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23 AUG 2007

MEMORANDUM

From: Commandant (CG-01)

To: Distribution

Subj: CHIEF OF STAFF'S FINAL DECISION LETTER ONTHE ANALYSIS OF A CLASS "A" MISHAP; USCGC HEALY (WAGB-20), DIVING MISHAP, 500 NAUTICAL MILES NORTHWEST OF POINT BARROW, ALASKA, 17 AUGUST 2006

Ref:
(a) Safety and Environmental Health Manual, COMDTINST M5100.47
(b) U.S. Navy Diving Manual, SS521-AG-PRO-010
(c) Coast Guard Diving Policies and Procedures Manual, COMDTINST M3150.1(series)
(d) United States Coast Guard Regulations 1992, COMDTINST M5000.3B
(e) Department of Defense Human Factors Analysis and Classification System (DoD HFACS), http://www.safetycenter.navy.mil/hfacs/default.htm

1. SYNOPSIS: On 17 August 2006, USCGC HEALY hove-to in position 77° 13′N 177° 42′W, approximately 500 miles northwest of Point Barrow, Alaska, for planned ice liberty while deployed for Arctic West Summer 2006. The dive team, consisting of Diving Officer (DO), Diver One (DV1), Diver Two (DV2) and three volunteer diver tenders, planned to conduct an Arctic familiarization dive staged from the ice approximately 60 ft forward of the bow. The three divers were outfitted with dry suits, Self-Contained Underwater Breathing Apparatus (SCUBA), and AGA™ masks and were each attached by independently tended lines. Both the DO and DV1 donned split fins. DV2 donned standard paddle fins. The divers placed weight in the pockets integrated into the design of their buoyancy compensator devices (BCD) in releasable and non-releasable pockets. The dive plan called for two dives, each to 20 ft for 20 minutes and no decompression. The divers entered the water with 40 lbs of soft weight each. Upon entering the water, DV2 discovered several dry suit malfunctions, aborted the dive, and returned to the ship to secure dive gear. At this point DV1 exited the water to readjust leaking gloves and to warm hands. DV1 also requested and obtained permission to use the "thumbs up" sign instead of the standard "OK" sign because of a loss of dexterity. When DV1 reentered the water the DO and DV1 requested and received 8 and 10 lbs of additional soft weight respectively, and continued with the dive. Both divers completed in-water checks and left the surface. The DO and DV1 departed the surface with over 60 pounds of weight (including lead shot and steel tank) each. Approximately 10 minutes later, the diver tenders had each paid out roughly 200 ft of line and both lines were taut, and tending up and down. Upon DV2's return, diver tenders were directed to commence hauling up the divers after line-pull signals went unanswered. Divers were retrieved by their tending lines. Once the divers came into view, they appeared lifeless. DV1 was recovered onto the ice first. DV1 was not breathing and had no pulse. The maximum depth

of DV1's depth gauge was in excess of the gauge's markings, which stopped at 200 ft. DO was recovered onto the ice immediately after DV1. DO was not breathing and had no pulse. The maximum depth recorded by DO's depth gauge was 185 ft. Cardiopulmonary Resuscitation (CPR) was immediately administered and all attempts to resuscitate both divers proved unsuccessful.

2. CLASSIFICATION: This is classified as a Class "A" mishap due to the death of two divers per 3.H.1 of reference (a).

3. PRE-MISSION CONDITIONS:

a. CUTTER: HEALY is a 420' polar ice breaker with an 82' beam, 29'3" draft, with a personnel allowance for 11 Officers, 14 Senior Enlisted (E7-E9), and 55 enlisted, with accommodations for 35 scientists, 16 surge personnel, and 2 visitors. HEALY is capable of breaking 4.5' of ice at 3 knots and 8' backing and ramming. The placement of the sonar transducers are approximately 140 feet aft of the bow. HEALY averaged 206 Days Away from Homeport (DAHP) during calendar years 2000 through 2005 while its limit is 185 DAHP. HEALY was commissioned in 1999.

b. STATUS OF APPLICABLE SHIP SYSTEMS: At the time of the mishap HEALY was hove to and was maintaining its relative position to adjacent ice floes by keeping approximately 8 RPMs ahead on each shaft. Four out of six of the ship's sonars remained energized at the time of the mishap. (The status of the sonars and the engineering plant was determined not to be causal in the mishap, however, per reference (b) their status should have been considered prior to the planned dive.)

c. DIVE TEAM: The dive team onboard HEALY at the time of the mishap consisted of three people: DO, DV1, and DV2. Per reference (c), chapter 2, HEALY has an allowance for 6 collateral duty divers. At the time of the mishap, four collateral duty divers were permanently assigned to HEALY; however, one of those divers was assigned on temporary duty away from the ship. The dive team composition for the planned dive (a cold water dive) was not in accordance with references (b) and (c). Specifically, four qualified divers were required for this type of dive (paired divers, standby diver, and diving supervisor) and no standby diver was designated.

d. CREW COMPOSITION: HEALY's command cadre includes a Captain as Commanding Officer (CO), a Commander as Executive Officer (XO), and a Lieutenant Commander as Operations Officer (OPS). At the time of the mishap, HEALY had 119 persons onboard consisting of 84 active duty Coast Guard members and a science contingent of 35 civilians.

e. METEOROLOGICAL INFORMATION: The on-scene weather conditions were clear sky and sunny with ten miles of visibility. The air temperature was 28 degrees Fahrenheit and the sea temperature was 29 degrees Fahrenheit. The winds were out of the west southwest at eight knots. The ice conditions were nine-tenths ice coverage of a three to five foot multi-year pack. Depth beneath the keel was approximately 1,418 meters or 4,650 feet.

f. PLANNING: The Diving Officer drafted a dive plan wherein the ship's dive team would conduct a training and familiarization dive under the ice. The dive plan indicated the equipment to be used was SCUBA gear with AGA^{TM} full face masks and dry suits. Just prior to the commencement of ice liberty on 17 August 2006, the DO submitted the dive plan and it was routed through the chain of command, which included review by the Operations Officer and the Executive Officer. The Commanding Officer approved the dive plan. The total routing and review time of the dive plan by the chain of command was 30 minutes, with one minor change indicating that the dive team was permitted to deploy to the ice from the ship's brow.

g. RISK MANAGEMENT: Prior to executing the dive plan on 17 August 2006, no Operational Risk Management (ORM) assessment or command level safety brief was conducted as is required by Coast Guard policy contained in COMDTINST 3500.3, Operational Risk Management.

h. SUPERVISION: The command cadre (CO, XO, and OPS) did not actively supervise training or material condition of the shipboard diving program. The day of the mishap the command cadre did not ensure key personnel (the Officer of the Day (OOD), Engineer Officer (EO), and Engineer of the Watch (EOW)) were briefed on dive operations. The command cadre intermittently observed dive preparations and dive operations. The dive side supervision was not in accordance with references (b) and (c) and standard practice in that the DO was both the designated diving supervisor and participated as a working diver, which resulted in the DO inadequately performing the duties of a diving supervisor. (A dive side is the location where a military or commercial dive is performed.)

i. PERSONAL PROTECTIVE EQUIPMENT AND SAFETY PROCEDURES: Reference (b) clearly delineates the requirements and recommendations for equipment when ice diving or diving when water temperatures are at or below 37 degrees Fahrenheit. Many of these requirements were violated and many of the recommended procedures were not followed.

