

## **Review comments for NPRM USCG 46 CFR Parts 8 and 197 (February 2015)**

These review comments are in reference to 46 CFR Parts 8 and 197 [Docket No.USCG-1998-3786], [RIN 1625-AA21] Commercial Diving Operations.

These review comments contained in this document are being submitted by:

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On behalf of ExxonMobil, I would like to thank the US Coast Guard for the opportunity to review and make comments to this Notice of Proposed Rule Making, regarding commercial diving operations in the US water ways and on the Outer Continental Shelf. Please see my personal information regarding qualification and experience at the end of this report.

### **General Note:**

As a commercial diving professional and now a representative of a major oil and gas corporation, I would like to thank the USCG for this NPRM. The US diving industry has grown and changed very rapidly over the last two decades, and it is imperative that the legislation that helps to ensure safe operations must keep pace. As an active participant in the industry I have been present for several unfortunate events where accidents have happened and casualties occurred that could have been prevented by simply following industry best practices. I would like to express my appreciation for USCG recognizing that the regulation is due for improvement and update. This current draft is certainly a step in the right direction. We are particularly pleased with the active auditing process and the use of approved third party organizations to assist the USCG. Enforcement of the regulation will be much more capable with the active auditing recommendations contained within. We are also very encouraged to see reference to diving industry standards that are already in place, as USCG recognition of these standards will help ensure that the organizations who strive to develop them have further credibility. We would like to note that there are additional diving industry practices from other trade organizations, such as the IMCA - North America Section International Code of Practice (IMCA D 014) that should also be referenced and considered as a comparative best practice to those references already contained.

### **Review Comments**

1. 197.202 – Incorporation by Reference
  - a. The International Marine Contractors Association is another trade organization that provides consensus standards by “Guidance Notes” for marine construction contractors in diving, ROV, Marine and Survey activities. This trade organization has a North and Central America section that is very proactive in the U.S and recognized by Oil and Gas Operators, Marine Construction firms, and diving contractors. The IMCA D 014

International Code of Practice for Offshore Diving Operations (ICOP) is the most widely recognized and accepted diving standard, for offshore operations, globally. This standard should also be adopted by reference, as it provides several areas of technical standard relevant to offshore diving equipment, personnel competence, operational aspects and health and safety, where the ADCI consensus standards does not, such as: Mobile and Portable Air Diving System performance and inspection criteria, Comprehensive Hyperbaric Evacuation Guidance for saturation diving.

- b. (h) Recommend that this CFR also reference OHSAS 18001 Occupational Health and Safety Management standard (Soon to be ISO 45001). This is a much more relevant standard to how organizations manage safety and occupational health, than the referenced ISO 9001 Quality Management System standard used in this CFR to show structure for safety management systems (197.225).
2. 197.204 – Commercial diving operations conducted in foreign waters - “US and Foreign flagged vessels conducting diving operation must have diving systems that comply with International Code of Safety for Diving Systems (IMO Rev.A 831) and have a certificate issued by the vessel’s flag administration or a party acting on behalf of the administration...”
  - a. The referenced code is applicable to Saturation/Closed Bell diving systems and does not include surface supplied air/mixed gas diving systems. As describe in the current NPRM, this will cause a gap in vessels that are outfitted with and using surface supplied air diving systems. This is a very good and important inclusion into the regulation, and should remain, but it does not include surface diving equipment. Perhaps rewording the regulation to show “relevant to saturation closed bell diving systems”. Another option is to include the *IMCA D 023 DESIGN (Diving Equipment Systems Inspection Guidance Notes) for Surface Supplied Air Diving Systems* as a reference and have the surveying entity issue a certificate of safety based on that standard. The IMCA DESIGN criteria was developed for diving systems to have a “classification standard” where there was no classification society rules or flag state standard for the dive system. It is widely known and usually required by Oil and Gas Industry operators.
  - b. Current USCG marine safety inspection personnel will need training and qualification in order to perform the surveys/inspections on complex diving systems, if performed by USCG. I have been working with USCG Marine Safety Inspection personnel over the last 3 years, providing training and understanding of the diving plant and equipment, so that they may better understanding the equipment when performing a vessel annual COI survey. Support for this activity has been through the USCG OSV (Offshore Supply Vessel) initiative to better understand mission statements that OSVs are undertaking.
  - c. Where the Code of Safety for Diving Systems is not a technical standard, the recognized third party classification societies that would survey vessels according to IMO Rev.A 831 Code of Safety for Diving Systems will likely, or need to apply their own technical standard and rules for diving systems to supplement the Code of Safety for Diving System language. Currently only American Bureau of Shipping (ABS), Det Norske Veritas (DNV) and Lloyds Register (LR) are the only IACS member class societies that have rules for diving systems. Perhaps the NPRM may be amended to say “must contact a recognized classification society authorized by USCG, and that have standards and rules for diving systems,”.

