



INDUSTRY GUIDANCE NOTE

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GUIDELINES TO SAFE DIVING OPERATIONS

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1. SUMMARY

- a) This Industry Guidance Note (IGN) published by the Safety, Health and Environment National Authority (SHENA), provides relevant information on the safe operating practices and procedures recommended for the industry. It also places accountability on all Principals, Employers, Operators, Self-Employed Persons and Users to ensure, that diving practices always adhere to good industry practices and, as a minimum, follow the recommendations provided herewith.
- b) The guidance document highlights Negara Brunei Darussalam’s applicable laws and distinguishes between commercial diving offshore, inshore, and recreational diving. It provides clarity on the duties and responsibilities of those involved in the diving operations as well as the need for a suitable diving plan to be in place for every dive. Risk assessment is required and shall be a consideration for all forms of diving and be implemented onsite. The guidance also covers the requirement of emergency procedures and arrangements that should be in place, as well as the responses that would be required in any eventuality.
- c) The document also summarizes the need to inspect equipment and appropriately maintain all critical equipment for the dive under a fit for purpose planned maintenance system. Record keeping is recommended and shall be implemented to ensure that all actions are tracked and that divers maintain personal logs as well as diving operations logs that should be maintained by the diving contractors.
- d) Guidance is also provided on the execution of the dive and highlights the need to carry out post-dive checks, which cover the diver, equipment, and the arrangements in place.

2. INTRODUCTION

- a) The Industry Guidance Note (hereinafter referred to as IGN) “Guidance for Safe Diving Operations” serves to provide guidance to the Principals, Employers, Operators, Self-Employed Persons and Users on diving safety and information pertaining to its associated equipment, planning, execution, risk management, inspection, and emergency response.
- b) This includes all organizations whose employees are involved in the preparation, use, and maintenance of diving equipment, whether owned by them or not. All diving operations involving diving equipment must be properly risk assessed, planned, and implemented by competent persons, appropriately supervised, and carried out safely.

2.1 WHAT IS DIVING OPERATION

- a) Diving is considered to be a high-risk activity in the project plan. The activity involves a unique combination of occupational health and safety issues performed in an unforgiving environment where errors can quickly develop into fatal accidents. However, the risks can be significantly reduced by adhering to the regulations, standard operating procedures, specific rules, and by adopting established and acceptable practices. Risks to each individual must be effectively managed if diving is to be conducted in a safe and efficient manner.
- b) For members of the public undergoing recreational diving, proper training by professional diving instructors must be undertaken and periodically refreshed.

3. PURPOSE

- a) The purpose of this IGN is to provide guidance to Principals, Employers, Operators, Self-Employed Persons and Users on diving operations safety, to ensure the prevention of dangerous occurrences and fatal incidents occurring from the diving activity.

4. APPLICABLE LAWS

- a) The Workplace Safety and Health Order, 2009 and the Workplace Safety and Health (General Provisions) Regulations, 2014 place duties on persons and employers who own, operate, or have control over any equipment;
- b) The Workplace Safety and Health (Risk Management) Regulations, 2014 requires the diving activity to be risk assessed;
- c) The Workplace Safety and Health (Incident Reporting) Regulations, 2014 requires that all incidents or accidents shall be reported to the Authority by raising the Initial Incident Notification (IIN) and shall be investigated accordingly;
- d) The Workplace Safety and Health (Facilities) (COMAH) Regulations, 2013 requires the appropriate marine vessel e.g., DP Offshore Support Accommodation Vessel, to have a Safety Case certificate in place. When the vessel enters the 500m zone of the offshore fixed facility, a Joint Safety Case certificate shall be in place.
- e) The Infectious Disease Act, 2010 shall require the Employer and/or Employees to comply with the following Sections of the Act:
 - i. Section 21: Control of occupation, trade, or business;
 - ii. Section 22: Certain persons not to act in manner likely to spread disease set out in the Fifth Schedule.

NOTE:

- i. SCUBA diving SHALL NOT be conducted in a commercial diving project as the risk IS NOT As Low as Reasonably Practicable (ALARP).
- ii. Divers using SCUBA diving equipment SHALL NOT be mobilized to a commercial working environment such as inspection, maintenance, removal, construction, or other modification of structures or material including and not limited to the removal of fishing nets that are impinging the subsea structures or equipment.
- iii. Commercial diving SHALL NOT be allowed without the provision of adequate communication system including black box and video capability between the Divers and Diving Supervisor.
- iv. Commercial diving SHALL ensure that the surface primary and secondary gas supplies are adequately available.

5. TERMS AND DEFINITONS

TERMS	DEFINITION
ADAS	Advanced driver-assistance systems are groups of electronic technologies that assist drivers in driving and parking functions.
AODC	The Association of Diving Contractors (AODC) is the non-profit led body representing diving contractors working Inland / Inshore in the UK and Ireland. The aim of this body is to 'Promote Safer Commercial Diving'.
At work	As an employee or as a self-employed person. The phrase covers divers who dive as part of their duties as an employee and divers who are in business on their own account during the time that they devote themselves to work as a self-employed diver for commercial purposes.
Diver	A person at work who enters a liquid and breathes gas at greater than atmospheric ambient pressure to survive
Diving project	Any activity, made up of one or more diving operations, in which at least one person takes part or will take part as a diver and extends from the time when that person, or the first such person, commences to prepare to dive until that person, or the last such person, has left the water
Diving operation	A diving operation identified in the diving project plan
DMT	Dive Medical Technician. To be an accredited DMT, the incumbent shall complete the IMCA advanced life support course. The purpose to enable the course participants to better position in term of critical analysis skills as well as learning to respond and manage medical emergencies while working under the medical chain of command.
DP	Dynamic Positioning is a computer-controlled system to automatically maintain a vessel's position and heading by using its own propellers and thrusters. Position reference sensors, combined with wind sensors, motion sensors and gyrocompasses, provide information to the computer pertaining to the vessel's position and the magnitude and direction of environmental forces affecting its position.
HRF	Hyperbaric Rescue Facility provides a practical hyperbaric rescue solution for diving operators working in remote locations. It has been designed and constructed for ease of transportation and mobilization at any suitable shore side facility. The system consists of single chamber divided into two compartments - main lock and entry lock. Main lock can accommodate up to 24 divers.

