incident:

- Take all reasonable measures to contain and minimise the effects of the incident including its effects on the environment and any risks posed by the incident to the health, safety and property of persons;
- Undertake clean up procedures;
- Remedy the effects of the incident; and
- Assess the immediate and long term effects of the incident (environment and public health);

o Within 14 days the SHEQ department must report to the Director-General DEAT, the provincial head of DEDET, the head of the local municipality, the head of the regional DWAF office such information as is available to enable an initial evaluation of the incident, including:

- The nature of the incident;
- The substances involved and an estimation of the quantity released;
- The possible acute effects of the substances on the persons and the environment (including the data needed to assess these effects);
- Initial measures taken to minimise the impacts;
- Causes of the incident, whether direct or indirect, including equipment, technology, system or management failure; and
- Measures taken to avoid a recurrence of the incident.

1.2. IDENTIFICATION OF EMERGENCY SITUATIONS

The site wide emergency situations that have been identified together with specific emergency response procedures are shown in Table 1.

TABLE 1: EMERGENCY SITUATIONS AND RESPONSE

ITEM	EMERGENCY SITUATION	RESPONSE IN ADDITION TO GENERAL PROCEDURES
1	Spillage of chemicals, engineering substances and waste	Where there is a risk that contamination will contaminate the land (leading to a loss of resource), surface water and/or groundwater, Marula will: 1. Notify residents/users downstream of the pollution incident. 2. Identify and provide alternative resources should contamination impact adversely on the existing environment. 3. Cut off the source if the spill is originating from a pump, pipeline or valve (e.g. TSF delivery pipeline, refuelling tanker) and the infrastructure 'made safe'. 4. Contain the spill (e.g. construct temporary earth bund around source such as road tanker). 5. Pump excess hazardous liquids on the surface to temporary containers (e.g. 210 litre drums, mobile tanker, etc.) for appropriate disposal. 6. Remove hazardous substances from damaged infrastructure to an appropriate storage area before it is removed/repaired.
2	Discharge of dirty water to the environment	1. Apply the principals listed for Item 1 above. 2. To stop spillage from the dirty water system the mine will: a. Redirect excess water to other dirty water facilities where possible; b. Pump dirty water to available containment in the clean water system, where there is no capacity in the dirty water system; and c. Carry out an emergency discharge of clean water and redirect the spillage to the emptied facility. 3. Apply for emergency discharge as a last resort.
3	Pollution of surface water	1. Personnel discovering the incident must inform the SHEQ department of the location and contaminant source.

ITEM	EMERGENCY SITUATION	RESPONSE IN ADDITION TO GENERAL PROCEDURES
		2. Apply the principals listed for Item 1 above. 3. Absorbent booms will be used to absorb surface plumes of hydrocarbon contaminants. 4. Contamination entering the surface water drainage system should be redirected into the dirty water system. 5. The SHEQ department will collect in-stream water samples downstream of the incident to assess the immediate risk posed by contamination.
4	Groundwater contamination	1. Use the groundwater monitoring boreholes as scavenger wells to pump out the polluted groundwater for re-use in the process water circuit (hence containing the contamination and preventing further migration). 2. Investigate the source of contamination and implement control/mitigation measures.
5	Burst water pipes (loss of resource and erosion)	1. Notify authority responsible for the pipeline (if not mine responsibility). 2. Shut off the water flowing through the damaged area and repair the damage (if Marula pipeline). 3. Apply the principals listed for Item 1 above if spill is from the dirty/process water circuit.
6	Flooding from failure of surface water control infrastructure	1. Evacuate the area downstream of the failure (e.g. opencast pits). 2. Using the emergency response team, rescue/recover and medically treat any injured personnel. 3. Temporarily reinstate/repair storm water diversions during the storm event (e.g. emergency supply of sandbags). 4. Close the roads affected by localised flooding or where a storm water surge has destroyed crossings/bridges.
7	Risk of drowning from falling into water dams	1. Attempt rescue of individuals from land by throwing lifeline/life saving ring. 2. Get assistance of emergency response team whilst attempting rescue or to carry out rescue of animals. 3. Ensure medical assistance is available to recovered individual.

ITEM	EMERGENCY SITUATION	RESPONSE IN ADDITION TO GENERAL PROCEDURES
8	Veld fire	1. Evacuate mine employees from areas at risk. 2. Notify down wind residents and industries of the danger. 3. Assist those in imminent danger/less able individuals to evacuate until danger has passed. 4. Provide emergency fire fighting assistance with available trained mine personnel and equipment.
9	Overtopping or failure of the tailings dam	1. Sound the alarm to evacuate danger area. 2. Pump water from top of dam and follow redirection of water as indicated in Item 2 above. 3. Stop pumping tailings to the TSF. 4. Recover casualties resulting from dam failure using the emergency response team. 5. Make the remaining structure safe. 6. Apply the principles of Item 1 above.
10	Injury from fly rock	1. The person discovering the incident will contact the mine emergency response personnel to recover the injured party and provide medical assistance. 2. Whilst awaiting arrival of the emergency response personnel, first aid should be administered to the injured party by a qualified first aider if it is safe to do so.
11	Falling into hazardous excavations	1. Personnel discovering the fallen individual or animal must mobilise the emergency response team to the location of the incident and provide a general appraisal of the situation (e.g. human or animal, conscious or unconscious, etc). 2. The injured party should be recovered by trained professionals such as the mine emergency response team. 3. A doctor (or appropriate medical practitioner)/ambulance should be present at the scene to provide first aid and transport individual to hospital.
12	Road traffic accidents (on	1. The individual discovering the accident (be it bystander or able casualty) must raise the alarm giving the

ITEM	EMERGENCY SITUATION	RESPONSE IN ADDITION TO GENERAL PROCEDURES
	site)	location of the incident. Able personnel at the scene should shut down vehicles where it is safe to do so. 2. Access to the area should be restricted and access roads cleared for the emergency response team. 3. Vehicles must be made safe first by trained professionals (e.g. crushed or overturned vehicles). 4. Casualties will be moved to safety by trained professionals and provided with medical assistance. 5. Medical centres in the vicinity with appropriate medical capabilities will be notified if multiple seriously injured casualties are expected.
12	Localised/partial Collapse of the underground mine	1. Sound the alarm to evacuate all employees from the mining void. 2. Determine location of collapse and number of unaccounted for personnel (i.e. those still trapped underground). 3. Assess risk of further collapse (based on reason for initial collapse). 4. Stabilise mine void in area of collapse and attempt rescue of trapped personnel with emergency response team. 5. Ensure medical personnel are mobilised to accept casualties.
13	Disturbance of archaeological, historical and heritage sites	1. On discovery of archaeological, heritage or historical importance mining should stop in that area. 2. The mine will obtain the services of a specialist to assess the importance of the site. 3. The specialist will indicate how to proceed with conservation and preservation of information and artefacts from the site. 4. A permit in terms of Section 35 of the National Heritage Resources Act will be obtained for disturbance of archaeological sites from SAHRA (or the provincial heritage agency when it is established), before mining resumes.
14	Development of informal settlements	The mine will inform the local authorities (municipality and police) that people are illegally occupying the land and ensure that action is taken within 24hrs.

The contact details of the relevant government departments are provided in Table 2 below.

TABLE 2: CONTACT DETAILS OF THE RELEVANT GOVERNMENT DEPARTMENTS

DEPARTMENT	CONTACT DETAILS
Department of Economic Development, Environment and Tourism	Department of Economic Development, Environment and Tourism PO Box 55464 Polokwane 0700 Tel: 015-295-5528 (switchboard)
Department of Environmental Affairs and Tourism	Mrs Pam Yako (Director General) Tel: 012 310 3529 Fax: 012 322 4832
Department of Minerals and Energy	Department of Minerals and Energy Private Bag X9467 Polokwane 0700 Tel: 015-287-4700 (switchboard) Fax: 015-287-4729
Department of Water Affairs and Forestry	Department of Water Affairs and Forestry Head Office / Regional Office Private Bag X313 / Private Bag X11259 Pretoria / Nelspruit 0001 / 1200 Tel: 0800 200 200 / 013 235 4206 Fax: 012 324 6592 / 013 235 4745

MARULA

Member of the Implats Group

MANDATORY CODE OF PRACTICE FOR EMERGENCY PREPAREDNESS AND RESPONSE

This is a mandatory Code of Practice in terms of Section 9(2) and (3) of the Mine Health and Safety Act (Act 29 of 1996). This Code of Practice was drawn up in accordance with DMR guideline, reference no. DMR 16/3/2/1-A5 issued by the Chief Inspector of Mines

Old Reference Number: **07.00.00**

New Reference Number: IMO_VEN_COP_005

FIRST IMPLEMENTATION DATE: 19 MARCH 2008
LAST REVISION DATE: 28 OCTOBER 2021
NEXT REVISION DATE: 28 OCTOBER 2024

VERSION: 6.0

Approved By

Name & Surname	Designation	Date	Signature
MM Motlhageng	Executive Marula Operations	28/10/24	

Reviewed By

Name & Surname	Designation	Date	Signature
S Mbatha	Snr. Ops Engineer	28/10/24	
M Mariri	Mine Manager	28/10/2024	
M Morua	Chief Ventilation officer	28/10/2024	
K Phoku	Area HSE	28/10/2024	
R Makuwa	FTHS Rep	28/10/2024	
S Mokwena	FTHSR Services	28/10/2024	

Authored By

Name & Surname	Designation	Date	Signature
EL Lemena	Ventilation Manager	28/10/2024	

Table of Contents

1. PURPOSE

The purpose of the COP is to, if properly implemented and complied with, improve emergency preparedness and response at the operations, thereby minimising risks to persons affected by emergencies. Where an incident has occurred, to investigate it fully and apply any lessons learnt during such an investigation, to prevent any repeat of such an incident. This COP also ensures that Marula Platinum Mine complies with the DMR guideline reference number DMR 16/3/2/1-A5 issued by the Chief Inspector of Mines (31 January 2011) for a Mandatory Code of Practice in terms of sections 9(2) and 9(3) of the MHSA. This Code of Practice supersedes all previous relevant Codes of Practice.