(1) Specific violations included:
   (a) Redundant scuba system or twin scuba bottles with one common manifold and an approved cold water regulator (with octopus) were not used as required.
   (b) Stainless steel ice screws were not used to secure the tending lines as required.

(c) A harness such as an Integrated Divers Vest, MK 12 jocking harness, etc. was not used.
(d) A shelter was not erected as close as possible to the diving site to reduce the probability of frostbite and equipment freeze-up as required.
(e) Weights installed in a vest type buoyancy compensator were not jettisonable as required.
(f) Nonstandard hand signals were authorized because DV1's hands were too cold to make the OK sign. Per reference (b) standard hand signals are required and a dive should be terminated upon severe impairment of manual dexterity.

(2) Specific recommendations that were not followed:
(a) A weighted line should be hung through the hole of the ice to aid the diver in retaining his bearing and sense of direction.
(b) Suspending a light at the end of the line may be helpful, as well as a series of strobe lights to indicate depth.
(c) It is recommended that the tending line be marked at ten foot intervals.
(d) While waiting to enter the water, divers should avoid sitting on or resting their feet on the ice or cold floor of a hut, and time on the surface with the diver suited, but relatively inactive, should be minimized to prevent chilling of the diver.

j. CONDITION OF THE DIVE LOCKER: The overall condition of the dive locker was fair. There were no dive gear maintenance or preventive maintenance records for any equipment except SCUBA tanks and surface supplied umbilical hoses. All Buoyancy Control Devices (BCD's), wetsuits and dry suits were neatly hung and stowed. Regulators and facemasks were stored in a storage locker and in good condition. Several dry suits were damaged and not in working order. The dive locker head was used as a spare gear locker. Old dive records, spare parts, and other miscellaneous items were strewn on the deck and disorganized. (The DO had contacted the Coast Guard Liaison Officer at the Naval Diving & Salvage Training Center the day before the mishap requesting at least one new dry suit for DV2, noting that dry suits present on board were damaged or the wrong size.)

k. POLICIES / PROCEDURES:

(1) COMMAND CADRE:
(a) Per reference (d), the responsibility of the commanding officer for that command is absolute. At the commanding officer's discretion, portions of that authority may be delegated to subordinates for the execution of details, but such delegation of authority shall in no way relieve the commanding officer of continued responsibility for the safety, efficiency, and well-being of the command.

(b) Per reference (c), the Commanding Officer of diving units shall be responsible for the safe and successful conduct of all dive operations, assign diving orders by letter designation of qualified unit divers, ensure funding is provided for unit level equipment maintenance and recapitalization, provide time for dive training and routine, structured physical training, and provide funding for adequate physical training facilities where no-cost facilities are unavailable.

(c) Per reference (d), the Executive Officer shall supervise and coordinate the work, exercises, and training of the personnel of that command.

(d) Per reference (d), the Operations Officer shall be responsible for the proper performance of the functions of the department, which include the preparation of vessel operation plans and training schedules required of the department.

(2) DIVING OFFICER: Per reference (c), the diving officer shall: ensure the safe conduct of all dive operations by providing overall supervision of dive operations and ensuring strict adherence to procedures and precautions; become thoroughly familiar with all Command diving techniques and have a detailed knowledge of all applicable regulations; ensure appropriate entries are made in personnel records to document diving qualifications. The diving officer shall also perform all operational and administrative duties associated with the Command diving program as well as oversee the command diving equipment maintenance program.

(3) DIVING SUPERVISOR: Per reference (c), the Diving Supervisor shall be assigned for each dive and shall exercise control over the actual dive operation, prepare dive plans for review by the diving officer considering contingencies, equipment requirements, diving assignments and back up requirements for a given dive operation, be familiar with all divers and support personnel on the team and evaluate the qualifications and physical fitness of the divers selected for each particular job, and inspect all equipment and conduct pre-dive briefings of personnel. While the operation is underway the Diving Supervisor monitors progress; debriefs divers; updates instructions to subsequent divers; and ensures that the Commanding Officer and other personnel as necessary are advised of progress and of any changes to the original plan. (These functions cannot be performed by the Diving Supervisor as required by reference (b), if the Diving Supervisor is also functioning as a working diver in the water.)

(4) STANDBY DIVER: For SCUBA dive operations, a designated Standby Diver must remain at the surface, properly outfitted and ready to enter the water immediately. The Standby Diver receives the same briefings and instructions as the primary diver(s), monitors the progress of the dive, and is fully prepared to respond if called upon for assistance.

(5) DIVER TENDERS: Per reference (b), the tending line is to be held by the tender at all times. As an additional safety measure during ice diving, the end of the tending line must be secured to a stationary object to prevent it from falling into the entry hole should it be dropped by the tender. The dive team must be thoroughly familiar with the procedures for line tending. (None of the diver tenders were properly trained or qualified as required by reference (c).)

l. TRAINING / RECORD-KEEPING REVIEW:

(1) The Coast Guard Diving Policies and Procedures Manual, reference (c), states:
(a) a combination of semi-annual and annual training as well as periodic dives is required in order to maintain proficiency, adequate experience, and qualification status,
(b) diver training is critical to maintaining an effective dive team and shall be scheduled in the unit long-term training plan,
(c) it is suggested that the DO be a member of the unit's training board,
(d) responsibility for administering an onboard training and qualification program for diving watch stations rests with the ship's Diving Officer, and
(e) the Commanding Officer must ensure required dive training is conducted.