IMCA	International Marine Contractors Association
Inland / Inshore Diving	Inside territorial waters (generally within 12 nautical miles from shore), including docks, harbors, anchorage, canals, culverts, rivers, estuaries, lakes, reservoirs, dams, flooded tunnels, and tanks.
JHA or JSA	Job Hazard Analysis or Job Safety Analysis, a safety management tool that can define and control the hazards in sequential steps associated with a job or procedure
LARS	Launch and Recovery System - a means of the Diver accessing and exiting from the water in a safe and controlled manner.
Lifeline	A line attached to a diver, used to tether, and communicate with a diver from the surface through line signals and is capable of supporting the diver's weight
Limiting line	A line shown in some decompression tables which indicates time limits (bottom times) beyond which the use of the decompression schedule is less safe.
PMS	Planned Maintenance System — a systematic, recorded, and verifiable equipment maintenance regime, carried out by a competent person, to ensure that plant and equipment used in diving operations are properly maintained according to the manufacturers recommendations to ensure that it is safe while being used. Once the work is done, the task is recorded as complete.
PTW	Permit to Work — A Permit to Work System is a standard operational procedure used by organizations to issue documented permission to perform tasks that are considered hazardous or non-routine. A permit to work form consists of specific instructions of the nature of the job, the time and place along with adequate information of critical safety procedures to follow.
Personal through water communications	Recreational divers usually use battery-powered communications systems to talk to each other, however, this is not commonly used for commercial diving operations.
Pull	A signal used on a lifeline of the Diver; the Diver to tender or tender to Diver makes a slow, deliberate pull action on the lifeline to gain attention or communicate between each other.
Quick Release Mechanism	A readily operated mechanism that enables the immediate release (e.g., Diver's equipment) from the secured position by a single operation of one hand, but which is designed to minimize the risk of accidental release.
Risk Assessment	The process of estimating the magnitude of risk and evaluating precautions that can be taken to prevent harm and deciding whether or not the level of risk is tolerable.

Repetitive Dive	Any repetitive dive conducted before you have completely off gassed from any previous dive or dives. The amount of actual dive time must be considered as already having been spent at a given depth for a planned repetitive dive.
ROV	Remotely Operated Vehicle. A Remotely Operated Underwater Vehicle is a <u>tethered</u> underwater mobile device, commonly called underwater robot.
SCE	Safety Critical Equipment
SCUBA	Self-Contained Underwater Breathing Apparatus. Open circuit diving equipment that supplies the Diver with breathing gas from the cylinder(s) carried by the Diver.
Standby driver	A diver fully dressed and equipped to enable immediate entry into the water to provide aid or assistance to the working Diver.
SPHL	Self-Propelled Hyperbaric Lifeboat. In the event of a major incident, the Self-Propelled Hyperbaric Lifeboat (SPHL) is to excavate and rescue the divers from the dive support vessel while they are under a hyperbaric condition.
SSDE or SSBE or SSBA	Surface Supplied Diving Equipment or Surface Supplied Breathing Equipment or Surface Supplied Breathing Apparatus that supplies breathing gas at the required pressure for depth, through a Diver's hose to a diver from plant at the surface.
SWL	Safe Working Load is the older term of working load limit. It is the breaking load of a component divided by an appropriate factor of safety giving a safe load that could be lifted or be carried.
Toolbox Talk – TBT	A meeting to ensure that everyone involved with the activity, clearly understands what the job entails along with its hazards and the precautions to be put in place.
WLL	Working Load Limit is the maximum load that may routinely be applied to an assembly or component in straight tension.

6. SCOPE AND REQUIREMENTS

- a) The scope of this guidance applies to and is in relation to any diving activity as per the following:
- i. Commercial diving – Offshore;
 - ii. Commercial diving – Onshore / Inland;
 - iii. Recreational diving – Offshore, Onshore / Inland.
- b) Diving activity is made up of one or more diving operations, in which at least one person takes part or will take part as a diver and extends from the time when that person, or the first such person, commences to prepare to dive until that person, or the last such person, has left the water, chamber or other environments in which they dive, or any part of the dive, took place and has completed any requisite decompression procedures.
- c) The scope of any diving activity covers persons diving or surface swimmers, conducted within their sphere of influence or responsibility using:
- i. Air;
 - ii. NITROX (breathing gas composed of a mixture of nitrogen and enriched oxygen);
 - iii. HELIOX (breathing gas composed of a mixture of helium and oxygen);
 - iv. Saturation diving (diving for periods long enough under pressurized environment);
 - v. Atmospheric Diving Suits (small one-person articulated anthropomorphic submersible suit of armor);
 - vi. Observation Diving; and
 - vii. Remote Operated Vessel (ROV) in support of diving operations.

6.1 COMMERCIAL DIVING – OFFSHORE

- a) The scope of commercial diving at Offshore will be as follows:
- i. Diving operation at sea in Brunei designated waters undertaken in connection with oil and gas offshore installations, structural constructions, wells, and pipeline works;
 - ii. Where closed bell* or saturation diving techniques are used both offshore and inshore; and
 - iii. Where diving takes place from vessels maintaining station. By the use of dynamic positioning (DP) vessel for all dives shallower than 50 meters or much deeper. Surface air diving is utilised from DP vessels as well as saturation diving.

Note:

* Diving bell is a submersible compression chamber used for transferring divers under pressure to and from the worksite.

Saturation diving is the diving technique where the Diver has reached the full saturation state for the pressure and breathing mixture being used. When this state has been reached, the time required for decompression is not further increased in relation to the duration of the dive.

- b) The required size of the dive team will depend on the risk assessment, which should consider the number of hours to be worked each day, the type of diving, the diving apparatus, and the techniques

to be used, any decompression requirements, the surface and underwater plant and safe systems of work being used, and the appropriate number required for safety.

- c) As per Industry Standards or International Marine Contractors Association (IMCA) Standards, the minimum number for surface diving activity is five (5) persons i.e., Dive Supervisor, Diver, Standby Diver, Tender for Diver and Tender for Standby Diver.

6.2 COMMERCIAL DIVING – INSHORE / INLAND

- a) The scope applies to all diving projects conducted in support of civil engineering or marine-related projects, including but not limited to underwater inspection, construction activities or fish farming as per the following type of dives:
 - i. Inshore within Brunei territorial waters (generally 12 nautical miles from the low water line);
 - ii. Inland in Brunei, including in docks, harbors, rivers, culverts, canals, lakes, ponds, reservoirs, and any other man-made water-filled bodies; and
 - iii. In tanks or swimming pools.
- b) The required size of the dive team will depend on the risk assessment, which should take into account the number of hours to be worked each day, the type of diving, the diving apparatus, and the techniques to be used, any decompression requirements, the surface, underwater plant, and safe systems of work being used, and the appropriate number required for safety. For guidance, the minimum number for a one dive operation is five (5) persons, consisting of 1 x Diver, 1 x Standby Diver, 2 x Diver Attendants and 1 x Dive Supervisor.

6.3 RECREATIONAL DIVING – OFFSHORE, ONSHORE, AND INLAND, INCLUDING TRAINING

- a) Recreational diving or sport diving is diving for leisure and enjoyment, usually when using scuba equipment. In this respect, the diving risk is managed by training the Diver in a range of standardized procedures and skills appropriate to the equipment the Diver chooses to use and the environment in which the Diver plans to dive.
- b) The full scope of recreational diving includes:
 - i. Breath-hold diving and surface supplied diving — particularly with lightweight semi-autonomous airline systems such as scuba — and technical diving (including penetration diving), as all of these are sometimes done for recreational purposes, but common usage is mostly for open water scuba diving with limited decompression;
 - ii. Scuba diving implies the use of an autonomous breathing gas supply carried by the Diver, the self-contained underwater breathing apparatus which provides the name for this mode of diving. Scuba may be the simpler and more popular open circuit configuration or one of the more complex and expensive closed or semi-closed rebreather arrangements. Rebreathers used for recreational diving are generally designed to require a minimum task loading on the Diver and as far as possible to fail safe and give the Diver ample warning to bail out to open circuit and abort the dive.

