Phillips, Kim (NRCan/RNCan)

From: kledez@mun.ca
Sent: Wednesday, October 25, 2017 8:04 AM
To: Phillips, Kim (NRCan/RNCan)
Subject: RE: Offshore Diving Stakeholder Engagement Session
Attachments: Stakeholder Engagement Draft Diving Policy Intent LeDez comments.pdf; LeDez comments on Stakeholder Engagement Draft Diving Policy Intent.docx

Kim:

Please see attached files for some comments for the Stakeholder Engagement process.

Please let me know if you need anything further.

Best wishes

Ken LeDez

From: Phillips, Kim (NRCan/RNCan) [kim.phillips@canada.ca]
Sent: October 5, 2017 10:26 AM
To: Phillips, Kim (NRCan/RNCan)
Subject: Offshore Diving Stakeholder Engagement Session

Good morning,
Thank you for attending the offshore diving stakeholder session on Monday. We appreciate the valuable feedback received during the session and look forward to receiving your written comments by October 27, 2017.
For your records, please find attached the deck that was presented at the session.
Best regards,
Kim Phillips
Senior Regulatory Officer
Offshore Petroleum Management Division
Natural Resources Canada
cell: (902) 402-0285
kim.phillips@canada.ca

Filename: LeDez comments on Stakeholder Engagement Draft Diving Policy Intent

Submitted by Dr. Kenneth LeDez

Thank you for the opportunity to provide comments to the Draft Policy Intent. This document accompanies the comments made on the Stakeholder Engagement Draft Diving Policy Intent LeDez comments PDF file. I will focus on issues related to medical aspects of offshore diving.

As a general comment, there needs to be a transformation from the current situation where Canadian regulators and physicians are relatively passive observers or consumers of recommendations from other jurisdictions into which Canada has had no input, to a situation where there are active steps, planning, input and control based upon Canadian experts advising on what is needed to ensure high standards and safety. A systematic approach to quality is more likely to produce effective results than "follow others" even though circumstances are different, or a "make it up as you go along" strategy.

Due to environmental and operational conditions the season for offshore diving in Canada is relatively restricted in duration. The price of oil and other economic circumstances are likely to continue to affect the amount of offshore diving. Cost-effective provision of high quality diving medicine services depends upon having well-trained physicians and other personnel, detailed planning and an appropriate regulatory framework.

Terms used for Physicians

The Draft Policy Intent uses two different terms:

- "Dive Physician"
- "Specialized Dive Physician"

Both types of physician are expected to be licensed in Canada and to have the Diploma in Hyperbaric Medicine from the Royal College of Physicians and Surgeons of Canada (RCPSC).

Because the terms in the document are listed in alphabetical order, the two terms are widely separated within the terminology section and this makes it somewhat confusing and more difficult for the reader to appreciate the differences.

The Royal College of Physicians and Surgeons uses the term "Hyperbaric Physician" to refer to both streams of the Diploma certification (Clinical Hyperbaric Medicine and Diving Medicine). The stream for an individual will be denoted in brackets after the diploma qualification. DMAC uses different terms:

- Medical examiner of divers – Level 1
- Diving Medicine physician – Level 2D

The levels designated by DMAC are somewhat incompatible with those of the CSA or the RCPSC, despite some similarities, and are in any case confusing.

The terms "Diving Medicine" and "Diving Medicine Physician" are much preferable for referring to the discipline and the doctor.

Suggestions / recommendations:

- ***"Diving Medicine Physician" ("DMP")*** and / or "Diving Medicine Physician (Examiner)" be used for the Diploma certified physician that is approved for assessing fitness of saturation divers. The Diploma meets the requirements for CSA Level 2 diving medicine physician, whereas the CSA itself requires only Level 1 to undertake the medical fitness assessment to divers.
- ***"Diving Medicine Specialist" ("DMS")*** and / or "Diving Medicine Physician (Specialist)" be used for the person who provides medical coverage for offshore saturation diving. This would meet the requirements for CSA Level 4 diving medicine physician.

I strongly recommend using ***DMP*** and ***DMS*** (or similar) as above for the following reasons:

1. The ***DMP*** would have, according to the Draft Policy Intent, the Diploma, and is therefore MUCH more qualified than the DMAC "Medical Examiner of Divers" (which is similar to CSA Level 1, except that training courses for the CSA Level 1 do not focus on saturation diving).
2. The planned revision of the Diploma program will incorporate the concepts of saturation and offshore diving. Physicians with the Diploma will have more extensive training and experience of treating divers than the DMAC "Medical Examiner of Divers".
3. Although the ***DMP*** may have less experience and training than the ***DMS***, they nevertheless could reasonably be part of a team of physicians that is overseen by the ***DMS***.
4. This provides the mentoring and guidance for the ***DMP*** to transition to becoming a ***DMS***, along with necessary additional training. Most DMAC Medical Examiner of Divers never make such a transition, as it is a completely different role. However, there are hundreds of divers in the UK sector, so each examiner there does see multiple divers each year.

<u>Requirement for Canadian dive medical by Canadian licenced physician with the Diploma</u>

I support this intent.

The Draft Policy Intent recommends that the physician that examines the diver for fitness assessment for offshore diving have the Canadian Diploma certification. I support this because the number of divers involved is very small and there is minimal or no coverage of important aspects of saturation and offshore diving in typical courses for physicians to examine inshore divers in North America. If medical fitness assessment of the diver may be undertaken by someone not familiar with saturation diving then important considerations may be omitted and any individual physician may only rarely, if ever, see a saturation diver. This would also make it impossible for any physicians to develop or maintain any experience or expertise in medical aspects of saturation diving. In contrast, the Medical Examiner of Divers training in the UK is very much geared towards saturation operations as there are hundreds of such divers.

At present, there is no mechanism for mutual recognition of diver medical assessments or the physicians that perform these assessments in different countries. Divers working in Canada's offshore may have a medical assessment from almost anywhere in the world and there is no process to verify any of the information or physician credentials. This has resulted in difficulties on multiple occasions. The

conditions in Canada's offshore are amongst the most challenging and the access to additional supports within a short time period is considerably less than in the North Sea and many other locations. Transportation to shore of a diver with medical problems may be more difficult or prolonged, for instance due to fog, strong winds or sea state.