3. 197.209 – Third Party Audits

- a. 197.209 (C) (2) – currently reads “Conduct audits of specific vessel operations and interview a **TPO’s** personnel to verify compliance with applicable Coast Guard regulations” This should read “...and interview a **CDO’s** personnel....”. The Commercial Diving Operator is the entity being audited by third party organization (TPO) in this case.
- b. In order for there to be consistency and effectiveness, there should be an audit criteria/template/guideline developed for use by the TPO or USCG personnel. IOGP members (ExxonMobil, Shell, BP, etc..) use a pre-developed audit format for assessing diving contractor’s diving safety management systems, dive equipment, diving personnel and diving support vessels, in order to maintain consistency in assessment, and provide interchangeable movement of contractors between each lease operator so that reevaluation doesn’t have to take place with each movement. Failure to have audit criteria could result in conflicting reports performed issued by different assessors.
- c. 197.209 (D) (2) – currently reads “Served as a diving supervisor overseeing the specific diving mode to be audited,”. Recommend that the verbiage be changed to read “Served as a **certified** diving supervisor overseeing the specific diving mode to be audited,” Additionally we would ask that the criteria for qualification as a TPO be changed and amended to include:
  - i. OHSAS 18001 Safety Management System Lead Auditor Course in addition to, or in place of “Organization for Standardization (ISO)9001–2008”. The OHSAS 18001 standard for lead auditor is much more consistent with diving safety management system auditing instead of ISO 9001 Quality Management Systems.
  - ii. Add “Training and technical experience with diving plant and equipment relevant to the planned diving mode”
  - iii. Add “Training and experience in Health and Safety process and procedures”
  - iv. Add “Maintain a logbook and record of previous audits performed”
- d. What is the administrative and application process in place that will allow organizations to be assessed and accepted by the Commandant? Will it be included in the regulation when ratified?

Having performed (36) diving safety management system audits of Diving Operators and Clients of CDOs in the last 12 years, one of the biggest challenges with accurate reporting is the competence of the auditor. Just being or having been a diving supervisor does not qualify an auditor for the technical knowledge needed to conduct an assessment based on the current 46 CFR 197, or the contents of this new NPRM.

4. 197.210 Internal Audits – This is a very important addition to the regulation and needed. We would like to add:

- a. There should be a criteria defined for the scope and elements used in the internal audit process. Perhaps the criteria should be the ISO 9001 Quality Management System process, which is already referenced in the NPRM. As IOGP members, we require

contractors to be certified to ISO 9001 so that internal audits are performed to a standard and are a condition of certification.

- b. By not establishing a criteria or qualification for the internal audit/auditor, the quality and accuracy of the assessment will likely suffer from inconsistency.

