

# MINE HEALTH AND SAFETY INSPECTORATE



## GUIDELINE

For the Compilation of a Mandatory Code of Practice for a Diving Operations Procedure Manual for Underwater Mining Operations



**mineral resources**

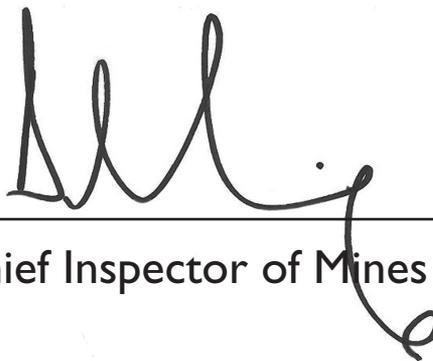
Department:  
Mineral Resources  
**REPUBLIC OF SOUTH AFRICA**



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For the Compilation of a Mandatory Code of Practice for a Diving Operations Procedure Manual for Underwater Mining Operations



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Chief Inspector of Mines

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31 January 2011

Date



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## CONTENTS OF THIS GUIDELINE

<b>PART A: THE GUIDELINE</b>	<b>1</b>
1 FOREWORD	1
2 LEGAL STATUS OF THE GUIDELINE	1
3 THE OBJECTIVE OF THIS GUIDELINE	1
4 DEFINITIONS	1
5 SCOPE	2
6 MEMBERSHIP OF TASK GROUP PREPARING THE GUIDELINE	2
<b>PART B: AUTHORS GUIDE</b>	<b>3</b>
<b>PART C: FORMAT AND CONTENT OF THE MANDATORY COP</b>	<b>4</b>
1 TITLE PAGE	4
2 TABLE OF CONTENTS	4
3 STATUS OF THE MANDATORY COP	4
4 MEMBERS OF DRAFTING COMMITTEE	4
5 GENERAL INFORMATION	4
6 TERMS AND DEFINITIONS	5
7 RISK MANAGEMENT	5
8 ASPECTS TO BE ADDRESSED IN THE MANDATORY COP	5
<b>PART D: IMPLEMENTATION PLAN</b>	<b>10</b>
1 IMPLEMENTATION PLAN	10
2. COMPLIANCE WITH THE CODE OF PRACTICE	10
3. ACCESS TO THE COP AND RELATED DOCUMENTS	10
<b>ANNEX 1: REFERENCES</b>	<b>11</b>
<b>ANNEX 2: GOOD DIVING PRACTICE</b>	<b>14</b>

## PART A: THE GUIDELINE

### 1. FOREWORD

- 1.1 Various accidents have occurred over the years whilst persons have been mining under water. Since 1988 six divers have died and seventy three have been injured.
- 1.2 The regulations in force in terms of item 4 of schedule 4 of the MHSA were originally drawn up in the 1940's and have not significantly changed since then. Diving has become more technical, diving environments differ from site to site resulting in diving modes varying from mine to mine. As a consequence there was a need to revise the regulatory environment to allow for these variations and to cater for technological advancements in the diving field.
- 1.3 In an initiative to address this issue, a tripartite sub-committee was established under the auspices of the MRAC. The task group prepared a report, which recommended that new regulations and a guideline for a mandatory code of practice for a diving operations procedure manual for underwater mining operations be prepared.

### 2. LEGAL STATUS OF THE GUIDELINE AND COP

- 2.1 In accordance with section 9(2) of the **MHSA** an employer must prepare and implement a **COP** on any matter affecting the health and safety of employees and other persons who may be directly affected by activities at the mine if the Chief Inspector of Mines requires it. These **COPs** must comply with any relevant guidelines issued by the Chief Inspector of Mines (section 9(3)) of the **MHSA**. Failure by the employer to prepare or implement a **COP** in compliance with this guideline is breach of the **MHSA**.

### 3. THE OBJECTIVE OF THIS GUIDELINE

The objective of this guideline is to enable the employer undertaking underwater mining operations to compile a mandatory code of practice for a diving operations procedure manual for underwater mining operations, which, if properly implemented and complied with, would protect the health and safety of persons involved in underwater mining operations.

