CODE OF PRACTICE
DIVING IN BENIGN CONDITIONS

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1. Introduction

1.1. General

Although diving is a hazardous task, some diving operations may be conducted in benign conditions that do not pose the risk associated with other diving operations.

The Code of Practice for diving in benign conditions is intended to assist the following, amongst others:

- Personnel involved in diving operations in benign conditions
- Client's staff involved in the preparation of bid documents and contracts
- Client and Contractor Representatives
- Personnel involved in Quality Assurance and Safety.

Health and safety must never be compromised for any reason. There is in particular a need for Clients and Contractors to recognize and accept the importance of providing sufficient appropriately qualified personnel to conduct operations safely at all times. This includes periods of routine preventative maintenance and repairs.

In order to provide information for diving employers / contractors, This Code of Practice seeks to lay down standards by which all diving contractors should follow when diving in benign conditions.

1.2. Status of the code

This Code is issued in terms of Regulation 24 of the Diving Regulations, 2009 and is based on the principles of providing a workplace that is safe and without risks to health.

This Code is not an authoritative summary of the law, nor does it create additional rights and obligations. Failure to observe the Code does not, by itself, render a person liable in any proceedings. Nevertheless when courts interpret and apply the Diving Regulations with respect to the type of diving procedures covered by this Code, they must consider it.

Employers, employees and their organizations should use this Code to develop, implement and refine their diving practices to address the health and safety issues in their own workplaces. This code should specifically be consulted when preparing operations manuals.

The code is intentionally general, because every person and situation is unique and departures from the guidelines in this code may be justified in appropriate circumstances. However, whenever deviation from this code is contemplated, such deviation must be clearly stated and outlined in the operations manual. An additional HIRA that specifically covers the deviations must be performed and recorded, containing the following aspects:

- Diving and working practice planned
- How the practice deviates from this code
- Specific reason(s) for the deviation
- Which specific hazards are introduced because of the deviation
- How these specific hazards are addressed to mitigate the risk

1.3. Work covered by the code

This Code is intended to provide advice and guidance in respect of all diving operations in South Africa where the diving is performed in benign conditions, meaning that **ALL of the following conditions** are met: (1) The diving work is performed in an artificially constructed tank or pool for the purpose of swimming or diving or for use as an aquarium; (2) The supervisor of the dive must have a full view of the diver – either from the surface or through viewing windows at all times during the dive; (3) there must be no hazards from entanglement or entrapment; and (4) the water depth may not exceed 8 metres. This code of practice does not cover any diving practices outside of this definition of "benign conditions", nor does it cover diving practices falling within this definition, but where any additional risks are present (e.g. contaminated water diving).

a. Diving practices using Class V divers for the purposes of scientific diving to a maximum depth of 20 meters is covered by the Scientific Code of Practice. However, scientific diving to a maximum depth exceeding 20 meters is covered by the Inshore Code of Practice.

b. All inshore and inland diving falling outside of the scope of diving described in the Code of Practice for diving in benign conditions and the Scientific Code of Practice is covered in the Inshore Code of Practice

c. Diving using mixed gas below 50 metres, closed bell, saturation diving techniques and offshore diving practices, including diving work in the oil and gas industry is covered in the Offshore Code of Practice.

d. Underwater mining operations are covered in the Underwater Mining Regulations under the Mine Health and Safety Act, 1996 and the guideline for the compilation of a mandatory code of practice for inshore underwater mining.

1.4. The OHSA Diving Regulations and Other Regulations

The Occupational Health and Safety Act (Act No 85 of 1993) and its regulations takes precedence over this code and the contents of this Code should be used only where they do not conflict with said legislation.

Any person carrying out diving operations in benign conditions should establish whether there are any other National Regulations that may apply to

the diving project. For instance, if any noise is present in the workplace, the Noise Induced Hearing Loss Regulations should be consulted, etc. These are all aspects that are not covered in the Diving Regulations, nor in detail in this code.

1.5. Implementation

This code shall be implemented upon promulgation of the Diving Regulations, 2009

1.6. Updating arrangements

The Code is a dynamic document and the advice given in it will change with developments in the industry. It is intended that this Code shall be periodically reviewed and any necessary changes or improvements made.

The latest version of this document will be available for download on the website of the Department of Labour.

2. Definitions

A number of specialized terms are used in this document. These terms are defined in the text to ensure that readers understand what is meant by them in this document.

2.1. Definitions in the Act and the Regulations

"**the Act**" means, unless the context indicates otherwise, the Occupational Health and Safety Act, 1993.

"**the Regulations**" means, unless the context indicates otherwise, the Diving Regulations, 2009.

Any word used in this Code of Practice that is defined in the Act or the Regulations shall have the meaning assigned to it in the Act or the Regulations. The definitions provided in the Act are used whenever conflict exists between these two texts.

2.2. Definitions in this Code of Practice

Definitions of technical terms are provided in the text

3. Diving contractor's manuals and procedures

3.1. General

All companies carrying out diving operations in benign conditions should prepare standard diving operational manuals and procedures covering their operations and any foreseeable emergencies. If the specific task they are undertaking is not standard then they should prepare specific written procedures for that work.

This Code is not meant to be a substitute for Company operation manuals and procedures, although it provides some guidance in aspects that should be covered in those manuals. The manual should cover all relevant aspects in this Code, as well as any additional aspects identified in the Hazard Identification and Risk Assessment (HIRA)

The manual shall be prepared in consultation with the employees and contain all relevant elements addressed in the Regulations and in this Code. The manual shall be made available to each diving team at the diving location before the commencement of each diving operation.

3.2. HIRA (Hazard Identification and Risk Assessment)

3.2.1. Introduction

For diving to take place under this Code of Practice the diving contractor must ensure that the definition of “benign conditions” is appropriate. If any hazards are present that poses additional risk (e.g. chemical contamination, working with power tools, etc.), the Inshore Code of Practice should be consulted for guidance.

The dive planning for a diving operation is unique to that specific operation, and therefore nothing other than general guidelines can be given. The safe planning and implementation of the dive operation will be based on the Hazard Identification and Risk Assessment (HIRA) in conjunction with the guidelines and diving regulations as well as the operations manual of the company.

No diving operation is to take place without a HIRA being carried out before the diving operation commences, all Hazards and Risks identified and communicated to all dive team members and other stakeholders during toolbox talks. The risk assessment will determine what diving mode is to be used and if diving is to take place at all.

3.2.2. Consultation needed

The diving contractor shall carry out a HIRA and risk management process in consultation with the whole dive team and include inputs from third party specialists (e.g. Approved Inspection Authorities) when required by any legislation or when otherwise considered appropriate.

When performing an “updated HIRA” before the dive starts, the diving supervisor shall consult with the other members of the dive team and include

inputs from other persons that may influence the health and safety of the divers.

3.2.3. HIRA process to follow

The HIRA process shall:

- identify and record hazards associated with the operation;
- ensure that an assessment is made to determine and record the risks associated with such identified hazards; and
- control such risks by implementing measures to either eliminate or minimize risks.
- implement medical surveillance for risks that remain

It is important to keep records of the HIRA and to have these available.

3.2.4. Hazard identification process

Health and safety hazards exist at all workplaces. A hazard is any agent, activity, situation or substance that can cause harm. Hazards can be divided into three groups, health hazards, safety hazards and hazards to the environment.
Hazards shall be identified during the preparation of the operational plan and prior to the commencement of the operation. Any hazards which arise during the operation should immediately be brought to the attention of the supervisor and the operational plan varied as necessary to ensure the health and safety of the workers or the operation aborted.

3.2.4.1. Health Hazards

An occupational health hazard is any agent that can cause illness to an individual. A health hazard may produce serious and immediate (acute) affects, or may cause long-term (chronic) problems.

Someone with an occupational illness may not recognise the symptoms immediately. For example, noise-induced hearing loss is often difficult for the affected individual to detect until it is well advanced.

Health hazards include: chemical hazards, biological hazards, physical hazards, psychosocial hazards and work design (ergonomic) hazards.

a. Chemical hazards: Chemical hazards include, but are not limited to:
- Breathing gases and the possibility of breathing contaminants
- Diving in chemically contaminated waters
- Exposures to any dusts, fumes, vapours, metals, chemical irritants and other chemical agents

b. Biological hazards: Biological hazards include, but are not limited to:
- Risk of marine life injuries
- Cross-contamination using diving gear
- Exposures to viruses, bacteria in the workplace
- Any agent that can cause an infection in the diver

c. Physical hazards: Physical hazards include, but are not limited to:
- Radiation hazards (including sunburn)
- Noise
- Temperature extremes
- Pressure (causing barotrauma, etc.)
- Electrical shocks

d. Psychosocial hazards: Psychosocial hazards include, but are not limited to:
- Working shifts (shift work)

e. Ergonomical hazards: ergonomical hazards include, but are not limited to:
- lifting and bending with heavy equipment in and out of the water
- Abnormal postures
- Repetitive movements

3.2.4.2. Safety Hazards

A safety hazard is any agent which may cause injury, or damage to property. An injury caused by a safety hazard is usually obvious. For example, a worker may be badly cut. Safety hazards cause harm when workplace controls are not adequate.