In summary, the requirement for the medical assessment of fitness for offshore and saturation divers to be performed by a physician with the Royal College of Physicians and Surgeons of Canada Diploma in Hyperbaric Medicine (Diving Medicine stream) is important in order to:

1. Ensure consistent high standards of medical assessment
2. Prevent "doctor-shopping" by any divers that may be seeking to evade requirements for the high quality medical assessments and access to previous diving medicine records that are essential to ensure safety of the entire dive team or divers
3. Facilitate access to medical records
4. Develop and maintain of Diving Medical expertise in Canada
5. Ensure that physicians participate in Continuing Professional Development and Maintenance of Competence, since maintenance of the Diploma certification is contingent on annual documentation with the RCPSC of such on-going education
6. Permit individual physicians to assess sufficient numbers of divers to sustain levels of skill and expertise
7. Enable physicians to attain and maintain the greater experience and expertise necessary to provide medical coverage of offshore saturation diving operations
8. Facilitate the long-term health assessment and follow-up of divers that is intrinsic to diving medical assessment in the U.K. and Norway
9. Enable the ***DMP*** or ***DMS*** to safely approve (and document) an extension to medical fitness certification in unforeseen circumstances, when needed for operational reasons, while a diver is offshore on an operation that takes longer than planned, such as due to adverse environmental conditions. Access to medical records and familiarity with the diving medical history of the diver is important in this regard.
10. Enable expedited medical assessment when short notice changes to dive teams are needed for operational reasons. (With adequate experience and expertise, access to records, and a medical team with appropriate infrastructure, assessment of a diver should be possible within 48 hours or less, which should provide operators with the flexibility that may be required.)

Access to medical records and prior diving fitness assessments

Offshore saturation divers travel widely for work and this contributes to the challenges of providing high quality medical assessment and coverage for diving operations. Divers are getting older and may have a number of medical conditions or be on medications, and yet be considered fit for diving. Physician knowledge of diver medical history is important for safe and adequate medical coverage.

The single most effective method to ensure adequate access to medical records is for the fitness assessment to be performed by a Canadian licenced physician possessing certification in Diving

Medicine from the RCPSC. The use of secure electronic records with access, approved by the diver, for the ***DMS*** covering the dive operation, would enable the standard of care necessary.

Regulations should include provisions requiring for divers to make previous diving medical assessments available, and for physicians to provide this to divers for this purpose.

Use of technology to enhance and facilitate diving medical assessment and records

It may be argued that the proposed requirement for the diving medical fitness assessment to be performed by a Canadian licenced physician that has Diploma certification in Diving Medicine from the RCPSC represents an undue burden upon divers and diving operators. Potential concerns in this regard should be weighed against the many important medical and safety advantages provided by the proposed requirement and the opportunities to mitigate the costs and inconvenience involved. There is essentially no mechanism to verify the standards of assessments from other areas of the world or to access detailed records when needed. At present, it is commonplace even for Canadian divers to have their medical assessment in other countries. And even when the medical assessment is performed in regions remote from Atlantic Canada where there is no saturation diving, detailed records may not be available. There is no standardization of the content or format of the records. There are various standardized medical assessment forms but none that are necessarily approved or required in Canada.

Using secure information technologies, divers could complete medical questionnaires online and upload the results of previously performed clinical tests. The ***DMP*** or ***DMS*** could review this information, determine whether any tests were acceptable and determine whether any additional tests were indicated. Additional questions or information could be handled in a similar manner. Such mechanisms can be used for pre-screening and preparing divers regardless of where they are located. This would help to ensure that most issues were addressed prior to the in-person examination, thereby minimizing uncertainties and the time required. This would enable expedited completion of the medical, perhaps even on board the dive vessel itself if this were necessary due to short notice changes.

The use of information technologies for this purpose would require compliance with applicable privacy, federal and provincial legislation and regulation on confidentiality, privacy and protection of personal health information. On-line video assessment could be incorporated when appropriate for the annual assessment or remote reassessment when needed, such as when circumstances necessitated an extension to medical approval due to unforeseen delays. However, it remains important for the diver to be physically assessed and examined by the ***DMP*** or ***DMS*** to determine fitness.

The regulations should anticipate the use of information technologies as components of the diving medical fitness assessment and of medical issues that arise offshore.

Medical equipment, supplies and facilities

The Draft Policy Intent is very limited in this area. There is reliance upon DMAC guidance. While this is likely the best information that is readily available and widely accepted, it is not adequate on its own, is infrequently updated, does not take account of the Canadian offshore environment, and there is no Canadian input into the recommendations. Diagnostic and therapeutic equipment is essential in up to

date medical care and barely addressed by DMAC. Supplies, equipment and techniques are continuously evolving and there must be a mechanism to ensure medical recommendations meet current standards. The specific items included in the various DMAC medical kits need detailed consideration. These kits tend to be organized according to location of intended use but even these locations merit reconsideration as to their suitability. Within each kit better functional organization could enhance emergency preparedness. It can be difficult to locate specific items quickly. For example, consideration should be given to ensuring that all airway and respiratory equipment is grouped together and easily accessible without needing to dig around bags stuffed with multiple supplies. Treatments for severe allergy is another possible functional grouping. The regulator should carefully consider whether mandating DMAC 15 or other DMAC guidance is optimal, when there may be advantages to referencing Canadian expert guidance. The latter could incorporate DMAC or recommend modifications or provide alternate recommendations. For the operator, having very specific requirements facilitates compliance. However, verifying compliance is difficult and laborious for the medical service and regulator given the current organization of DMAC kits. New approaches should facilitate verification.

DMAC does not adequately consider the facilities, medications, equipment and supplies on the DSV and the in the vicinity of the hyperbaric chambers. Better guidance in this regard would improve standards of emergency and routine medical care. An expert Canadian Diving Medicine Advisory Committee would be able to develop up to date guidance in collaboration with diving operators.