5. 197.210 External Audits

- a. There should be a criteria defined for the scope and elements used in the internal audit process. The current language in the NPRM states *“The external audit must be of sufficient depth and breadth to ensure that the CDO or vessel or facility owner that permits a commercial diving operation to take place on board complies with the requirements of this subpart.”* This criteria is ambiguous and will likely cause inconsistencies in reporting, or could cause an area of importance to become unchecked. We recommend that an audit checklist or guidance document be produced that the agency/TPO uses in the assessment. The IOGP Diving Operations Safety Committee would be willing to share its workbook with USCG for this purpose.

6. 197.220 Commercial diving operators

- a. (E) – *“The name of the dive supervisor for each commercial diving operation is provided to the person in charge (PIC) of the vessel or facility before beginning the operation;”*. This statement and requirement tends to cause confusion in industry regarding who within the CDO may designate the Dive Supervisor. We would recommend that the statement include details about who in the CDO organization can designate as the diving supervisor(s). Such as the “on-shore operation manager”, or “designated person ashore (DPA)”, such as the IMO ISM Code for vessels is structured for marine vessel operations. Additionally, where diving operations are conducted over a 24 hour period, there will often be (2) dive supervisors assigned to the operation, each being responsible for a 12-hour shift. We would recommend that the regulation state that *“Only one supervisor be named for each working shift, and the names of each dive supervisor assigned to the operation be designated in writing by the CDOs on-shore management, and be provided to the person in charge (PIC) of the vessel or facility before beginning the operation,”*
- b. Table 197.220 (F) – Drill requirements – the requirement to drill each 90 days on the action of launching the stand-by diver, recovery of the mock injured diver to the deck decompression chamber is not repetitious enough to allow each member a chance to perform the drills. The current 90 day requirement will not allow enough divers to perform the drill. In the diving industry the predominant scheduling culture of these drills is:
  - (1)-Each Diver perform an unconscious diver recovery drill within the first 3 days of the diving operation, then once every thirty days thereafter on projects that run consistently for more than 30 days. (This includes launching the stand-by diver and recovering him/her aboard the vessel by the designated method)
  - (2)-Within the first 3 days of each commercial diving project, the dive team shall perform a full unconscious diver recovery drill that include transporting the mock injured diver to the recompression chamber and placing him/her inside with an attendant

For drill (3), the hyperbaric evacuation drill, the current language suggests that the entire hyperbaric evacuation system (hyperbaric rescue chamber or hyperbaric lifeboat) be launched and recovered aboard the vessel each 90 days. This activity would be very time consuming, impractical and substantial cost impact, as it would require divers to be removed from saturation, and the activity takes up to 48-72 hours to re-commission the dive system after the hyperbaric chamber/lifeboat is reconnected to the saturation system. Additionally, the launch and recovery of the hyperbaric lifeboat/HRC is performed annually under survey, as a condition of classification. What could be used as an alternative is to say:

(3)- for dive systems utilizing hyperbaric rescue chambers or hyperbaric rescue craft, a drill that requires manning the lifeboat and simulated functioning of hyperbaric evacuation systems be performed at least every 90 days or when adding a new member to the dive team or when initiating a new dive location

This type of frequency and criteria will help ensure that each member of the dive team gets sufficient opportunity to perform the drills and learn the valuable techniques and details needed to perform the activity consistently. (Note; as a commercial diving accident investigator, I often find that the stand-by diver has lacking experience and knowledge on the details needed to affect a successful recovery. The stress of the situation often causes a breakdown in needed communications between the dive supervisor and stand-by diver that can lead to improper actions. Only through repeated drills can the details and muscle memory needed for success be learned.)

c. Table 197.220 (K) Dive Notice – Required Contents

The current language states that the “*OIC Marine Inspection is to be notified 24 hours in advance of before any commercial diving operation begins*”. We would respectfully request clarification for:

- Who is responsible to perform this action? CDO, client operator, or dive supervisor?
- How will the notification be performed? Written, email, phone, fax?
- What considerations are there for “emergency or urgent” situations where divers are needed to dive in less than 24 hours, such as marine causality response (vessel sinking, helicopter recovery, body recovery, etc.)
- What warrants a “commercial diving operation” event, where the notification made to USCG remains valid? A date range? A location movement? The completion of an agreed work scope between CDO and client operator? Does work stoppage for a period of time, then recommencement warrant a new notification? Etc....