### 4. DEFINITIONS AND ACRONYMS

In this guideline for a code of practice or any amendment thereof, unless the context otherwise indicates, the following definitions and acronyms apply-

**MRAC** means Mining Regulation Advisory Committee

**COP** means a Code of Practice

**MHSA** means Mine Health and Safety Act, 1996 (Act 29 of 1996)

**IMCA** means International Marine Contractors Association.

**Risk Assessment** means the process by which every hazard is identified and risk assessed according to the requirements of section 11 of the MHSA.

Words defined in the underwater mining regulations in Chapter 19 and used in this guideline for a COP, have the meanings ascribed to them in those regulations.

## 5 SCOPE

This guideline covers the significant health, environmental and safety risks associated with the design and application of diving equipment and organisational dive modes, as well as competency criteria for divers and emergency procedures relating to underwater mining operations.

## 6 MEMBERSHIP OF TASK GROUP PREPARING THE GUIDELINE

6.1 This document was prepared by the MRAC Task Group on Underwater Mining Operations.

6.2 The members appointed were the following:

Messrs L D Polley	- State
A v d Merwe	- State
F Swart	- Employers
K L Seyfried	- Employers
W C Potgieter	- Employers
J Uys	- Employers
D van Deventer	- Employers
G Davies	- Employers
D A Stone	- Labour
Ms S E Smit	- Employers

6.3 The following persons also contributed to the compilation of this guideline.

Messrs M J Grobler	- State
R C Duyts	- State
A Hay'Buchannan	- Labour
J Ballot	- Employers

## PART B: AUTHORS GUIDE

### AUTHOR'S GUIDE

1. The **COP** must, where possible, follow the sequence laid out in **Part C “Format and Content of the COP.”** The pages as well as the chapters and sections must be numbered to facilitate cross-referencing. Wording must be unambiguous and concise.
2. It should be indicated in the **COP** and on each annex to the **COP** whether -
  - 2.1 the annex forms part of the **COP** and must be complied with or incorporated in the **COP** or whether aspects thereof must be complied with or incorporated in the **COP**; or
  - 2.2 the annex is merely attached as information for consideration in the preparation of the **COP** (i.e. compliance is discretionary).
3. When annexes are used the numbering should be preceded by the letter allocated to that particular annex and the numbering should start at one (1) (e.g. 1, 2, 3, A1, A2, A3,...).
4. Whenever possible illustrations, tables, graphs and the like, should be used to avoid long descriptions and/or explanations.
5. When reference has been made in the text to publications or reports, references to these sources must be included in the text as footnotes or side notes as well as in a separate bibliography.

## PART C: PROPOSED FORMAT OF THE CODE OF PRACTICE

### 1 TITLE PAGE

The COP should have a title page reflecting at least the following:

- 1.1 the name of the mine;
- 1.2 the heading of the **COP** (“Mandatory Code of Practice for Inshore Diving”);
- 1.3 a statement to the effect that the **COP** was drawn up in accordance with **DMR** guideline, reference No. **DMR 16/3/2/2-A7** issued by the Chief Inspector of Mines;
- 1.4 the mine’s reference number for the **COP**;
- 1.5 effective date of the COP; and
- 1.6 revision dates of the COP.

### 2 TABLE OF CONTENTS

The COP must have a comprehensive table of contents.

### 3. STATUS OF THE MANDATORY COP

Under this heading the **COP** must contain statements to the effect that -

- 3.1 the mandatory **COP** was drawn up in accordance with **DMR** guideline Reference Number DMR 16/3/2/2-A7 issued by the Chief Inspector of Mines;
- 3.2 this is a mandatory **COP** in terms of sections 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 **COPs**; and
- 3.5 all managerial instructions or recommended procedures (voluntary **COPs**) and standards on the relevant topics covered in the COP must comply with the **COP** and must be reviewed to ensure compliance.

### 4. MEMBERS OF DRAFTING COMMITTEE

- 4.1 In terms of section 9(4) of the **MHSA** the employer must consult with the health and safety committee at the mine on the preparation, implementation or revision of the **COP**.
- 4.2 It is recommended that the employer should, after consultation with the employees in terms of the **MHSA**, appoint a committee responsible for drafting the **COP**.
- 4.3 The **COP** must not be an overly technical document and the participation of supervisory and employee level personnel when compiling the document is essential.
- 4.4 The members of the drafting committee assisting the employer in drawing up the **COP** must be listed giving their full names, designations, affiliations, professional qualifications and experience. This committee should include persons competent in under water mining operations sufficient in number effectively to draft the **COP**.