Some examples of safety hazards include, but are not limited to:

a. Environmental conditions: include, but are not limited to:
- physical conditions at the operation's site,
- cleanliness of the premises and plant

b. Task related aspects: Include, but are not limited to:
- use of tools and equipment
- Feeding or managing hazardous marine life

c. Associated activity factors: Includes, but are not limited to:
- accessing the site (including emergency response),
- other equipment at the site
- other structures at the site.
- Working Alone
- Slipping/tripping hazards
- Fire hazards
- Moving parts of machinery, tools and equipment
- Pressure systems and differential pressure situations
- Implementation of permit-to-work systems
- Lockout-procedures

d. Emergency response factors: includes, but are not limited to:
- location and availability of appropriate emergency systems and emergency response procedures.
- Unconscious diver recovery procedures

- Severely injured diver recovery procedures
- Availability of first aid kit and support

3.2.4.3. Environmental Hazards

An environmental hazard (hazards to the environment) is a release to the environment that may cause harm or deleterious effects. Environmental hazards usually cause harm when controls and work procedures are not followed.

3.2.5. Risk Assessment

Risk Assessment evaluates the frequency, probability and the consequences of a hazard, into a semi-quantitative measure of risk.

The aims of a risk assessment are to:

- Identify and evaluate risks to enable contingency planning and minimise potential risk to health, environment and equipment.
- Provide a baseline mechanism for communicating to operational personnel the risks and means of minimising them, of a particular task or project.
- Ensure staff compliance to the company health, safety and environmental requirements, as well as compliance with relevant statutory regulations, guidelines and contractual obligations.

3.2.5.1. Risk assessment process

The risk assessment shall be conducted in the following way:

a. Assess who may be exposed

Exposure may take place during the dive or the person may be exposed while on the surface. The HIRA must include the health and safety of surface personnel also

b. Assess how the persons will be exposed

The exposure route may be important, for instance chemical exposures may be via the lungs or be absorbed through the skin. Skin exposure may cause local effects (e.g. chemical burns) or may cause systemic effects due to absorption of the chemical

Mechanical injury (safety risks) may happen due to improper equipment being used or if a person is not familiar with the operation of the equipment or not experienced in its use

c. Assess the exposure “dose”

The levels of the hazards are important factors to consider. The specific noise level can predict the level of hearing loss expected. The dose is estimated as a combination of concentration and time of exposure.

In order to measure the levels of chemical substances, some physical hazards, etc., the services of an Approved Inspection Authority ("Occupational / Industrial Hygienist") is required in terms of some of the Regulations.

Some exposures, e.g. noise levels, can not be measured under water.

d. Assess the exposure frequency

The more the person is exposed to the hazard, the higher the risk of injury or disease

e. Assess the influences of exposures on each other

Some exposures may have an influence on each other, for instance mixed chemical exposures. Exposure to any one of the elements may not be considered a health risk, but the combined effect of exposure may be considerable. Exposure to chemicals and noise show a bigger effect that just combination to any one of these in isolation. The assessment should thus take the "big picture" into consideration.

f. Assess the consequences of exposure

Some exposures cause acute effects, while others may cause long-term effects, like causing cancer, hearing loss, etc.

Consultation with the Designated Medical Practitioner and the Occupational Medicine Practitioner (or Occupational Medicine Specialist) is required.

g. Note all your findings

All of the findings should be carefully noted in the HIRA. This will provide a record of systematic approaches taken to address risks.

3.2.6. Risk mitigation and risk control

Control of risk is achieved by selecting from the hierarchy of control measures one or more measures which individually or in combination achieve the required risk reduction. Only those hazards (identified during the hazard identification process) that poses a real risk (as determined in the risk assessment process) needs to be addressed. If the risk assessment determined that a hazard is associated with acceptable risk, this should be indicated in the HIRA and it need not be addressed further.

Appropriate control measures shall be applied to the risks, using the hierarchy of controls in the following order:

a. Elimination

Where the level of risk cannot be controlled to an acceptable level, no diving work shall take place.

b. Substitution

Where the risk can be controlled by performing the task using alternative methods, consideration shall be given to using these alternative methods.

c. Design

Plant and procedures shall be designed to minimize risk.

d. Isolation

Persons should be isolated from the identified hazards. Diving apparatus provide adequate protection to a number of hazards, e.g. hypothermia, marine stings, etc.

e. Administrative control measures

Every operational plan should seek to minimize the degree and duration of the worker's exposure to risk. Rotation of workers is a good example to minimize exposure

Almost every aspect of planning falls into this administrative category.

Administrative controls include, but are not limited to:

i. training, supervision, experience and selection of employees, including staffing levels;
ii. provision of an appropriate operations manual;
iii. organization and planning before, during and after the operation;
iv. selection of appropriate plant; and
v. selection of the appropriate form and level of communication.

f. Personal protective equipment

Appropriately designed and sized personal protective equipment shall be provided, used and maintained. The limitations of all equipment used shall be identified as part of the risk assessment process. Information from manufacturers and from records of prior experience should be used to identify limitations.

3.2.7. Recording of occupational exposures and medical surveillance

If the HIRA process was followed and risk mitigation strategies were put in place, there may still be a level of risk that is accepted as part of the operation. In case any employee is exposed to such a risk that remains, appropriate measures shall be put in place to specifically screen such an employee for consequences of the exposure (including the levels of exposure, e.g. using Biological Exposure Indices) and the possibility of an occupational disease.

Screening for occupational diseases shall be conducted in consultation with an occupational medicine specialist, occupational medicine practitioner or an occupational health practitioner (as appropriate).

An accurate record should be available in the diver's medical file. This is a requirement in addition to the normal "fitness to dive" evaluation of divers.

3.2.8. Recording, updating and reviewing

All of the findings of the HIRA shall be formally recorded, including the names of the persons involved therein. All of the aspects listed above should be included where appropriate.

A comprehensive HIRA should be performed for each diving project, but provision should be made for a "quick assessment" prior to each dive. This process must allow for changes in the diving project, based on the findings. The "quick HIRA" shall be performed by the whole team involved in the dive and be recorded.

Records of health hazards should be kept in accordance with the Regulations pertaining to those hazards, e.g. Regulations for Hazardous Chemical Substances, Regulations for Hazardous Biological Agents, etc.

4. Duties, responsibilities and relationships

4.1. The Client

The client is the person or company who has placed a contract with a diving contractor for a diving project. The Client will usually be the operator or owner of a proposed or existing worksite where diving work is going to take place or a contractor acting on behalf of the operator or owner. If the client appoints an on-site representative then such a person should have the necessary experience and knowledge to be competent for this task.

The client shall be responsible for the following:

- to prepare a documented health and safety specification for the diving work, and provide any diving contractor who is making a bid or appointed to perform diving work for the client with the same;
- to promptly provide the diving contractor and his or her agent with any information which might affect the health and safety of any person at work carrying out diving work;
- to appoint the diving contractor in writing for the diving project or part thereof on a diving site;
- To notify the provincial office of the Department of Labour of any diving work taking place;

- to take reasonable steps to ensure that each diving contractor's health and safety plan is implemented and maintained on the diving site: Provided that the steps taken, shall include periodic audits at intervals mutually agreed upon between the client and diving contractor, but at least once every month;
- to stop any contractor from executing diving work which is not in accordance with the principal contractor's health and safety plan contemplated in for the site or which poses to be a threat to the health and safety of persons;
- to ensure that where changes are brought about, sufficient health and safety information and appropriate resources are made available to the diving contractor to execute the diving work safely;
- to ensure that every diving contractor is registered and in good standing with the compensation fund or with a licensed compensation insurer prior to work commencing on site; and
- to ensure that potential diving contractors submitting tenders, have made provision for the cost of health and safety measures during diving.
- to ensure that a copy of the diving contractor's health and safety plan is available on request to an employee, inspector or contractor.
- Ensuring that sufficient time and facilities are made available to the diving contractor at the commencement of the project in order to carry out all necessary site-specific safety and familiarization training.
- Ensuring that other activities in the vicinity do not affect the safety of the diving operation. They may, for example, need to arrange for the suspension of other work activities.
- Ensure that a formal control system for example, a permit-to-work & lock out system exists between the diving team and others that may influence their safety (e.g. operation of valves).
- Providing the diving contractor with details of any possible substance likely to be encountered by the diving team that would be a hazard to their health. They will also need to provide relevant material safety data sheets for these substances. This information will need to be provided in writing and in sufficient time to allow the diving contractor to carry out the relevant risk assessments.
- Keeping the diving supervisor informed of any changes that may affect the diving operation, e.g. valves opening, etc.