2. SCOPE

This COP will apply to Marula Platinum Mine's operations.

3. STATUS OF MANDATORY CODE OF PRACTICE

a) The COP was drawn up in accordance with Guideline Reference Number DME 16/3/2/1-A5 issued by the Chief Inspector of Mines.
b) This is a Mandatory COP in terms of section 9(2) and (3) of the MHSA;
c) The COP may be used in an accident investigation / enquiry to ascertain compliance and also to establish whether the COP is effective and fit for purpose;
d) The COP supersedes all previous relevant COP's;
e) 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;
f) Any revisions required to this document must be routed to the Standards Committee to implement amendments. The frequency of review of this Code of Practice is risk-based. This document must be reviewed if there are significant changes to related standards, regulations, guidelines or procedures; or in mining processes, or in event of a risk assessment outcome or an incident or accident requiring revision; or as deemed necessary by management.
g) To ensure its continual validity and effectiveness, three years from the date of the last revision is regarded as the deadline for a repeat revision if none of the abovementioned events flagged an obligatory document revision in the interim.

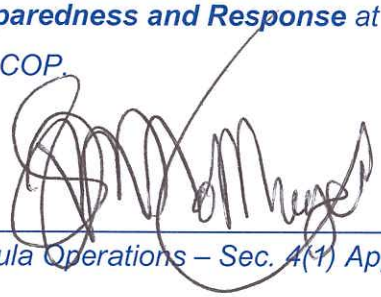
4. MEMBERS OF DRAFTING COMMITTEE

4.1 To comply with the requirements of Section 9(4) of the MHSA, management has consulted with the Marula Health, Safety and Environmental (HSE) Committee on the preparation, implementation, and revision of this COP, see annexure 1 of this COP.

4.2 Marula Platinum Mine has appointed the committee to revise this MCOP as per annexure 2.

4.3 The members of the drafting committee were appointed by Marula Operations 4(1) appointee for the drafting and revision of this COP as indicated in the paragraph below: -

*I the undersigned, **Moses Motlhageng**, in my capacity as Sec. 4(1) appointee of Marula Operations appoint the employees listed below to the drafting committee for the COP for **Emergency Preparedness and Response** at Marula Mine; to prepare, implement and where applicable revise this COP.*



Marula Operations – Sec. 4(1) Appointee

The following are members of the Drafting Committee:-

Name	Occupation	Qualification/ Affiliations	Experience In Years	Signature
Edmund Lemena	Ventilation Manager	MVSSA	32 Yrs	
Blondie Kgwete	*Sectional Manager Driekop*	AMMSA	14 yrs	
FV Nkosi	*Senior Ops Engineer Driekop*	SCC	25 yrs	
S Mbatha	*Senior Ops Engineer Clapham*	FCESA/AMPE	23 yrs	
Malefo Morua	Chief Ventilation Officer	MVSSA	17 Years	
Joseph Moloto	HSE Co-ordinator	B-TECH ANSPSA	21 Years	
Gerald Petzer	HRD Superintendent - Mining		32 yrs	
K.W Phoku	AMCU HSE Representative	AMCU HSE	15 yrs	
M.S Mokwena	FTHSR - Services	FTHS. Services	22 yrs	
MT Mogakala	FTHSR - Driekop	FTHS Rep	16 yrs	
R Makuwa	FTHSR - Clapham	FTHS/Rep	09 yrs	
R Makhado	FTHSR - Plant	FTHS	15 yrs	

5. GENERAL INFORMATION

5.1 LOCALITY

Exploration activities, which led to the discovery of PGEs at Marula Mine, started in the 1920s following the discovery of PGEs by Hans Merensky on the nearby Maandagshoek farm (now Modikwa Mine). Follow-up exploration in the 1960s and 1980s by Anglo American Platinum Limited (Anglo Platinum) entailed exploration drilling targeting both the Merensky and the UG2 Reefs. There` is limited data relating to these historical exploration initiatives.
Guided by information from historical information, Platexco Incorporated (Platexco) conducted exploration campaigns in the 1990s involving drilling and sampling, and an aeromagnetic survey of Winnaarshoek (part of Marula Mine area). Platexco also initiated a Feasibility Study during the period 1998 to 2000 for exploitation of the PGE reefs at Marula Mine before the project was acquired by Implats. Implats acquired the mineral rights to the Clapham and Forest Hill farms and a sublease to Driekop farm from Anglo Platinum in exchange for the Hendriksplaats farm (now part of Modikwa Mine).

Implats initiated further exploration activities in October 2000 and subsequently completed the Feasibility Study started by Platexco, which included a mechanised mine plan focused on the UG2 Reef. Challenges encountered during the mechanised mine planning resulted in a revised Feasibility Study, which included a conventional mine plan. Development of Marula Mine commenced in October 2002.

Current operations at Marula Mine are based on the exploitation of the UG2 Reef by conventional and hybrid (mechanised/conventional) mining methods. The overlying Merensky Reef is yet to be exploited. However, the Merensky Reef has been subjected to a number of techno-economic assessments by Implats since 2006, starting with a Scoping and Prefeasibility Studies between 2006 and 2007 and, subsequently, a Feasibility Study that was halted due to economic uncertainties brought by the Global Recession.

In 2010, Implats commissioned a second Feasibility Study for the exploitation of the shallow Merensky Reef Mineral Resources by conventional mining methods, with the intention to supplement ore tonnage shortfalls to the existing plant at the mine. Initial results were discouraging due to the high upfront capital requirements and long lead times for ore delivery to the plant. Further optimisation studies indicated that there may be a possibility for economic exploitation of the Merensky Reef with the adoption of a phased and less capital-intensive low production hybrid mining option. These options need to be interrogated through trade-off studies and a detailed Feasibility Study.

Marula's mining operation is located within the Greater Tubatse Fetakgomo Local Municipality of Limpopo Province, on the Eastern Limb of the Bushveld Complex, some

35km to the north-west of Burgersfort. The geological succession is broadly similar to that of the Western limb with the same two horizons occurring in the Critical Zone and which host economically exploitable quantities of PGM's, namely the Merensky Reef and the underlying UG2 Reef. Both reefs sub-outcrop in the lease area and dip generally in a west-south-west direction at about 12°. The vertical separation between the Merensky and UG2 Reefs is around 400m.