### 5 GENERAL INFORMATION

The general information relating to the employer’s underwater mining operations must be stated in this paragraph. The following minimum information must be provided:

- 5.1 A brief description of the mine and its location (including the locations of all underwater mining operations e.g. concession areas, mining licences).
- 5.2 The commodities produced;
- 5.3. The type of underwater mining methods and equipment used as well as general environmental and geological conditions that could effect the underwater mining operations;
- 5.4 Other relevant COPs;
- 5.5 A history and analyses of all diving related incidents and accidents at the mine.

## **6 TERMS AND DEFINITIONS**

Any words, terms, phrases or definitions or terminology of which the meaning is not absolutely clear or which will have a specific meaning assigned to it in the COP, must be clearly defined. Existing and/or known definitions should be used as far as possible. The drafting committee should avoid jargon and abbreviations that are not in common use or that have not been defined. The definition section should also include acronyms and technical terms used.

## **7 RISK MANAGEMENT**

- 7.1 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 and to record the significant hazards identified and risk assessed. The COP must address how the significant risks identified in the risk assessment process must be dealt with, having regard to the requirement of section 11(2) and (3) that, as far as reasonably practicable, attempts should first be made to eliminate the risk, thereafter to control the risk at source, thereafter to minimize the risk and thereafter, insofar as the risk remains, to provide personal protective equipment and to institute a programme to monitor the risk.
- 7.2 To assist the employer with the risk assessment all relevant information such as accident statistics, ergonomic studies, research reports, manufacturers specifications, approvals, design criteria and performance figures for all relevant equipment should be obtained and considered.
- 7.3 In addition to the periodic review required by section 11(4) of the MHSa, the COP should 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 methods, plant or equipment and material.

## **8. ASPECTS TO BE ADDRESSED IN THE MANDATORY COP**

The COP must set out how the significant risks identified in terms of the risk assessment process referred to in paragraph 7.1 above will be addressed.

The COP must address at least the aspects set out below unless there is no significant risk associated with that aspect at the mine's underwater diving operation sites.

- 8.1 The COP must set out a description of the strategies to protect divers from drowning or suffocation during underwater mining operations, covering at least the following:
  - 8.1.1 All equipment, the failure of which could lead to drowning or suffocation and possible causes of such equipment failure.
  - 8.1.2 All probable situations that could cause panic by the diver leading to drowning or suffocation.
  - 8.1.3 All hazards that could lead to entrapment or entanglement that could cause drowning or suffocation. These could include at least the following:
    - Fall of ground or rocks

- Slope (Face) failures
- Cables, pipes and umbilical(s)
- Incompetence (site specific training)
- Adverse environmental conditions for diving (Kelp)
- Lack of communication during the dive
- Enclosed areas

- 8.1.4 All possible causes of lack of sufficient air supply and which could lead to drowning or suffocation.
- 8.1.5 All possible situations in which lack of site specific training could lead to drowning or suffocation.
- 8.1.6 All adverse environmental conditions which could lead to drowning or suffocation.
- 8.1.7 All possible causes of communication failure which could lead to drowning or suffocation.
- 8.1.8 All possible causes for a diver being unfit to dive and which could lead to drowning or suffocation.

8.2 The COP must set out a description of the strategies to protect divers from being electrocuted during underwater mining operations, covering at least the following:

- 8.2.1 All equipment, the failure of which could lead to electrocution and possible causes of such equipment failure.
- 8.2.2 All possible situations in which lack of site specific training could lead to electrocution.
- 8.2.3 All possible causes of communication failure which could lead to electrocution.

8.3 The COP must set out a description of the strategies to protect divers from being poisoned during underwater mining operations, covering at least the following:

- 8.3.1 All equipment, the failure of which could lead to poisoning and possible causes of such equipment failure.
- 8.3.2 All possible situations in which lack of site specific training could lead to poisoning.
- 8.3.3 All possible situations in which poor air quality and incorrect mixtures could lead to poisoning.
- 8.3.4 All possible situations in which compressor inlet could lead to poisoning.
- 8.3.5 All probable situations in which marine life could lead to poisoning.

8.4 The COP must set out a description of the strategies to protect divers from any other physical injury (i.e not drowning, suffocation, electrocution or poisoning) during underwater mining operations, covering at least the following:

- 8.4.1 All equipment (including suction and lifting equipment), the failure of which could lead to such other physical injury and possible causes of such equipment failure.