- c) The reasons to dive for recreational purposes are many and varied, and many divers will go through stages based on their personal reasons. Among the reasons are:
- i. Tourism and sight-seeing, including visiting a variety of places with different things to see;
 - ii. Extreme sport aspect: some divers wish to explore their personal limits and abilities under challenging conditions. This includes some competitive underwater sports and environmental and physiological challenges;
 - iii. Commonly, the naturalist and underwater life observers:
 - Exploration of the unexplored aquatic environment, the marine shipwrecks, etc.
 - Recreational stress management diving that can produce health benefits of mood improvement.
- d) The recreational diver training organizations shall offer the basic diver training in stages leading to certification by the issuance of diver certification card;
- e) The scope of recreational diver training courses ranges from minor specialties, which require a classroom session and an open water dive and subsequently to complex specialties. The duration may take several days to weeks and require several classroom sessions, confined water skills training and practice, and a substantial number of open-water dives, followed by a rigorous assessment of knowledge and skills;
- f) Recreational diver training can be divided into entry level training, which are those skills and knowledge considered essential for the Diver to dive unsupervised at an acceptably low level of risk by the certifying agency, and further skills and knowledge which allow better performance and extend the environmental capacity and equipment choices of the diver;
- g) In term of many recreational diving activities, and equipment and environmental specialties which must require training from the entry-level courses cover the following activities:
- i. Snorkeling — Swimming at the surface with a diving mask and snorkel to view the shallow underwater environment;
 - ii. Free-diving (also called skin diving) — Swimming below the surface on breath-hold;
 - iii. Identifying, surveying, and monitoring sea life and freshwater life that may be associated with marine archeology or underwater photography, science project and marine biology;
 - iv. Rescue diver — Usually considered a desirable diving skill, but may be part of the requirements and function of volunteer safety divers, and generally a requirement for any dive leadership certification;
 - v. Underwater navigation — Enhanced competence at following and recording underwater routes, generally excluding the use of a guideline, which is considered a separate competence, and using a compass and landmarks;
 - vi. Underwater photography - Use of photographic equipment designed or modified for underwater use for recording the environment or artistic purposes;
 - vii. Underwater search and recovery knowledge and procedural skills for conducting underwater searches and recovering relatively small objects from underwater;
 - viii. Underwater videography — Use of video recording equipment designed or modified for underwater use for recording the environment or artistic purposes.

6.4 DIVING EQUIPMENT

- a) Diving equipment means any work equipment for diving that includes diving accessories and attachments used for diving operation, not limited to commercial purpose shall follow the Industry Standards, Among the examples of the diving equipment would consist of but are not limited to:
- i. Personal diving equipment includes and is not limited to quality diving helmet and mask (Figure 1), waterproof diving hood (Figure 2), diving full mask and half mask (Figure 3), quality wetsuit (Figure 4), quality diving footwear - fins (Figure 5), diving cylinder (Figure 6), and cylinder valves (Figure 7). For commercial diving, the standard personal diving equipment include diving helmet and diving harnesses;
 - ii. Tank bangers for communication (Figure 8);
 - iii. Regulator and decompression chamber (Figure 9);
 - iv. Depth Gauge, Submersible Pressure Gauge (SPG) and Compass (Figure 10);
 - v. Minimum allowable air/gas supply for the Diver and the use of air chamber of the saturation system shall comply with IMCA D050 standards. Note: Vessel air and industry air compressors are not acceptable;
 - vi. Independent sufficient air supply for the standby diver;
 - vii. Emergency air supply for the diver and standby diver;
 - viii. Suitable breathing apparatus for the diver and standby diver;
 - ix. Emergency bailout cylinder for the diver and standby diver (Figure 13);
 - x. Safe means to enter the water;
 - xi. Safe and suitable means to exit from the water and recover an unconscious diver;
 - xii. First aid and medical equipment (Figure 14).



Figure 1: Commercial diving helmet and mask



Figure 2: Waterproof diving hood

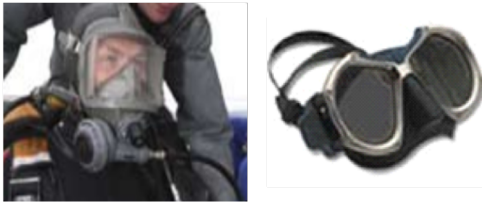


Figure 3: Diving full mask & half



Figure 4: Diving wetsuit



Figure 5: Diving footwear - Fins



Figure 6: Diving cylinders



Figure 7: Cylinder valves (J-valve, Y-valve & H



Figure 8: Tank bangers

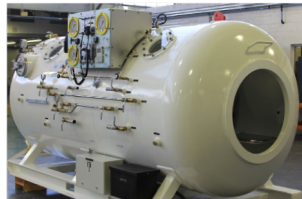


Figure 9: Regulators and Diving Decompression Chamber



Figure 10: Depth Gauge, Submersible Pressure Gauge and Compass



Figure 11: Parachute lifting bags



Figure 12: Hydraulic tools & Underwater breakers



Figure 13: Emergency bailout cylinder



Figure 14: First aid and medical equipment

7. DUTIES

7.1 GENERAL

- a) Shall ensure the responsibilities and accountabilities of all the persons associated with the diving activity are clearly defined, communicated, and well understood;
- b) Every person in the diving company, whom to any extent shall be responsible for, has control over or is engaged in a diving activity, or whose acts or omissions could adversely affect the health and safety of persons involved in such an activity, shall take such measures as is reasonably practicable for a person in his position should take to ensure that the applicable regulations and standards are complied with at all times.

7.2 DIVING COMPANY OR DIVING CONTRACTOR

- a) The diving contractor should ensure as a minimum that:
 - i. The diver wears a full-face mask, which should be fitted with either an oral-nasal or a mouthpiece;
 - ii. Divers undertaking commercial diving work shall use a full diving helmet or a soft hat with hard shell for protection;
 - iii. The diver carries an independent secondary source of breathing gas (for example, a bailout cylinder);
 - iv. Each diver shall have an independent primary gas supply and secondary breathing gas supply that can be common to both divers;
 - v. Each diver shall also have an emergency gas supply (bailout cylinder) capable of supplying enough gas to supply to the diver for 1 minute of every 10m of umbilical the diver is utilizing;
 - vi. Within a commercial diving activity, divers SHALL NOT use SCUBA while engaging in commercial diving activities. Divers shall utilize SSBA, and the diver's umbilical shall be tended at all times;
 - vii. There is a lifeline from the diver to the surface. This should be tended. Two divers connected by a buddy line need only be provided with one tended lifeline; and
 - viii. Appropriate two-way communication with the diver is provided.
- b) Shall ensure that the diving activity is planned, risk assessed to As Low as Reasonably Practicable (ALARP), mitigated with all adequate measures and conducted in a manner which protects the health and safety of all persons taking part in that activity;
- c) Shall ensure that, before the commencement of the diving activity, a diving activity plan is prepared in respect of that activity in accordance with applicable regulation and that the diving operation plan is thereafter updated as necessary during the continuance of the activity;
- d) Shall produce the specific work step by step standard operating procedure for all activities regarding the scope of work.