4.2. Diving Contractor

On any diving project there needs to be one company in overall control for the diving operations. This will normally be the company who employs the divers. If there is more than one company employing divers on a single diving project, then there will need to be a written agreement as to which of these companies is in overall control.

The company in control is called the Diving Contractor. The name of the diving contractor should be clearly displayed and all personnel, clients and

others involved in the diving operation should be aware who the diving contractor is.

The diving contractor will need to define management structure in writing. This should include arrangements for a clear handover of supervisory responsibilities at appropriate stages in the operation, again recorded in writing.

The diving contractor's responsibilities include provisions to ensure that:

- risk assessments have been carried out and signed by the required personnel.
- a diving operations manual is compiled in consultation with employees.
- the place from which operations are to be carried out is suitable and safe.
- there are sufficient personnel of the required grades in the diving team (see minimum manning levels in the Diving Regulations)
- the personnel are qualified and competent.
- suitable plant and equipment is supplied
- the plant and equipment is correctly certified and properly maintained.
- a suitable plan is prepared which includes emergency and contingency plans. This should be signed and dated by the person preparing it.
- suitable site-specific safety and familiarization training is provided to all members of the dive team.
- project records are kept of all relevant details of the project, including all dives.
- adequate arrangements exist for first aid and medical treatment of personnel, including consultation with the level 2 designated medical practitioner.
- there is a clear reporting and responsibility structure laid out in writing.
- supervisors are appointed in writing and extent of their control documented.
- all relevant regulations are complied with.
- any person or company not directly involved in the diving project is informed of the diving project and their roles therein, whenever their work or practices may impact on the health and safety aspects of the diving project
- the provincial office of the Department of Labour is notified whenever any diving project is taking place.
- all the relevant aspects covered in the Regulations and this Code are complied with

The level of detail or involvement required of the diving contractor, and information on how to meet the responsibilities are given in the relevant sections of this Code.

4.3. Diving Supervisor

Supervisors are responsible for the operation that they have been appointed to supervise and they should only hand over control to another supervisor appointed in writing by the diving contractor. Such a handover will need to be

entered and signed in the relevant operations logbook and must be clearly communicated to the dive team.

Supervisors can only supervise as much of a diving operation as they can personally control both during routine operations and if an emergency should occur. Supervisors cannot supervise two different dive sites at once.

The diver must at all times be in full view of the diving supervisor, which may be through viewports or from the surface. When the diving supervisor does not supervise the diver from the surface (but rather from viewports), he or she must be in direct communication (e.g. on two-way radio) with a person (who will not be diving) at the surface and be ready to take over in the event of an emergency. This means that a four-man team is needed (plus a designated medical practitioner on call) if the supervisor does not supervise the dive from the surface, with either one of the following configurations:

1x supervisor 1x diver 1x standby diver 1x attendant 1x DMO (on call)	1x supervisor 2x divers (buddied up) 1x attendant 1x DMO (on call)

The supervisor is entitled to give direct orders in relation to health and safety to any person taking part in, or who has any influence over, the diving operation. These orders take precedence over any company hierarchy. These orders could include instructing unnecessary personnel to leave an area in which diving operations are taking place, instructing personnel to operate equipment, etc.

To ensure that the diving operation is carried out safely, supervisors will need to ensure that they consider a number of points including:

- Satisfy themselves that they are competent to carry out this work, and that they understand their own areas and levels of responsibility and who is responsible for any other relevant areas. Such responsibilities will need to be contained in the relevant documentation. They should also ensure that they are in possession of a letter from the diving contractor appointing them as a diving supervisor.
- Satisfy themselves that the personnel they are to supervise are competent to carry out the work required of them. They should also check, as far as they are reasonably able, that these personnel are fit and in possession of a valid medical certificate of fitness.
- They will need to check that the equipment they propose to use for any particular operation is adequate, safe, properly certified and maintained. They can do this by confirming that the equipment meets the requirements set down in this Code. They should ensure that the equipment is adequately checked by himself or herself or another competent person prior to its use. Such checks will need to be documented, for example, on a pre-prepared checklist which has been signed and recorded in the operations log for the project.

- They will need to ensure that the operation they are being asked to supervise complies with the requirements of this Code. Detailed advice on how they can ensure this is given in various sections of this Code.
- They will need to establish that all involved parties are aware that a diving operation is going to start or continue. They will also need to obtain any necessary permission before starting or continuing the operation.
- The supervisor shall comply with all the requirements imposed on him or her in accordance with the Regulations.
- The supervisor must ensure that he/she has a suitable means of recalling divers at all times.

In many organisations there is more than one qualified Dive Supervisor, in such cases it is advisable that a Senior Dive Supervisor ("diving superintendent") who takes overall responsibility for any diving at that organisation, is appointed in writing. Where this person delegates responsibility to another dive supervisor it should also be done in writing, but this could be done easily, for example, on a roster sheet.

The level of detail or involvement required of the diving contractor, and information on how to meet the required responsibilities, are given in the relevant sections of this Code.

4.4. Divers

Divers have the following duties and responsibilities:

- Every diver will take reasonable care of his own health and safety and not endanger the health or safety of any other person by any act or omission.
- Comply with the requirements imposed on him or her by the operations manual, and with the instructions given by the diving supervisor (in as far as this does not endanger the health and safety of any person)
- Co-operate with the diving supervisor and the diving contractor in the fulfilment of their duties
- Carry out any lawful order given to him or her by the diving supervisor or diving contractor
- As soon as he or she becomes aware of any situation which is unsafe or unhealthy, bring this to the attention of the diving supervisor, who will record this in the operations log and incorporate this in the "updated HIRA"
- If he is involved in any incident at work that may affect his health or has caused an injury to himself, report this to the supervisor, who will note it in the operations log and ensure that the designated medical practitioner is consulted.
- Comply with the duties listed in the Regulations.

4.5. Level 2 Designated Medical Practitioner (DMP)

The level 2 DMP should ensure the health aspects of the diving project are appropriately addressed. This may include the following aspects:

- Performing fitness-to-dive examinations on the divers

- Reviewing, scrutinizing and updating medical examinations performed by level 1 DMP and/ or medical practitioners not contracted by the company

- Providing specific inputs in the operations manual regarding relevant health aspects that should be addressed, including emergency medical protocols and procedures

- Providing specific inputs regarding contents of the first aid kit and assistance in sourcing the contents thereof

- Providing inputs in the HIRA from the medical point of view

- Arrange for the workplace visit of an occupational medicine specialist or occupational medicine practitioner (as appropriate) when required to assess specific workplace hazards

- Arranging (in consultation with occupational medicine specialists or practitioners) for the measurement of workplace hazards by an Approved Inspection Authority.

- Consultation with an occupational medicine specialist, occupational medicine practitioner or occupational health practitioner (as appropriate) when required in terms of specific health hazards in the workplace, or when an occupational injury has occurred or when an occupational disease is diagnosed

- Consultation with travel medicine practitioners whenever specific issues occur, e.g. the need for specific vaccinations, etc.

- Providing assistance and advice in the case of workplace accidents, injuries and illnesses

- Providing inputs in diving apparatus selection and working tool selection when appropriate

- Providing telephonic and/ or on-site advice and assistance in each case of decompression illness and organise any special investigation, follow-up and rehabilitation that may be required, including the performance of fitness assessments after recovery.

- Recording of the appropriate medical information in the diver's logbook, including treatment provided, for each case of decompression sickness.

- Providing practical advice regarding the application of divers with restricted fitness for diving, which may include adding additional restrictions or, in consultation with the examining DMP, remove such restrictions temporarily or permanently.

- Providing project-specific medical support
- Provision of any other medical advice, services and equipment as required from time to time.
- Reviewing of workplace health and safety indicators and development of appropriate action plans to address health issues in such a way that continuous improvement is evident.
- Provision of a yearly medical report to the diving contractor/ employer
- Complying with the provisions listed in the Diving Regulations

To effectively perform these duties, the level 2 designated medical practitioner must be available for consultation with the diving contractor and the diving team should be able to telephonically contact the level 2 designated medical practitioner without difficulty.

4.6. Others

The actions of others can have a bearing on the safety of the diving operation even though they are not members of the team.

5. Relationships

5.1. Client and diving contractor relationships

Responsibilities and liabilities of the client and the contractor must be clearly defined.