(2) The DO reported aboard for a first tour afloat on 23 June 2004. The DO completed the Basic Diving Officer Course at the Naval Diving and Salvage Training Center (NDSTC) on 11 May 2004. This training included 80 training days and provided training to perform SCUBA and surface supplied diving and to perform as a Diving Officer. This training did not include any cold water specific training. Prior to the dive on 17 August 2006, the DO had conducted approximately 24 dives during 19 dive days over a two year period. Seven of the 24 dives were conducted in the Arctic Ocean (a cold water environment) during the summer of 2005 while serving on CGC HEALY. Those dives were conducted with surface-supplied air as opposed to dives with SCUBA. The last dive the DO participated in prior to the one on 17 August 2006 was on 10 April 2006. With this dive profile, the DO was a diver with limited military dive experience and no cold water SCUBA experience. This was the DO's first cold water SCUBA dive.

(3) DV1 reported aboard for a first tour afloat on 25 May 2005. DV1 graduated from the Navy Diving and Salvage Training Command's (NDSTC) SCUBA course on 1 March 2006. This course provides 35 days of basic instruction in the operational use and maintenance of open circuit SCUBA equipment, diving physics, identifying diving injuries and recognizing the need for treatment. Coast Guard specific follow-on training includes training in operation of dry suits, full-face masks, lift bags, and the Emergency Evacuation Hyperbaric Stretcher (EEHS). Since receiving training, DV1 had only conducted two dives in one dive day on 10 April 2006. With this dive profile, DV1 was a diver with limited military dive experience. DV1 had never conducted a cold water dive.

(4) DV2 reported aboard for a first tour afloat on 18 July 2006. DV2 graduated from the Navy Diving and Salvage Training Command's (NDSTC) SCUBA course on 8 July 2005. Since receiving training, DV2 had only one dive day consisting of four dives on 20 October 2005. With this dive profile, DV2 was a diver with limited military dive experience. DV2 had never conducted a cold water dive.

4. CAUSAL AND CONTRIBUTING FACTORS

a. CAPABILITIES: There was no conclusive evidence of failures of equipment that caused this mishap.

b. HUMAN FACTORS: As outlined in reference (e), the Department of Defense Human Factors Analysis and Classification System (DoD HFACS) provides a systematic, multidimensional approach to error analysis, standardizing the human factors analysis approach for the investigation of mishaps. DoD HFACS examines four main tiers of failures/conditions: 1) Acts, 2) Preconditions, 3) Supervision, and 4) Organization. A factor is considered "causal" when if removed in the sequence of events it would most likely have broken the chain of errors and the mishap would not have occurred. A factor is considered "contributory" when it is not singularly responsible for the mishap; however, when combined with causal or other contributory errors it influenced the progression of the mishap. "Non-contributory" factors were problems or hazards that were determined to not have been causal or contributory to the mishap, but which had the potential to have done so.

(1) ACTS: The following errors (mental or physical activity in which the operator failed to achieve his intended outcome) were committed.

(a) Errors: Skill-based Error

1. Procedural Error (causal) – Procedural error occurred when the dive team did not properly follow Chapter 11 of reference (b) when they failed to appropriately use: a redundant scuba system or twin scuba bottles with one common manifold and approved cold water regulator; a shelter as close as possible to the diving site; and the required number of divers (four) for this type of dive.
2. Overcontrol / Undercontrol (causal) – This is a factor when an individual responds inappropriately to conditions by either overcontrolling or undercontrolling the aircraft/vehicle/system. The error may be a result of preconditions or a temporary failure of coordination. The DO and DV1 were carrying excessive weight resulting in under control, and the unqualified diver tenders did not recognize and stop the divers' uncontrolled decent soon enough to prevent the mishap.

3. Checklist Error (contributory) – The dive team and HEALY crew failed to run an appropriate or effective checklist in that they did not consider equipment tag outs, did not have dive gear configured properly, did not conduct a risk assessment, and did not ensure all requirements for an ice dive were followed per reference (b).

(b) Errors: Judgment and Decision Making Error

1. Risk Assessment During Operation (causal) – Risk was not adequately evaluated which led to unsafe conditions. There was no use of Operational Risk Management when the command determined whether to conduct the dive along with ice liberty and then subsequently allowed a polar bear swim at the same time. The informal dive-side dive brief should have been a formal brief and should have included a formal risk assessment. Finally there should have been an additional risk assessment when the dive plan changed due to the DV2 departing the dive side due to leaking suit, and when there was a loss of dexterity in DV1's hands.
2. Decision Making During Operation (causal) – The divers did not select the proper course of action in a time constrained environment due to faulty logic when they continued the dive after experiencing equipment malfunctions. This includes DV1's leaking gloves, DV2's departure due to a leaking suit, and weights added to non-releasable pockets. The time constraints were due to attempting to accomplish the dives prior to the expiration of ice liberty.
3. Task Misprioritization (contributory) – The HEALY Command Cadre (CO, XO, Operations Officer) and the Dive Team did not organize, based on accepted prioritization techniques, the tasks needed to manage the immediate situation. The dive was not operationally necessary in that it was being done for qualifications and proficiency. Getting a dive accomplished and conducting ice liberty took priority over safety.
4. Necessary Action – Rushed (contributory) – The necessary action of routing the dive plan through the chain of command was accomplished, however, it was rushed and led to an unsafe situation when no briefing was provided for certain critical members of crew, i.e. the Officer of the Deck and the Engineering Officer, no risk analysis was conducted, and the CO and XO did not ask follow-up questions regarding the conduct of the dive.
5. Necessary Action – Delayed (contributory) – The necessary action of commencing the dive was delayed due to DV1's problems with gloves and DV2's problem with the dry suit. These delays increased the time on the surface where the divers were subject to chilling and equipment was subject to cooling, leading to an unsafe situation.
6. Caution/Warning – Ignored (contributory) – A caution or warning was perceived and understood but ignored by the DO when the CO asked if all three divers could be in the water, and when DV2 questioned the placement of weights in pockets that would not allow their jettison.

(c) Errors: Perception Errors

1. Error due to misperception (causal) – The DO and DV1 perceived they needed more weight than necessary. The diver tenders did not perceive the line was paying out too quickly and that the line was tending up and down due to an illusion caused by refraction of the water.