Need for a mechanism for on-going advice and updating medical requirements

This is a major omission from the policy intent. It is difficult to conceive of a situation whereby medical equipment and services can be kept up to date without some mechanism for on-going input and guidance for the Boards, regulators, diving medicine physicians and diving operators. In the Canadian offshore there is much less backup or supports compared to the situation in the North Sea and many other locations, and the distances are often greater and the environmental conditions frequently more severe. The DMAC 15 equipment and supplies list is quite basic. The Draft Policy Intent does not consider the health facilities, medications, supplies and equipment needed on the vessel to support the diving operation. Of course, other standards are also involved and diving operators working in the Canadian offshore generally considerably exceed the minimum DMAC guidance. The Policy Intent does state that the medical supplies should be acceptable to the Diving Medicine Specialist and this is a very important provision. This does create the potential for differences in standards, although the requirement for Diploma certification and additional training for the ***DMS*** would tend to reduce variations somewhat. Nevertheless, the effectiveness of diving medical support and the ease of compliance for diving operators would be enhanced by the availability of up to date guidance specific to the needs of the Canadian offshore. It is not likely that, even if Canadian input was possible, DMAC would undertake a substantial effort to develop recommendations applicable to Canada. Therefore, it is strongly recommended that the Policy Intent consider possible mechanisms for ensuring on-going medical guidance for offshore diving. The regulator could potentially host the guidance on its own websites or support a separate website. Modest support for web-based or in-person meetings would assist in the process. However, the most important need would be for any Canadian diving medicine committee or advisor to have some degree of recognition or representation to the Boards or regulator,

and for the committee or advisor to have an adequate degree of independence from petroleum producers and perhaps from the regulator also. Some consideration of what mechanisms would work best is recommended.

Training of dive vessel "medic"

Offshore dive vessels must continue to be required to have a Canadian "medic" on board to provide a range of services, including assisting the ***DMS*** in managing medical conditions in divers. The "medic" is normally either a Canadian certified and licenced paramedic or nurse. This should not be confused with the "diver medics", who are saturation divers than have undergone an introductory course for emergency medical care. The vessel medic on the other hand has much more extensive health care training and experience. However, at the present time, the vessel medic is not required to have any specialized training related to diving medicine. Many Dive Support Vessels (DSV) have typically had their own medic on board who may have somewhat more experience of medical aspects of diving operations but who do not have a Canadian health care certification or licence. Such individuals could act as a valuable resource to the Canadian medic. However, due to financial and jurisdictional issues it is anticipated that their availability will be less in future. In addition, it is important for optimal care and communication with the ***DMS*** that the Canadian medic on the DSV have some understanding of diving medicine and the medical issues that may arise before, during and after saturation and other diving. Not only would this enable more effective care of injured or ill divers this could impact upon the diving operation itself.

There is currently no specialized diving medicine training program for DSV medics (nurses and paramedics) in Canada that is recognized by the applicable professional colleges or licencing authorities. Due to the small numbers of individuals involved in Canada and the rate of turnover, implementing training courses through the applicable authorities may not be expected to occur in the near term.

Nevertheless, it would be feasible and straightforward for the ***DMS*** and providers of specialized diving medicine services to provide or arrange suitable training for nurses and paramedics that work as a DSV medic. It is proposed that such training be required in the policy intent and regulations. The training itself could comprise a combination of on-line learning and in person training, and incorporation of simulation would be very valuable.

Since there is not a clear path at present towards licencing or professional college training for the DSV medics it is proposed simple that such training be **"provided or approved by or acceptable to the *DMS*"**.

OFFSHORE DIVING

Proposed Policy Intent for the Atlantic OHS Regulations & FORRI Framework Regulations

Government of Canada
Government of Newfoundland and Labrador
Government of Nova Scotia

September 15, 2017

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INTRODUCTION

On December 31, 2014, amendments to the federal *Canada-Newfoundland and Labrador Atlantic Accord Implementation Act* and the *Canada-Nova Scotia Offshore Petroleum Resources Accord Implementation Act* and the corresponding provincial laws came into force. These changes established a statutory occupational health and safety (OHS) regime for each offshore area that apply to all workplaces in the offshore area, as well as passengers in transit to/from and in-between those offshore workplaces. The changes also clearly established the Canada-Newfoundland and Labrador Offshore Petroleum Board and the Canada-Nova Scotia Offshore Petroleum Board as the regulator of OHS matters in its respective administrative area.

Simultaneously, transitional regulations (both federal and provincial versions) were brought into force to implement the OHS regime, including *Diving Operations Safety Transitional Regulations*. Those regulations will be automatically repealed in December 2019, requiring that new regulations enter into force prior to that date. As such, the Governments of Canada, Newfoundland and Labrador and Nova Scotia have embarked on the development of OHS regulations under each Accord Act with the participation of the two boards.

In addition to this ongoing work, the Governments are also working toward modernizing existing operational regulations through the Frontier and Offshore Regulatory Renewal Initiative (FORRI). Through FORRI, the five operational regulations that pertain to installations, operations, geophysical activities, certificate of fitness, and drilling and production will be reviewed, modernized and amalgamated into the Framework Regulations. This regulatory modernization will help Canada maintain the highest standards for operational safety, environmental protection and management of offshore petroleum resources.

As part of these initiatives, governments are holding engagement sessions with stakeholders on draft policy intent, as well as a session on the draft regulatory text. This engagement approach will ensure that stakeholders can provide feedback throughout the process of regulation development.