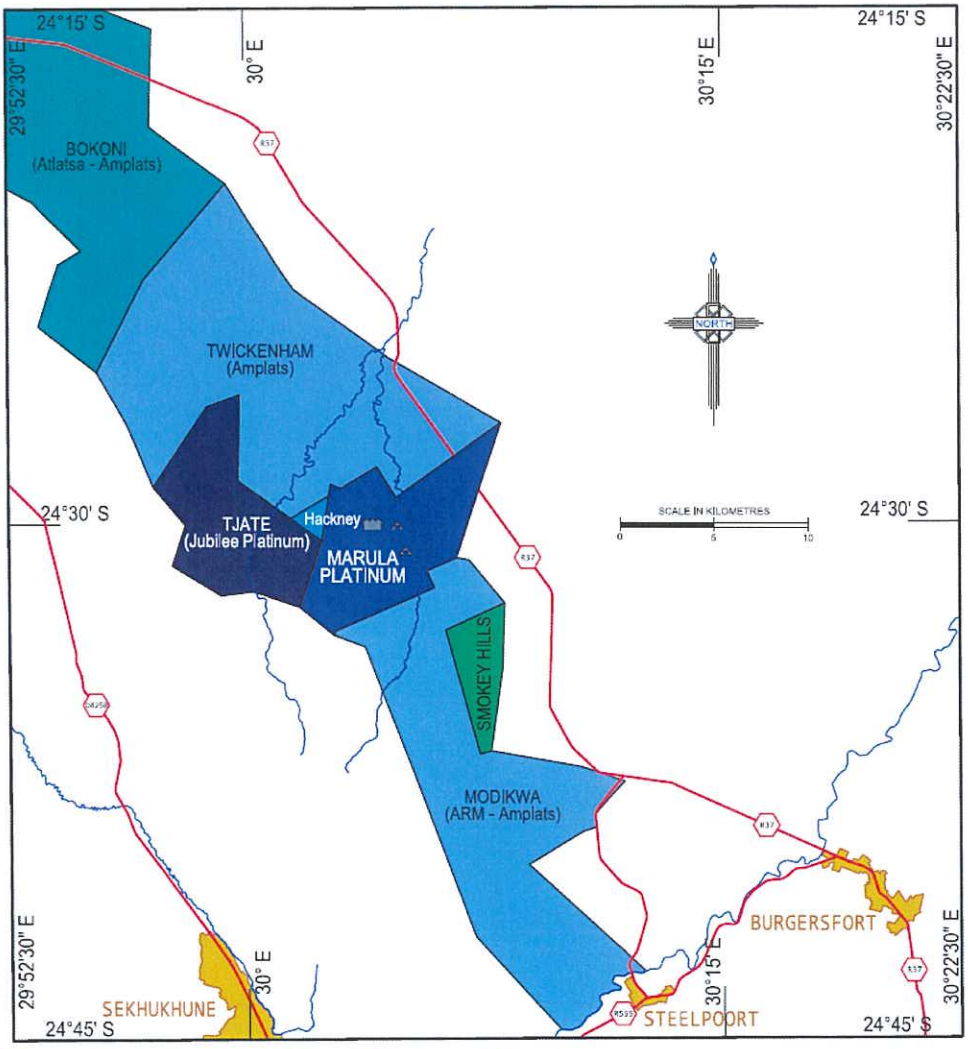


Figure 1. Locality plan of Marula Platinum Mine

5.2 Geographical Setting

Impala Platinum's Rustenburg lease area lies on the western lobe of the Bushveld Igneous Complex. This complex consists of alternating chromitite, pyroxenite, norite and several types of anorthosite layers. These layers dip towards the east at an average of 10^0. Depicted below are tectonic and regional geological settings for Impala Platinum Mine in relation to western limb of the Bushveld Igneous Complex.

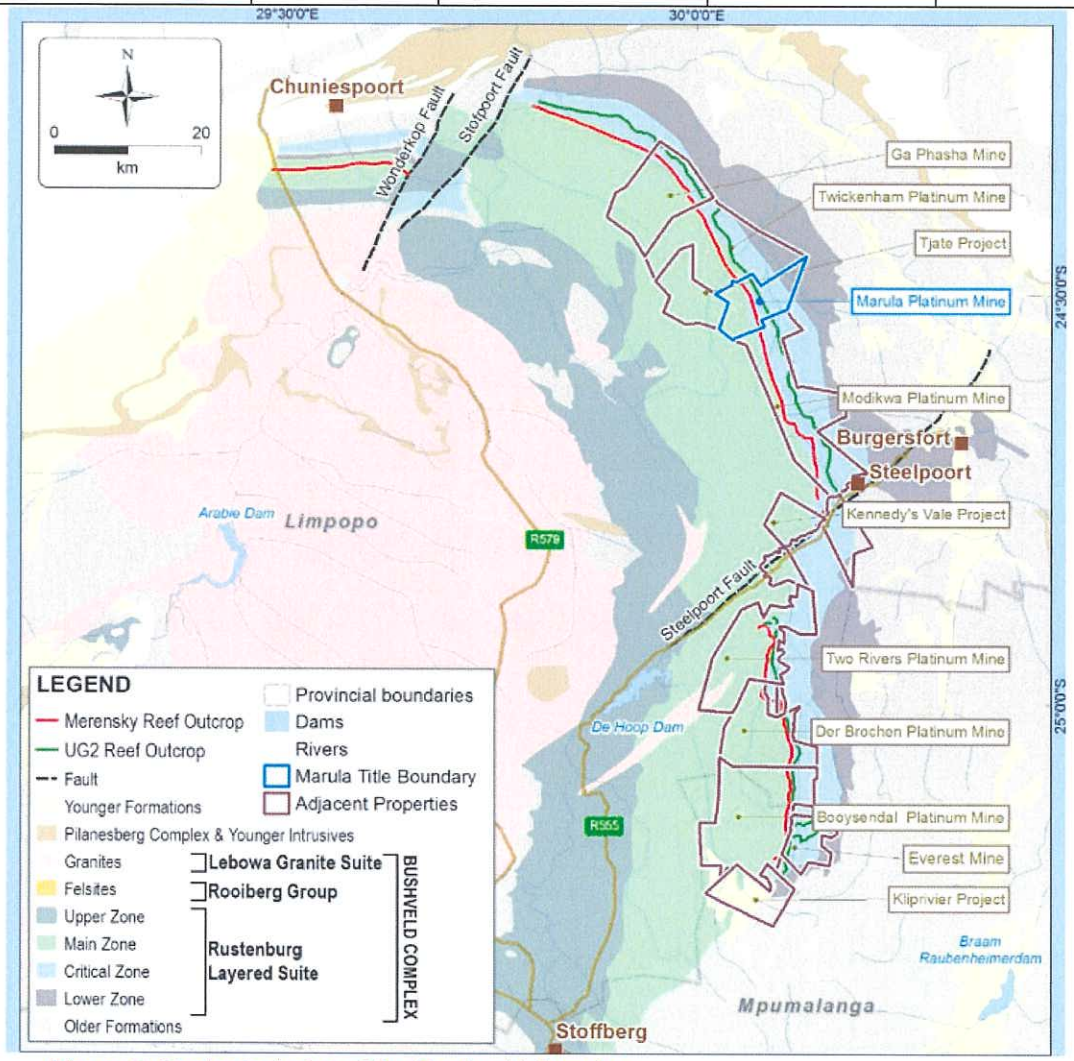


Figure 2. Geological plan of the Bushveld Complex

The following major geological features are found in the lease area:

- *Faults – normal faults are the most common on the property. Fault planes generally extend through to surface. The influence and effect of faulting contributed significantly towards instabilities experienced early on in the life of the mine. Most faults have strikes that tend towards the strike of the reef.*

- *Dykes - two types of dykes are encountered, namely dolerite and lamprophyre. Dolerite dykes are generally hard (UCS more than 200 MPa) and the shear strength of the dyke / host rock contact is normally also considerable. These dykes are generally blocky, and the excavations located within the dyke experience localized stability problems. Lamprophyre dykes are significantly weaker (UCS from 0 to 60 MPa) and occur more frequently than dolerite dykes. The lamprophyre dyke / host rock contact has a very low strength. Lamprophyre material weathers rapidly and these dykes generally become self-mining when exposed to water. The direction of the dykes generally coincides with the direction of the major joint set, which in turn coincides with the fault direction in the area.*

- *Joints break up the hanging wall and footwall strata surrounding the reef plane. Generally, 3 joint sets are identified although as many as 5 sets can occur. Joint directions vary, with dominant joint sets being aligned on strike on some shafts but on dip at other shafts. The mean dip angle appears to be within 35° of the vertical with a scatter of 45° on either side. This general picture does not rule out the sporadic occurrence of low inclination planar joints. Curved joints known locally as cooling joints also occur in certain areas.*

- *Potholes occur throughout the lease area in an entirely random fashion. Due to their geological complexity and associated strata control problems, they are generally not mined. The amount of reef remaining in pothole losses impacts on rock engineering design, particularly small pillar behaviour, which in turn impacts on the selection of ground control districts.*

WIDTH (m)	CODE	ROCK TYPE	UNIT
0.18	U3L2	Chromitite	UG3 Leader Chromitite Layer 2
7.40	U3P1	Feldspathic Pyroxenite	UG3 Pyroxenite 1
0.24	U3L1	Chromitite	UG3 Leader Chromitite Layer 1
1.22	U2H4	Mottled & Spotted Anorthosite	UG2 Hanging Wall 4
4.93	U2H3	Feldspathic Pyroxenite	UG2 Hanging Wall 3
4.58	U2H2	Norite - Melanorite	UG2 Hanging Wall 2
8.11	U2H1B	Pyroxenite	UG2 Upper Hanging Wall
0.04	U2AN2	Anorthosite	
2.81	U2H1B	Pyroxenite	
0.03	U2AN1	Anorthosite	
1.08	U2H1B	Pyroxenite	
0.003	LCL3	Chromitite	
0.14	U2H1B	Pyroxenite	
0.003	LCL2	Chromitite	
0.19	U2H1B	Pyroxenite	
0.003	LCL1	Chromitite	
0.78	U2H1B	Pyroxenite	
0.005	U2L2	Chromitite	UG2 Upper Leader
0.58	U2H1A	Feldspathic Pyroxenite	UG2 Lower Hanging Wall 1
0.005	U2L1	Chromitite	UG2 Lower Leader
0.07	U2LP	Feldspathic Pyroxenite	UG2 Leader Parting
0.61	U2MC	Chromitite	UG2 Main Chromitite
0.55	U2FP	Feldspathic Pyroxenite & Pegmatoid	UG2 Footwall Pegmatoid
4.06	U2F2	Feldspathic Pyroxenite	UG2 Footwall 1
2.28	U1H3	Mottled Anorhtosite	UG2 Footwall 2
16.64	U1H2	Norite	UG1 Hanging Wall 2
31.10	U1H1	Feldspathic Pyroxenite & Pegmatoid	UG1 Hanging Wall 1

Figure 3. A Typical geological succession

5.3 Mining Environment

5.3.1 Commodities produced

The economic orebody is currently mined for platinum group minerals, namely:

- *The UG2 Chromitite seam, consisting of chromitite and pegmatoid units.*
- *The Merensky reef overlays the UG2 chromitite seam by 400 m vertically.*

The general strike of these orebodies is east-west.
The average stoping width is 1.25 m on the UG2 Chromitite seam.
The mining depths range from 30 to 650 m below surface.