(d) Violations:

1. Violation - Lack of Discipline (causal) – Lack of Discipline is a factor when an individual, crew or team intentionally violates procedures or policies without cause or need. This occurred when the DO told the Commanding Officer (CO) that the dive was within regulations when it was not, and the CO, who was responsible for the safe conduct of all dive operations, lacked familiarity with dive procedures, and approved the plan. The dive was executed without the required number of divers, with no dive supervisor or standby diver topside, and unqualified diver tenders. In addition, the DO and DV1 filled their equipment pockets with weights. The equipment pockets are secured with heavy zippers and are not easily opened, making emergency jettison difficult, if not impossible. The DO and DV1 eventually departed the surface with over 60 pounds of weight (including the steel air tanks).
2. Violation - Routine/Widespread (contributory) – This is a factor when a procedure or policy violation is systematic in a unit/setting and not based on a risk assessment for a specific situation. The bridge watch and the Officer of the Deck knew diving operations were being conducted; however, they had no contact with the diving supervisor as required by the Standing Orders for the USCGC HEALY Dive Team. There were also no tag outs completed for the ship's screws, sea suction, or sonars, as required by the Standing Orders.

(2) PRECONDITIONS: The following preconditions (active or latent environmental, or personnel factors that affect practices, conditions or actions of individuals and result in human error or an unsafe situation) existed.

(a) Environmental Factors: Physical Environment

1. Vision Restricted by Environmental/Meteorological Conditions (contributory) – This is a factor when weather, haze or darkness restricts the vision of the individual to the point where normal duties are affected. Near the surface the divers and diver tenders had unlimited visibility in the water; however, once descended and/or under the ice, the divers would have experienced darkness and no frame of reference. The diver tenders also lost sight of the divers in the water, and experienced refraction in viewing the tending lines.
2. Thermal Stress-Cold (contributory) – This is a factor when the individual is exposed to cold resulting in compromised function. The sea water was 29 degrees Fahrenheit leading to the use of dry suits, and increased thermal layering for the hands reducing manual dexterity. DV1's hands had also lost dexterity due to a cold water leak into the gloves.

3. Noise Interference (contributory) – This is a factor when any sound not directly related to information needed for task accomplishment interferes with the individual's ability to perform that task. The diver tenders experienced noise interference from ice liberty and the polar bear swims, which were being held in close proximity to the dive side.
4. Environment Immediately Dangerous to Life or Health (contributory) – Diving in general, and cold water diving specifically, is an environment immediately dangerous to life or health.
5. Thermal Stress-Heat (non-contributory) – This is a factor when the individual is exposed to heat resulting in compromised function. DV1 was dressed out and on the ice over 40 minutes prior to the commencement of the dive and was physically active during that time. This physical activity may have caused increased body heat, followed by rapid cooling in the water, and may have diminished DV1's physical capacity.

(b) Environmental Factors: Technical Environment

1. Equipment User Interface (causal) – The divers did not have the required familiarity or expertise needed to properly manipulate the equipment as designed. The divers lacked the ability to manipulate their dry suits to maintain neutral buoyancy. The divers' lack of familiarity or expertise was demonstrated when they failed to properly orient the hoses on their tanks, when they added weights to pockets that did not allow for jettison and when the DO used an ill-fitting dry suit.
2. Communications Equipment (contributory) – Radio communications equipment for communications between the dive side and the divers in the water was not available to the divers at the dive side, and was not used, although it was available on the ship.
3. Controls and Switches (contributory) – One of the ways divers control their movement in the water column is through the use of weights. The divers could not easily release their weights to allow them to rise in the water column.

(c) Condition of Individuals: Cognitive Factors

1. Inattention (causal) – The dive team and diver tenders all had a reduced conscious attention due to a perceived absence of a threat and their own self confidence.
2. Distraction (causal) – Ice liberty, polar bear swims, ice football and the presence of alcohol in the near vicinity of the dive interrupted the attention of and inappropriately redirected the attention of diver tenders.
3. Channelized Attention (contributory) – This is a factor when the individual is focusing all conscious attention on a limited number of environmental cues to the exclusion of others of a subjectively equal or higher or more immediate priority, leading to an unsafe situation. The unqualified diver tenders were focused on paying out line and did not recognize that the lines were paying out too quickly.

4. Negative Transfer (contributory) – This is a factor when the individual reverts to a highly learned behavior used in a previous system or situation and that response is inappropriate or degrades mission performance. The unqualified diver tenders may have reverted to their knowledge of line tender signals for shipboard firefighting, which are different from line-pull signals for diving.

(d) Conditions of Individuals: Psycho-Behavioral Factors

1. Personality Style (causal) – This is a factor when the individual's personal interaction with others creates an unsafe situation. Examples include authoritarian, over-conservative, impulsive, invulnerable, submissive or other traits that result in degraded crew performance. The DO created an unsafe situation during the execution of the dive because during the preparation for the dive the DO's confidence projected in a way that others did not continue to question the DO's responses regarding the required number of divers and the use of weights in pockets that did not allow for jettison. The DO's actions were impulsive and may have been due to a sense of invulnerability, particularly after DV2 left the dive side and the dive continued with just two divers, no standby diver and no dive supervisor at the dive side.
2. Overconfidence (causal) – The command cadre (CO, XO and Operations Officer), the divers, and diver tenders were overconfident in their ability to safely supervise or perform the planned dive. The command cadre and the divers overestimated their ability to do the dive safely. The command cadre also overestimated the DO's abilities, skills, and knowledge. The DO demonstrated overconfidence when the DO did not engage in the required safety practices set forth in references (b) and (c). DV1 and DV2 mirrored the overconfidence of the DO by proceeding with the dive without questioning whether the dive should take place when safety precautions were not followed.
3. Complacency (causal) – Reduced conscious attention by the CO, Executive Officer, the Operations Officer, the divers, and the diver tenders due to an attitude of overconfidence or the sense that others "have the situation under control" led to an unsafe dive. The Operations Officer inappropriately determined the dive evolution to be routine with minimal risk.
4. Get-Home-Itis/Get-There-Itis (causal) – The DO saw this as the only opportunity to do an ice dive. Once in the water the divers were reluctant to cancel the dive operation even though DV1 had a loss of manual dexterity, and DV2 had to leave the dive side.
5. Emotional State (contributory) –The DO was afraid of an uncontrolled ascent and was focused on avoiding an uncontrolled ascent, rather than being focused on ensuring neutral buoyancy. The DO was also very excited about the dive operation the day of the mishap.
6. Misplaced Motivation (contributory) – The DO and DV1 may have had other personal reasons besides familiarization/training for conducting the dive at that time.

7. Overaggressive (contributory) – This is a factor when an individual or crew is excessive in the manner in which they conduct a mission. The preparation, routing and presentation of the dive plan was overaggressive.