- 8.4.2 All probable situations that could cause panic by the diver leading to such other physical injury.
- 8.4.3 All hazards that could lead to entrapment or entanglement that could cause such other physical injury. These could include the following:
- Fall of ground or rocks
  - Slope (Face) failures
  - Cables, pipes, umbilical(s), fishing line, ropes, etc.
  - Incompetence (site specific training)
  - Adverse environmental conditions for diving (Kelp)
  - Lack of communication during the dive
  - Enclosed areas
- 8.4.4 All driven machinery (impellers and propellers) which could lead to such other physical injury.
- 8.4.5 All possible situations in which lack of site specific training could lead to such other physical injury.
- 8.4.6 All adverse environmental conditions (including rocks, currents, slippery surfaces) which could lead to such other physical injury.
- 8.4.7 All possible causes of communication failure which could lead to such other physical injury.
- 8.4.8 All probable causes for a diver being unfit to dive and which could lead to such other physical injury.
- 8.4.9 All possible falling objects which could lead to such other physical injury.
- 8.4.10 All probable marine life which could cause such other physical injury.
- 8.5 The COP must set out a description of the strategies to protect divers from diving related illnesses during underwater mining operations, covering at least the following:
- 8.5.1 All equipment, the failure of which could lead to diving related illnesses, including depth measuring equipment and possible causes of such equipment failure.
- 8.5.2 All probable situations that could cause panic of the diver and which could lead to diving related illnesses.
- 8.5.3 All hazards that could lead to entrapment and cause diving related illnesses.
- 8.5.4 All hazards that could lead to entanglement and cause diving related illnesses.
- 8.5.5 All possible causes of lack of air supply/ incorrect air mixture and which could lead to diving related illnesses.
- 8.5.6 All possible situations in which lack of site specific training could lead to diving related illnesses.
- 8.5.7 All probable adverse environmental conditions which could lead to diving related illnesses.

- 8.5.8 All possible causes of which communication failure which could lead to diving related illnesses.
  - 8.5.9 All probable causes for a diver being unfit to dive and which could lead to diving related illnesses.
  - 8.5.10 Measures to ensure adherence to dive profiles (tables)
- 8.6 The COP must set out a description of the strategies to protect divers from being lost during underwater mining operations, covering at least the following:
- 8.6.1 All equipment, the failure of which could lead to a diver being lost and possible causes of such equipment failure.
  - 8.6.2 All probable situations that could cause panic of the diver and which could lead to a diver being lost.
  - 8.6.3 All hazards that could lead to entrapment and cause a diver being lost.
  - 8.6.4 All hazards that could lead to entanglement and cause a diver being lost.
  - 8.6.5 All possible situations in which lack of site specific training could lead to a diver being lost.
  - 8.6.6 All adverse environmental conditions which could lead to a diver being lost, including poor visibility.
  - 8.6.7 All possible causes of communication failure which could lead to a diver being lost.
- 8.7 The COP must set out a description of the strategies to protect divers in an emergency during underwater mining operations, covering at least the following:
- 8.7.1 diving related illness;
  - 8.7.2 fire, including a fire in the chamber;
  - 8.7.3 equipment failure;
  - 8.7.4 unsafe environmental conditions (sea currents, temperature, weather, visibility, marine life etc.);
  - 8.7.5 a diver becoming lost, trapped underwater, injured or unconscious;
  - 8.7.6 loss of pressure in chambers;
  - 8.7.7 emergency signalling;
  - 8.7.8 emergency assistance under water and on the surface, which may include standby rescue craft;

- 8.7.9 decompression including therapeutic recompression and decompression and the availability of compression chambers for these purposes;
- 8.7.10 the provision of first aid and the obtaining medical assistance with specific reference to the need for consultation with a designated medical practitioner if decompression sickness or if any other complications should occur;
- 8.7.11 calling assistance from emergency services including advance liaison with those services where appropriate;
- 8.7.12 emergency evacuation from the working place;
- 8.7.13 the provision of emergency supplies; and
- 8.7.14 co-ordinating emergency procedures between diving vessels and an offshore installation.