- e) Before the commencement of any diving operation, the diving contractor shall:
- i. For any commercial diving operation, appoint a qualified diving supervisor certified by IMCA / ADAS / AODC to supervise that operation;
 - ii. Make a written record of that appointment;
 - iii. Ensure that the person appointed is supplied with a copy of any part of the diving activity plan which relates to that operation;
 - iv. Seek out and have available the current weather report for the duration of the operation; and
 - v. As soon as possible after the appointment of a supervisor, provide that supervisor with a written record of his appointment.
- f) Shall ensure that there are sufficient people with suitable competence to carry out safely and without risk to health, both the diving activity and any action (including the giving of first aid) which may be necessary in the event of a reasonably foreseeable emergency connected with the diving activity. For commercial diving, the following requirements shall be observed:
- Minimum personnel for an air diving project shall be five (5) i.e., 1 Supervisor, 1 Diver, 1 Standby Diver and 2 x Dive Tenders;
 - At least one person should be qualified as a DMT (Dive Medical Technician). If only one DMT is available, he or she should not dive, or he or she should complete the standby duties.
- g) Shall ensure that suitable and sufficient plant /equipment is available whenever needed to carry out safely and without risk to health both the diving activity and any action (including the giving of first aid and oxygen) which may be necessary in the event of any reasonably foreseeable emergency connected with the diving activity;
- h) Shall ensure that the standard operating and maintenance procedures are in place, and any plant/equipment made available, fit for purpose, and is maintained in a safe working condition;
- i) Shall ensure that the emergency preparedness procedures and rescue plan are in place and periodically tested;
- j) Shall ensure, so far as reasonably practicable, that any person taking part in the diving activity complies with the requirements and prohibitions imposed on him by or under the relevant statutory or regulatory provisions and observes the provisions of the diving activity plan;
- k) For commercial diving, shall ensure formal risk assessments are to be conducted and as required, the client's permit to work system is fully complied with, and its precautions are effectively implemented. All work condition changes shall stop the activity, shall be re-assessed, and permit to work system measures shall be reviewed;
- l) Shall ensure all simultaneous activities are managed to ensure the safety of the diving operation at all times;
- m) Shall ensure that a record containing the required particulars is kept for each diving operation as well as a record of diving equipment; and

- n) Shall retain the diving operation record in his / her possession for at least two (2) years after the date of the last entry in it.

7.3 DIVER(S)

- a) Shall be suitably qualified for the work they intend to undertake. A diving qualification would not be required by persons under training or persons providing emergency medical treatment in a hyperbaric chamber.
- b) Shall ensure works are performed in accordance with the approved procedures and diving plan;
- c) Shall ensure regular communications are maintained with key personnel at the worksite, offshore or inshore installation, etc.;
- d) Shall report any plant/equipment defects or deficiency to the superior;
- e) Shall maintain adequate records and logs of events;
- f) Shall ensure reporting of job progress and operational issues is made to the relevant personnel onshore and offshore;
- g) Shall strictly follow all the measures described in the Permit to Work (PTW) system. All condition changes shall be reported immediately to the Dive Supervisor;
- h) Shall not dive if he is aware of any pre-medical condition which makes him unfit to dive;
- i) Shall observe the emergency preparedness procedures or rescue plan; and
- j) Shall intervene in any unsafe acts or unsafe situations that have the potential to impact his colleagues.

8. PLANNING

8.1 DIVING PLAN

- a) In planning any diving operation, the identification and assessment of risk is key to identifying the most appropriate equipment and method for the job.
- b) The complexity of the diving plan and the extent of the resources used to manage risk must reflect the diving operation's complexity and difficulty.
- c) The diving plan should be split into individual tasks. Each individual task (that makes up the complete diving operation) is then further split into the necessary steps to complete each particular task. In this way, potential hazards can be identified, and a risk assessment can be conducted, including the identification of controls and recovery measures.
- d) All diving operations involving diving equipment must be:
 - (i) Properly planned by a competent person;
 - (ii) Appropriately supervised by a qualified diving supervisor;
 - (iii) Carried out in a safe manner (such as diving plan, risk assessment, toolbox talk); and
 - (iv) In possession of relevant permit to work as required.
- e) For guidance on conducting the risk assessment, reference should be made to the Workplace Safety Health Order (Risk Management) Regulations, 2014.
- f) In line with the Client or Facility HSE requirements, Permit to Work (PTW), relevant Risk Assessment Process (e.g., Job Hazard Analysis – JHA or Job Safety Analysis - JSA) and Rescue Plan shall be established and effectively implemented in addition to the diving plan.
- g) Approved lifting plan shall be established. Communication shall be a dedicated system to all cranes or winch operators, preferably through a hard-wired communication system.

8.1.1 MOBILIZATION PLAN

- a) When a contract is established for the diving scope of work, the process for managing mobilization should be in place with an opening to contract mobilization audit.
- b) The plan should ensure that the mobilization is carried out safely, efficiently, and timely. It involves reviewing the work scope objectives followed by detailed logistics and engineering pre-planning, complete with the risk assessment and assurance process.
- c) The mobilization plan will address such items as:
 - i. Project work scope;
 - ii. Pre-mobilization meetings;
 - iii. Third-party contractor audits;
 - iv. Site safety planning and auditing;

- v. Project HSE plan review;
- vi. Designation of responsibilities;
- vii. Third-party contractor integration and management during the mobilization;
- viii. Detailed mobilization schedule including the equipment mobilization sequence and the supporting logistical requirements;
- ix. Management of change during the mobilization;
- x. Communications during the mobilization;
- xi. Project and vessel/worksites inductions;
- xii. The onboard management of non-vessel personnel;
- xiii. Emergency and contingency plans;
- xiv. Availability of all required documentation;
- xv. Requirement for a documented acceptance and sign-off process.

8.1.2 DEMOBILIZATION PLAN

- a) At the completion of a contract, the process for managing demobilizations should be in place and also open to an audit;
- b) The plan should ensure that the demobilization is carried out in a safe, efficient, and timely manner;
- c) The demobilization plan will address items such as:
 - i. Demobilization meetings;
 - ii. Third-party contractor audits;
 - iii. Site safety planning;
 - iv. Project HSE plan review;
 - v. Designation of responsibilities;
 - vi. Third-party contractor integration and management during the demobilization;
 - vii. Vessel / worksite deck plans: current and final;
 - viii. Detailed demobilization schedule including the equipment demobilization sequence and the supporting logistical requirements;
 - ix. Management of change during the demobilization;
 - x. Communications during the demobilization;
 - xi. Vessel / worksite induction;
 - xii. The onboard management of non-vessel personnel;
 - xiii. Emergency and contingency plans;
 - xiv. Capturing of as built and other key project deliverables;
 - xv. Performance data.
- d) There may be a requirement for a documented acceptance and sign-off process by the main contractor, client, and some third-party companies during the demobilization.