UG2 Chromitite Seam

The UG2 Chromitite seam is a well-defined unit ranging in thickness from 60cm to 65cm with an average width of 62cm. Usually a coarse grained basal pegmatoid is present below the UG2 chromitite layer varying in thickness from 0.2 to 0.3meters. The absence of this unit indicates a possible pothole in the UG2 chromitite reef.

The immediate hanging wall strata above the UG2 Chromitite seam consists typically of a 0.2 to 0.4-meter-thick layer of pyroxenite, followed by anorthosite layer, linked by a sharp contact. However, within the pyroxenite the presence of chromitite layers known as the UG2 Leaders (U2L1 and U2L2) and the three poorly developed Leader triplets represent planes of potential parting.

Figure 4. Grade profile of the UG2 Reef

5.3.2 Mining method

The method most suited to the orebody and simultaneously resulting in the highest stoping grade is the conventional, narrow breast mining stope arrangement cleaned with a winch and scraper. The ore is scraped from the face to the center gully and either tipped into an ore pass (conventional mining method) or muck bay (hybrid method).
The Conventional mining configuration has haulages in the footwall approximately 25m below the reef horizon. Dump trucks convey the ore to centrally located tipping points. These tipping points are situated on top of silos that feed ore onto conveyor belts all the way to surface.
The hybrid mining configuration has haulages in the reef horizon. The LHDs load the ore in the muck bays and tip it onto a conveyor belt system.
Stope face advance of 0.9m per blast, based on conventional drilling and roof bolting is achieved.

5.3.2.1 Support

*Pillar design is as such, depending **on** the depth of mining, but generally consist of a combination of indestructible barrier pillars and yielding in-stope pillars. In areas where mining underlies critical structures, increased pillar safety factors on pillars are adopted to protect these structures.*
The mining support system consists of a combination of approved temporary props and nets and approved bolting for the development ends. In the stoping environment, the support consists of approved temporary props and nets; approved bolting and approved pre-stressed timber elongates.

5.3.2.2 Ventilation

The mine ventilation system has been designed to ensure that sufficient volume of air is supplied for:

a) *ventilation purposes*
b) *cooling down of working places and*
c) *the dilution and dispersion of pollutants.*

This volume of air will remove the blasting fumes from production sections within 3 hours after the blast. For effective ventilation, a total air volume of 300 m^3/s is required for Driekop system and 450 m^3/s for Clapham shaft. A minimum air velocity of 0.25 m/s and 0.15 $m^3/s/m^2$ will be provided for the stoping panels and the development ends respectively ensuring adequate cooling and maintaining maximum reject temperature below 28.5 degrees Celsius. This air velocity will also assist with the dilution and clearance of flammable gas emissions within working places.

5.3.2.3 Topography and Elevation

The regional terrain of the Greater Tubatse Local Municipality is rugged and mountainous with the surface topography often reaching in excess of 1 500m above mean sea level (mamsl) and valley floors at elevations of approximately 850mamsl.

The area surrounding Marula Operations is characterized by an escarpment to the west-southwest which is dissected by northeast trending river valleys. Most of Marula Operations are, however, located on a relatively flat, broad valley formed by the Moopetsi River. The valley drains to the north and is bound on the west by the Leolo Mountains and to the southeast by the Lebalelo Mountains. The Leolo Mountains rise in elevation from about 1 000mamsl to approximately 1 622mamsl. The plains lie at elevations between 889mamsl and 1 000mamsl. The flat topography of the valley is interrupted by three hills known as the three heads of the farm Driekop. There are several smaller hills ranging in altitude from 910mamsl to 959mamsl. Erosion dongas are prevalent along the watercourses with depths varying from 2m to over 10m.

5.3.2.4 Setting of the Mine

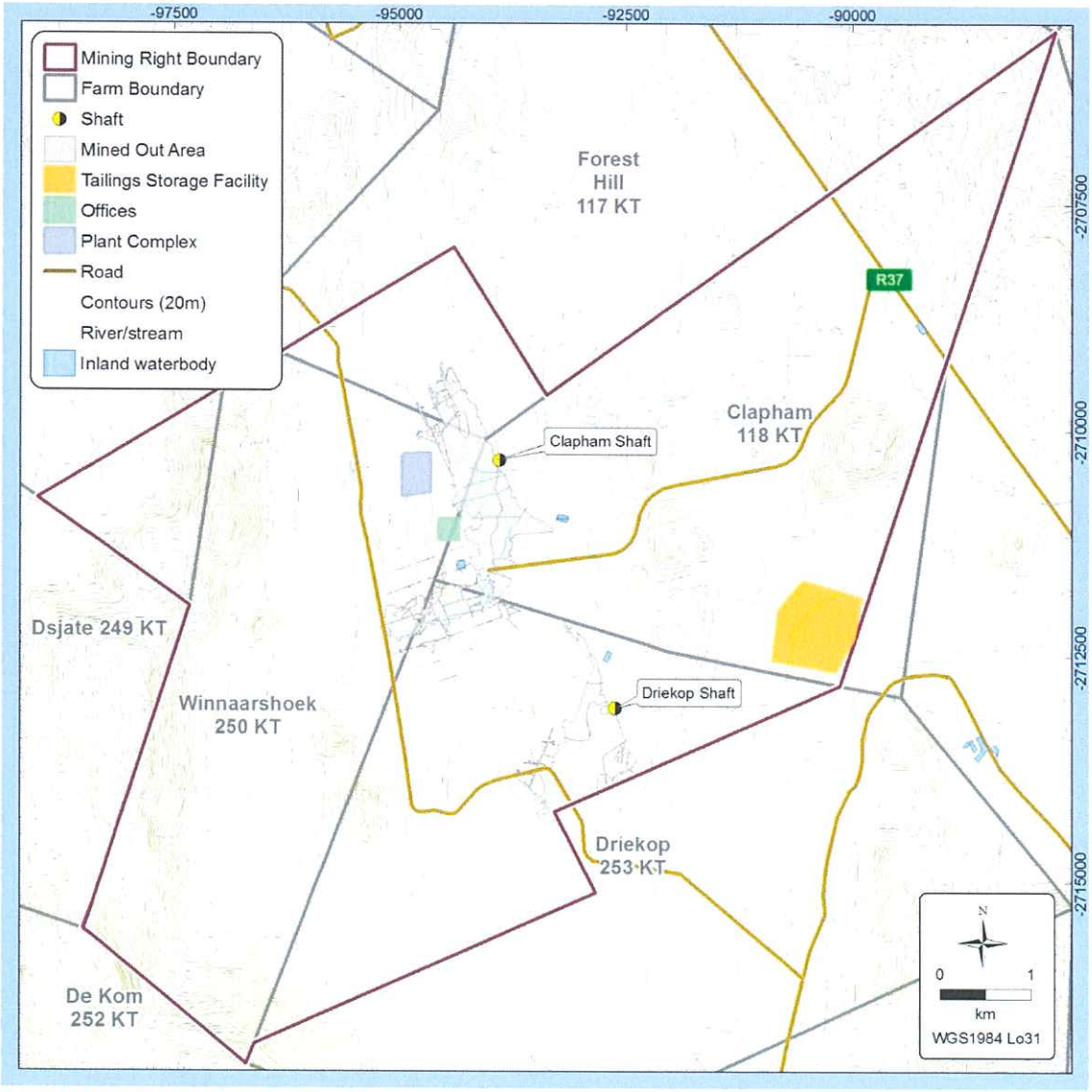


Figure 1. Topo-cadastral map of Marula and surrounds

5.4 UNIQUE FEATURES

In the recent years and especially in the cases of deeper shafts within the group, the encounters of underground pressurised gas pockets have tended towards more noticeable levels.

Although such phenomenon are known to occur in isolation, most encounters which have been recorded tend to be generally associated with or in close proximity to geological structural features and anomalies typically in the form of dykes, faults, IRUPS (iron rich ultramafic replacement pegmatoid), shear zones and intensely jointed / blocky / fractured ground. Std. 17.01.10 - Underground geotechnical diamond drilling procedures prompts proactive safety steps and provides guidelines in order to possibly detect anomalies and related phenomena ahead of current mining faces.

6. ACRONYMS AND DEFINITIONS

6.1 Acronyms

In this Code of Practice or any amendment thereof, unless the context otherwise indicates, the following meanings will apply.