In the contents of the Dive Notice, there is a statement that the “Diving System Safety Certificate” number be included in the notification. As described before in the comments to 197.204, Under IMO Res.A 831, there is no Diving System Safety Certificate (DSSC) relevance for surface supplied air/mixed gas diving systems, only saturation systems. This would mean that a surface supplied air diving operation notification would not have a DSSC number to provide.

We feel that the “notification to dive” initiative attempted by USCG is very good and the proactive manner of notification will increase diligence for CDOs and client operators to ensure that proper and safe operations are planned and executed. But the mechanisms and detail for how the notification is to be performed will require additional thought and explanation in order to be achievable and consistent.

7. 197.222 Dive Supervisors

- a. (l) The current statement “*Keep a record in the dive log noting where and when testing occurred for each of the following, along with the test results*” contains a list of diving plant and equipment to accompany the regulation. We would recommend that the “Diver Deployment and Recovery Equipment” or “Diver Launch and Recovery Equipment” be included in the listed equipment. Personnel lifting equipment failures in dive plant and equipment can be catastrophic, and is often over looked in maintenance cycles.

We would also recommend inclusion of the IMCA DESIGN Diving Equipment Systems Inspection Guidance Notes to requirement (10) – Diving Equipment Inspection. Referencing the IMCA DESIGN standard in this location will accommodate all of the equipment listed in the section, and additional critical equipment not identified, such as hot-water systems, gas purity analysis equipment, wire ropes, electrical systems.

8. 197.223 Operations manual

- a. (c) The list should include the CDOs “dive decompression tables, treatment table and detailed instructions on how to utilize them”.
- b. (d) The list should include “evacuation of divers under pressure” and “Trapped submersible diving bell”.

9. 197.225 Safety management system

- a. The current language states a CDO “*must conduct operations in accordance with a safety management system meeting the requirements of ISO 9001–2008,*”. Recommend that this NPRM change the statement to read “requirements of OHSAS 18001 SMS standard”. The ISO 9001 standard is not relevant to safety management systems; it is a standard for Quality Control Management Systems. As recommended for change in section 197.202-Incorporation by reference, the OHSAS 18001 standard will soon become ISO 45001 by end of 2015. Additionally, the language in the .225 section could also include reference to IMO – ISM Code, for safety management systems that are used onboard vessels.

10. 197.240 Personnel Training and Qualifications (General Requirements)

- a. We would respectfully recommend that in addition to the language of (a) and (b) in this section, an additional requirement be in place that requires CDOs to have a “method of competence assurance for each member of the dive team that must be documented and traceable”. His system should be similar in nature to the USCG or USN Personnel Qualification Standards (PQS). Would recommend that the USCG consider referencing IMCA Competence Guidance note (IMCA C 003) *Guidance on Competence Assurance and Assessment – Diving Division*. This document provides a framework and method for contractors to be able to track and document knowledge, skill and experience for each dive team member. Often time when we review the qualification of dive team members, the contractor verbalizes the diver’s competence, but has little to offer in

showing documented knowledge or experience in the tasks to be undertaken. The current ADCI reference only considers the act of diving in the skills and knowledge matrix, not mission orientation or project tasks. This is a big gap.

- b. We would strongly recommend that USCG make it a requirement for divers and supervisors to carry and have updated a diver's personal logbook. USCG diving regulation is the only diving regulation that does not require this. It is a basic tool for the diver to show he/she is a legitimate commercial diver and it is used to help validate the diver's qualification and experience.