This phase of engagement focuses exclusively on the topic of Offshore Diving, and includes the aspects of diving that will be covered under both the OHS Regulations, as well as the Framework Regulations. Written comments on this policy intent may be submitted by October 27, 2017 to:

Kim Phillips
Project Manager, OHS Initiative
kim.phillips@canada.ca

All written comments will be posted to the Atlantic OHS Initiative webpage without any amendments or alterations. The webpage can be found here: https://www.nrcan.gc.ca/energy/offshore-oil-gas/18883

	DRAFT POLICY INTENT
	PART ONE
	FRAMEWORK REGULATIONS – DRAFT POLICY INTENT
1	**Diving Vessels** 1) Diving vessels must be: a) classed by a recognized classification society; and, b) Convention vessels as defined in the Canada Shipping Act. 2) In addition, diving vessels must: a) Be equipped with evacuation systems and ensure equipment sizing and capacity is suitable for the demographics of the workforce in the operating region; and b) Meet the following requirements outlined within the Framework Regulations: i. Section 6.3 Innovations; ii. Section 6.4 Physical and Environmental Conditions; iii. Section 6.5 Structural Design, Tests and Analysis; iv. Section 6.10 Materials for Installations and Pipelines; v. Section 6.12 Air Gap and Freeboard; vi. Section 6.13 Motion Response; vii. Section 6.15 Station-keeping; viii. Section 6.17 Ballast and Bilge; ix. Section 6.18 Watertight Integrity of Floating Platforms; x. Section 6.21 General Electrical Standards; xi. Section 6.24 Integrity Management; xii. Section 6.25 Installations Operations; xiii. Section 6.26 Operations Manual; xiv. Section 7.1 Repair, Replacement and Modification on Installations; xv. Section 7.2 Facilities for Inspection and Maintenance; xvi. Section 7.3 Piping Systems; xvii. Section 7.4 Mechanical Equipment; xviii. Section 7.6 Control Systems; xix. Section 7.7 Integrated Software Dependent Systems; xx. Section 7.8 Monitoring Systems; xxi. Section 7.9 Communication Systems; xxii. Section 7.12 Helidecks; xxiii. Section 7.10 General Alarms; xxiv. Section 7.13 Cranes and handling devices; xxv. Section 7.14 Navigation Aids; xxvi. Section 7.34 Temporary and Portable Equipment; xxvii. Section 7.35 Emergency Electrical Power; and xxviii. Section 7.36 Heat tracing/winterization (where applicable).

	DRAFT POLICY INTENT
2	**Dive Systems** The selected diving system must be fit for purpose and suitable for the planned activity.

	DRAFT POLICY INTENT
	PART TWO
	OCCUPATIONAL HEALTH AND SAFETY – DRAFT POLICY INTENT
	ACRONYMS ACGIH American Conference of Governmental Industrial Hygienists CSA Canadian Standards Association DMAC Diving Medical Advisory Committee DP Dynamic Positioning DSS Dive Safety Specialist HLB Hyperbaric Life Boat HRF Hyperbaric reception facility IMCA International Marine Contractors Association MSW Metre Seawater ROV Remotely Operated Vehicle SCUBA Self-contained Underwater Breathing Apparatus.

	DRAFT POLICY INTENT
	DEFINITIONS *For the purposes of this Part, the term "Dive Contractor" will have the same meaning, duties and responsibilities as the "Employer", under the Act.* "Ambient pressure" means the external pressure on the body of a diver. "Competent person" means a person a) qualified because of that person's knowledge, training and experience to do the assigned work in a manner that ensures the health and safety of every person in the workplace, and b) knowledgeable about the provisions of the Act and these regulations that apply to the assigned work, and about potential or actual danger to health or safety associated with the assigned work. "Dive physician" means a physician who: a) is licensed to practice medicine in Canada; and b) possesses a diploma in Hyperbaric Medicine - Diving from the Royal College of Physicians and Surgeons of Canada. "Decompression table" means a table or set of tables that shows a schedule of rates for safe descent and ascent, decompression stop times, and the appropriate breathing mixture to be used by a diver during a dive. "Diving bell" means a submersible compression chamber designed for transport of personnel between the surface and the work site at atmospheric pressure or under increased pressure. "Dive contractor" means a diving company or firm undertaking petroleum related diving operations for which an authorization has been granted. "Dive team" means all positions involved in the dive activity, including divers, diving supervisors, dive safety specialists, standby divers, diving bell attendants, life support supervisors and technicians, ROV pilots and dive medical technicians who may participate in a dive activity or be required to participate in the dive activity. **"**Dive site" means a site from which the diving operation is performed. **"**Diving operation" means an activity where the diver is directly exposed to increased ambient pressure. "Hyperbaric chamber" means a pressure vessel and associated equipment designed for the purpose of subjecting humans to greater than atmospheric pressures.

	DRAFT POLICY INTENT
	"Hyperbaric evacuation unit" means a self-propelled hyperbaric evacuation system capable of providing an escape route for saturation divers living under pressure from a stricken vessel. "Hyperbaric reception facility" means a shore-based hyperbaric facility specifically designed to accept divers from an isolated hyperbaric evacuation unit to a large living complex for safe decompression. "Life Support Package" means a portable, containerized system with enough basic equipment to allow the safe decompression of divers evacuated within a hyperbaric evacuation unit. "Saturation diving" means a technique of diving that equalizes the pressure of inert gas in the body with the ambient pressure and allows extended periods of bottom time without additional decompression time required. "Saturation chamber" means a compression chamber used for a saturation dive that is equipped to permit divers to remain at greater than atmospheric pressure for a limited period of time. "Standby diver" means a diver that shall be prepared and equipped to give immediate assistance to the diver. "Surface-supplied diving" means a diving technique in which the diver is supplied from the dive location with air by way of an umbilical. "Specialized Dive Physician" means a physician who: a) is licensed to practice medicine in Canada b) possesses a diploma in Hyperbaric Medicine - Diving from the Royal College of Physicians and Surgeons of Canada; and c) has completed training in saturation diving medicine from a recognized training institution. "Wet bell" means a device with an upper section containing a pocket of breathable gas, and which is used to lower and recover divers to and from work-sites subsea. "Working depth" means the depth from the water surface of the diver at work.