A client shall discuss and negotiate with the diving contractor the contents of the health and safety plan and thereafter finally approve the health and safety plan for implementation.

No client shall appoint a diving contractor to perform diving work, unless the client is reasonably satisfied that the diving contractor that he or she intends to appoint has the necessary competencies and resources to carry out the work safely.

A client may appoint an agent in writing to act as his or her representative and where such an appointment is made, the responsibilities as are imposed by the regulations upon a client, shall as far as reasonably practicable apply to the person so appointed.

No client shall appoint any person as his agent, unless the client is reasonably satisfied that the person he or she intends to appoint has the necessary competencies and resources to perform the duties imposed on a client by the regulations.

5.2. Employer and employee relationships

Any person who works for, or renders services to the diving contractor (employer) is presumed, until the contrary is proved, to be the employee of the diving contractor, regardless of the form of the contract (including when "free-lance" services are provided), if any one or more of the following factors is present:

- The manner in which the person works is subject to the control or direction of the diving contractor
- The person's hours of work are subject to the control or direction of the diving contractor
- In the case of the person working for a diving company, the person is part of the company
- If the person has worked for the diving contractor for an average of at least 40 hours per month over the last three months
- The person is economically dependent on the diving contractor for whom that person works or renders services
- The person is provided with tools of trade or work equipment by the diving contractor
- The person only works for or renders services to one diving contractor

Whenever this employer-employee relationship exists between the diving contractor and divers, diving supervisors or other persons, the diving contractor must fulfil the duties of the employer as specified in the Act and the Regulations; and the divers, diving supervisors or other persons must fulfil the duties of employees as specified in the Act and the Regulations.

5.3. Designated Medical Practitioner relationships

The designated medical practitioner should be closely involved in the diving operation and provide appropriate medical support as needed.

5.3.1. Diving Contractor and level 2 DMP

The Diving Contractor contracts the medical assistance services of a level 2 DMP. The Diving Contractor however stays in overall control of the diving operation and the DMP may not take over the diving operation (e.g. during an emergency) or prescribe to the Diving Contractor which course of action to follow. The DMP is thus contracted in an advisory capacity only, unless specific levels of responsibility and involvement in the diving operation is described in the operations manual in detail.

The Diving Contractor must carefully consider the advice provided by the level 2 DMP and consider how it impacts the health and safety of the diving operation as a whole before the advice is accepted or rejected. Conflicts of opinion should not take unnecessary times to resolve and it is therefore required that as much as possible information is contained in the operations manual.

Whenever the Diving Contractor rejects the advice of the level 2 DMP (with appropriate reasons), the DMP may request that such refusal be provided in writing and this shall not be unnecessarily refused by the Diving Contractor. The level 2 DMP may not refuse to provide any further medical advice and assistance for that specific diving operation (e.g. as a means of "strong-arming"). Further advice may be sought from other level 2 DMPs or other consultants with appropriate knowledge and/ or experience.

These provisions shall apply to all diving operations under the control of the diving contractor. However, whenever a diver is evacuated from the workplace for medical reasons and reaches a medical facility, the Diving Contractor shall not have control over the case any longer.

5.3.2. The client or diving contractor level 2 DMP and other DMPs

A close collaborative relationship is needed between the level 2 Designated Medical Practitioner performing the responsibilities listed in the Regulations and this Code and other Designated Medical Practitioners. A diver may have had his annual medical examination with one specific Designated Medical Practitioner and then goes diving with a number of different Diving Contractors in the course of the year, which means that a number of different level 2 Designated Medical Practitioners (each contracted with a different diving contractor) will also be involved. There is clearly no need to perform a full medical examination on each occasion, as the medical examination performed by the initial Designated Medical Practitioner may still be valid. However, there may be a need to perform specific examinations (in collaboration with occupational health personnel) as a result of specific hazards being present in the workplace (e.g. allergic tests for specific marine animal exposures), which is specific to a diving operation.

The Designated Medical Practitioner performing the initial diving medical examination must provide copies of the annual medical examination to the level 2 Designated Medical Practitioner responsible for the diver during a specific diving project. The written consent of the diver is still required in each case. If copies of the diving medical examination are provided to the diver, an additional original signature of the Designated Medical Practitioner and the original stamp of the Designated Medical Practitioner are required on each page for authenticity purposes.

5.4. The project plan, dive plan, operations manual and HIRA

The diving project plan defines the scope of diving work to be performed and contains all the elements relating to the diving project.

Dive plans contain the proposed profile and tasks of each dive and these are updated when required.

An operations manual is needed for each diving contractor. It contains all elements required in terms of the Regulations.

The HIRA forms part of the project plan and the dive plans and is updated as required.

5.5. The Occupational Health and Safety Act, the Diving Regulations, other Acts and other Regulations

The Occupational Health and Safety Act is the overarching legislative text, determining the duties of employers, employees, health and safety representatives, health and safety committees, etc. The Diving Regulations are provided in order to provide details on how the Act should be applied in the diving industry. Even more details are provided for specific sectors of the diving industry in the different Codes of Practice provided under the Diving Regulations. No single document can thus be read without proper reference to the others.

This also means that other regulations published under the Act may be applicable from time to time. These must also be consulted whenever appropriate (including Codes of Practice that may be published in terms of those regulations).

Other Acts may also be relevant on a specific diving project and the diving contractor should ensure that all the relevant texts are consulted.

6. Work planning and working equipment

6.1. Work planning

Before any diving is carried out there should be a dive plan in existence. The dive plan will consist of a diving contractor's standard operating policies and any site-specific risk assessments and procedures.

The plan will need to cover the general principles of the diving techniques as well as the needs of the particular operation. It will also need to provide contingency procedures for any foreseeable emergency.

Many factors need to be considered when preparing a dive plan for a diving project. The risk assessment will need to identify site-specific hazards and their risks. Based on this information, the plan will then need to state how these hazards and risks can be controlled.

Whenever a diving project is planned, the information required in terms of the Diving Regulations must be forwarded to the provincial office of the Department of Labour in the prescribed manner.

6.2. Equipment location and integrity

The diving contractor must ensure that the dive team is provided with all the necessary equipment and procedures to undertake the diving work without compromise to health and safety.

6.3. Compressors

6.3.1. General

Compressors and all receiver tanks and pressure vessels used in connection with compressors in the course of a diving project shall meet the required regulations and standards.

Compressors shall be operated by a competent person who, if circumstances permit, may also act as a diver's tender. The compressor operator shall ensure that all compressor-related equipment is in good working order. Particular attention shall be given to valves, stopvalves, draincocks, gauges, and all parts liable to be damaged.

6.3.2. Prevention of contamination

The diving contractor shall ensure that adequate procedures are in place to ensure that compressed air supplied to divers comply with the minimum requirements set out elsewhere in this document. This will include procedures, checklists, maintenance and tests with regards to compressor air intakes, the compressor itself, the filtration systems and any other part of the equipment. Some of these aspects are covered in other Regulations under the Act. Testing for air contamination is also covered elsewhere in this Code.

6.4. Chambers

All chambers used under this code shall be of a twin-lock configuration and have sufficient space available to treat all the ill or injured divers in an emergency, with at least one ill diver lying in the horizontal position.

6.4.1. Availability of recompression chambers

When diving within the scope of this code, there would not be a requirement to have a recompression chamber available on site. However, arrangements must be made to ensure that all divers could receive recompression therapy within two hours from the time when the need for recompression is identified (e.g. following an arterial gas embolism). The diving contractor must then identify the location of the nearest diving or hyperbaric chamber and make sure it is within two hours by road to the arranged diving chamber. It remains

the responsibility of the diving contractor to ensure that such a facility is in a safe and operational state.

6.4.2. Operation of chambers

Guidance relevant to the operation of chambers is provided in the Inshore Code of Practice

6.5. Gases

Gases stored in cylinders at high pressure are potentially hazardous. The dive plan needs to specify that the gas storage areas need to be adequately protected. All gases used during diving projects will need to be handled with appropriate care.

6.5.1. Storage Cylinders

Gas cylinders will need to be suitable in design, fit for purpose and safe for use. Each cylinder needs to be tested and have appropriate certification issued by a competent person. Cylinders used for diving within the scope of this Code may be subjected to special conditions, such as use in salt water, and will therefore need special care.

Detailed requirements are contained in other Regulations under the Act.

6.5.2. Marking and Colour Coding of Gas Storage

The contents of the cylinders should be unambiguously marked on the cylinder.

6.5.3. Quantity of Gas

The likely quantities of gases needed for diving operations, including emergencies, will need to be calculated when planning a diving project. Allowances will also need to be made for leakage, wastage, contingencies, etc. Diving must be stopped if the quantity of gas needed for safety purposes falls below the minimum specified in the operations manual and the dive plan.