We would recommend a statement such as "Each diver and dive supervisor must carry a professional diver's logbook that contains copies of the divers training, certification, medical qualification, and experience for dives performed. Each dive profile should list the diver's mode of diving, maximum depth, bottom time, decompression profile and comments of tasks performed. The CDO must verify that each logbook is accurately filled out by the diver, and the information about each dive is authenticated by the dive supervisor by signature. The logbook entry must be stamped for validity by the CDOs or vessels designated ink or watermark stamp. Each member of the dive team must be in possession of his/her logbook at the dive sight, and make it available for the dive supervisor".

#### 11. 197.241 Stand-by Diver

- a. We would recommend adding a requirement that addresses the standby diver being provided "an accommodation that keeps he/she in thermal balance and environmental conditions that does not expose them to extreme heat, cold, or the elements". Often the standby diver will modify dress and position themselves in places that are not conducive to immediate response due to excess heat, cold or discomfort from wearing to equipment.

#### 12. 197.242 Dive Supervisors

- a. We would strongly recommend that in addition to the ADCI requirements referenced for training and qualification, that he/she also "attend a formal course of instruction that provides for training in operations planning, standards and legislation, dive site normal and emergency management; refresher training in diving physics, physiology, and equipment management".

As a dive supervisor instructor in military and commercial diving industry for 12 years, one of the biggest gaps we witness in the commercial diving industry is the lack of knowledge and skill the dive supervisor candidate has while transitioning from diver to supervisor. The experiences of being a diver does not translate into skills needed as supervisor. The US diving legislation (USCG/OSHA 29CFR1910) and the ADCI diving trade organization qualification scheme are the only regulations/standards where training of the supervisor is not defined. The current Rev.6 of ADCI standard does require candidates to pass theory based test, but there is no requirement for training to become

a supervisor, or refresher training on core subjects that the candidate has not likely used in several years. In the US based scheme, the formal training are in the beginning stages of initial diver training, but many of the tools and skills necessary for supervisor work activities is not applicable for several years. Additionally the initial training provided in the ANSI-ACDE-2007 standard (Referenced in ADCI and this sub-part) does not provide for supervisor training. Some contractors do provide in-house training, but it is inconsistent, does not follow a standard, and is compulsory. Some contractors do send candidates to available Trainee Dive Supervisor courses, but this is only to satisfy the IMCA qualification scheme in order to work for some oil and gas clients and to qualify for work in the international industry where the ADCI scheme is not accepted. Purely based on safety and reducing risk to the dive operation, Dive Supervisor candidates should be trained formally to become qualified.

13. 197.243 Divers and dive tenders

- a. Sections (C) regarding saturation divers states “and complete *at least 100 dives as a mixed-gas diver*”. This is stated to be a pre-requisite to qualifying as a saturation diver. As surface supplied mixed gas diving becomes more scarcely used, in favor of saturation diving, this become very costly and almost impossible to achieve for many dive contractors. Client operators are favoring saturation over surface supplied Heliox diving more, and there will not be as much opportunity and ability for divers to reach this number of mixed gas dives. Additionally, the surface supplied mixed gas technique is relative to saturation diving, but not so much as the prescribed experience level offers much in the way of cross transferable skills needed in saturation. Saturation diving involves a much more complex plant and equipment, diving methodology, decompression philosophy, physiological differences and overall concept. We would recommend a reduction in required surface supplied mixed gas dives performed, and substitute for formalized saturation diving training. Perhaps (10) surface-supplied mixed gas dives, and completion of a formalized saturation diving course, that includes practical usage of mixed gas in the course.
- b. We would recommend that in addition to the items identified in this section, consideration be made to include, in section (C), requirement for formal training in closed bell and saturation diving techniques after meeting the prerequisites of air and mixed gas dives performed . The current ANSI-ADCE-2009 Commercial Diving Training Standard only provides for mixed gas diving, and does not provide for saturation diving or closed bell diving techniques. All saturation diving techniques are assumed to be learned on the job from commercial diving contractors, or divers travel to other countries to formally learn the technique. In the US, some contractors do provide theory based training or saturation diving, but most simply place surface divers into a working saturation system on a diving project and leave the education and training to the divers inside the saturation system to “mentor” the trainee. The ADCI Consensus standards only provides language to the competence and training of saturation bell divers in as far