ACRONYMS	FULL NAME
COP	Code of Practice
CAS	Collision Avoidance System
ISO	International Organisation for Standardisation
LHD	Load Haul Dumper
MHSA	Mine Health and Safety Act (Act 29 of 1996).
OEM	Original Equipment Manufacturer
PPE	Personal Protective Equipment
PTO	Planned Task Observation
RACI	Roles: "Responsible", "Accountable" "Consult" and "Inform"
SABS	South African Bureau of Standards
SAMRASS	South African Mines Reporting Accident Statistical System
SIMRAC	Safety in Mines Research Advisory Committee
TMM	Trackless Mobile Machinery

6.2 Definitions

DEFINITIONS	
Accident	See incident definition.
Authorised Person	Person who has been appointed by the site authority, and who is in possession of any relevant or required certification of competency
Bord	Roadway driven in ore body or seam.
Competent Person	As defined in Chapter 1 of the Minerals Act, 1991
Cross-cut	A horizontal opening, like a tunnel, that cuts the rock formation at an angle to the strike in order to reach an ore body.
Dip	The angle in degrees between a horizontal plane and an inclined earth feature such as a rock strata, fault or dyke.
Discontinuity	Any surface across which some property of a rock mass is discontinuous (e.g. bedding planes, fractures).
Drive	A horizontal opening, like a tunnel, lying in or near the ore body, parallel to the strike.
Dyke	An igneous intrusion which cuts across the surrounding strata in the vertical plane (associated with a dyke are zones of deformation or weakness in the surrounding strata. Slips and faults are commonly observed in these zones).
Explosive	Any chemical compound, mixture or device, the primary or common purpose of which is to function by explosion. These include explosives, blasting agents and detonators. The term includes but limited to, dynamite and other high explosives; slurries, emulsions and water gels, black powder and pellet powder, initiating explosives; detonators (blasting caps); safety fuse, squibs, detonating cord, igniter cord and igniters.
Face	Vertical / near vertical rock profile - typically produced by mining activities.
Fall Of Ground	Shall mean and include falls from hanging, sidewall, face, pillar and pressure burst or strain burst but shall not include any fall of ground which occurs on the surface. This definition includes a rock falling from the hanging sidewall, face or pillar which falls onto the footwall and either rolls or slides down and strikes a person some distance away.
Fault	Fracture in a rock mass across which there has been displacement.
Force	An action that tries to move an object from a stationery position, or to change its rate of movement or its direction of movement.

Geotechnical area	A portion of a mine where similar geological conditions exist which give rise to a unique set of identifiable rock-related hazards for which a common set of strategies can be employed to minimise the risk resulting from mining.
Ground control	The ability to predict and influence the behavior of roof strata in a mining environment, having due regard for the safety of the workforce and the required serviceability and design life of the mine.
Hazard	A source of potential harm to people, facilities, the environment or the community that, should it involve potential damage, will be an 'energy' such as electricity, pressure or a chemical. The environmental term, "aspect", is synonymous with hazard. A hazard must be recognised and understood to manage the related risk. Understanding a hazard includes the nature, magnitude, and potential consequences as well as relevant "target" or impact characteristics, potential timeframes, pathways or mechanisms of its manifestation and residual harm. Also, understanding sources of harm to the community may require recognition of incentives.
Incident	An undesired event that gave rise to an accident, property damage, environmental damage or other loss OR an undesired event which had the potential to lead to an incident.
Joint	Fracture or crack in a rock mass across which there has been no displacement.
Major Rock Fall Incident	Any Rock Fall Incident where: • At least 10m² of roof, or 5m³ has been displaced from the roof of the mining excavation, or • At least 10m³ of rock has been displaced from rib sides, or • Any unplanned or uncontrolled slope failure causing damage to the surface which may pose a significant risk to the safety of personnel of the mine, or Any unplanned or uncontrolled subsidence / sinkhole causing damage to the surface which may pose a significant risk to the safety of personnel of the mine.
Minor Rock Fall Incident	Any rock fall incident where the volume or tonnage dislodged is less than that for a major incident, or where no risk is posed to personnel
Near Miss (Hit)	An incident where no death, ill health, injury, property damage, environmental damage or other loss occurs may also be referred to as a "near miss" or a "near hit". The term incident includes "near misses" and "near hits".

Procedure	Approved document with detailed sequential steps describing HOW a specific task is performed. The procedure should either contain the content of the supporting standard document or refer to the standard.
Process	A structured, measured set of tasks or activities designed to produce a specific output (service or product) for a particular customer (s).
Risk	The likelihood that occupational injury or harm to persons will occur / Chance or possibility of injury or property damage
Rock	Typically, a consolidated aggregate of minerals forming part of the earth's crust.
Rock Engineering	The discipline that applies rock mechanic principles
Rock Fall	Fall of rock fragment or portion of fractured rock mass not resulting from the simultaneous occurrence of a seismic event.
Support	A structure or a structural feature built into or around an underground excavation to maintain its stability.
Surface Structures	Would include boreholes, buildings (permanent and temporary), dams, graves, monuments, pans (private and water affairs), pipelines, power lines, railway lines and tunnels, reservoirs (private and water affairs), rivers and streams, roads (major / secondary / district) and underground oil storage facilities.

7. RISK MANAGEMENT PROCESS

7.1 Hazard Identified and Risks Assessed

Section 11 of the MHSA requires the employer to identify hazards, assess the health and safety risks to which employees may be exposed while they are at work, record significant hazards identified and risks assessed. This COP addresses how significant risks identified must be dealt with, having regard to the requirements of section 11 (2) and 11 (3), the procedures and standards forming part of and annexed to this document deals with the management of each foreseeable incident.

All attempts have been made to eliminate risks, thereafter to control the risk at source, thereafter to minimise the risk and thereafter, insofar as the risk remains, provide personal protective equipment and to institute programmes to monitor the risk.

The standard structured Risk Assessments are used to identify hazards, assess the health and safety risks to which employees are exposed while at work and record the significant hazards identified and risks assessed. The risk assessment processes cover the following:

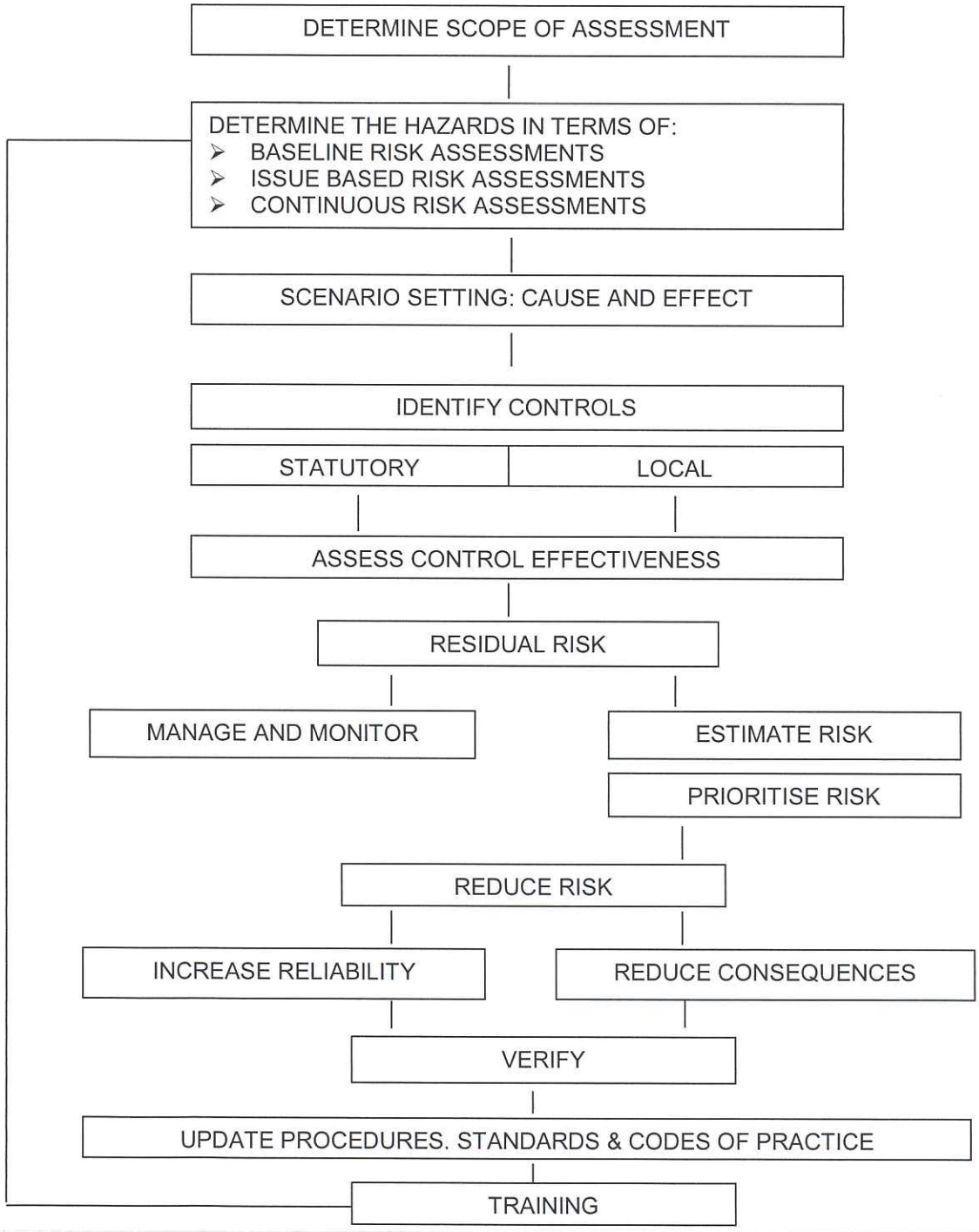
a) How the significant risks identified must be handled.
b) How due regard to the requirements of section MHSA Regulation 11(2) and (3) will be implemented.
c) How, as far as is reasonably practicable, it will be shown that meaningful attempts were first made to eliminate the risk.

d) How the risk will be controlled at the source, if it cannot be eliminated.
e) How the risk will be minimised if it cannot be controlled at the source.
f) How personal protective equipment will be provided and a programme to monitor the risk instituted.