	PLANNING REQUIREMENTS
	Dive Project Plan
1	1) The Dive Contractor must, in consultation with the Dive Safety Specialists appointed under Section 21, and, where applicable, the dive vessel master, establish, implement and maintain a written Dive Project Plan that outlines, in detail, all operational and safety elements of the proposed dive operation, including: a) the nature and description of the work to be performed; b) A list of legislation, regulations (including this one), standards and codes of practice that the dive contractors considers applicable to the Dive Project c) A description of the diving operations; including the diving methods relevant for the scope of work and if relevant, include a description of dynamic positioning operations; d) detailed plan for how the task will be carried out; e) description of the hazards identified and risk assessments conducted as required under Section 2, including the required controls specific to the known hazards or the task to be performed f) the anticipated duration of the work, including number of hours to be worked each day; g) estimated and maximum time to be spent at each depth; h) the appropriate number of dive personnel required to safety carry-out the work; i) the hierarchy of command for the project; j) the name and qualifications of all members of the dive team, as well as any specialized training required to carry out the task; k) a method for communicating the Dive Project Plan to the dive team and any other persons who may be affected by the plan; l) any appropriate protective equipment that is to be used; m) dive system being used, and an assessment and identification of what components require redundancy ; n) a plan for familiarizing and instructing the dive team on the use of equipment to be used in carrying out the task; o) The results of any systematic assessments for identifying potential failure modes, consequences and appropriate mitigating measures; p) A table with drawing providing the safe distance to thrusters on dynamic positioning vessels; q) effect of weather and ocean conditions, including cold water hazards; r) all subsea lifts planned, and include crane operator certification requirement and drawings approved by a professional engineer for every lift; s) schedules for inspecting systems and the names of any persons responsible for carrying out the inspections; t) Communications available at the dive site to support the provision of medical advice and ensure accessibility in an emergency situation; u) emergency response plan, in accordance with Section 5; and v) any other information that is necessary to be able to plan for safe diving operations.

	2) When developing or revising a Dive Project Plan, a diving contractor must ensure that there is effective consultation with, and participation of, divers and other employees who will or may be working on the project.
	Project Hazard Identification and Risk Assessment
2	1) A project hazard identification and risk assessment must be carried out as part of the planning process and must take into account the hazards that may exist, and the hazards that may develop during the course of the work and the actions necessary to control and mitigate any identified hazards. 2) The hazard identification and risk assessment must be: a) Carried out in consultation with all parties involved in the dive activity and must be documented; b) Reviewed and accepted by both Dive Safety Specialists appointed under subsections 21(1) and 21(2); c) Be communicated and made available to all parties to ensure they are fully aware of the associated risks with the operation, and d) a copy must be readily available in the dive control room. 3) The hazard identification and risk assessment shall be amended, as necessary, to address any changes to the initial work scope or unplanned operations that may arise while the diving operation is underway. The activity must not proceed until this is completed and any necessary controls are put in place.
	Diving Safe Work Procedures
3	The Dive Contractor must establish, implement and maintain written diving safe work procedures and instructions that address, at a minimum: a) specific tasks to be carried out, as well as the equipment to be used; b) The outputs and findings of the hazard identification and risk assessment required under Section 2; c) diving from a dynamically positioned vessel, as applicable and in accordance with Section 4; d) the treatment of decompression illness; e) responding to hazardous weather or water conditions; f) aborting a dive; g) the provision and calculation of appropriate quantities of gases required for diving, including primary, secondary and therapeutic treatments; h) the maintenance of thermal balance, including the active heating of breathing mixtures; i) the provision and calculation allow for leakages, wastage and contingencies, and any other factor that may result in unplanned depletion of gas; and j) any other matters that may be applicable to the planned dive activity.

4	1) Where a dive operation is being executed from a dynamically positioned vessel, the dive contractor must establish, implement and maintain written safe work procedures for the vessel that includes: a) guidance on the conduct of diving operations as they may be affected by the DP vessel itself; b) actions to be taken in case of changes in station keeping alert status; c) vessel operations in close proximity to other marine installations and structures; d) vessel operations where divers enters areas with physical obstacles; e) precautions to guard against thruster wash or suction effect; f) equipment entanglement; g) vessel repositioning; and h) any other information necessary for the safe execution of the dive operation. 2) There shall be frequent communications between the Dive and DP Control Stations, who shall inform each other immediately about any changes in operational circumstances. 2) The vessel must be equipped with a) an indicator continuously displaying its station keeping status, and b) a visual and audible alarm system warning of station keeping status changes, both of which shall be visible on the bridge and dive control room and other critical areas as appropriate.
	Emergency/Contingency Response
5	1) The Dive Contractor shall develop written contingency and emergency response plans specific to the dive system and dive site to address all foreseeable emergencies identified in the hazard identification and risk assessment required under Section 2, to be followed in the event of an emergency in or near the dive site, on all of the following: a) emergency notification protocol; b) the methods for communication and for loss of any communication; c) the rescue of a diver following an incident or emergency at the dive site, including the relocation and recovery of a lost bell; d) identification of the necessary resources to implement a plan under this section; e) a medical contingency plan for emergency medical treatment, including the provision of medical care for a critically injured/sick diver under pressure, in accordance with Section 33; f) plan for emergency hyperbaric evacuation, including recovery and reception of hyperbaric lifeboats, in accordance with Section 56; g) vessel or dive system emergencies that have the potential to jeopardize the safety of a diver; h) in-water diver emergencies including, but not limited to, an injured or unconscious diver; i) chamber system emergencies including, but not limited to, fire, loss of pressure, atmospheric contamination, or failure of life support system; j) regular conduct of emergency response drills and exercises, in accordance with Section 58; k) a method for communicating the emergency response plan to all persons who may be affected by the plans; and l) Any other information necessary for the emergency preparedness and the safe execution of emergency response.