8.2 DIVING PROCEDURES

- a) Diving Procedures shall be written in compliance with the applicable regulations and industry standards, the contractors and legislative expectations, policies, and industry best practices;
- b) Hold points should be included in procedures where there is a requirement for specific signed authorization for work to continue (e.g., completion of safety briefing, toolbox talk, identification of subsea equipment, valves, flanges, etc. and receipt of key documentation such as permits and isolation certificates, etc.);
- c) Scope of work must be clearly defined in order to facilitate timely preparation and issue of procedures;
- d) The responsibility for the procedure owner shall include:
 - i. Review and comment of the draft by the contractor and then issued to the client for review and approval process;
 - ii. Final review, approval, and issuance before work can commence.
- e) Diver communications is an important aspect where most of the basic hand signals or hard wire communications or lifeline signals are common to most commercial and recreational diving operation and training agencies. This must be included in the company procedure;
- f) Communication protocol when utilizing winches or cranes must be included in the company lifting and crane operation;
- g) The company procedures for self-rescue in an out of air situation and for bringing an unresponsive casualty to the surface shall also need to be established, tested and maintained with an emergency response plan and a hyperbaric rescue facility;
- h) The company procedures shall define the diving methods, equipment, and hazards determined to ALARP as part of the risk assessment. The following conditions may lead to restrictions being imposed on the diving operation:
 - i. Reduced or impaired surface and sub-surface visibility;
 - ii. The presence of contaminants in the water or around the dive site;
 - iii. Obstructions, both above and below water;
 - iv. The presence of dangerous marine life;
 - v. Strong currents;
 - vi. Working near water intakes and/or discharges;
 - vii. Pressure differentials - pipelines, dams, etc.;
 - viii. Minimum gas / air quantities at work sites including divers gas chambers, diving bells, habitat, and hyperbaric rescue facility (HRF);
 - ix. Minimum quantity of personnel involved within a dive team (air or saturation);
 - x. Maximum allowable bottom times;
 - xi. Use of self-propelled hyperbaric lifeboat (SPHL) for saturation diving;
 - xii. Requirement of a chamber to be onsite when the dive is at a certain distance / time away from the worksite;
 - xiii. Rest periods for divers;

- xiv. Lifting operations being undertaken on/near the dive site;
 - xv. Communication protocol when utilizing winches or cranes;
 - xvi. Vessel movements around the dive site;
 - xvii. Environmental considerations, such as monsoon weather; and
 - xviii. Night diving.
- i) Night diving operations are restricted by surface visibility. Diving operations to be carried out during the hours of darkness (or restricted visibility) will need to be the subject of a specific risk assessment. They will require suitable surface lighting of the worksite to ensure no 'dark area'.

8.3 RISK ASSESSMENT

- a) A risk assessment must be carried out to identify site-specific hazards and their risks and identify the controls and precautions necessary to safely undertake these tasks. All aspects of the work, including the mobilization, demobilization, onshore trials, and transit to site, must be risk assessed As Low as Reasonably Practicable (ALARP).
- b) So-called 'generic procedure' may cover some areas of the work (e.g., laying concrete mats, water blasting, etc.). These procedures must be examined as part of the overall risk assessment unless it can be shown that they have been independently risk assessed.
- c) The generic procedure and its associated independent risk assessment must be available for review during the job-specific risk assessment. The risk assessment team must ensure that the generic procedure is applicable to the work in hand and any variations are identified and included as part of the overall risk assessment.
- d) Where the same activities have been carried out previously, it is permissible to use previous risk assessments as guidance as long as no other changes to the worksite have been implemented.
- e) The risk assessment should cover the following, however, not be limited to the following considerations:
- i. Weather conditions;
 - ii. Water flow, intakes, discharges, and water currents including differential of pressure;
 - iii. Water quality;
 - iv. Visibility at the surface and below the surface;
 - v. Simultaneous activities, as applicable;
 - vi. Use and type of equipment;
 - vii. Communication arrangements;
 - viii. Diver safety equipment;
 - ix. Lock Out Tag Out (LOTO) control as part of ship husbandry;
 - x. Emergency response and readiness;
 - xi. Competency of the team.
 - xii. Remotely Operated Vessel (ROV) operation;
 - xiii. Habitat requirements;
 - xiv. Umbilical management plan when diving from a DP vessel;
 - xv. Risk with respect to Surface Supplied Mixed Gas Diving — Heliox;
 - xvi. Integrity of mobile and portable surface supplied system.

8.3.1 RESPONSIBILITIES

- a) The diving contractor who is accountable for the work has the responsibility for the occupational safety and health risk assessment. If the contractor is changed after the initial risk assessment for any reason, then the new contractor must re-risk assess the work and ensure controls are suitably implemented onsite.

8.3.2 PERSONNEL INVOLVED

- a) The risk assessment activity should be attended by any person whose acts or omissions could adversely affect the:
 - i. Health and safety of persons engaged in the diving project;
 - ii. Contractor's / company's assets;
 - iii. Operational / execution performance.
- b) The necessary personnel must be available for all phases of the risk assessment for the scope of the diving operations. As examples, this can include personnel from the following:
 - i. Operations, installation, worksite, area management with intimate local knowledge of the management and control systems which are to be utilized during the work;
 - ii. Subcontractors (e.g., commissioning, pumping, rock dumping, grouting, survey, dredging, crane, haulage, security, etc.);
 - iii. Specialists (e.g., marine, aviation, diving, lifting, etc.);
 - iv. Third-party operators (including drill rigs, accommodation, other operators).
- c) If the correct personnel are not present, then the risk assessment should not go ahead. All personnel presence should be competent in the area of expertise they are providing. All those involved in the risk assessment must contribute fully to the process without exceptions.

8.3.3 DIVING PROJECT PLAN

- a) The diving project plan shall be based on an assessment of the risks to the health and safety of any person taking part in the diving project and shall consist of a record of the outcome of the planning carried out, including all such information and instructions as are necessary to give advice to and to regulate the behavior of those so taking part to ensure, so far as is reasonably practicable, their health and safety;
- b) The diving project plan shall identify each diving operation that makes up the diving project. The nature and size of any diving operation so identified shall be such that it can be safely supervised by one person;
- c) The project risk assessment should be reviewed at regular intervals, even if the risk is minimal, to ensure that the risk assessment is still adequate and does not need to be revised;
- d) Method Statement and Risk Assessment shall be developed prior to commencement of any Dive Operation. The Dive Plan shall be specific for each particular operation within the

Project. The Dive Plan shall incorporate or reference a Method Statement which provides step-by-step instructions for the Dive Supervisor to comply with;

- e) The Emergency Response Plan shall include emergency and contingency plans for the location where the work is going to be carried out and agreed by all relevant parties.