6.5.4. Divers' Breathing Gas Supply

All divers must receive an uninterrupted supply of breathing gas.

Breathing gases must be analysed before being put online if any gas other than air is used within the same locality.

6.5.5. Bailout systems

A bailout system is not required when diving within the scope of this code

6.5.6. Breathing gas toxicities (nitrogen narcosis or oxygen toxicity)

To ensure that no breathing gas toxicity is possible, the only breathing gas allowed under the scope of this code is compressed air.

6.5.7. Gas Purity Standards for diving in benign conditions

The levels of contaminants in the breathing gas supply should be kept as low as is reasonably practicable. The contaminants in the breathing mixture must not exceed 10% of the published Time Weighted Average Occupational Exposure Limits (as published in other regulations under the Act). The following contaminants must be tested at an interval not exceeding six months and must not exceed the following maximum levels:

- Carbon monoxide: 0.2ppm maximum
- Carbon dioxide: 500ppm maximum
- Methane:25ppm maximum
- Oil: 1.0 mg/m^3 maximum
- Water: 15mg/m^3 maximum
- Odour: none detectable

6.5.8. Air purity testing

To ensure that breathing air complies with these minimum standards, the diving contractor will ensure that the air is tested in the following manner:

- The compressor should have a monthly functionality test on delivery/ flow
- An air purity test is performed on a minimum of a 6-monthly basis, provided that the compressor functionality test remained within specification
- An air purity test may be performed more frequently if deemed necessary.

Testing for contaminants other than those listed above shall be conducted if their presence is suspected.

Quantitative testing for particulate matter (including oil) shall be conducted if its presence is evident in a qualitative test.

A record of these tests should be kept for inspection

6.6. Diving masks

Divers diving under the scope of this code may use a half-mask. The use of full-face masks or helmets is not permitted, unless the person has received training as a Class IV diver, or the diving contractor can prove that the person has received proper training and instruction on diving with such equipment, including the emergency procedures associated with the use thereof.

6.7. Communications

Effective communications are essential to ensure that all personnel directly involved in operations are made fully aware of the work being undertaken and

that during operations all parties are kept aware of the status of any unusual situation.

Communications between the diving team and any other relevant personnel (such as aquarium personnel) are important to the safe and efficient operation.

6.7.1. Communications between the supervisor and divers

There must be effective communication between the supervisor and the divers, including an emergency signal system. The supervisor must be able to immediately get the attention of divers in the water at any time.

An effective way to recall divers must be available.

6.7.2. Communications between the supervisor and others

The diving contractor must ensure that an effective means of communication is in place between the diving supervisor and any other person that may assist in the diving operation, e.g. tenders, aquarium personnel, etc.

6.7.3. Communications with Designated Medical Practitioners

Communication with the level 2 Designated Medical Practitioner may be needed in the course of a diving operation, especially in the case of an accident or other medical emergency. The diving contractor must lay down clear protocols and procedures in the operations manual in consultation with the Designated Medical Practitioner. Care should be taken to ensure that medical information is provided to the dive team when needed.

6.8. General

6.8.1. Equipment Register

An equipment register will need to be maintained at the worksite, with copies of all relevant certificates of examination and test and any other relevant additional information.

6.8.2. Suitability of equipment used

The diving contractor will need to be satisfied that the equipment provided for the diving project is suitable for the use to which it will be put, in all foreseeable circumstances on that project. Suitability can be assessed by means of evaluation by a competent person, clear instructions or statements from the manufacturer or supplier, physical testing, or previous use in similar circumstances.

New, or innovative, equipment will need to be considered carefully, but should not be discounted because it has not been used before.

6.8.3. Certification of equipment used

The standards and codes used to examine, test and certify plant and equipment, and the requirements of those who are competent to carry out such examinations, tests and certification, must be followed. Suitable certificates (or copies) will need to be provided at the worksite for inspection.

6.8.4. Maintenance and Testing of Diving Equipment

Diving plant and equipment is used under extreme conditions, including frequent immersion in salt water. It therefore requires regular inspection, maintenance and testing to ensure it is fit for use, e.g. that it is not damaged or suffering from deterioration.

6.8.4.1. Periodic Examination, Testing and Certification

Detailed guidance exists on the frequency and extent of inspection and testing required of all items of equipment used in a diving project, together with the levels of competence required of those carrying out the work.

6.8.4.2. Planned Maintenance System

The diving contractor must establish a system of planned maintenance for plant and equipment.

Such a system may be based on either passage of time or amount of use, but ideally will be based on a combination of both. For each major unit, the system will need to identify the frequency with which each task is to be undertaken and who should do the maintenance work. The individual involved will then need to complete a record of the maintenance work.

6.8.4.3. Testing immediately before use

All diving equipment used must be checked and tested by the dive team before use so as to determine whether it is in good working order.

6.9. Surface control point equipment

When diving is in progress, a surface control point shall be equipped, as a minimum, with the following equipment:

a. a first-aid kit appropriate for the size of the work crew and work location;
b. therapeutic oxygen;
c. an adequate two-way communication system connecting the dive site with medical assistance;
d. adequate means to facilitate the entry and exit of divers to and from the water;
e. adequate means to facilitate the immediate exit from the water of an unconscious diver;
f. such other equipment as may be needed to ensure safe operations

7. Personnel

7.1. Training and competence: General

Any class of diver is allowed to dive under the scope of this code. The minimum level of training of personnel committed to work under the scope of this code include

- Successful completion of a Department of Labour approved training course
- Previous training that is approved by the Depart of Labour

Any person taking part in a diving operation must have the necessary competence and training prior to engaging in diving work and be fully conversant with the machinery, tools and equipment used during the diving project.

No diver is allowed to dive to a depth greater than that for which he or she is qualified.

7.1.1. Competence

To work safely, efficiently and as a member of a team, personnel need to have a basic level of competence for the task they are being asked to carry out. Competence may not be the same as qualification. A person who has a particular qualification, such as a diver training certificate, should have a certain level of competence in that area but the diving contractor and the diving supervisor will need to satisfy themselves that the person has the necessary competence to perform the specific task required during the particular diving operation. This will normally mean establishing that the person has had sufficient training coupled with experience. The various members of the diving team will require different levels and types of competence

7.1.1.1. Diving supervisors

There is only one person who can appoint a supervisor for a diving operation and that is the Diving contractor. The supervisor should be appointed in writing.

The diving contractor shall ensure that the diving supervisor is competent to fulfil the duties and responsibilities of the supervisor as contemplated in Section 4

The Diving contractor should consider a number of factors when appointing a supervisor. Regarding qualifications, it is relatively simple to establish if a person is suitably qualified to act as a Supervisor and any person being considered for appointment as a supervisor will need to be in possession of the relevant certificate.

If a diving operation is being planned, which does not fall clearly in to the areas normally undertaken by that diving contractor, then detailed consideration will need to be given to the most suitable qualification for the supervisors to be selected.

Clearly the issue of competence is more subjective and the diving contractor needs to consider the operations being planned and the competence of any individual being considered for appointment as a supervisor.

The possession of the necessary qualification does not in itself demonstrate competence for any specific operation. The Diving contractor will need to consider the details of the planned operation, such as the complexity of the part of the operation the person is going to supervise, the equipment and facilities which will be available to the supervisor, the risks which the supervisor and divers may be exposed to and the support which would be available to the supervisor in an emergency. After such consideration, a decision will need to be made whether one supervisor can be responsible for all that is intended or whether more supervision is required.

Relevant previous experience supervising similar operations will demonstrate a suitable level of competence however if this has been gained with a different diving contractor then checks should be made to establish the veracity of the claimed experience. For this purpose the log book maintained by the supervisor can be consulted and if necessary, the details checked with previous diving contractors.

If relevant previous supervisory experience of similar operations cannot be demonstrated, due to unique features of the planned operation, or to the limited previous experience of the individual being considered, then the diving contractor should assess the relevant information available, consider the possible risks involved and make a decision as to the competence of the individual concerned.

7.1.1.2. Diver

Before commencing diving, the diving supervisor shall ensure that the diver is competent to perform the task required. This could be done by scrutinizing the contents of the diver's logbook, or previous experience of working with the diver. If competency can not be assured, the diver should be accompanied by another diver that is competent and who can act as the lead diver for that dive.

Divers need to have the original certificate of diver training in their possession at the site of the diving project - copies may not be accepted.

Competence is required of a diver in several different areas simultaneously:

- The diver will need to be competent to use the diving techniques being employed.

- They will need to be competent to use any tools or equipment they need during the course of the dive.
- They will need to be competent to carry out the tasks required of them. This will normally require them to understand why they are doing certain things and how their actions may affect others. Even tasks which are apparently very simple, such as feeding fish, require a degree of competence, both to ensure that the task is completed correctly and also to ensure that any strange behaviour of the animals is detected early.