(e) Conditions of Individuals: Adverse Physiological States

1. Trapped Gas Disorder (causal) –Trapped gas disorder was a causal factor when air trapped in the lungs expanded on ascent causing pulmonary overinflation and barotrauma. The lungs ruptured forcing air bubbles into blood vessels.
2. Hypoxia (causal) – Both the DO and DV1 were out of air when they were recovered at the dive side. Insufficient oxygen supply to the body was sufficient to cause an impairment of function to both divers.
4. Operational Injury/Illness (contributory) – Nitrogen Narcosis may have been a factor, but it is impossible to know for certain.
5. Sudden Incapacitation/Unconsciousness (contributory) – The DO and DV1 experienced hypoxia, which would have caused sudden incapacitation or unconsciousness.
6. Fatigue - Physiological/Mental (contributory) – The HEALY crew had been underway continuously for 40 days without liberty. The DO had endured a long deployment and an arduous ship schedule over 2 years, leading to cumulative fatigue. DV1 may also have experienced fatigue.
7. Physical Task Oversaturation (contributory) – The DO and DV1 would have had to recognize their decent, cleared their ears, inflate their suits, drop weights, signal each other and signal diver tenders all within a compressed time period. The number and complexity of these tasks likely exceeded their ability to perform.

(f) Conditions of Individuals: Perceptual Factors – Illusion

1. Misperception of Operational Conditions (contributory) – The divers may have misperceived the speed and amount of their descent. The diver tenders misperceived the depth to which the divers were descending.
2. Expectancy (contributory) – Both the divers and the diver tenders had in mind that the divers would not go deeper than 20 feet, and this expectation was strong enough to create a false perception of the expectation.
3. Illusion - Visual (contributory) – The divers lacked an in-water vertical reference, such as a weighted line with a light at the bottom or a series of strobe lights to indicate depth. Per reference (a) this line should be hung from the dive side to aid divers in retaining their bearing and sense of direction.

(g) Personnel Factors: Coordination / Communication / Planning Factors

1. Communicating Critical Information (causal) – The DO did not provide critical information to the command and the dive team about deviations from the policies in references (b) and (c). Critical information was also not passed to the dive side personnel about dive procedures such as limiting the amount of line that the diver tenders should give to the divers. Furthermore, the ability to communicate critical information between the divers in the water and diver tenders was inadequate.

2. Crew /Team Leadership (contributory) – The crew/leadership techniques on HEALY failed to facilitate a proper crew climate, to include establishing and maintaining an accurate and shared understanding of the evolving mission and plan on the part of the crew or team members. This was evidenced in that the command cadre (CO, XO, and Operations Officer), dive team, and diver tenders did not have a clear understanding of the dive plan, their responsibilities for the dive, or team coordination and safety before, during, or after the dive.
3. Cross Monitoring Performance (contributory) – The command cadre, dive team, and diver tenders failed to monitor, assist, or back-up each other's actions and decisions prior to the mishap.
4. Assertiveness (contributory) – This is a factor when individuals failed to state critical information or solutions with appropriate persistence. The CO, one of the diver tenders, and DV2 on separate occasions challenged the DO on whether the dive could be executed properly with all three divers in the water and with the DO acting as the dive side supervisor. The DO reassured them that they could because it was a familiarization dive. DV1 expressed a concern to the DO about placing weight in pockets that would not allow them to be jettisoned, but did not continue to repeat the concern after the DO responded that DV1 should not be concerned. Finally, although the Officer of the Deck (OOD) attempted to establish radio communications with the dive side, the OOD did not ensure they were established.
5. Standard/Proper Terminology (contributory) – Standard/proper terminology is a factor when clear and concise terms, phrases, hand signals, etc, per service standards were not used. A standard diver hand signal was changed before the divers descended, and dive line-pull signals could have been confused with ship firefighting and damage control signals.
6. Challenge and Reply (contributory) – Communications did not include supportive feedback or acknowledgement to ensure that personnel correctly understood announcements or directives in that the divers did not ensure the diver tenders fully understood the standard line-pull signals.
7. Mission Planning (contributory) – This is a factor when an individual, crew or team failed to complete all preparatory tasks associated with planning the mission, including information collection and analysis, coordinating activities within the team and with appropriate external agencies, contingency planning, and risk assessment, resulting in an unsafe situation. The dive plan for this operation was grossly inadequate for the circumstances, particularly in light of the distance to emergency facilities, and the planned concurrent activities (ice liberty). The plan did not address contingencies, as evidenced by a lack of information on external medical contact information and a lack of the crew's familiarity with the Hyperlite Chamber. In addition, no formal risk assessment was done.

8. Mission Briefing (contributory) – Critical members of the HEALY crew, the Engineer of the Watch (EOW) and the Officer of the Deck (OOD), and the diver tenders were not provided sufficient information or instructions; and the participants in the dive, including the diver tenders, failed to discuss contingencies and strategies to cope with contingencies. No formal dive brief was provided to the EOW or OOD. The dive side brief was inadequate and the information provided in the written dive plan was insufficient.
9. Task/Mission – In-Progress Re-Planning (contributory) – This is a factor when crew or team members fail to adequately reassess changes in their dynamic environment during mission execution and change their mission plan accordingly to ensure adequate management of risk. This is covered in the "Risk Assessment during Operation" factor under "Acts"; however, it applies here as well. There were several points where the dive could have and should have been called off.
10. Miscommunication (contributory) – This is a factor when correctly communicated information is misunderstood, misinterpreted, or disregarded. If the tugs on the lines were actually line-pull signals from the divers, they were misinterpreted by the diver tenders.

(3) SUPERVISION: The following supervisory conditions (methods, decisions, or policies) existed and directly affected the practices, conditions, or actions of the individuals involved in this mishap, resulting in human error or an unsafe situation.

(a) Inadequate Supervision:

1. Leadership / Supervision / Oversight Inadequate (causal) – The Coast Guard, from the Dive Program at Headquarters to the operational commander, the command cadre of HEALY, and the DO, did not perform adequate oversight of the dive program on board HEALY. Leadership did not ensure that the dive program was operated in accordance with dive policy. This included the fact that the dive locker had never undergone a Commandant Dive Program Safety Survey/inspection; there was no oversight of HEALY's dive program by CG PACAREA; the HEALY command cadre lacked knowledge that the Diver Tenders were not qualified and the DO failed to meet currency requirements (two of the dives sighted in the recertification letter were not in compliance with the requirements). The HEALY command cadre lacked familiarity about dive policy which resulted in the command failing to recognize that the dive was not adequately staffed; and no formal ORM was conducted to assess the risk of the dive. The HEALY Command Cadre also created an unsafe situation by not ensuring all sonar were secured; and in conducting ice liberty with alcohol and allowing a polar bear swim at the same time, and in very close proximity, to the dive side. (A "polar bear swim" is a morale activity that involves jumping into cold water with minimal dress, e.g. a bathing suit.)