8.8 In order to ensure that diving operations are carried out safely the COP should require that a diving plan be prepared for every dive, which plan should:

- 8.8.1 address the number of divers and support personnel required, the competencies and qualifications they need to have and their ability to execute the planned dive safely, including carrying out contingency and emergency plans;
- 8.8.2 address the determination, allocation and communication of task assignments and responsibilities of each diving team member for each diving mode used;
- 8.8.3 address the determination and communication of the dive plan, diving and safety procedures and checklists for each diving mode used;
- 8.8.4 consist of the employer's standard operating rules and any site-specific risk assessments and procedures;
- 8.8.5 cover the general principles of the diving techniques as well as the needs of the particular operation;
- 8.8.6 be communicated to the entire crew.

## **PART D: IMPLEMENTATION PLAN**

### **1. IMPLEMENTATION PLAN**

The employer must prepare an implementation plan for the COP that makes provision for issues such as organisational structures, responsibilities of functionaries and programmes and schedules for the COP that will enable proper implementation and management of the COP. (A summary of- and a reference to a comprehensive implementation plan may be included).

### **2. COMPLIANCE WITH THE COP**

The employer must institute measures for monitoring compliance with the COP.

### **3. ACCESS TO THE COP AND RELATED DOCUMENTS**

- 3.1 The employer must ensure that a complete COP with related documents are kept readily available at the mine for examination by any affected person.
- 3.2 A registered trade union with members at the mine or where there is no such union, a health and safety representative on the mine, or if there is no health and safety representative, an employee representing the employees on the mine, must be provided with a copy on written request to the employer.
- 3.3 The employer must ensure that all employees are fully conversant with those sections of the COP relevant to their respective areas of responsibility.

## REFERENCES

- (i) International Code of Practice for Offshore Diving  
IMCA (International Marine Contractors Association)  
Carlyle House, 235 Vauxhaul Bridge Road  
London SW1V 1EJ  
United Kingdom  
Website:<http://www.imca-int.com>
- (ii) Commercial Air Diving Manual  
Professional Diving Centre  
South Africa
- (iii) Octo Marine Ltd  
Safety Management System & Air Diving Manual  
Cape Town  
South Africa
- (iv) Commercial diving projects offshore  
Diving at work regulations 1997  
Approved code of practice  
HSE
- (v) Commercial diving projects inland/ inshore  
Diving at work regulations 1997  
Approved code of practice  
HSE
- (vi) IMCA Guidance Note No IMCA D018
- (vii) IMCA  
Guidance Notes  
Volume 1
- (viii) IMCA  
Guidance Notes  
Volume 2
- (ix) Dr PG Lansberg  
MB BCh MCGP MD  
PO Box 17230  
Benoni West  
1503
- (x) The Diving Medical Advisory Committee  
Guidance Notes  
Carlyle House,  
235 Vauxhaull Bridge Road, London,UK
- (xi) AODC 052 REV 1  
Diving Equipment Systems Inspection Guidance Note (D.E.S.I.G.N.)  
Volume II

Reference	Source	Description
1	AODC 055	Protection of water intake points for diver safety
2	AODC 031	Communications with divers
3	AODC 010	Gas cylinders used in conjunction with diving operations
4	AODC 037	Periodic examinations of bailout cylinders
5	AODC 064	Ingress of water into underwater cylinders charged by means of a manifold system
6	AODC 016	Marking and colour coding of gas cylinders, quads and banks for diving applications
7	AODC 028	Divers gas supply
8	AODC 039	Emergency air bottles in diving baskets
9	AODC 029	Oxygen cleaning
10	AODC 009	Emergency isolation of gas circuits in the event of a ruptured bell umbilical
11	AODC 019	Guidance note on emergency diving bell recovery
12	OADC 012	Bell emergency location equipment trials
13	AODC 026	Divers emergency heating
14	AODC 061	Bell ballast release system and buoyant ascent in offshore diving operations
15	AODC 017	Guidance note on the marking of hyperbaric rescue system designed to float in water
16	AODC 035	Code of Practice for the safe use of electricity underwater
17	AODC 054	Prevention of explosions during battery changing in relation to diving systems
18	AODC 056	Code of Practice in the initial and periodic examination, testing and certification of diving plant and equipment
19	AODC 063	Underwater air lift bags
20	IMCA 013	IMCA offshore diving supervisor and life support technician schemes
21	DMAC 15	Medical equipment to be held at the site of an offshore diving operation
22	DMAC 28	The provision of emergency medical care for divers in saturation
23	DMAC 17	Training and refresher training for doctors involved in the examination and treatment of professional divers
24	DMAC 11	First aid training for divers and diving equipment
25	DMAC 13	Guidance on assessing fitness to return to diving after decompression
26	DMAC 01	Aide memoir for recording and transmission of medical data to shore
27	DMAC 02	In water diver monitoring
28	DMAC 06	The effect of sonar transmissions on commercial diving activities
29	DMAC 12	Safe diving distance from seismic surveying operations
30	DMAC 22	Proximity to a recompression chamber after surfacing
31	DMAC 07	Recommendations for flying after diving
32	DMAC 21	Guidance on the duration of saturation exposure and surface intervals between saturations
33	AODC 065	SCUBA
34	AODC 034	Diving when there is poor surface visibility