Care should be taken to ensure that a diver is not claiming or exaggerating experience in order to obtain work or appear knowledgeable to their superiors. If there is any doubt about the validity of experience then the individual should be questioned in detail to establish their exact level of knowledge.

It should be recognised that inexperienced divers require gaining competence in a work situation and it is correct to allow this provided it is recognised by the other members of the team that the individual is in the process of gaining experience and competence. In such a case it would be expected that the other team members and particularly the supervisor, would pay particular attention to supporting the person gaining competence.

7.1.1.3. Tenders

Tenders are there to help the divers. They should therefore be competent to provide the level of assistance that the diver expects and needs.

Competence is required of tenders in that:

- They should understand the diving techniques being used. Including a detailed knowledge of the emergency and contingency plans.
- They will need to be familiar with the diver's personal equipment.
- They should understand the method of deployment being used and all of the actions expected of them in an emergency.
- They should understand the ways in which their actions can affect the diver.

7.2. Training and competence – Rescue and First Aid

The diving contractor must ensure that adequate medical support, with competencies appropriate to the diving environment, is available at all times to deal with an emergency situation. Medical support should be available to the diver from the time of injury until the diver receives appropriate medical care. The hazard identification and risk assessment should guide the diving contractor in this respect.

Generally speaking, the following should be in place:

Any diver that is not able to help himself in an emergency should be rescued. This is usually done by a fellow diver or the standby diver. This means that all

divers should be in possession of an in-date first aid qualification and be competent in standard diving rescue techniques. The standby diver must be in immediate readiness to dive and shall remain on duty at the control point on the surface of the water during the diving operation.

Diving supervisors should have an in-date first aid qualification and be able to take over and manage the diving emergency appropriately and have competency in doing a basic cardio-respiratory and field-neurological examination and consult with a Designated Medical Practitioner.

The diving supervisor should be in contact with the Designated Medical Practitioner in the case of a diving accident to ensure that optimal treatment of any condition is given to the injured diver.

7.3. Training and Competence - Safety and Technical

It is necessary that diving contractors ensure that their personnel receive safety and technical training in order to allow them to work safely and in line with any relevant legislation, or to meet specific contractual conditions or requirements.

Safety Training may include the following:

- training that is required in terms of any other regulation or legislative document
- courses specific to the premises of the client (e.g. induction courses)
- task-specific safety training outlining any special hazards associated with the tasks being worked performed (as identified in the HIRA)
- Refresher training at regular intervals.

7.4. Number of personnel and team size

The diving contractor will need to specify the size of team based on the details of the project and as specified in the diving regulations. For safe operation, this may need to include additional surface support personnel and other management or technical support personnel.

The diving contractor will normally need to provide a sufficient number of competent and qualified personnel to operate all the equipment and to provide support functions to the diving team, rather than relying on personnel provided by others for assistance.

If personnel who are not employed by the diving contractor are to be used in the diving team for any reason they will need to be carefully considered for competence and suitability before being included. Such personnel can create a hazard to themselves and others if they lack familiarity with the contractor's procedures, rules and equipment.

The team size and composition must always be sufficient to enable the diving operation to be conducted safely and effectively. This means that a number of

eventualities should be considered when deciding team size and make-up including the following:

- Type of task
- Type of equipment (SCUBA, surface supplied, etc.)
- Deployment method.
- Location.
- Water depth
- Handling of any foreseeable emergency situations.

The overriding factor must always be the safety of personnel during operation and maintenance. It is the absolute responsibility of the diving contractor to provide a well-balanced, competent team of sufficient numbers to ensure safety at all times.

When a dive is taking place, a diving supervisor will need to be in control of the operation at all times. For large projects, more than one supervisor may be needed on duty. Each supervisor will only be able to provide adequate supervision of a defined area of operations, including dealing with foreseeable contingencies or emergencies.

The diving buddy may act as the standby diver while diving under the scope of this code, provided that the supervisor is supervising the dive from the control point at the surface. If the diving supervisor is not supervising the dive from the control point, an additional person need to be added to the team as a dive tender, to ensure that adequate surface support is available. The diver is then supported by a standby diver, who may be at the surface or in the water as a buddy.

7.5. Readiness and availability of personnel

All personnel required for the diving operation must be ready and available before the dive commences. This includes personnel who may be on call and available telephonically (e.g. Designated Medical Practitioners)

7.6. In-date personnel

Only personnel that are in-date may take part in diving operations. If a person is not in date, the diving contractor must ensure that the person receives appropriate training and supervision.

7.6.1. In-date divers

Divers are considered to be in-date when they have a valid diving medical certificate as required by the Regulations, which certifies that the diver is fit to dive and the diver has participated in an in-water diving operation of not less than 30 minutes' duration in the previous six months

8. Medical

8.1. *Designated Medical Practitioners*

Not all medical practitioners and medical specialists are able to render general and emergency medical care to injured divers. Medical practitioners should thus receive additional training and have adequate experience to render medical support to diving operations.

Some medical practitioners have had additional training that enables them to examine divers regarding their fitness to dive. All of these medical practitioners are designated in terms of the Regulations as level 1 Designated Medical Practitioners. These designated medical practitioners are however not competent in providing medical support to diving operations.

Some Designated Medical Practitioners, because of additional training and experience, are able to render medical support to diving operations. All of these medical practitioners are designated in terms of the Regulations as level 2 designated medical practitioners. These medical practitioners are able to perform diving medical examinations on divers AND advise on the emergency treatment of divers, as well as on recompression therapy for diving accidents.

The designation of all medical practitioners lapse after a period of four years, unless the designated medical practitioner attends refresher training prior to expiry of the designation.

All diving operations should secure the medical support of a designated medical practitioner who is competent to do so.

8.2. *Occupational Health Personnel*

Not all health practitioners are able to render occupational health care. Additional training and registration is required to perform these functions. Certain regulations under the Act require that specific work-related medical functions be performed by practitioners who have undergone such training and who are appropriately registered. The legal definition of these practitioners is contained in the Occupational Health and Safety Act.

8.2.1. Occupational Health Practitioners

Practitioners registered as nurses, doctors or specialists can undergo training in occupational health that enables them to register as “occupational health practitioners”. This is thus a general term that includes all these practitioners. All such practitioners are registered – either as occupational health nursing practitioners or as occupational medicine practitioners or as occupational medicine specialists. Certain medical functions may be performed by occupational health practitioners (these are then usually performed by nursing practitioners). Certain functions are however legally required to be performed by occupational medicine practitioners (doctors).

8.2.2. Occupational Medicine Practitioners

Occupational Medicine Practitioners are General Medical Practitioners (GPs) and Medical Specialists who have undergone additional training in occupational health and are registered as occupational medicine practitioners.

8.2.3. Occupational Medicine Specialists

These are occupational medicine practitioners who have undergone specialist training in occupational medicine. They are registered as occupational medicine specialists and have advanced knowledge on occupational medicine matters.

8.3. Occupational Health Advice and Support

Not all occupational health practitioners are able to provide occupational health support for diving projects. Occupational Health Practitioners that do not have appropriate knowledge and experience in providing such support in the hyperbaric environment should consult with a level 2 designated medical practitioner or a colleague experienced in hyperbaric work. The following considerations are worth mentioning:

- The Occupational Exposure Limits (as contained in the Regulations for Hazardous Chemical Substances) need significant adjustment and can not be applied “as is”.
- The increase in environmental pressure acts as an additional risk factor, which necessitates it being considered as part of “mixed exposures”. The effect is in some cases additive and in others synergistic.
- Significant physiological changes in the cardiovascular, respiratory and other systems of the body significantly changes a number of toxicological principles, which should be taken into account. The absorption, distribution, metabolism and elimination of almost all substances are changed.
- Some exposures are extremely difficult (if not impossible) to model (e.g. noise exposure: sound conduction is different in different fluids that divers are diving in; increase in pressure has an effect on sound conduction; the middle ear space may be filled with compressed gas or with gas other than air; the external ear canal may be filled with fluid – thus splinting the tympanic membrane, etc.)
- Specific diving injuries and diseases are listed as occupational diseases. A thorough knowledge of these is needed.

The diving contractor should only use occupational health practitioners that are competent to provide such services in the diving environment. The ideal is a designated medical practitioner who is also registered as an occupational medicine practitioner or occupational medicine specialist.

8.4. Medical certification

8.4.1. Fitness to dive certification

A diver shall not be permitted to dive unless a he has a valid diving medical certificate signed by a Designated Medical Practitioner, and the certificate includes all the aspects listed in the Regulations. This examination should be

performed every 12 months, or more frequently as determined by the examining Designated Medical Practitioner.