The Risk Profiles were considered in drawing up this COP.

To ensure a rational approach towards health, safety and environmental risk assessments, the flow of events, as shown in Figure below, is essential and refers to all types of risk assessments.

The flow of the health, safety and environmental risk assessment process



7.2 EMERGENCY AND ACCIDENT STATISTICS

To assist with risk assessment, the emergency incidents and accident statistics were considered.

7.3 REVIEW OF THE COP

This COP will be reviewed periodically as and when required by Section 11(4) of the MHSA but not exceeding 3 years, after every serious incident relating to Emergency Preparedness or Response or if significant changes are introduced to procedures, mining and ventilation layouts, mining methods, plant or equipment and material.

It is the responsibility of the Training Department to incorporate significant changes into relevant training material and update the training system.

The comprehensive risk assessments were conducted with different stake holders. Marula has implemented risk management framework and procedures to address the identified risks according to the different working places and the following are standards to ensure that the risks are minimised:

In identifying / reducing the risk all possible information like accident statistics, locality of Marula to emergency services, ergonomic studies, research reports, manufactures specifications, approvals, design criteria, performance figures of all equipment have been obtained and considered.

8. ASPECTS ADDRESSED IN THIS CODE OF PRACTICE

8.1 EMERGENCY PREPAREDNESS MEASURES

8.1.1 Detection and early warning systems

In order to ensure that emergencies are detected as early as practically possible and persons are warned timeously of such emergency, Marula operations has implemented the following:

a) *Marula mine is broadly covered with equipment for early detection of fire at different locations at the mine*:

- *Conveyor belts structures are adequately covered at head sections, tail sections and drive sections with CO sensors, smoke sensors and ambient air sensors.*
- *Shaft area is covered adequately with CO sensors and smoke sensors at strategic places determined by the competent person appointed under section 12.1 of MHSA and reviewed on a quarterly.*

- *Surface lamp rooms are equipped with fire detection(CO sensors and automated suppression system) covering strategic places and are monitored in the shaft control room*
- *Surface high risk area like filing rooms, MCC rooms (Smoke beacon heads)*

b) *i) A total of 672 Gas Detection Instruments and 874 Viro-Caps are in use at the mine as personalised detectors and early warning systems.*

ii) Furthermore a total of 100 Carbon monoxide detection sensors, 77 Smoke detection sensors are installed at strategic points at both surface and underground and monitored from the surface control room on the fire detection system.

c) *Detailed procedures for personal issue of detectors/early warning systems at the mine is as following:*

i) Flammable Gas Detection Instruments

Flammable Gas Detection Instruments (GDI) are allocated to persons with a valid flammable gas proficiency certificate and Ventilation Officials in possession of at least Chamber of Mines practical certificate in mine environmental control.

The following occupations or persons are allocated with Flammable Gas Detection Instruments:

- *Miners*
- *Competent A (Safety Representatives)*
- *Boilermakers*
- *Boilermaker Servicemen*
- *Persons performing hot work*
- *Ventilation Official*
- *Diamond Drill Operators*
- *Samplers*
- *Safety Representatives*
- *Surveyors*
- *Electricians*
- *Electrical Servicemen*
- *Shift Supervisors*
- *Mine Overseers*
- *Safety Officers*

***Note**: In case of GDI failure, damage or loss during the shift each Miner / Competent A person working in remote area must borrow dual gas measuring instrument (GDI) from the shift supervisor or the Safety representative.*

8.1.1.1 Procedure to obtain a Gas Detection Instrument

i) Person will obtain flammable gas proficiency certificate from the training centre and the certificate be renewed on an annual basis.

ii) Once the training is completed, the person must report to the HR at the shaft to conduct shaft specific induction which includes Gas Detection Instrument allocation at the lamproom

iii) Person must report to the lampsman who will verify the proficiency certificate, complete the instrument allocation form and allocate the instrument.

iv) The Lampsman will inform Enterprise Systems Administrator on persons to be allocated in the system. Administrator to capture users on the system for allocation of GDI's. This will ensure that the marrying of the clocking card and the GDI is achieved.

v) Persons issued and allocated with instruments will be responsible to visually check and test the instrument on a daily basis for functionality and damages before proceeding underground

vi) Once the Person has completed the visual checks and testing of the instrument at the allocated testing point, they will then sign on the daily register

8.1.1.2 Flammable Gas Warning Devices (Viro - Caps)

Flammable Gas Warning Devices (GWD) are allocated to the persons in the following occupations:

i) Rock Drill Operators (includes all Stope and Development)

ii) Night Shift Development Winch Operator

iii) Back stope and U-tube winch operators (day and night shift)

iv) Pump Attendants

v) Drill Rig Operators

These persons are not required to have a proficiency certificates in order to be allocated.

8.1.1.3 Procedure to obtain a Gas Warning Device

i) Person to undergo flammable gas awareness training at training centre and be renewed on an annual basis.

ii) Once awareness training is completed the person must report to the shaft HR to conduct shaft specify induction which includes Gas Warning Device allocation.

iii) Person must report to the lampsman who will complete the instrument allocation form and allocate the instrument.

iv) Person will be responsible to visually check and test the instrument on a daily basis for functionality and damages before proceeding underground

v) Once the Person has completed the visual checks and testing of the instrument at the allocated testing point, they will then sign on the daily register

8.1.1.4 Procedures to ensure that actual settings of alarm levels remain effective are as listed below:

a. Gas Detection Instruments

i) Alarm Indicator For Gas Exposure

- *When the GDI-Sentinel alarm, LED's are flashing rapidly for 10 seconds on and 10 seconds off continuously without the audible alarm, the instrument is indicating that it was exposed to CO gas over 50ppm for a period of 3 minutes or / and CH4 over 0.5% for a period of 1 second and longer for the last shift and will keep flashing until a downloading of data (on single point downloading charger) is complete and GDI is put back on charge.*
- *Even during alarming the GDI-Sentinel operation will still function as normal and will not be altered by the timed alarm including:*
  - *The CH4 Alarm Level will remain on 1% (Unchanged)*
  - *The CO first alarm will remain on 50ppm*
  - *The CO TWA alarm will remain on 30ppm*
  - *ALL data logging and downloading system operations will remain unchanged*

b. Alarm Settings

- *CO timed alarm – exposure over 50ppm for a period of 180 seconds and longer.*
- *CO TWA – exposure over 30ppm for a period of eight hours and longer.*
- *CO alarm levels are as follows:*
- *First Alarm 50 ppm*
- *Second Alarm 400 ppm*
- *Flammable gas timed alarm – CH4 gas over 1.0%*
- *Flammable gas time latching – CH4 gas over 0.5% for a period of 1 second and longer.*
- *Alarm level for Ch4 is 1.0%*
- *LED flash interval – 10 seconds and will flash rapidly for 10 seconds interval continuously.*

c. Gas Warning Device

i) Alarm levels

The unit has 3 flammable gas alarms. (2 settable and OR is fixed)

- *The first alarm is a pre-warning and will only flash the red led.*

- *The second alarm is a warning that the flammable gas level is now critical and the red led will flash with the main lamp and the buzzer will sound.*
- *The over range alarm will be latched and the user have to reset this alarm in a safe area. Red LED will remain on.*
- *The unit also has settable 2 toxic alarms if the unit is fitted with a toxic sensor.*

d. *Frequencies of maintenance, calibration and testing procedures are as listed below:*

i) *Gas Detection Instruments*

- *Calibration (Once a month)*

- *If daily tests indicate that instruments are in need of calibration, it will be done by the appointed certificated Lamps man, precisely in accordance with the OEM specified calibration procedure.*
- *All calibration gases and associated calibration apparatus have the following characteristics to ensure reliable results:*
  - *Calibration mixtures are certified or analysed to be accurate to at least 5 percent of the actual labelled gas concentration.*
  - *A regulator assembly of sufficient sensitivity and stability is used to reduce compressed cylinder pressure. The regulator is suitable for this service, and incorporate appropriate connections.*

  - *A direct reading flow rate indicator, pre-set regulator, expandable bladder or other flow controlling element is installed in the calibration gas supply line to permit adjustment of flow rate to the instrument manufacturer's specified value, range and accuracy.*

- *The calibration system is resistant to absorption of and corrosion by, the calibration gas.*
- *Appropriate adapters to connect the calibration system with the flammable gas detection instrument are used. The design of calibration fixtures for diffusion type sensing systems has adapters, designed to ensure that the calibration gas uniformly surrounds the sensor.*
- *All tests are conducted in a manner to ensure safe venting of calibration gases.*

  Instruments are allowed to stabilize at operating temperature, and then operating controls should be adjusted in accordance with the OEM instruction manual.