Reference	Source	Description
35	AODC 047	The effects of underwater currents on divers performance and safety
36	AODC 032	Remotely operated vehicle intervention during diving operations
37	IMCA R004	Code of Practice for the safe and efficient operation of remotely operated vehicles
38	AODC 062	Use of battery operated equipment in hyperbaric conditions
39	AODC 049	Code of practice for use of high pressure water jetting equipment by divers
40	DMAC 03	Accidents with high pressure water jets
41	IMCA D003	Oxy-arc cutting operations under water
42	IMCA D101	Diving operations from vessels operating in DP mode
43	103 DPVOA	Guidance for the design and operation of dynamically positioned vessels
44	108 DPVOA	Power system protection for DP vessels
45	IMCA M117	The training and experience of key DP personnel
46	AODC 014	Minimum quantities of gas required offshore
47	DMAC 05	Recommendations on minimum level of oxygen in helium supplied offshore
48	AODC 038	Guidance note on the use of inert gases
49	DMAC 04	Recommendations on partial pressure of oxygen in bail-out bottles
50	AODC 020	Length of divers umbilicals from diving bells
51	ADC	Association of Diving Contractors-Consensus Standards for Commercial Diving Operations available from ADC, 3910 FM 1960 WEST, SUITE 230, HOUSTON, TX 77068, USA

Mine Health and Safety Act, 1996 (Act 29 of 1996).

Occupational Health and Safety Act, 1993 (Act 85 of 1993) and Diving Regulations

SANS 10019-2001

BSEN 250

IMCA D014

## ANNEX 2

### GOOD DIVING PRACTICE

(This annex is attached is for information only)

1. Procedures and checklists should be used for the use, checking and maintenance of equipment for each diving mode. Guidance exists on the frequency and extent of inspection and testing required of all items of equipment used in a diving operation, together with the levels of competence required of those carrying out the work. All of the equipment used in a diving operation will need to comply with any applicable standards and legislation.
2. Medical equipment will need to be at a diving site to provide first aid and medical treatment for the dive team. The equipment required will depend on the type of diving. Particular problems could arise should a diver become seriously ill or is injured while under pressure. Medical care in such circumstances may be difficult and the employer and supervisor, in conjunction with their medical advisor, will need to prepare contingency plans for such situations.
3. Prior to commencing diving operations the employer should ensure that:
  - 3.1 the personnel necessary for rendering assistance to a diver, as well as those members of the personnel who may be required in case of an emergency, are placed on standby and that all equipment which may be required for use in case of emergency is made and kept ready for immediate use;
  - 3.2 persons who have been trained to operate compression chambers take charge of such chambers and arrange for such persons to remain on duty while the chambers are in use and be available while diving operations are in progress;
  - 3.3 a diver who intends to participate in a dive, is provided with all the necessary and correct diving equipment in order to safeguard his health and safety;
  - 3.4 a diver who intends to participate in a dive, is qualified as recorded in the diver's logbook for the type of diving equipment to be used;
  - 3.5 all diving equipment which is used for any diving operation is checked and tested by the diving team immediately prior to the commencement of every dive in order to determine whether it is fit for use, and no air/gas in portable containers shall be accepted unless a certificate of purity is supplied by the supplier;
  - 3.6 the maximum bottom or excursion depth, time of a dive, the decompression schedule and the technique to be used in any diving operation are made known to and are understood by the diving team;
  - 3.7 the diving team is informed and trained with regard to the procedures which have to be followed in case of emergency, and have practised these procedures at intervals not exceeding six months;