as a diver having performed days in saturation and number of bell runs to get a certificate from the ADCI. There is no requirement for the training needs for a divers to actual get into saturation, other than what is listed in the ANSI-ACDE-2009 standard, which does not cover saturation diving. This continues to be a high risk method of preparing divers for this complex style of diving. Additionally, the US continues to be the only nation regulating commercial diving, where formal training of saturation diving is not required. Even the US Navy requires advanced training beyond surface diving in order to perform this technique. We strongly encourage USCG to consider adding training as a requirement to this diving mode.

14. 197.244 Life-Support Technicians

- a. In addition to the qualification items listed in this sub-part and the ADCI 6<sup>th</sup> Edition standard, we recommend that formal training in dive physics, physiology, saturation diving equipment, life-support and saturation diving theory. This should be a prerequisite to performing the activity. Recommend that USCG reference the *IMCA D 013 IMCA offshore diving supervisor and life support technician certification schemes*. Perhaps a statement such as; “Life Support technician trainees must attend a training course that meets the IMCA D 013 standards Terminal Objectives for Assistant Life Support Technician Courses.” Currently in the U.S, the life support technician is prepared for the position on the job, by the dive contractor employing him/her. There is two formal training courses set-up in the US that meet the IMCA D 013 standard, but these are optional courses for US personnel to attend in order to achieve international certification to work outside the US, or where some US client operators require the IMCA standard.

15. 197.245 Saturation technicians

- a. We strongly recommend that the term “Saturation technician” be changed to “Dive equipment technician”, as there is confusion in industry as to whether a “sat tech” must be present on surface supplied diving operations.
- b. We strongly recommend that the USCG consider adding a requirement that addresses having a “qualified dive equipment technician on each dive operation that can perform maintenance to critical life support systems according to the equipment manufactures recommendations”. This should not be restricted to saturation diving. Dive personnel fatalities in the last 15 years in the US OCS, and internationally have been attributed to improper, lacking and insufficient maintenance of life-support equipment. A member or members of the dive team should be designated as dive equipment technicians, and should be properly trained.

16. 197.247 Diver medical technicians

- a. We strongly recommend that this sub-part include a requirement to have “qualified diving medical technician immediately available at the dive site”. It is our experience

that dive operations sometimes lack properly trained and competent medical personnel that have the ability to handle hyperbaric/diving injuries, or the physical trauma from standard occupation health injuries that can/do result from working at remote dive sites. Chemical burns, electrocution, bites/contact with aggressive sea-life, amputations, crush injuries and drowning are all examples of non-hyperbaric injuries that often happen at offshore worksites. The listed qualification and training scheme in this sub-part is very good and sufficient, but the sub-part lacks the requirement to list a minimum number of technicians to have at the site.

17. 197.261 Operations conducted from a dynamic positioning vessel

- a. We recommend that the USCG consider referencing the *IMCA D 010 Diving operations from vessels operating in dynamically positioned mode*, as well as the ADCI standard. The IMCA standard offers additional levels of protect and best practice for this operation, and references the other applicable IMO MSC Circular references that are imperative to DP vessel design, configuration and set-up needed for manned diving operations.

18. 197.264 Operations involving multiple dives

- a. We respectfully request clarification on this requirement. Where the statement “*must first make sure that equivalent air depth calculations are determined by the dive supervisor and the diver, and that those calculations are entered into the Standard Navy Air Tables contained in the U.S. Navy Dive Manual*”. This action is irrelevant to repetitive diving (multiple dives). We would think that the USCG was meaning to state “Residual nitrogen level designators would be calculated and entered into the Standard Navy Repetitive Dive Table, or something to this effect. The statement currently in place is relevant to enriched-air, or NITROX diving instructions.