- *The instrument is placed in the calibration mask and the final span reading*

noted. The calibration is adjusted, if necessary, so that the output reading equals the concentration of the calibration gas. The calibration gas is removed, and it is ascertained that the instruments return to zero. This procedure may is repeated if the instrument zero and span adjustment interact.

- *Ascertainment is made that any/all alarms are activated when the set point(s) is reached. The OEM's recommendations are followed when selecting the calibration gas for instruments with alarms, as the concentration required is usually slightly higher than the nominal alarm setting (to guarantee prompt alarm actuation).*

The calibration test herein described is conducted lastly before an instrument is released from the lamp room.

i) Maintenance

- *Separate rooms for gas detection instrumentation portable lamps are available, dedicated for maintenance purposes*
- *Routine maintenance of the flammable gas detection system is conducted on a regular basis to ensure the reliability of the units.*
- *Inadequate maintenance, incorrect zero adjustment and deteriorated batteries are not allowed as they are the causes for errors in gas detection. Errors and failures in gas detection apparatus or systems are timeously addressed so that they may not be self-evident.*
- *To ensure that certification is not invalidated, any repair or maintenance that involves certified apparatus is carried out by the OEM.*
- *All the instruments with batteries not lasting a minimum of eight hours have their batteries replaced*
- *It is also be discharged biweekly and fully charged thereafter in order to identify the possible battery failures*

The following are poisoning agents contaminants which are common to reduce the sensitivity (poisoning) of a sensor:

a) Brasso and Silvo
b) Silicone products; Furniture polish, glass polish, waterproof spray, CRC spray, car wax, paints, silicone sealant, Q20 spray, cosmetic creams, milky lotions, lipstick, etc.
Do not aim any spray into the sensor housing or surrounding area to cause the instrument to give a reading.
c) Homogenized gases Chloride, phosgene, ethyl chloride, vinyl chloride, carbon tetra chloride, chloroform, Freon.
d) Sulphuric Compounds Hydrogen sulphide, sulphur dioxide, etc

e) *Lead Compounds Ethylene tetra chloride in petrol vapours and automobile exhaust gases.*
f) *Diesel Fuel*

Defective units are withdrawn from service and returned to the OEM. Do not aim any spray into the sensor housing or surrounding area to cause the instrument to give a reading.

1) *Testing procedure*

- *GDI's are bump tested by users on a daily basis before proceeding underground*
- *All GDI's that has failed the bump testing, they will be returned to the lampsman who will then issue the user with the spare GDI*
- *The Lampsman will remove all the GDI's that has failed the bump test from service until they have been checked by the OEM*

2) *Gas Warning Device*

i) Calibration (Once a month)

- *Only approved Calibration/Test station are used when the calibration procedure for any sensor is attempted. Only competent personnel trained in the calibration procedure of the Viro-Cap instrument, are executing the calibration of any sensor.*
- *The cap lamp with Viro-Cap instrument is removed from the charger, and waited until the start-up complete beep tone is generated.*
- *Follow the calibration procedures as described in the appropriate Viro-Cap Calibration/Test station manual.*
- *During the actual calibration do not remove the instrument from the calibration/test mask as this will result in an erroneous calibration.*
- *Upon successful calibration of a sensor the instrument will return to normal operational mode as soon as the user switches the lamp on if it was switched off. If the lamp was switched on during calibration switch the lamp off for 10 seconds and then switch back on. The unit will generate the start-up complete beep tone when ready.*
- *If the unit has failed the calibration at start up the unit will continuously flash the LED's indicating that the unit is not functional. Return unit to an OEM approved technician for repair.*

ii) Maintenance

- *Separate rooms for gas warning device are available, dedicated for maintenance purposes*
- *Routine maintenance of the gas warning device is conducted on a regular basis to ensure the reliability of the units.*
- *Inadequate maintenance, incorrect zero adjustment and deteriorated batteries are not allowed as they are the causes for errors in gas detection. Errors and failures in gas detection apparatus or systems are timeously addressed so that they may not be self-evident.*

- *To ensure that certification is not invalidated, any repair or maintenance that involves certified apparatus is carried out by the OEM.*
- *Defective units are withdrawn from service and returned to the OEM.*

iii) Testing procedure

- *The GWD is removed from the charger, and waited until the start-up complete beep tone is generated*
- *All GWD's are bump tested by users on a daily basis before proceeding underground*
- *All GWD's that has failed the bump testing, they will be returned to the lampsman who will then issue the user with the spare GWD*
- *The Lampsman will remove all the GWD's that has failed the bump test from service until they have been checked by the OEM*

8.1.2 Communication Systems

a) To ensure the appropriate communication of emergencies the two-way radios, cell phones and telephones are used for communication at the mine. These communication systems are placed at the following strategic places at the mine but not limited to:

(i) Surface Areas

- *Shaft Control Rooms*
- *Emergency control rooms*
- *Offices*
- *Workshops*
- *Surface Belt Installations*
- *Security guard house*
- *Medical Stations*
- *Compressor House*

(ii) Underground

- *Conveyor belt installations (Head and Tail Sections)*
- *Chairlifts boarding and Landings*
- *Refuge Chambers*
- *Workshops*
- *Refuelling bays*

b) Arrangements for communications from the mine to outside parties

- *Emergency telephone list to outside parties are displayed in the shaft control rooms*
- *Emergency telephone lists are filed at the emergency control rooms*
- *All communications to outside parties during emergency will be made via the emergency control*

c) The testing of the effectiveness of the communication systems on a frequent basis

- *The testing of communication to the external parties is made via the shaft control rooms by calling the listed emergency numbers displayed in the control room on a monthly basis and keep records*
- *Testing of the telephones inside the underground refuge bays is conducted by calling the shaft control rooms from these refuge bays during routine inspection audits and records kept in the control room*

8.1.3 Emergency Medical Care

a) Marula Operations have appropriate emergency medical care and facilities that are readily available to deal with emergencies. These facilities are provided by the mine at Marula Mine Clinic.

b) Marula Mine also has the Emergency Service Practitioners available onsite twenty four (24) hours a day and seven (7) days a week.

c) Marula use the services of an emergency service provider for emergency situations

d) In addition to this Marula uses external hospitals in the region to provide further medical services.

e) First aid bags are located at designated places at the operation

f) First Aiders have been trained to perform level one mine first aid. This training is refreshed two yearly.

g) The first aid bags system is supported by the medical clinic situated on the property co-ordinated by the first aid training official.

8.1.4 Mine evacuation and escape procedures.

a) Procedures for escape and/or rescue of persons

i) Escape route plans are displayed at the mine's underground working places in the waiting places, these escape route plans indicates the escape route that must be travelled by workers from the working places to the designated place of safely (Refuge Bays)

ii) Escape route plans that indicates the position of the place of safety (Refuge Bays) in relation to the shaft egress are also displayed inside these places with the clearly defined procedure

iii) General working areas (i.e. Workshops, Refuelling Bays, Conveyor Belts, etc.) also has the escape route plans displaced at strategic places indicating the routes to the place of safety (Refuge Bays)

iv) Reflective emergency escape route signs are displayed along the escape route and travelling ways to the place of safety (Refuge Bays)

v) The mine has the second outlet situated at the top sections between Driekop and Clapham Shaft that is to be used in case of emergency

vi) All underground personnel are issued with the self-contained self-rescuers (SCSR) that are to be used in case of emergency for evacuation to the safe places

b) Provision of places of safety

i) Places of safety (Refuge Bays) are provided with life sustaining facilities, such as potable water, breathable air, telephone etc. (All Refuge Bays at the mine must be compliant to Regulation 16.6(2) of the MHSA)

ii) The underground refuge bays are placed at intervals not exceeding 750m from one another on each and every half level

iii) The locations of these refuge bays are indicated on the mine rescue plan that is reviewed on the quarterly basis by the person appointed under 12.1 regulation of the MHSA.

8.1.5 Training and awareness

i) In order to ensure that all potentially affected persons are educated, trained and made aware on how to deal with emergencies, rescue drills and emergency simulations, the use of SCSR's, shutting down of controls/lock out devices and specific training on the use of emergency equipment is provided.