	2) Detailed emergency procedures covering all emergency scenarios shall be readily available to all members of the dive team.
	OPERATIONAL REQUIREMENTS
6	SCUBA operations and surface-supplied diving using a helium-oxygen gas mixture are not permitted.
7	1) Surface supplied air diving shall not exceed 50 msw. 2) For all surface oriented diving operations a double-lock compression chamber shall be ready for use at the worksite. Diver must be able to reach maximum depth in the chamber within time limits as specified in diving tables, required under Section 14.
8	1) When conducting a saturation dive operation, a means to effectively locate, assist and recover all divers shall always be available in the event of a lost bell. 2) A closed bell shall be capable of sustaining the lives of trapped divers for at least 24 hours 3) A closed bell shall be equipped with a location device using the International Maritime Organization (IMO) agreement recognized frequency to enable rapid location if the bell is lost. 4) The main umbilical system of a diving bell must be fitted with suitable protective devices that will prevent uncontrolled loss of the atmosphere inside the diving bell if any or all of the components in the umbilical are ruptured.
	Duration of Dives and Periods of Rest
9	In planning the dive activities, the Dive Contractor must conform to the time limits for saturation exposure limits outlined in CSA Z275.2 *Occupational Safety Code for Diving Operations.*
10	1) A continuous rest period of at least 12 hours shall be included in any 24 hour period for personnel working under water or under increased ambient pressure and a minimum of six (6) hours of uninterrupted sleeping period must be provided. 2) Surface personnel carrying out support functions for the dive operation, and whose work have an influence on safety during the operation, shall have at least 12 hours continuous rest period during the course of a 24 hours period.

11	1) Standby divers must have had, except in the event of an emergency, 12 continuous hours off since a previous dive; 2) In the case of surface-supplied diving operations, the standby diver must not have any residual inert gas.
	Decompression
12	Decompression must be carried out in accordance with proven decompression tables appropriate for the type and depth of diving, developed to minimize potential decompression sickness, and approved by the Specialized Dive Physician.
13	The Dive Contactor must have a program and procedures in place, and training provided, for decompression that will minimize any illness or adverse effects on the diver, and it must consider repetitive factor of an air dive and residual inert gases of any diver.
14	Standby divers shall not have any residual inert gas.
15	Accelerated decompression must only be used in extenuating, emergency circumstances.
16	Notwithstanding Section 57, in the event of an emergency, the Dive Contractor shall ensure that life support for divers is maintained for 24 hours.
17	1) A diver who has undertaken a surface-supplied dive must not fly in an aircraft for 18 hours after a dive, unless the inert gas load remaining does not create a risk to the diver. 2) A diver who has undertaken a saturation dive must not fly in a fixed-wing aircraft for 12 hours following the dive or helicopter above 300 m altitude. 3) Notwithstanding the above, where the diver has suffered decompression sickness, air travel must be approved by the Specialized Dive Physician, regardless of the time that has elapsed.
18	Decompression facilities must be suitable to accommodate the entire number of divers completing their decompression, as well as any other people needed to carry out decompression.

19	A Surface compression chamber must: a) be designed and constructed to be fit for the purpose and to ensure safety; b) provide a suitable environment for its occupants, including amenities appropriate to the type, depth and duration of the diving operation; c) contain sufficient space in at least one of its compartments to enable at least two occupants to lie down comfortably in the compartment and, if a person will be in the surface compression chamber for a period of eight consecutive hours or less, have an internal vertical diameter of at least 1.5 m; d) be equipped with a medical lock; e) be fitted with adequate equipment, including facilities for i. supplying to and maintaining for its occupants an appropriate breathing mixture, ii. lighting and heating the compression chamber, and iii. removing carbon dioxide.
	PERSONNEL AND QUALIFICATIONS
20	**Dive Team Size and Composition** 1) The Dive Team must be appropriately sized, taking into consideration the hazard and risk assessment required under Section 2, with sufficient qualified personnel available to operate and maintain all the equipment and to provide support functions to the diving team. 2) Notwithstanding the above, a minimum of two dive supervisors must be in attendance at all times during active diving activities.
21	**Dive Safety Specialists** 1) The Operator shall designate, in writing, a Dive Safety Specialist who a) Must be available i. During the planning phase prior to the commencement of the dive program, and ii. at all times at the dive site during the execution of the diving program to advise on any matter related to the safety of the diving program; b) Is independent of any dive contractor involved in the diving program, and c) Is not the same person who has been appointed by a dive contractor as the Dive Safety Specialist under subsection (2); d) Has overriding authority to make decisions with respect to the safety of divers.

	2) If all or part of a dive program is carried out by a dive contractor on behalf of the Operator, the dive contractor must appoint, in writing, a Dive Safety Specialist who a) Must be available i. During the planning phase prior to the commencement of the dive program, and ii. at all times at the dive site during the execution diving program, to advise on any matter related to the safety of the diving program, or those portions of it, carried on by the contractor on behalf of the operator; b) Is independent of Operator, and c) Is not the same person who has been appointed by the Operator as the Dive Safety Specialist under subsection (1). 3) A DSS must not have any other role assigned to them for the period of time that the dive activity takes place.
22	**Specialized Dive Physician** A Specialized Dive Physician must be a) Capable of providing medical advice and assistance for all reasonably foreseeable events that the dive program may encounter b) readily available on a 24 hour basis for medical advice and for transportation to the dive site to provide medical treatment c) capable of advising and administering medical treatment to a diver in compression.
	Qualifications, Training and Competency
23	During execution of the work, the Operator must monitor the continued competence of the dive contractor.
24	All members of the dive team must be competent to carry out their respective roles.
25	Each position in the dive team, and any ROV pilot, where pilots are deployed in the diving operation, must conform to the competencies outlined in CSA Z274.4 *Competency Standard for Diving, Hyperbaric Chambers and Remotely Operated Vehicle Operations.*
26	All members of the dive team, other than the specialized diving physician, shall hold valid certificates issued by a certifying body acceptable to the Chief Safety Officer.
27	Certificates of competency shall be issued based on completion of formal training from an accredited institution.