8.4 COMPETENCE

- a) The diving company shall establish the competency assessment process for the positions associated with the commercial diving scope;
- b) The competence of those involved shall cover the following areas:
 - i. Have a minimum of 2 years' experience, preferably 5 years, at an inshore/offshore worksite;
 - ii. Have attended formal risk assessment training;
 - iii. Is familiar with the PTW system;
 - iv. Have competence and training in the industry HSE processes/practices.
- c) Be knowledgeable with the following:
 - i. Company policies, practices, and procedures;
 - ii. Relevant and appropriate legislation and industry guidance including best practices;
 - iii. The contract between diving contractor and client;
 - iv. Relevant HSE bridging document and hazard identification plan (HAZID) as required in the contract with the client;
 - v. Mechanical and physiological aspects of diving.
- d) During the execution of the work, the diving company must monitor the continued competence of the diving crew and maintenance team personnel;
- e) Where necessary, the company should also determine if any additional competence assurance is needed due to local circumstances. The monitoring should include a verification that the contractor complies with the management system that may include:
 - i. Competence and close monitoring of the replacement of personnel;
 - ii. Provision of the necessary induction courses;
 - iii. Training of contractor personnel in job-related activities and procedures;
 - iv. Completion of all agreed upon HSE training, including any specified statutory training requirements;
 - v. Availability of HSE documents, instruction, and information leaflets with particular attention to the use of local language reinforced with simple visual messages.
- f) In terms of diving skills enhancement, these are generally accepted by recreational diver certification agencies as necessary for any scuba diver to be considered competent to dive without direct supervision, and others are more advanced. However, some diver certification and accreditation organisations may consider some of these to be essential for minimum acceptable entry-level

competence. Divers are instructed and assessed on these skills during basic and advanced training and are expected to remain competent at their level of certification, either by practice or refresher courses.

g) The scope of diving skills includes:

- i. Selection;
- ii. Functional testing;
- iii. Preparation and transport of scuba equipment;
- iv. Dive planning;
- v. Preparation for a dive;
- vi. Kitting up for the dive;
- vii. Water entry, descent, breathing underwater, monitoring the dive profile (depth, time, and decompression status);
- viii. Personal breathing gas management;
- ix. Situational awareness;
- x. Communicating with the dive team;
- xi. Buoyancy and trim control;
- xii. Mobility in the water and ascent;
- xiii. Emergency and rescue procedures;
- xiv. Exit from the water;
- xv. Un-kitting after the dive;
- xvi. Cleaning and preparation of equipment for storage; and
- xvii. Recording the dive, within the scope of the diver's certification.

h) Diver communications is a particular aspect where most of the basic hand signals are common to most recreational diver training agencies.

8.5 INCIDENT AND EMERGENCY MANAGEMENT

- a) The diving company shall establish the procedures for the incident reporting and investigation as well as emergency and recording management;
- b) Every incident should be reported and recorded immediately, with the level of follow-up action to be determined by the seriousness of the incident and by the diving company management. Any identified recommendations or corrective actions following the investigation shall be implemented to prevent recurrence, and learning shall be communicated within the diving company;
- c) For guidance on incident reporting and investigation management, reference should be made to the Workplace Safety Health (Incident Reporting) Regulations, 2014.

8.5.1 EMERGENCY RESPONSE PROCEDURES

- a) The Diving Company's Emergency Response procedures should include flowcharts, which will indicate the process for dealing with diving emergencies. These flowcharts are generic in nature, therefore specific emergency contact checklists will need to be generated for each diving worksite.

8.5.2 EMERGENCY RECOVERY OF A DIVER

- a) When carrying out diving operations, there must be a system for recovering a distressed/injured diver back into the diving site platform/location. This diver recovery method must not expose the surface personnel or Diver to any elevated risk of incurring personal injury during the recovery process;
- b) Due to decompression sickness, a diver may require hyperbaric treatment. Arrangements must be in place to ensure that such treatment is available either at a recompression chamber on-site in a hospital, or other place, and known to the project team. The response should also include a plan for access to the hyperbaric chamber as well as safe transport of the diver;
- c) Duration of access, for a diver who requires hyperbaric treatment, to a hyperbaric rescue facility (HRF), shall not be more than a maximum of 2 hours.

8.5.3 PRE-INCIDENT PLAN

The pre-incident plan outlines emergency considerations and requirements that **MUST** be considered when planning any diving operation.

8.5.3.1 SCUBA Equipment Loss of Primary Air Supply

- a) The SCUBA diver has a limited quantity of air available for his use. He must always be aware of his remaining air supply by continually monitoring his contents gauge;
- b) If a SCUBA diver loses his primary air supply, he must immediately switch over to his secondary / emergency air supply, which may be a second cylinder, that the diver was equalising from or a pony cylinder;
- c) Once the diver is on his secondary air supply, he must immediately begin his ascent to the surface in a controlled manner. The diver should signal to the tender that he is surfacing. Using the communications, the diver should inform the dive supervisor of his status and his intentions.

8.5.3.2 SSDE (Surface Supplied Diving Equipment) Loss of Primary Air Supply

- a) If the SSDE diver loses his primary air supply, he must inform the diving supervisor. At the same time, the Diver should open his bailout emergency supply valve and commence breathing from the bailout. The diving supervisor will immediately open an alternative /emergency air supply on the supply panel. The dive SHALL be terminated by the Diver returning to the surface, on his emergency air supply, by following his umbilical back to the surface;
- b) If the diver(s) loses his primary supply, he should go onto bailout and inform the Supervisor. The supervisor should switch over to diver's secondary supply and diver(s) should then isolate his bailout supply. The dive SHALL then be terminated;
- c) If the diver (s) returns on his bailout emergency supply and his umbilical got snagged, he could then

breath down his bailout supply and then if the secondary supply failed the diver would be in serious difficulties;

- d) It is unusual for equipment failure to cause an SSDE diver to lose his primary air supply, and the loss of the diver's air supply may be caused by a trapped or severed umbilical;
- e) In all instances of a loss of the diver's primary air supply, an investigation will need to be carried out to determine the cause of the air loss and the actions required to prevent a reoccurrence;
- f) In instances of a loss of the diver's primary air supply, the standby diver may be required to enter the water to assist the diver.

8.5.3.3 Entanglement

- a) The possibility of diver entanglement should be determined as part of the risk assessment process;
- b) Any diver can become entangled or fouled during diving activities. The entanglement may be on a mooring line, propellers, wreckage, debris, natural bottom formations, fishing lines or man-made structures, and the entanglement can be exacerbated by poor visibility and disorientation;
- c) If the entanglement occurs when using SCUBA equipment during recreational diving, the diver's air supply may be too limited for a lengthy untangling procedure near the end of his dive. This is one of the reasons for planning for the diver to return to the surface with 500 psi (34 Bar) remaining in his tank;
- d) SCUBA equipment **SHALL** not be used for any commercial diving activities;
- e) If the diver or his umbilical becomes entangled, he should:
 - i. Stop;
 - ii. Remain calm;
 - iii. Think;
 - iv. Signal the tender /inform the dive supervisor of the problem;
 - v. Follow the umbilical back along to the entanglement; and
 - vi. Attempt to free himself.
- f) The dive supervisor will make the decision to deploy the standby diver to clear the fouled tether/diver after he has reviewed the situation and assessed all the options available to him;
- g) The pre-dive briefing should strongly discourage divers from disconnecting the umbilical and swimming freely to the surface. This requirement should be part of the diving contractors diving regulations and be included within their Diving manual;
- h) The risk of a second diver entanglement can never be discounted, and once the diver has released his umbilical his position becomes unknown, and the ability of the standby diver to assist him becomes very difficult.

