Phillips, Kim (NRCan/RNCan)

From: Mike Graham <thebankhouse@hotmail.com>
Sent: Sunday, October 15, 2017 3:25 PM
To: Phillips, Kim (NRCan/RNCan)
Subject: Re: Offshore Diving Stakeholder Engagement Session
Attachments: Stakeholder Engagement Draft Diving Policy Intent.docx

Hello Kim
Please find attached my feelings in the form of commons in the relevant section of the documents. To re-iterate my experience I have been in the diving industry since 1979 mainly in the offshore sector as an air diver/sat diver/diving supervisor both air and sat and as an offshore manager the later for the last 13 years.
I have witness a lot of changes in the industry with most making it a safer improved working environment. What I see that has brought about the greatest gains is the descriptive legislation in the UK and the descriptive guidance from both IMCA and IOGP that the oil companies have signed off on. I am not sure what reasons are being used to not use both of these organisations guidance but feel that should be our starting point. In my experience a few things that make the offshore diving off our coast different is the known extremely cold water which forms into to thermoclines , currents that can be of different intensities at different depths and the proximity of our oil fields to land and other diving vessels (quite often only one is present off our coast at any particular time). These are the issues that need to be descriptive in how they are going to be dealt with in not only the risk assessment but in our legislation.
Thank you for time
Regards
Mike Graham
604 967178

From: Phillips, Kim (NRCan/RNCan)
Sent: 05 October 2017 12:56
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

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

Contents

INTRODUCTIO N

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.

Comment [MG1]: This should also be descriptive in saying dive systems have to classed by a known society. Only DNV vessels required that systems be classed. They prefer DNV classed but do allow Lloyds or ABS.

	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.

Comment [MG2]: We should start this section by saying that the Dive project plan must conform to industry best practices of both IMCA and IOGP. We should not be trying to re-invent the rules but ensuring thing that are known hazards in Canada are highlighted and covered. A few of the main issues I have encountered in my time offshore Canada are extremely cold water (colder than anywhere else I have been), Strong changing tides and currents, distance to other diving vessels and physical distance offshore for recovery.

Comment [MG3]: See above this should not be left to the contractor.

	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.

Comment [MG4]: Add Bridge/ client office/offshore managers office or at least access on their computers to all information.

Comment [MG5]: They must also have a descriptive method of Management of change which clearly states what can be done offshore and what will need to be sent ashore for approval.

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.

Comment [MG6]: Dedicate clear comms between bridge and dive control that cannot be interrupted by any other party.

	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.

Comment [MG7]: Industry best practice is 12 hours why are we dictating a lower standard? Why are divers in saturation given less time that surface personnel see paragraph below. This makes no sense to me.

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.

Comment [MG8]: Accept the IMCA standards as they also are descriptive for time between saturation exposures and repetitive diving.

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.

Comment [MG9]: They need to be on the vessel during the whole operations. There are many things that can affect the satellite communications and a qualified DSS should be available at all times.

	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.

Comment [MG10]:

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).

Comment [MG11]: Originals not copies must be carried by the personnel.

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;

Comment [MG12]: This should be tested and proven before divers are committed to saturation and/or the vessel leaves the port.

Comment [MG13]: Be more descriptive as they might say we know where they are they are at the end of their umbilical's. Use the word transponders that can be seen real time on the navigation screen in dive control.

Comment [MG14]: Change this as the standby in the bell does not wear a either a reclaim hat or a bail out.

Comment [MG15]: Ensure there is enough hot water for the standby should he need to leave the bell to rescue the divers.

	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.

Comment [MG16]: IMCA D044 is the most update information on ppm for contaminated water and hydrocarbons in the water. Use that standard.

	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.

Comment [MG17]: As I mentioned previous this should be dedicated hard wired with no other parties on the system or all other parties can be easily isolated from the system should it be required.

Comment [MG18]: It should be stated that a means of monitoring the bell internal atmosphere for hydrocarbons in real time both in the bell and on surface be present and working. Such as a Hypergas.

	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 dive 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	<u>Emergency Drills and Exercises</u> 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.