19. General Comment

- a. We would recommend that USCG place a requirement regarding the selection and usage of diving decompression table for all diving modes and operations.
- b. Currently in the US commercial diving industry, there are many varieties, interpretations and modifications to dive tables used by dive contractors. The most common philosophy observed is that contractors use various versions of US Navy dive tables (revision 3-6), and then the contractor adds “modifiers” that are supposed to add additional levels of safety, where it increases the diver’s decompression requirement more than what is prescribed on the table, by artificially increasing the depth and time he/she was exposed. This is a very common practice. The concern that should be observed by USCG and all stake holders is that often these modifications are instituted without further analysis as to the adverse effects of the change, or with the knowledge and consent of the entity that publishes the original decompression table (US Navy in this case), or a qualified diving medical doctor that offer perspective from a medical consideration.

- c. Many of the tables being used by the commercial contractors are not analyzed by the equivalent methods that the US Navy or other qualified decompression table developers use to scientifically prove the tables usability. Many of the dive tables used today exceed the US Navy's current exposure levels on bottom times at depth, and do not seem to modify and mature with the US Navy revisions.
- d. We would recommend that USCG make a statement to the effect that "dive decompression tables used must be equivalent to the current version of US Navy tables, or tables that are developed, tested and approved by an organization that is qualified and accredited to develop commercial diving tables."

20. 197.270 Equipment (General requirements)

- a. (b)- States that "*must comply with subchapters F and J of this chapter or other equivalent standards*". We would like some clarification on which sub-charters these are, as we cannot seem to locate them.
- b. (C) – We recommend that USCG consider referencing the IMCA DESIGN (Diving Equipment Systems Inspection Guidance Notes) (IMCA D 023 Surface Supplied Air Systems , IMCA D 024 Saturation Diving Systems, IMCA D 037 Surface Mixed-Gas Diving Systems and IMCA D 040 Mobile/Portable Surface Supplied Systems. The current reference to ADCI 6<sup>th</sup> Edition standard for supplementing dive equipment is valuable, but the ADCI standard leaves out several components of the dive system, such as hot-water systems, launch and recovery systems for surface diving, modular control vans, electrical power supply, failure mode effect analysis (FMEA), and suitable periodic examination/testing.
- c. (d) – this is a very good addition to the standard, but in many scenarios this will be difficult to achieve, as it is written. Classification societies will undertake the type of assessment stated, but will require that the mobile/packaged dive system be designed, fabricated and certified to the diving system rules of the class society (American Bureau of Shipping, Lloyds Register or Det Norske Veritas) before such documentation can be produced. Unless the components of the dive system are certified by the class society during the design and fabrication process, they will generally only act as third party witnesses to certain testing and examination activities.

Unfortunately this will not address the requirement to ensure the system is fit for purpose. The suggested language changes that would make this easily achievable would be "the unit and its installation must be certified by a classification society that has

standards for diving systems, and that meets the requirements of 46 CFR part 8, or by another organization acceptable to the Office of Design and Engineering Standards, Commandant (CG-ENG).”

Additionally we would like clarification on what the interpretation of “Modular or Packaged commercial diving unit” is. Does this apply to both surface supplied and saturation diving systems? Would recommend a definition of these terms, and what differentiates them from permanently affixed, or in-built dive systems aboard vessels.

21. 197.271 Commercial diving operator’s general equipment duties.

- a. We would recommend that USCG reference *the IMCA D 018 Code of practice for the initial and periodic examination, testing and certification of diving plant and equipment*. This standard achieves all the elements in the section of this sub-part. This standard is also the most common and widely used standard for maintaining commercial diving equipment in the international industry. It is also being used in the US by the IOGP and major diving contractors. Most dive equipment manufactures already reference this IMCA D 018 standard when designing and building commercial dive equipment.