- i) Correct umbilical management by the diver by knowing where the umbilical leads to at all times, and by the tender so that he can 'feel' the diver at all times, will reduce the possibility of entanglement.

8.5.3.4 Loss of Communication

- a) The procedure to be employed when a diver loses communication should be discussed at the pre-dive briefing. If communication with the diver is lost, the diver should immediately terminate the dive, and signal the tender that he / she is leaving the bottom;
- b) When the dive supervisor realises that he has lost communication with the diver, he should instruct the tender to signal the diver to 'come up' using line pulls;
- c) For commercial diving: If diving is being conducted from a DP (Dynamic Positioning) vessel, line pulls will not work as there would be an umbilical stopper on the umbilical for maximum allowable working length of umbilical as per umbilical management procedure. There should be a procedure for loss of communication, and these shall be rehearsed through diver emergency drills;
- d) The decision to deploy the standby diver to assist the Diver, may be carried out after the diving supervisor has reviewed the situation and assessed all the options available to him.

8.5.4 PANDEMIC MANAGEMENT PROTOCOLS

- a) The employer and employees of diving company shall comply with the Workplace Safety and Health Order, 2009 and its regulations thereunder; as well as the Infectious Diseases Order, 2010, Standard Operating Procedures (SOP) and directives of the Ministry of Health (MOH), Brunei Darussalam in curbing the local transmissions of COVID-19 or other known occupational diseases;
- b) Practicable measures to reduce the risk of transmission and potential exposure of diving workers to COVID-19 or other known occupational disease, throughout the dive operations must follow their own SOP in addition to the MOH SOP including but are not limited to:
 - i. Ensuring scan in and out utilizing the BruHealth QR code of the workplace;
 - ii. Ensuring personnel displaying cold or flu like symptoms to refrain from entering the workplace and to seek medical attention or a SARS-CoV-2 swab test;
 - iii. The wearing of face masks at all times;
 - iv. Ensuring the nose and mouth are covered properly;
 - v. Ensuring the temperature checks;
 - vi. Ensuring the provision of hand sanitizers upon entry to the workplace;
 - vii. Ensuring appropriate social distancing measures and the placement of such signs in confined spaces;
 - viii. Ensuring good hygiene practices such as frequent hand washing;
 - ix. Ensuring sanitation of diving equipment;
 - x. Ensuring the use of Video Conferencing for meetings in place of physical meetings where possible;
 - xi. Having a business continuity plan to ensure sustained essential operation, to address the

situation if an employee has been tested positive for COVID-19 and the handling of quarantine order.

- c) Constant monitoring and supervision shall be established to ensure the effective implementation of controls.

8.6 INSPECTION

- a) A qualified dive technician must thoroughly inspect diving equipment. Inspections are required in a number of situations, including where it is exposed to conditions, which can cause deterioration resulting in danger;
- b) Records shall be kept of all thorough inspections should be made and held by the equipment owner, and any defect or failure found by the competent person on the diving equipment (accessories) must be reported to the superior;
- c) A company inspection plan shall be established and conducted by qualified and competent persons. The scope of inspection covers the operability, safety, integrity, and compliance to the procedures such as the manufacturer's recommendations on maintenance or local regulatory requirements;
- d) All diving equipment shall be recorded within the diving company's planned maintenance system (PMS). The PMS shall have an identification procedure for all priority equipment such as Safety Critical Equipment (SCE).

8.7 AUDIT

- a) As part of the diving company's Safety Management System (SMS), the annual audit plan shall be established and implemented accordingly;
- b) In accordance with the International Organization for Standardization (ISO) and IMCA's Auditing Guidance on Diving System, the audit plan shall include both internal and third-party audits.

8.8 MEDICAL EXAMINATION

- a) All professional divers must have a valid certificate of medical fitness to dive from a recognized hyperbaric diving medical practitioner who is certified in hyperbaric and underwater medicine or occupational medicine. It is recommended that professional divers are routinely assessed to EDTC Level 1 or Level 2D for medical fitness on an annual basis;
- b) Where a diver has suffered any injury or illness related to his work in the past year, he should declare to the Authorized Diving Medical Practitioner (ADMP) and a record of it be maintained by the ADMP and also by his employer e.g., decompression sickness.

8.9 MAINTENANCE

- a) The diving company shall establish a Planned Maintenance System (PMS). All diving equipment must be subject to regular inspection, maintenance and testing in accordance with the company's PMS;
- b) The PMS should follow the recommendations for the maintenance of the diving equipment and the original equipment manufacturer (OEM);
- c) As a minimum, this periodic examination and testing SHALL be carried out by the dive equipment owner;
- d) All maintenance and repair of diving equipment must be carried out by qualified and competent dive equipment technicians;
- e) Technicians working on diving helmets, masks, and regulators MUST have completed an appropriate maintenance training course at a training facility approved by the manufacturer for the equipment.

8.10 RECORDS

- a) The diving company shall establish and retain the following documented information or records:
 - i. All divers, diving supervisor and dive equipment technician personal documentation, including and not limited to their training qualifications and certificates;
 - ii. First aid training certificates;
 - iii. Medical examination certificates.
- b) Medical certificates issued by a qualified medical examiner, is considered essential;
- c) Training or competence matrix shall be established and maintained;
- d) Dive proposal documentation shall be retained;
- e) Diver's daily log should include, but not be limited to:
 - i. Name and signature of the Diver;
 - ii. Date of the dive;
 - iii. Name and address of the diving company;
 - iv. Name and signature of the diving supervisor for that dive;
 - v. Location of the diving project;
 - vi. Name of the diving vessel (where applicable);
 - vii. The maximum depth reached on each occasion;
 - viii. The time the diver left surface, the bottom time, and the time the Diver reached the surface;
 - ix. The breathing apparatus and the breathing mixture;
 - x. The decompression schedule followed by the Diver;
 - xi. Any work done by the diver;
 - xii. Details of any injury suffered by the Diver;
 - xiii. Any incident of note that occurred during the dive;

- f) All diving contractor companies should have dedicated, pre-printed Diving Operations Logs. The following details should, as a minimum, be included in the Diving Operation Log:
- i. Name and address of the diving company;
 - ii. Date of the entry;
 - iii. Name(s) of the dive supervisor(s);
 - iv. Location of the diving operation;
 - v. Name of the diving vessel;
 - vi. Names and duties of those taking part in the diving operation;
 - vii. The diving regulation that applies to the diving operation;
 - viii. The purpose of the diving operation;
 - ix. The breathing apparatus, the breathing mixture and pressure used by each diver including the primary, secondary, and bail-out cylinder pressure;
 - x. Time at which the diver leaves the surface, the bottom time, and the time the Diver returns to the surface;
 - xi. The maximum depth each diver reaches;
 - xii. The decompression schedule for each Diver;
 - xiii. Emergency support arrangements;
 - xiv. Any emergency or incident of special note which occurred during the diving operation, including details of any decompression illness and the treatment given;
 - xv. Details of the pre-dive inspection of all plant and equipment used in the diving operation;
 - xvi. Any defect recorded in the functioning of any plant and equipment being used in the diving operation;
 - xvii. The weather during the diving operation;
 - xviii. Any other factors likely to affect the safety or health of any persons engaged in the diving operation; and
 - xix. Name and signature of the supervisor completing the record.