If the medical examination is carried out during the last 30 days of the validity of the preceding medical then the start date of the new certificate will be the expiry date of the old certificate.

8.4.2. Additional fitness to dive requirements

Additional risks (as determined by the HIRA) may necessitate additional medical examinations. The level 2 Designated Medical Practitioner should scrutinize all medical examinations of the company divers to ensure all the relevant examinations were performed. If such Designated Medical Practitioner did not perform the examinations himself, this may require consultation with the other Designated Medical Practitioner who has performed the initial fitness evaluation. These additional tests will then be performed when needed. Such additional requirements (if any) and the specific fitness requirements should be listed in a specific medical section in the operations manual.

8.4.3. Occupational Health requirements

Exposure to specific occupational health risks may require even further examinations in terms of other regulations. Many of these examinations must be performed by an occupational health practitioner or an occupational medicine practitioner and a Designated Medical Practitioner who does not have this qualification is not legally allowed to perform the examinations himself. An additional certificate (issued by the occupational health practitioner or occupational medicine practitioner) should then be provided.

8.4.4. Medical certificates from international diving doctors

Some divers may have completed a diving medical examination internationally before diving in South Africa. The Designated Medical Practitioner must scrutinize all these medical examinations and perform any additional examinations that are required in terms of local conditions, regulations and specific workplace risks.

Not all of these investigations need to be repeated, provided that the Designated Medical Practitioner has ascertained that:

- the examinations pertains to that specific diver (verified by a signature of the examiner AND the diver on all examinations)
- the examinations were performed by an appropriate medical practitioner (e.g. diving medical practitioner in another country)
- the examinations comply with appropriate quality and validity requirements
- Any X-ray examinations must be accompanied by the original X-ray plates OR a report issued by a specialist radiologist.
- The physical examination shall always be repeated.

The DMP may then issue a valid medical certificate based on these examinations and those additional examinations that may be needed. Clear procedures in the operations manual will provide transparency.

8.4.5. Extensions of fitness

The fitness of a diver for diving work is certified for a maximum of 12 months. This period may however be shortened for specific reasons (e.g. 3-monthly follow-up of blood pressure) at the discretion of the examining Designated Medical Practitioner. The Designated Medical Practitioner that has provided this restriction in the duration of fitness may extend this fitness if based on good medical principles and the initial concerns were adequately addressed. This may, for instance, happen after discussions between the level 2 Designated Medical Practitioner and the Designated Medical Practitioner initially performing the examination and issuing the restriction.

No medical certificate may be extended beyond the maximum period of 12 months. Divers that are planning to work in the period close to expiry of their medical certification should ensure that they submit for a medical examination prior to leaving on such diving project, or alternatively ensure that they can obtain a diving medical examination prior to the expiry thereof.

8.4.6. Appeal against fitness decisions

All persons found unfit for diving, or fit with a restriction, may appeal such a decision if he or she feels there is a reason providing sufficient grounds for such an appeal. The appeal procedures are clearly explained in the Regulations.

Before appealing against the decision, it is advisable to discuss the decision with the Designated Medical Practitioner – especially the level 2 Designated Medical Practitioner. The reason for the unfitness or restricted fitness should be explained in plain language to the person concerned, including the explanation of results of investigations that the decision is based on. This requires designated medical practitioners to ensure that appropriate investigations are performed before a decision is made.

The appeal procedure should NOT be used to cover the costs of non-routine or expensive specialist investigations and examinations. When these are indicated, it should be performed BEFORE the diver is certified unfit or fit with restrictions. Discussion with other medical colleagues may be indicated. All Designated Medical Practitioners are advised to confirm all cases of unfitness with a colleague prior to declaring a person unfit.

An appeal should be accompanied by the medical certificate issued in terms of the examination, as well as the grounds for the appeal

8.5. *Medical records*

8.5.1. Records of fitness to dive examinations

The results of fitness-to-dive examinations shall be recorded in the medical file of the diver and be kept at the examining Designated Medical Practitioner in accordance with accepted medical practice prescriptions and principles. A certificate to certify the diver's fitness to dive may be provided to the diver and/

or the company, but it is essential that the particulars are entered in the logbook of the diver and stamped. Care should be taken not to divulge medical confidential information.

The level 2 Designated Medical Practitioner should request copies of these examinations (if not performed by him). This will ensure that he can provide appropriate medical support for the diving team and is intimately familiar with the medical conditions of the team. The information should be used to trend health effects related to specific risks present in the workplace. Examples of these include trending of lung function tests, hearing thresholds and blood results (e.g. Biological Exposure Indices). Many of these will need to be performed in consultation with an occupational medicine practitioner. Any abnormalities found should prompt a workplace visit and investigation, with an update of the HIRA and implementation of specific risk mitigation strategies.

8.5.2. Diving fitness registry

All designated medical practitioners performing medical examinations should forward the following information regarding examination to the Southern African Undersea and Hyperbaric Medical Association (SAUHMA):

- the date of the examination
- The period of validity of the examination
- Name of the person to whom it relates
- Passport or identity number of the person
- Whether the person is considered fit or not
- Any restrictions that may apply
- The name, address, telephone number and designation number of the designated medical practitioner who performed the medical examination

This applies to examinations for all persons covered by the diving regulations, namely divers, diving supervisors, system's technicians, instructors, etc.

8.5.3. Records of occupational health examinations

Records of occupational health assessments shall be recorded in the medical file of the person and be kept at the office of the occupational medicine practitioner. This would include records of biological monitoring and/ or records of medical surveillance.

Some of these records must be kept for extended periods, e.g. 40 years (see other regulations). A certificate to verify the diver's fitness for work (in addition to diving fitness) must be provided to the company.

8.5.4. Records of occupational diseases

Any occupational diseases should be reported in accordance with the Compensation for Occupational Injuries and Diseases Act. The diagnosis of an occupational disease also requires a workplace investigation, update of the HIRA and implementation of specific risk mitigation strategies.

8.6. Fitness on the day of diving

Although a diver may be certified as fit to dive for a period of up to twelve months, there are a number of conditions that may render a person temporarily unfit for work on a given day or for a specific period.

8.6.1. Responsibilities of the diver

No diver shall dive if he feels that he is unfit to dive for any reason.

Divers who consider themselves unfit for any reason, e.g. fatigue, minor injury, recent medical treatment, etc., will need to inform their supervisor. Even a minor illness, such as the common cold or a dental problem, can have serious effects on a diver under pressure, and should be reported to the supervisor before the start of a dive. Supervisors should seek guidance from the diving contractor's designated medical practitioner, if there is doubt about a diver's fitness.

Divers who have suffered an incident of decompression illness will need to record details of the treatment they received in their log books. They will need to show this to the supervisor responsible for the first dive after the treatment in order that an assessment can be made of their fitness to return to diving.

8.6.2. Responsibilities of the supervisor

A diver shall not dive when, at the discretion of the diving supervisor or diver, the diver is judged incapable of functioning safely and effectively under water. The supervisor may require the diver to consult with the level 2 DMP if there is any uncertainty regarding the person's fitness to dive.

The supervisor shall specifically enquire about the fitness of each person to dive and this shall be recorded in the diving log.

Due regard shall be given to the restrictions noted on the diver's fitness on the medical certificate.

8.6.3. Fitness after illness or injury

If, on account of an illness or injury (whether diving-related or not), a person has been medically unfit to take part in a diving project for a period of fourteen days or more, the person shall not be allowed to dive again or participate in the diving project in any way unless he or she furnishes the diving contractor with a medical certificate indicating the nature of his or her illness or injury and in which a medical practitioner certifies that he or she has recovered from such illness or injury.

Whenever the diving contractor feels that the illness or injury of the person is of such a nature as to make an examination by a designated medical practitioner desirable, such person shall not participate in diving work until a designated medical practitioner has certified that the person is again fit for diving work.

8.6.4. Fitness after decompression illness

Divers who have suffered decompression illness, including cases where the diving supervisor or the diver himself suspects that the diver has suffered decompression illness, shall not be allowed to dive again without consultation with the Level 2 Designated Medical Practitioner. If the Designated Medical Practitioner confirms a diagnosis of decompression illness, this will be reported as an occupational disease and noted in the diver's logbook. The diver may only be allowed to dive again after being passed as fit to dive by the Level 2 Designated Medical Practitioner. The following minimum times before re-assessment by the Designated Medical Practitioner are recommended:

8.6.4.1. Simple decompression sickness

Simple decompression sickness is extremely unlikely to present while diving within the scope of this code.

8.6.4.2. Serious neurological decompression illness

Serious neurological decompression sickness is extremely unlikely to present while diving within the scope of this code

8.6.4.3. Barotrauma of the lungs (with or without gas embolism)

Barotrauma is possible while diving within the scope of this code. It is recommended that divers be fully evaluated four to six weeks after the incident.