8.2 Emergency Response Measures

8.2.1 Rescue and response capabilities

a) In order to ensure that emergencies are reacted to timeously with adequate rescue and response capabilities, Marula Platinum Mine has ensured adequate rescue and response resources by providing and maintaining, readily available two (2) Mine Rescue Teams consisting of at least five competent persons per team, and entered into an agreement with a rescue service provider to coordinate and facilitate the provision of mine rescue teams and other services, relating to an emergency, like (access to specialized equipment, additional emergency resources, back up facilities and transport)

b) Marula Platinum Mine shall make arrangements with a rescue service provider to ensure that additional instrumentation and equipment is available to maintain rescue brigades),and has access to rescue equipment and training facilities, including HTT, Workload Testing and Simulated Training

c) Make additional specialized equipment accessible (Respiratory protective devices- Self-contained closed circuit breathing apparatus- Compressed oxygen or compressed oxygen –nitrogen type – Requirements, testing

8.2.2 Management of emergencies

8.2.2.1 Marula Platinum Mine shall ensure effective management of emergency incidents are addressed under the following headings here below:

a) Updating manuals and establishing emergency control centres

b) The duties and responsibilities of persons required during an emergency.

c) Procedures to deal with adverse environmental conditions.

d) In order to ensure that emergencies can be managed and dealt with effectively, emergency manuals, contacts of neighbouring mines, contacts of emergency services, internal and external telephone directory need to be updated on a regular basis.

e) An emergency control centre/s available with certain facilities, including internal and external communication, as described in the standard. Documents should be easily accessible.

f) The duties and responsibilities of persons required during an emergency will be clearly defined.

g) Adverse environmental conditions that could be encountered during an emergency, e.g. flooding, gases, heat, etc. and should be dealt with accordingly.

8.2.2.2 Establishing Emergency Control Centers

Emergency control rooms are nerve centers of effective and coordinated management of emergencies. A well-designed and efficient emergency control room is the key to success in controlling an emergency operation.

To ensure an orderly and efficient transition from routine to effective mine emergency the following must be achieved.

i) Information gathering and analysis

ii) Effective communication

iii) Planning strategy

iv) Coordinated planned action

v) Record keeping

vi) Involvement of all key personnel

vii) Ensuring safety of operational personnel

The acceptable dimensions of an emergency control room is 35 square meters, it must be designed in such a way that no unauthorized persons can access.

a. Plans

It is a requirement that adequate and updated copies of Rescue and Ventilation plans are readily available for every mine rescue team proceeding underground (Depicted on the plans will be position of FAB, exact location of seals and stoppings, airflow direction and quantities, Escape routes, Sub-stations, Telephone positions, Refuge bays, Water and air valves, Ventilation door positions etc)

b. Telephone and Communication

It is the responsibility of management to ensure the following system is immediately available:

- *Speaker phone*
- *An unrestricted line to facilitate calls for equipment suppliers and Mine Rescue Teams*
- *Communication with FAB*
- *Internal communication/telephone system for mine calls*

c. Furniture and Fittings

Emergency control room is fitted with the following:

- *Small stationery cupboard*
- *Pin boards*

- *Excellent lighting*
- *Mine Rescue Team Control Board*

d. *Duties and Responsibilities*

Once the initial of setting up Emergency Control Room and strategic plan has been adopted the following personnel should man it:

- *Manager in charge – takes overall charge and responsibility during his shift*
- *Scribe – Maintains accurate comprehensive records of all proceedings(Formal)*
- *Environmental Control – Interpret fire behavior and effectiveness of the strategy*
- *Mining Department – Knowledge and advice on current mining layout*
- *Survey Department – Supply updated plans*
- *Runner – Ensure material is loaded for transport down the mine*
- *Engineering Department – Break-down or stoppages of fans, pumps etc.*
- *Stores – Issuing and control of material and equipment*

8.3 REPORTING AND RECORDING

In order to ensure Marula Mine is prepared for an emergency, regular inspection, testing and maintenance of all emergency equipment and facilities is required.

A Document Management System will be implemented to ensure that all measures, procedures, standards and other supporting documentation as well as the person/s responsible, is recorded, maintained and archived.

In order to effectively and efficiently manage emergencies, mine management must be conversant with the following procedures:

#	DMR Guideline Heading	Sub-Heading	Marula Mine Document Title	Reference
8.3	*Reporting and Recording*	*Inspection, Testing and Maintenance of All Equipment and Facilities used in an Emergency*	*Call Out Proto Team Procedure*	***Std.07.10.14***
			Audit Emergency Facilities Procedure	***Std. 07.10.32***
			Investigate Emergency Incident Procedure	***Std. 07.10.33***
			Submission of Statutory Reports Standard	***Std. 03.30.02***
			Dangerous Occurrences, Accident and Injury	***Std. 03.30.03.01***

#	DMR Guideline Heading	Sub-Heading	Marula Mine Document Title	Reference
			Investigation Standard	
		The Reporting, Recording and Archiving System, at Appropriate Intervals of Those Measures and Procedures and The Person/s Responsible	*Submission of Statutory Reports Standard*	***Std. 03.30.02***
			Dangerous Occurrences, Accident and Injury Investigation Standard	*Std. 03.30.03.01*
			Setting and Reviewing of Standards	*SWP.01.01.01*

8.4 EMERGENCY ASPECTS ADDRESSED IN OTHER MANDATORY COPS

a) *Mandatory Code of Practice to Combat Rockfall and Rockburst Accidents in Tabular Metalliferous Mines*
b) *Seismicity*
c) *Impala experiences intermediate seismic activity on daily bases, these activities is monitored with a mine. A mine wide PRISM seismic network system on Impala is installed to monitor, prevent and control the level of seismicity generated by mining activities within the lease area. The recorded seismic events ranges between ML = -2.4 and ML = 2.4 in magnitude throughout the Impala lease area. Spatially, these seismic events locate in, or very close to the reef plane, some in the back areas of active or old mined-out panels.*
d) *Mandatory Code of Practice for the Prevention of Flammable Gas Explosions in Mines Other than Coal Mines*
e) *Mandatory Code of Practice for the Prevention of Fires in Mines*
f) *Mandatory Code of Practice for the Management of Self-Contained Self-Rescuers in Mines*
g) *Mandatory Code of Practice for an Occupational Health Programme on Personal Exposure to Airborne Pollutants*
h) *Mandatory Code of Practice for an Occupational Health Programme on Thermal Stress*
i) *Mandatory Code of Practice for an Occupational Health Programme for Noise*
j) *Mandatory Code of Practice on Trackless Mobile Machinery*
k) *Mandatory Code of Practice on Minimum Standards of Fitness to Perform Work at a Mine*
l) *Mandatory Code of Practice for the Mitigation and Management of COVID-19 Outbreak*
m) *Mandatory Code of Practice for the Management of Working in the Confined Space*
n) *Mandatory Code of Practice for Risk Based Emergency Care on a Mine*
o) *Mandatory Code of Practice for Mine Residue Deposits*

PART D: IMPLEMENTATION

1. IMPLEMENTATION PLAN

Task	Responsible Person/s	Responsibilities
Revision of standards related to this procedure	*Ventilation Manager*	*Collaborate with other stakeholders in the identification of the need to review the standards and procedures.*
Communicate the updated COP to all stakeholders	*Ventilation Manager*	*Present the revised COP to the following forums:* • *Ventilation Co-ordination Meeting* • *Impala Standards Committee Meeting* • *Joint HSE Steering Meeting.* • *Mine Managers forum* • *Engineering forum*
Communicate the updated COP to all stakeholders	*Ventilation Managers and Chief Ventilation Officers*	*Shaft HSE Meetings*
Provide training	*HRD Managers*	*Review emergency preparedness and response training to align with COP.*
Emergency Simulation	*Mine Managers* *Line Supervision*	• *Perform emergency simulation* • *Monthly escape route drills*
Second Outlet Inspections to adjacent shaft	*Mine Managers*	*Monthly escape route inspections*
Instrument availability (Lamproom)	*Shaft Engineers*	*Ensure sufficient number of functional and calibrated gas detection instruments is available at all times with a spare capacity of 10%.*
Reporting	*Mine Managers* *Line Supervision*	• *Conduct emergency incident investigations* • *Conduct gas testing before and during the shift* • *Report any presence of gas detected* • *Deal with the presence of gas detected*
Audits	*Chief Ventilation Officers* *Safety Officers*	• *Conduct emergency control room inspections*

Task	Responsible Person/s	Responsibilities
	Line Supervision – Shift Supervisors / Foremen and Miners	• *Conduct review of all the fire detection head positions* • *Conduct lamp-room audits* • *Conduct flammable gas audits* • *Conduct conveyor belt audits* • *Conduct refuge bay inspections*
Mine Rescue Plans	*Chief Surveyors* *Chief Ventilation Officers*	• *Quarterly updating of Mine Rescue Plans*

2 REVISION LOG

Change Codes

A	Incident	**E**	Equipment Changes
B	Audit finding	**F**	Process Changes
C	Legislation Changes	**G**	Periodical
D	Technological Changes		

DATE	VERSION	SECTION	CHANGES	CODE	REVIEWED BY
19 /3/2008	1	Changes indicated in blue	New document		Std Committee
01 /09/2011	2	Complete Document	Major revision	G	Std Committee
17/04/2014	3	Complete Document	Major revision in consultation with TPS Consulting	G	Std Committee
20/10/2014	4	Complete Document	Revised for adoption to Marula operations	G	Std Committee
03/10/2015	4		Management Changes	G	Std Committee
09/09/2021	5	Complete Document	*Mandatory Review, Conversion to new template and new numbering*	D	Std Committee
28/10/2021	6	Changes in blue	*Changes indicated in blue*	D	Std Committee