2. Supervision - Modeling (causal) – While the dive was taking place the command cadre (CO, XO, and Operations Officer) and the rest of HEALY crew were participating in ice liberty and this ice liberty mentality spilled over to the personnel at dive side. The DO influenced the other divers to take actions inappropriate to their skill levels and in violation of standard procedures when they used an inappropriate tank configuration and did not properly follow the procedures in references (b) and (c); and when DV1 used too much weight. The diver tenders due to their inexperience and being unqualified may have modeled line tending pull signals for ship's damage control evolutions instead of the proper diving line-pull signals in reference (b).
3. Local Training Issues / Programs (causal) – The required one-time and recurrent training received by the divers and diver tenders were limited and inadequate especially with the dry suits and in a polar environment. The DO did not meet currency requirements and diver tenders were unqualified at the time of the dive. The unit dive training program was determined to be unsatisfactory by the Dive Program Safety Survey conducted after the mishap.
4. Supervision - Policy (contributory) – This is a factor when policy or guidance or lack of a policy or guidance leads to an unsafe situation. Prior to the mishap there was no policy requiring formal training for the command cadre (CO, XO and Operations Officer) of units with authorized dive teams. Reference (c) is ambiguous as to the requirements for re-gaining diving qualifications for divers on Diving Orders where the 6 month currency requirement has not been maintained, but qualifications have not lapsed more than a year. The policy regarding the use of recreational dives as qualification dives, if performed with a military dive team, is also not clear.

(b) Planned Inappropriate Operations:

1. Ordered/Led on Mission Beyond Capability (causal) – This is a factor when the supervisor/management directs personnel to undertake a mission beyond their skill level or beyond the capabilities of their equipment. The DO led the dive team to undertake a mission beyond their skill level. DV1 and DV2 had no experience in dry suits in a cold water environment and the diver tenders were also unqualified.
2. Crew/Team/Flight Makeup/Composition (causal) – This is a factor when the makeup of the crew should have reasonably raised obvious concerns in the minds of crewmembers involved in the mission, or in any other individual directly related to the scheduling of the mission. The make up of the dive team should have raised safety concerns in the minds of the command cadre (CO, XO and Operations Officer), and the divers, because all three divers were in the water at the same time, including the DO; and the dive team did not plan to have a standby diver. In addition, the divers had no experience with dry suit SCUBA diving in a cold water environment, and the diver tenders were unqualified.

3. Limited Recent Experience (causal) – This is a factor when the supervisor selects an individual whose experience for either a specific maneuver, event, or scenario is not sufficiently current to permit safe mission execution. The DO had limited cold water Surface Supplied dry suit diving experience. DV1 and DV2 did not have any experience with cold water diving and had limited dry suit experience. None of the divers had significant SCUBA dry suit and cold water diving experience.
4. Limited Total Experience (causal) – This is a factor when a supervisor selects an individual who's performed a maneuver, or participated in a specific scenario, infrequently or rarely. The DO had limited experience diving in cold water environments. None of the divers had experience with SCUBA dry suit equipment in deep (unlimited bottom), cold water environments. The diver tenders had no experience or training with SCUBA line tending.
5. Proficiency (causal) – This is a factor when an individual is not proficient in a task, mission or event. The divers and diver tenders were not proficient due to their lack of experience and qualifications to perform a deep, cold water SCUBA dry suit dive.
6. Risk Assessment - Formal (causal) – This is a factor when supervision does not adequately evaluate the risks associated with a mission or when pre-mission risk assessment tools or risk assessment programs are inadequate. No formal risk assessment was conducted or implemented with the command, dive team or diver tenders in accordance with COMDTINST 3500.3 (Operational Risk Management). Without a proper risk assessment, the dive team, diver tenders, and the command were not fully aware of the hazards involved. They all believed this would be a simple and safe dive no deeper than 20 feet.
7. Authorized Unnecessary Hazard (contributory) – The supervision (the command cadre, and Diving Officer) authorized a mission or mission element that was unnecessarily hazardous without sufficient cause or need, including intentionally scheduling personnel for a mission or operation that they were not qualified to perform. The dive was not operationally necessary, but was being conducted for training; and the divers did not have sufficient experience to safely conduct the dive. Conducting ice liberty and allowing polar bear swims concurrent with the dive operation also significantly increased the hazards at the dive side.

(c) Supervisory Violations:

1. Directed Violation (causal) – This is a factor when a supervisor directs a subordinate to violate existing regulations, instructions or technical guidance. The DO as supervisor of the dive team directed subordinates to violate existing dive policy per reference (b) by planning the dive to have the dive supervisor in the water as a working diver, by not having a standby diver at the dive side, and by not properly training and instructing the diver tenders.

2. Supervision - Defacto Policy (contributory) – This is a factor when unwritten or "unofficial" policy perceived and followed by the individual, which has not been formally established by the properly constituted authority, leads to an unsafe situation. There was no established ice liberty policy set by an authority above the CO of HEALY, neither was there policy on polar bear swims.

(4) ORGANIZATIONAL INFLUENCES: The following organizational influences (communications, actions, omissions, or policies of upper-level management) have directly affected the supervisory practices, conditions, or actions of the personnel involved in this mishap, resulting in system failure, human error, or an unsafe situation.

(a) Resource/Acquisition Management:

1. Attrition Policies (contributory) – This is a factor when the process through which equipment is removed from service is inadequate and this inadequacy creates an unsafe situation. The process for removing spent dive gear is unclear and local support policies were not in place (inspection, safety checks, PMS). Damaged and ill fitting gear was left in the dive locker and confused with other gear.
2. Accession/Selection Policies (contributory) – This is a factor when the process through which individuals are screened, brought into the service or placed into specialties is inadequate and creates an unsafe situation. CG divers were screened based upon physical qualifications and time available to devote to collateral duty. Since diving was a collateral duty, there were no experience requirements for CG divers on polar icebreakers.
3. Personnel Resources (contributory) – This is a factor when the process through which manning, staffing or personnel placement or manning resource allocations are inadequate for mission demands and the inadequacy causes an unsafe situation. CG divers—especially diving officers—transfer after one tour preventing experience and professional knowledge from being accumulated at field units. HEALY divers lacked necessary experience and were insufficiently staffed to properly conduct cold-water dives.
4. Financial Resources/Support (contributory) – This is a factor when an organization or operation does not receive the financial resources to complete its assigned mission and this deficiency creates an unsafe situation. Dive program size, structure, oversight and funding did not keep pace with the expansion of the operational dive program.
5. Operator Support (non-contributory) – This is a factor when support facilities (dining, exercise, quarters, medical care, etc) or opportunity for leave/recreation or rest are not available or adequate and this creates an unsafe situation. Polar icebreakers deploy for extended periods of time limiting crew opportunities to take leave. Prior to incident, HEALY had been underway for 40 days without liberty or significant rest.