22. Equipment section general comments

- a. Mechanical Launch and recovery systems for divers (LARS) – this sub-part does not address diver launch and recovery systems. The referenced ADCI standard does not appropriately address mechanical diver launch and recovery systems for surface diving systems. We strongly suggest that USCG place a section in this sub-part regarding the LARS system, and to make a general requirement that “Diver Launch and recovery systems must be fit for purpose; designed and built to appropriate standards for use in a marine environment where the dynamic amplifications of sea state are considered, meets personnel lifting requirements and is certified by a classification society that has rules for diving systems.
- b. There is currently no requirement for the CDO to perform risk assessments on the dive systems operating philosophy, architecture or capability in designated conditions. Diving system design, outfitting and set-up must be supported with a study to analyze possible failure modes and to place proper redundancy and mitigations where potential for failure exists (Electrical systems, hydraulic systems, breathing supplies, communications, hot-water, environmental analysis equipment, etc..). A risk assessment study should follow a format that allows each system and component to be analyzed and mitigations to be listed. This helps ensure that systems are properly constructed and are capable for performing the diving operation within the design criteria (Sea-state, temperature ratings, etc...).

We strongly recommend that USCG reference the *IMCA D 039 FMEA guide for diving systems* which helps perform failure mode effect analysis studies on the system, or a

statement to the effect of “CDO must perform and have available a hazard study and risk assessment of the diving systems plant and equipment, where potential failures in single components could affect the operational suitability of the system. Areas of risk to safety must be rectified with additional equipment and/or procedures that eliminates, or reduces the risk as low as reasonably practical.

23. Dive team staffing requirements

- a. We would recommend that USCG also include diving medical technician (DMT) in the list. We would suggest “at least (1) qualified DMT be immediately available at the dive site. The DMT may be a diving member of the dive team, so long as there is another qualified DMT aboard that is available at the dive site.
  
- b. We would recommend that USCG include dive equipment technician in the list. We would suggest “a member of the dive team must be a qualified dive equipment technician that is capable of maintaining the plant and equipment in appropriate operating condition”.

## Commenters' Experience and Qualification

### Experience Summary

- 26 years of experience as a US Navy and commercial diving professional. Performing SCUBA, Surface Supplied (air and mixed gas) and Saturation diving activities for military, oil and gas industry, marine salvage industry and municipal utility services industry.
- (2011 – present) Currently serving as ExxonMobil's Diving Critical Activity Specialist. Functional responsibility to oversee and manage all diving activity in the Upstream organization for global projects. I perform dive contractor qualification audits and capability assessments to current USCG 46 CFR 197 regulations and diving industry standards, such as IOGP, IMCA and ADCI.
- From 2005 – 2011, served as the Global Diving Compliance Manager for Cal Dive International, a major US based diving contractor.
- From 1989-2005 served as a diver and diving supervisor on inshore and offshore diving projects

### Relevant Qualifications

- Diving Safety Specialist (Closed Bell Diving) – Divers Certification Board of Canada (DCBC)
- Saturation Diving Supervisor – Association of Diving Contractors International (ADCI)
- Bell Diving Supervisor – International Marine Contractors Association (IMCA)
- Closed Bell Diver – IMCA Recognized and ADCI
- EOD Diver – US Navy
- Diving System Assurance Auditor (IMCA D 07/13)
- Dynamic Positioning for Diving Operations Induction
- Diving Safety Management System Auditor ISO/OHSAS 18001 – ISO 9001 QMS Lead Auditor
- Member of the *Diving Operations Safety Committee* of the International Association of Oil and Gas Producers (IOGP)
- Occupational Diving Standards technical committee member of the Canadian Standards Association (CSA)
- Former member of the Saturation Safety Committee of the ADCI
- IOGP RP 478 compliant Diving Work Site Representative