8.11 MANAGEMENT OF CHANGE (MOC)

- a) The diving company shall establish and maintain the management of change procedure;
- b) If the diving situation has changed, risk assessment and management of change process shall be carried out;
- c) All risk mitigations shall be implemented, monitored, and routinely reviewed for their effectiveness.

8.12 IMPROVEMENT

- a) The diving company should continually improve the adequacy and effectiveness of the operational diving management;
- b) Any gaps or shortcoming identified following inspection, audit, and incident recommendation should be treated as improvement opportunities to enhance the diving operation management's overall performance.

9. EXECUTION OF DIVE

9.1 DIVE BRIEFING

- a) Before commencing the diving operation, the dive team will need to be briefed. It is normal to hold a Project Briefing off site. However, for smaller diving operations, the briefing could be by way of a Toolbox Talk on site. This should include, but not be limited to:
 - i. The objectives of the diving operation (what we plan to do and how we plan to do it);
 - ii. A review of the risk assessment;
 - iii. Equipment checks are completed and all fit for use including hyperbaric chamber on site and at HRF (Hyperbaric rescue facility);
 - iv. Operational environmental parameters and the weather forecast;
 - v. The Dive Plan (i.e. the discrete tasks required to accomplish the dive plan);
 - vi. The dive rota (the order in which people dive) and dive team personnel duties;
 - vii. Umbilical management plan, maximum allowable umbilical length;
 - viii. Project safety precautions (what we are going to do to keep ourselves, and others, safe);
 - ix. Break periods for divers is important during the dive operation including saturation bell diving;
 - x. Special safety considerations (anything extraordinary that may hurt us); and
 - xi. Emergency response (what we do if things go wrong).
- b) Prior to each dive, the divers' briefing should involve the standby diver for the dive, so that in the event of an emergency the standby diver will understand the work task being carried out.

9.2 PRE-DIVE CHECKS

- a) The following checks **SHALL** be carried out prior to the Diver entering the water. Standby diver 'checks' that he or she has:
 - i. Check non return valve on diver's hat is working;
 - ii. Check emergency air supply is working and is of suitable pressure;
 - iii. Check primary and secondary main air supply is on and working;
 - iv. Check communications;
 - v. Check the umbilical is secured to the harness;
 - vi. Check the helmet /mask is ready to be put on immediately if required to enter the water;
 - vii. Check the knife and diver emergency recovery strop;
 - viii. Check the fins; and
 - ix. Check for leaks.
- b) Diver 'checks' that he or she has:
 - i. Check non return valve on diver's hat is working;
 - ii. Check emergency air supply is working and is of suitable pressure;
 - iii. Check main air supply is on and working;
 - iv. Check communications;
 - v. Check the umbilical is secured to the harness;
 - vi. Check the helmet/mask is secure;

- vii. Check the knife;
 - viii. Check the diver emergency recovery strop;
 - ix. Check the fins or boots, gloves, etc.; and
 - x. Check the tools for the work tasks.
- c) Once the diver is in the water, check for leaks around the first stage regulator by observing for bubbles around the valve/bailout area. Provided no leaks are seen the diver can proceed to the worksite.

9.3 ATTENDING THE DIVER

- a) The divers' attendants are normally trained divers who act as dive tenders as part of their duties;
- b) The attendant (tender) helps the diver to get dressed, checks the diver's equipment once he is dressed and assists the diver to the ladder / water entry point;
- c) Once the diver is in the water, the tender always handles the diver's umbilical ensuring that the correct amount of tether is given to the diver. The diver's umbilical must be held firmly, but not taut. The diver must be able to move freely without feeling constrained by his umbilical, but there should not be an excessive amount of umbilical in the water. The tether can easily become fouled / entangled if this occurs. Equally, the tender must be able to respond to signals from the diver when given through his tether;
- d) The umbilical management plan should be available at the dive station clearly stating the maximum allowable umbilical length.

9.4 ASCENT

- a) When the dive task is completed or the maximum time for the dive at the depth has been reached, the diver will return to the surface, the diver shall ascend at a rate in accordance with the diving tables being used, normally about 10 m (30 feet) per minute;
- b) For a normal ascent, the Diver should breathe steadily and naturally. A diver **MUST** never hold his breath during ascent because of the danger of suffering a lung over expansion injury;
- c) It is also good practice for the diver to ascend with an arm extended overhead. In the murky waters normally encountered in harbours and inland waterways, the diver **MUST** always be careful of obstructions and potential overhead hazards;
- d) Prior to the diver leaving the worksite, the diver will request the tender to come up on his umbilical, until it is pulling against his harness. This will ensure that the umbilical is not fouled on any subsea structure;
- e) It is normal for the tender to hold the diver's umbilical and for the diver to 'climb' / follow his umbilical back to the surface, during which time the diver tender **SHALL** recover the umbilical in as it becomes free to do so.

9.5 POST DIVE CHECKS

- a) Once the diver has been recovered from the water, he should:
 - i. Confirm with the dive supervisor that he is feeling well;
 - ii. Remove his diving equipment (aided by the tender).

- b) Meanwhile, the dive team will:
 - i. Thoroughly clean the mask mouthpiece with a mild sanitizing solution, then flush with freshwater;
 - ii. Check if any items of the dive equipment need maintenance;
 - iii. Charge the bailout bottle, if necessary;
 - iv. Check the status of the HP air supply cylinders;
 - v. Carry out post-dive equipment checks; and
 - vi. If another dive is to take place on the same worksite, the diver will brief the next diver on the status of any tools/equipment that is still on site (this is normally in conjunction with the dive supervisors briefing).

10. USEFUL REFERENCES

a) This section outlines the references that are very useful as additional guidance.

- i. UK HSE: Commercial diving projects offshore — Diving at work Regulation 1997;
- ii. UK HSE: Commercial diving projects inland / inshore — Diving at work Regulation 1997;
- iii. UK HSE: The medical examination and assessment of commercial divers (MA1);
- iv. OGP Diving Recommended Practices;
- v. International Marine Contractors Association (IMCA) Guidelines;
- vi. Flag States and Classification Society;
- vii. Workplace Safety and Health Council (WSHC) Technical Advisory for Inland/Inshore Commercial Diving Safety and Health.