28	1) All members of the dive team shall hold current certification in standard first aid, as well as first aid oxygen administration. 2) On every dive team, one member excluding the supervisors and the divers underwater shall have diver medical technician certificate of competence.
29	Personnel certification and qualifications documentation shall be readily available.
	HEALTH, SAFETY AND WORKING ENVIRONMENT REQUIREMENTS
	HEALTH
	Fitness to Work
30	All divers must be certified as physically and medically fit to dive by a Dive Physician within 12 months immediately before the diver performs their duties in the dive program and the diver must attest that there has not been a change in their medical fitness since their last assessment.
31	Pre- and post-dive medical checks, in accordance with procedures approved by the Specialized Dive Physician, shall be conducted routinely for all divers. For saturation divers these checks shall be performed upon entering and surfacing from saturation dives, and for air divers prior to and after completion of work periods.
32	**First Aid & Medical Supplies and Equipment** The Dive Contractor, in consultation with the Specialized Dive Physician, shall ensure sufficient supply of first aid and medical supplies, equipment and medications are available at the dive site, for all reasonably expected injuries and illnesses that could occur and that were identified in the Hazard and Risk Assessment, and at minimum, must conform to DMAC 15 *Medical Equipment to be Held at the Site of an Offshore Diving Operation.*
33	**Medical Contingencies** 1) The Dive Contractor shall establish a system for handling medical contingencies in connection with the planned dive operations. The medical contingency plan shall address a) handling of all acute medical problems in diving operations b) plan for hyperbaric evacuation, in accordance with section 56, c) how to return personnel to surface pressure and give required medical treatment during decompression period, d) how qualified medical treatment can be given to personnel under pressure, e) how drills are to be carried out in order to handle an incident or a hazardous situation. 2) Training shall be provided on the drills identified in 33(1)(e).

34	**Medical Monitoring and Communications** 1) The Dive Contractor shall ensure that the specialized diving physician a) is able to communicate directly with a diver inside the saturation chamber or diving bell, b) has visual and auditory aids to observe and examine the divers when needed, and c) has remote access to monitoring or clinical assessment technologies, as technology permits. 2) The person performing advanced first aid shall have priority and unimpeded access to suitable communication devices with the specialized diving physician, or any other competent personnel as may be required. 3) Internet bandwidth (data transfer rate/communication access and speed) must be sufficient to provide chamber monitoring that allows the results of ongoing medical testing, such as electrocardiograms, to be transferred to the Specialized Dive Physician
	DIVER SAFETY
35	**Diver Locator** The Dive Contractor shall ensure a means exists that permits a diver's location to be constantly known.
36	**Hazardous Substances** The Dive Contractor shall document a system to ensure that all materials utilized in chambers, bells and breathing circuits etc., do not contain or produce gases or vapours that may be harmful to the divers during normal operational conditions.
37	**Standby Diver Equipment** Standby divers shall be equipped with the same diving equipment as the primary diver.
	WORKING ENVIRONMENT
38	**Thermal and Humidity Exposure** 1) The Dive Contractor must ensure: a) all dive team members are made fully aware of the hazards of cold water on a diver; b) Thermal control systems for divers in water, in hyperbaric chambers, bells, habitats (and in ADS systems) shall have the capacity and the accuracy to ensure thermal balance and comfort for the divers/occupants during all phases of a normal dive c) Redundancy in heating systems for all breathing mixtures;

	2) In the event of loss of thermal balance in diver, equipment or gas, or in the event there is any loss of hot water, even if the loss is expected to be temporary, the dive is to be suspended immediately and divers are to return to the diving bell/basket. 3) Life support systems for living chambers shall have the capacity to control the relative humidity to between 40% and 60% at operational depth of the system and with a full complement of divers in the chambers.
39	**Seismic Activities near the Dive Site** 1) Where seismic activity is planned within the vicinity of a dive site: a) The diving vessel and seismic vessels must be in regular contact so that both are aware of each other's work program b) a risk assessment must be conducted to assess the risk to the divers health prior to the commencement of the seismic operation , if the seismic activity is to occur within 10km of the dive site; 2) No dive activity shall proceed if the risk assessment has determined that the divers may be exposed to noise levels beyond maximum allowable levels prescribed by ACGIH
40	**Contaminated Working Environment** When diving in locations where the seabed or seawater may be contaminated, the dive activity shall conform to the requirements related to diving in contaminated waters laid out in CSA Z275.2 *Occupational Safety Code for Diving Operations.*
	TECHNICAL REQUIREMENTS
41	**System for Failure Detection** 1) A system for active monitoring of critical components and equipment of the diving system that provides indications in the dive control room of the health of the system. 2) Registration/notification and correction of dive system and diver equipment failures must be established, implemented and maintained. 3) Equipment failures detected during routine, pre-dive checks (documented in checklists/logs) must be registered as equipment failures.

	Communications
42	All dive team members, including the emergency response team both offshore and on shore, must be able to effectively communicate with one another at all times in order to safely execute the activity and obtain medical attention, if needed.
43	For communications between the supervisor and any diver involved in the diving operation, a primary communication system must be used that a) is dedicated; b) has sound quality adequate to enable breathing to be clearly heard and oral communications to be clearly heard and understandable; c) is equipped with a voice descrambler in the event that a breathing mixture contains a substance that distorts voice transmissions; d) a recording device that continuously records all oral communications while a dive is in progress.
44	There shall be communication system redundancy such that the supervisor and the divers are able to continue to communicate orally in the event of a failure of the primary communication system.
45	The diving supervisor shall have two-way audible / voice communications with the bridge and other relevant operational activity personnel.
46	If an ROV is in use in conjunction with diving operations, there shall be a dedicated communications link between the diving supervisor and the ROV operator and the diving supervisor shall have a monitor in dive control room displaying the same picture as the ROV operator.
	Monitoring
47	The Dive Contractor shall ensure that: a) the breathing patterns of divers are monitored at all times; b) verbal reports from divers can be received by those tasked with monitoring them ; and, c) visual monitors are employed.
48	1) The internal atmosphere of a bell must be continuously monitored to ensure low level contaminants do not exceed levels that may become toxic at depth. 2) The dive contractor shall ensure that there is redundancy in place within the bell and dive control that will ensure internal bell monitoring by ensuring that multiple devices are utilized. 3) Diving bell oxygen and carbon dioxide levels must be constantly analyzed and recorded hourly as a minimum.