6. Acquisition Policies/Design Processes (non-contributory) – This is a factor when the processes through which vessel, equipment or logistical support are acquired allows inadequacies or when design deficiencies allow inadequacies in the acquisition and the inadequacies create an unsafe situation. Lack of equipment accountability and centralized dive equipment procurement procedures led to non-standard and often ill-fitting dive gear.

(b) Organizational Climate:

1. Unit / Organizational Values / Culture (contributory) – This is a factor when explicit/implicit actions, statements or attitudes of unit leadership set unit/organizational values (culture) that allow an environment where unsafe mission demands or pressures exist. Multiple distracting activities, lack of dive safety culture on HEALY and lack of attention to the dive program were contributing factors to the mishap.
2. Perceptions of Equipment (contributory) – This is a factor when over or under confidence in an aircraft, vehicle, device, system or any other equipment creates an unsafe situation. The DO was over confident, and this overconfidence was due to experience with weight needed during surface supplied dives and acclimatization to an oversized dry suit.
3. Unit Mission/Aircraft/Vehicle/Equipment Change or Unit Deactivation (contributory) – This is a factor when the process of changing missions/aircraft/vehicle/equipment or an impending unit deactivation creates an unsafe situation. Changing from surface supplied air to SCUBA created fundamental difference in equipment (air, communications, and configurations) and related safety parameters.
4. Organizational Structure (contributory) – This is a factor when the chain of command of an individual or structure of an organization is confusing, non-standard or inadequate and this creates an unsafe situation. The organizational structure for approving and reviewing a dive operation on HEALY was unclear and not standardized. The chain of command for the dive program was inadequate Coast Guard-wide.

(c) Organizational Processes:

1. Operational Tempo (OPTEMPO)/Workload (contributory) – This is a factor when the pace of deployments, workload, additional duties, off-duty education, PME, or other workload-inducing condition of an individual or unit creates an unsafe situation. On average, HEALY had an excessive deployment load averaging 206 days away from homeport (2001-2006) and it had been underway 40 days without liberty before the incident. Since diving was a collateral duty and the DO's primary duty was Marine Science Officer in addition to being a first tour afloat Junior Officer, the DO was not able to properly focus on diving officer responsibilities.

2. Program and Policy Risk Assessment (contributory) – This is a factor when the potential risks of a large program, operation, acquisition or process are not adequately assessed and this inadequacy leads to an unsafe situation. As required, no risk assessment was conducted related to the planned dive. With significant changes in the CG dive program following 9/11, no risk assessments were conducted for the dive program as a whole.
3. Procedural Guidance / Publications (contributory) – This is a factor when written direction, checklists, graphic depictions, tables, charts or other published guidance is inadequate, misleading or inappropriate and this creates an unsafe situation. Dive programmatic guidance was not complete, unclear or cumbersome. CG policy was not explicit with respect to ice diving, ice liberty or alcohol consumption during ice liberty.
4. Organizational Training Issues/Programs (contributory) – This is a factor when one-time or initial training programs, upgrade programs, transition programs or other training that is conducted outside the local unit is inadequate or unavailable (etc) and this creates an unsafe situation. There is insufficient dry-suit, SCUBA and CG specific training for dive officers and dive team members.
5. Program Oversight/Program Management (contributory) – This is a factor when programs are implemented without sufficient support, oversight or planning and this leads to an unsafe situation. The polar operations program is poorly managed, insufficiently staffed, and significantly fragmented at the HQ and PACAREA level which adds an additional burden on optimally manned, over-tasked polar icebreakers. Staffing for the dive program was insufficient for managing the size of the Coast Guard's program, and the data available to the dive program manager on dive operations is insufficient to make decisions or adjustments to field operations.
6. Doctrine (non-contributory) – This is a factor when the doctrine, philosophy or concept of operations in an organization is flawed or accepts unnecessary risk and this flaw or risk acceptance leads to an unsafe situation or uncontrolled hazard. The polar operations program does not have any established doctrine.

5. CORRECTIVE ACTIONS. The following actions will be or have been accomplished through a reprioritization of existing resources or by using the resource proposal process.

   a. COMPLETED: As a result of this mishap, a variety of beneficial and appropriate corrective actions were directed and implemented by units designated as dive units per reference (c), the Assistant Commandant for Human Resources, or the Assistant Commandant for Operations including:

      (1) All dive operations onboard HEALY were suspended and remain suspended.

      (2) The Pacific Area Commander completed a special Ready for Operations assessment of HEALY's unit wide training program in March 2007.

(3) In accordance with ALCOAST 440/06, a one-day safety stand down was ordered and completed for all diving units. In addition, a modified diving program safety survey (no training, inspection only) was completed on every diving unit on or before 12 January 2007.

(4) Area and District Commanders have designated diving program oversight billets within their commands responsible for tracking the readiness, qualification and training status of their units.

(5) Prior to and during Operation Deep Freeze 2007, USCGC POLAR SEA completed a dive risk assessment, completed prescribed dry suit training, and added a temporary duty USCG diving advisor to serve as dive team safety observer during Antarctic training and dive operations.

(6) The Assistant Commandant for Operations reaffirmed and emphasized that diving unit commanders are to provide the opportunity for and require regularly scheduled training dives to allow divers to maintain proficiency as required by reference (c).

(7) The Assistant Commandant for Operations chartered a cross-directorate study team to evaluate requirements, management and policy guidance of the Coast Guard's diving program. (See para. 5.b.)

(8) The Assistant Commandant for Operations ensured that a Dive Program representative attended the Diving in the Arctic Environment course from 15 – 22 March 2007 (sponsored by the Smithsonian Scientific Diving Program).