- 3.8 sufficient emergency medical oxygen/gas mixture suitable for breathing is available at the work place for the entire diving operation;
- 3.9 no sources of ignition, batteries, smoking requisites or any flammable articles likely to cause a fire or explosion are at any time taken into or stored in a compression chamber and appropriate fire extinguishers are readily available; and
- 3.10 a complete copy of the decompression treatment tables applicable to the diving operations being performed, together with the relevant explanatory procedures are available for the information of the diving team on the site where the diving operations are being performed as well as to the designated medical practitioner when applicable.
4. During the performance of a diving operation the employer should ensure that:
- 4.1 diving operations are carried out safely and strictly in accordance with the manner planned by the diving supervisor and that the bottom time and decompression schedule referred to above are strictly adhered to;
- 4.2 for any dive the following persons should remain on duty at the control point on the surface:
- (i) a standby diver who must be ready to dive as determined by risk assessment. Provided that two divers in the water at the same time who are near enough to be able to communicate with and to render assistance to each other in an emergency may be regarded as the standby diver for the other: Provided further, that where a diving bell is being used, the standby diver should descend in the same bell to a depth from which work is to be carried out and should remain in the bell in order to be able to render immediate assistance to the diver working outside the bell;
  - (ii) if a life-line is used the line should be attended at all times;
  - (iii) such other persons as are necessary to operate any machinery and equipment which may be required during the diving operation; and
  - (iv) at least one person who is qualified to render first-aid and who possesses thorough knowledge of the first-aid treatment to be applied and the use of all equipment which is used in cases of drowning, decompression sickness and other ailments associated with diving operations is available at the surface while the diving operations are in progress: Provided that where saturation dives are undertaken such person should be a life support technician or if required a qualified hyperbaric doctor;
- 4.3 only divers who are in-date divers participate in diving. A diver is classified as being out of date after not having performed a dive according to his/her classification for

more than 90 days. A diver becomes in date again when the supervisor is satisfied that the diver has done the necessary acclimatisation dives;

- 4.4 no diver who on account of indisposition due to physical or mental infirmity considers himself/herself unfit to participate in diving, or who is therefore considered unfit by the diving supervisor, participate in any diving or is permitted or required to participate in any diving;
- 4.5 life-lines, buddy lines, surface markers and recognised warning signals are used: Provided that if the diving supervisor considers the use of life-lines or buddy lines hazardous or impracticable he/she may dispense with the use thereof;
- 4.6 a shot line is used when the diver is not lowered to the underwater working place by means diving stage or bell, unless the use of a shot line is impracticable;
- 4.7 each diver is able to communicate with the surface control point except where a buddy line is used in which case at least one of the divers should be able to communicate with the surface control point;
- 4.8 for diving at a depth exceeding 50 metres, a diving stage is used except when a bell is provided. A closed bell or one atmosphere diving suit is used for all diving operations at a depth exceeding 70 metres;
- 4.9 no diver undertakes a dive if not fully conversant with the operation of machinery or the use of tools and equipment which the diver may require to operate or to use in performing the dive;
- 4.10 no diver undertakes a dive to a depth greater than that for which the equipment, which the diver is using, is suitable;
- 4.11 no diver dives to a depth greater than that to which the diver is acclimatised unless the diver acclimatises himself/herself to such greater depth by undertaking at least two acclimatising dives under the supervision of another in-date diver who has already been acclimatised to such greater depth and the diver must record in the diver's log book the depth to which the diver is acclimatised;
- 4.12 no diver dives to a depth greater than that for which the diver is qualified;
- 4.13 for all diving modes, a sufficient supply and standby supply of the appropriate breathing mixture is readily available at the required pressure to support all the activities of the diving team for the duration of the diving operation;
- 4.14 reasonable steps are taken to ensure that the air supplied and the standby supply to the divers is pure and that such air complies with the requirements of an approved standard;

- 4.15 where a diving operation is to be carried out in darkness-
- (i) a lamp or other device is attached to the diver to indicate his/her position
  - (ii) the place on surface, the bell or diving stage from which diving is carried out, is illuminated to enable the diver to identify its position;
- 4.16 where the diving depth exceeds 5 meters, calibrated depth measuring devices are used and, where reasonably practicable, such devices are suitable for being monitored from the surface;
- 4.17 every diver, within 24 hours of completion of a dive, enters full particulars of the dive in the diver's logbook and that the entry is signed by the diver and countersigned by the diving supervisor.





## mineral resources

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REPUBLIC OF SOUTH AFRICA