	Breathing Mixtures
49	The dive contractor must ensure an adequate quantity of breathing mixture is available at any time during the diving operation, including sufficient quantity to ensure the complete diving operation, a reasonable quantity of reserve supply and an additional supply for use in the event of an emergency.
50	A breathing mixture supply system used for a dive must be appropriate for the depth and circumstances of the dives, but at minimum, any calculations for gas consumption shall be set no lower than 42.5L per minute.
51	Compressed breathing air mixtures, reserve supply quantities and the analysis of the air shall conform to CSA Z275.2 *Operational Safety Code for Diving Operations, Appendices A-D*.
52	1) The Dive Contractor shall ensure that each diver's breathing gas shall be of the correct composition, quality, temperature and flow for all foreseeable situations including independent primary and secondary supplies. Gas supplies shall be arranged so that interruption of supply to one diver will not affect other divers' supply. 2) Any gas mixture containing more than 25% oxygen by volume should be handled as if it were pure oxygen. 3) A competent member of the dive team analyzes, at a minimum, the oxygen content of gas mixes upon delivery of the gas and immediately prior to use; 4) Diving shall be halted if the gas quantities fall below acceptable minimums for safety.
53	**Gas Cylinders and Storage** 1) Gas cylinders must be suitable in design, fit for purpose and safe for use. Each cylinder should be tested and have appropriate certification issued by a competent person. 2) All gas storage units must comply with Canadian or international standards of colour-coding and marking of gas storage cylinders, quads and banks. Whatever standard is employed it shall be consistent for the project and readily identifiable. Where appropriate, pipe work shall also be colour-coded. 3) Adequate fire protection shall be provided for gas storage areas to control and extinguish or control fires as appropriate and to minimize any danger to safety that results or may be reasonably expected to result from the exposure of stored gases to fire.

54	**Diver Access – Surface Supplied Diving** 1) When diving from a marine installation or structure where the freeboard is less than 2 metres, a risk assessment should be carried out to establish whether there are any hazards to the Divers from obstructions that could be dangerous when the diver enters or exits the water. 2) If no hazards are identified and where the freeboard is less than 2 metres then one or the other then one of the following can be used to deploy a diver: a) A wet bell or basket system with a secondary system for deploying the standby diver, b) a secured ladder that extends at least 2 metres into the water, or c) An alternate means that affords equivalent or better protection than (a) or (b) 3) Where the risk assessment identifies potential obstructions that could be hazardous to the diver, or where the freeboard is more than 2 metres then one of the following shall be used for deploying divers: a) A wet bell with a secondary system for deploying the standby diver, b) a divers basket with a secondary basket for deploying the standby diver, or d) An alternate means that affords an equivalent or better protection than (a) or (b)
	EMERGENCY PREPAREDNESS REQUIREMENTS
	Hyperbaric Evacuation
55	1) A Hyperbaric Reception Facility must be available and on standby for the entirety of the project; 2) Dive contractor must have the capability to transfer the hyperbaric life boat to the hyperbaric reception facility within 72 hours in moderate sea states. 3) Prior to diving operations commencing a trial fit of the hyperbaric life boat to the hyperbaric reception facility transfer trunking shall be completed to test and verify the compatibility of the hyperbaric life boat and the hyperbaric reception facility.
56	1) The Dive Contractor must : a. conduct a risk assessment covering the launch, stabilization, recovery and normalization phases of an evacuation; and b. develop, based on the risk assessment, a detailed plan for hyperbaric evacuation of divers, specific to the dive installation and must include, at minimum: i. all relevant procedures including those related to the recovery and transport of the hyperbaric life boats to the reception facility; and ii. emergency contact information.

	2) Training on the plan must be provided, and the plan must be readily accessible, to a) all dive team members b) the Dive Control room c) on the bridge of the vessel, and d) at the hyperbaric reception facility
57	1) A Life Support Package must be on standby at a suitable location and ready for deployment in the event of a hyperbaric evacuation in the hyperbaric life boat. 2) The Life Support Package must be designed to extend the life support capabilities of the hyperbaric life boat beyond the time needed to ensure all divers are able to be fully decompressed.
58	Emergency Drills and Exercises 1) The Dive Contractor shall establish and implement a program for routine training, exercises and drills with respect to all reasonable foreseeable dive emergencies ensure a high level of emergency preparedness, which shall include, at minimum:. a) diver evacuation drill shall be conducted prior to, or shortly after, commencement of operations and on a monthly basis thereafter if the duration of the dive program is longer than a month. b) Hyperbaric lifeboats shall be launched and manoeuvred in the water at intervals not exceeding 12 months. c) Each diver shall practice boarding a hyperbaric lifeboat at intervals not exceeding 12 months. d) Drills involving location and recovery of a lost bell drill shall be carried out prior to, or shortly after, commencement of operations and on a quarterly basis thereafter if the duration of the dive is longer than 3 months. e) The dive team shall practice the procedures for dealing with a diver who has suffered injury or decompression sickness, on a monthly basis. f) Loss of position drills shall be completed on the diving vessel on a monthly basis, covering different scenarios such as fire, flooding, and loss of dynamic positioning capability. 2) Emergency drills and exercises shall be carried out at planned intervals to train personnel in, and test the adequacy of, the emergency response equipment, procedures and arrangements for any additional emergency scenarios identified in the hazard identification and risk assessment.

	RECORDS AND REPORTING REQUIREMENTS
59	1) Every diver engaged in a diving activity shall maintain a dive logbook. 2) All relevant records and dive logbooks must a. contain the details of each task and the diving program and are signed immediately after each entry, and b. record the names and job titles of the persons responsible for the various aspects of the dive program. 3) Records and logbooks must be retained in accordance with Section XX (record retention schedule –to be included in Phase 3)
60	All audio and visual communications must be recorded and all recordings must be kept for at least 48 hours after the diver has returned to the surface or the saturation living chamber.
61	Notwithstanding the above (Section 60), where an incident has occurred during a dive program, communications records including all audio and visual recordings must be retained indefinitely.