Note: Although decompression sickness is highly unlikely while diving under the scope of this code, divers may have performed diving work under the scope of another code of practice. The provisions provided in these other codes should then be applied before the person is allowed to dive in benign conditions.

8.6.5. Victimization

No person reporting himself as unfit for work shall be forced to work and such a person shall not be victimized in any way. A consultation with the level 2 DMP may be required and this may in certain instances occur telephonically.

No person may victimise a diving supervisor who considers a diver unfit for diving due to indisposition, physical illness or mental infirmity and such a diver shall not be allowed to participate in the diving project without being cleared by the level 2 DMP.

8.7. Fitness screening

8.7.1. Screening before diving

Each diver shall be medically screened, at the discretion of the diving supervisor, to ensure that the diver is physically fit on a day-to-day basis. This examination may be performed by the supervisor himself, who may refer the person for further medical evaluation if needed. Such a screening examination may include the person's ability to equalize, his balance and

coordination and other screening tests as prescribed by the level 2 Designated Medical Practitioner in the operations manual.

In certain high-risk areas screening for drugs of abuse should be included. This may be done at random intervals without the divers, diving supervisors or any other person involved in the diving project knowing. Such screening should however always be conducted within the guidelines and limits set in a company policy on drugs of abuse (including alcohol). Such a policy should include clear guidelines and standard procedures, including measures related to disciplinary action (when appropriate) or rehabilitation programmes and disability management (when appropriate). Labour legislation should be consulted in this regard.

8.7.2. Screening after diving

The supervisor should screen all divers after a dive and specifically enquire about any abnormal sensations or any other symptoms that may suggest injury or disease sustained during the dive. The presence or absence thereof should be clearly noted in the diving log. Any abnormalities should be reported to the level 2 Designated Medical Practitioner without delay.

8.8. Medical alert tag

Because diving under the scope of this code is not associated with an increased risk for decompression sickness, it is not compulsory for divers to wear a medical alert tag or bracelet.

8.9. Medical equipment on site

A minimum amount of medical equipment will need to be at a diving site to provide first aid and medical treatment for the dive team. This minimum will depend on the type of diving and a list of the contents of the medical kit shall be compiled in conjunction with the diving contractor's level 2 DMP. The DMP will then know what equipment and supplies are available when giving advice to a worksite. The diving contractor, in conjunction with their DMP, will need to prepare contingency plans for emergency situations.

The first aid equipment should be adequately marked to enable any person to identify the first aid kit.

A specific person should be made responsible for the first aid kit (usually the supervisor). The issue of supplies from the kit should be accompanied by an injury report and proper control of the contents needs to be maintained, including due cognizance of expiry dates thereof.

Before any dive commences, the diving contractor must ensure that the emergency equipment is ready for immediate use.

Sufficient stored quantities of medical oxygen must be available at every dive site to ensure that an emergency may be dealt with effectively. Not having enough oxygen available to manage all injured divers is not acceptable.

8.10. Flying after Diving

The dive plan will need to state that flying is avoided for a specified time following a dive because of the decrease in pressure on the diver's body caused by increased altitude and the resultant increased risk for decompression sickness – even after shallow diving.

9. Control of diving operations

The diving contractor shall maintain strict control over all diving operations and ensure that all the aspects listed in this Code of Practice are in place and complied with.

9.1. Discipline

Good discipline must continuously be maintained during the diving operation to ensure that the diving project is carried out safely. The diving project must be carried out strictly in accordance with the manner planned by the diving supervisor and the bottom time and decompression schedules chosen before the dive must be strictly adhered to.

9.2. Diving Equipment

SCUBA is the only mode of diving under this code.

This diving mode's equipment consists of the following: half mask; a dive cylinder; a regulator, consisting of a first and second stage; a buoyancy compensating device or cylinder harness; and pressure gauge indicating the remaining pressure in the dive cylinder. The 50 bar reserve, as indicated on the pressure gauge, may be considered as sufficient for an emergency supply

9.3. Water intakes, discharges and differential pressure environments

Divers are vulnerable to suction or turbulence caused by water intakes and discharges. The diving contractor will need to establish with the client whether there are any hazards in the vicinity of the proposed diving project. If there are any intakes or discharges, suitable measures will need to be taken to ensure that these cannot operate while divers are in the water unless the divers are adequately protected with a suitable physical guard. Such measures will need to be part of a work control system, such as a permit-to-work system, and could include mechanical isolation.

If any differential pressure environment is identified as a risk during the HIRA, diving should not be permitted under the scope of this code

9.4. Hazardous Marine Life

In some diving projects conducted under the scope of this code, divers may come in contact with marine life which will pose a hazard. Prior to commencing diving operations it should therefore be established if there is any hazard of this type.

If hazardous marine life is present then suitable emergency and contingency plans should be drawn up in consultation with the level 2 Designated Medical Practitioner to deal with its effects.

9.5. *Emergency and contingency plans*

Before a dive commences, all members of the diving team must be systematically and thoroughly informed and trained with regard to the procedures to be followed in case of an emergency.

This is usually done in the form of induction training and the “toolbox talk”.

9.5.1. Diving Emergencies

The diving contractor's operations manual should contain a section laying out the actions required of each member of the diving team in the event of a foreseeable emergency occurring during operations.

The following list, which is not exhaustive, identifies the type of possible emergencies to be considered:

- Dealing with an injured or unconscious diver: both in the water and on the surface
- Provision of recompression therapy in the case of a gas embolism
- Communication with emergency services, local medical facilities and hospitals
- Providing first aid
- Faulty or broken equipment

Specific checklists should provided whenever appropriate to facilitate management in an emergency

9.5.2. Standby diver

Whenever a standby diver is required (in case the supervisor does not supervise the dive from the surface of the water), the standby diver must be adequately dressed, checked and ready to go with mask off and have adequate diving equipment should a rescue become necessary.

If the supervisor supervises the dive from the surface of the water, two divers may be buddied up and serve as the standby diver for each other.

9.5.3. Recovery of unconscious diver

All dive sites shall have a means of recovering an unconscious or injured diver from the water safely and effectively in a timely manner.

9.6. *Medical assistance*

9.6.1. Level 2 Designated Medical Practitioners

The diving contractor shall ensure that arrangements are made with one or more level 2 Designated Medical Practitioners, either with the Designated Medical Practitioners directly or with a medical facility employing Designated Medical Practitioners whenever diving projects are planned.

The operations manual should clearly indicate the responsibilities of the designated medical practitioner and the extent of involvement in diving operations. The following guidelines should be considered:

- Irrespective of the type of diving performed, each diving team should have reasonable access to the advice of a designated medical practitioner
- Whenever a significant injury occurs during a diving project, the diving supervisor is required to follow the company protocol. The Designated Medical Practitioner must be contacted in all cases and the injury should be recorded as an occupational injury on duty.

9.6.2. Emergency medical services

Certain circumstances may require the diving contractor to make use of emergency services.

The contact number for the local emergency services (or the national emergency number) should be readily available to the diving team.

The specific procedures for contacting emergency services should be clearly outlined in the operations manual and checklists should be provided to facilitate appropriate management in an emergency.

9.7. *Working periods*

Working periods should not be extended or prolonged to an extent that health and safety is compromised. It should be remembered that accidents are more likely when personnel work long hours because their concentration and efficiency deteriorate and their safety awareness is reduced.

When breaks are taken in the course of a diving operation, the diving contractor will need to ensure that the health and safety is not compromised in any way and that qualified and experienced personnel are available to act as reliefs during these breaks. This is particularly important in relation to supervisors whose responsibilities are often onerous and stressful. Any such handovers of responsibility should be recorded in writing in the operations log.

9.8. Language during operations

In an emergency, personnel tend to revert to their own language. If team members do not speak the same language, this can cause an obvious hazard. The dive plan should state the language to be used during the project, and all team members will need to be able to speak to each other fluently and clearly at all times, particularly during emergencies.

9.9. Termination of dive

At the onset of any sign of malfunction of equipment or sign or symptom of distress, the diver shall, when possible, notify the dive supervisor, the dive tender, and any diving buddy by an appropriate signal and terminate the dive.

9.10. First Aid and Medical Equipment

Adequate first-aid and medical equipment will be kept on site.

Oxygen on site shall be of sufficient quantity to transport an injured diver to a treatment facility breathing 100% oxygen at a flow-rate of 25l/min.

10. Records

10.1. General

All records required in terms of the Regulations must be kept and be available for inspection.

10.2. Planned maintenance records

Records of the planned maintenance system and the maintenance procedures undertaken must be available for inspection.