(9) The Assistant Commandants for Operations and Human Resources have developed a dive training module for inclusion in appropriate training syllabi for Command Cadre of dive units and other field units who may utilize divers. Specifically, a block of instruction has been added to the Prospective Commanding Officer and Executive Officer (PCO/PXO) Afloat Course, the Prospective Operations Officer (POPS) Afloat Course, and the Boat Forces Command Cadre Course at the Leadership Development Center located at the U.S. Coast Guard Academy.

(10) The Assistant Commandant for Operations has updated the Dive Program Safety Survey checklists to reflect changes in CG/Navy policies as of 23 April 2007, has upgraded the Dive Program Manager billet from an O-3 to an O-4, and has established a Chief Petty Officer billet as the Assistant Coast Guard Diving Program Manager.

b. Corrective Actions to be Completed: Numerous factors associated with this mishap were reviewed. The applicability of the corrective actions is contingent on the overarching need to determine the requirement for diving within the Coast Guard as captured in 5.b.(1). If the Coast Guard finds the need to retain an organic diving capability, then 5.b.(1) thru 5.b.(9) must be fully evaluated and/or implemented, as indicated. If the Coast Guard determines there is a need for another diving system or structure, then all listed corrective actions shall be considered for applicability to the new system or structure. Finally, regardless of the determination about the future of the Coast Guard dive structure, corrective actions 5.b.(10) thru 5.b.(18) shall be accomplished.

(1) The Assistant Commandant for Operations has chartered a cross-directorate study team; including dive expertise from the Navy and other recognized experts, to evaluate the requirements, management and policy guidance of the Coast Guard's diving program with a report to my office. At a minimum, the following aspects shall be covered by the study team:

(a) Validate the operational requirement for dive capability aboard polar icebreakers, seagoing buoy tenders, Maritime Safety and Security Teams (MSSTs) and any other types of units currently having such capability. If such a capability is found to be warranted, identify options for fulfilling that capability aside from organic Coast Guard staff (contracted divers, divers from other agencies, etc).
(b) Determine the proper mix of dive experience and training levels required at Coast Guard diving units.
(c) Determine proper staffing levels of Coast Guard diving program management at Headquarters, Area and District levels.
(d) Develop a section in reference (c) that addresses command cadre oversight and management guidelines.
(e) Evaluate and determine optimal method of conducting onboard preventive maintenance of Coast Guard diving equipment. Specifically evaluate the practice of equipment exchanges versus onboard maintenance.
(f) Review and revise, if necessary, the Diving Safety Program (including the Safety Survey Form) to ensure a more objective process that accounts for differences in experience levels of inspectors. The Safety Survey Form shall be included as an enclosure to the reference (c). The Diving Program Safety Survey (DPSS)/inspection program shall clearly define a pass/fail criteria for dive lockers. Additionally, survey items and tasks shall be reviewed to determine if they are currently applicable.
(g) Determine the employment feasibility of remote operating vehicle (ROV) use in diving applications, to include polar icebreaker ship husbandry support and port security inspections.

(2) Additionally, the cross-directorate study team shall review and evaluate the following, if the decision is made to keep an organic dive capability within the USCG:

(a) Explore the realignment of diving positions and establishment of shore-side diving lockers, allowing divers to exclusively work and focus on diving as their primary duty.
(b) Consider Primary duty divers and 2nd tour divers as Primary Duty Diving Officers on cutters designated as diving units per reference (c).
(c) Consider establishing unit technical experts to properly supervise dive operations.
(d) Consider establishing a Coast Guard working diver program (divers to graduate Navy Diver Second Class course) vice SCUBA diving program (divers currently graduate from Navy Scuba diver course).
(e) Consider establishing CG master diver program, including development of specific competencies.
(f) Consider establishing a defined diving career path and competencies within the Officer Specialty framework.
(g) Ensure all Coast Guard diving units have a qualified diving officer.
(h) If there is a change to the organization where dive lockers are no longer assigned to field unit commanders, ensure Operational Commanders who have oversight of dive lockers designate diving program oversight billets within their commands who are responsible for tracking the readiness, qualification and training status of their units.
(i) Identify and provide guidance for high risk, low frequency dive missions, including the use of dry suits and other equipment, or in environments not trained during certifying dive courses.
(j) Determine/validate data required for the Diving Program Manager to monitor experience levels and proficiency of dive teams.
(k) Institute a periodic Dive Team Readiness reporting mechanism for Area, District, Deployable Operations Group, and unit use.
(l) Examine the need to train more than the DO in the use of surface supplied air on polar class icebreakers.
(m) Consider consolidating CG dive policy and procedures into reference (c) instead of referencing Navy Diving Manual.

(3) The Assistant Commandant for Operations shall amend and correct reference (c) to address the following items:

(a) Create an Ice Diving section to provide comprehensive policy on cold water diving to include risk assessment of diving in dynamic ice conditions and clarify requirement for dive side shelter.
(b) Establish standard relief process for Diving Officers.
(c) Develop standard checklists for dive operations which accommodate different dive scenarios such as diving on the ship, in close proximity to the ship, and away from the ship.
(d) Mandate diving pre-briefs using standardized checklists.
(e) Include example dive brief and checklist/template in reference (c).

(f) Establish clear guidance for units conducting dive operations outside of external emergency response capabilities.
(g) Correct discrepancy in guidance regarding diving recertification after qualifications lapse beyond six months, but less than 12 months.
(h) Clearly mandate that a medical response and evacuation plan is a requirement for any dive operation, to include designation of personnel assigned to conduct/provide emergency medical response.
(i) Include a section regarding diving gear maintenance.
(j) Include a section defining mishaps, near mishaps, and associated reporting requirements.
(k) Include guidance on the use of dry suits, to include under what conditions they should be considered, combinations of equipment to be used with them, and cautions regarding their limitations.
(l) Specify & revalidate unit training requirements.
(m) Clarify differences between operational and recreational dives. Clearly state recreational dives cannot be used for operational qualifications.
(n) For dives where tending lines are utilized, ensure dive plans establish a limit to the depth divers can go, i.e. a "floor limit", using working tending line limits.
(o) Establish a standardized dive plan template and routing procedures.
(p) Establish crew endurance requirements for dive personnel.
(q) Realign the qualification requirements for Diving Supervisor to the Navy standard which requires the Diving Supervisor to be a qualified diver.
(r) Develop a unit self-assessment process for dive operations that can be utilized by unit commanders and operational commanders to gauge need for support outside of normally scheduled dive visits.
(s) Provide additional, tailored guidance to specific CG missions not covered in the Navy Diving Manual.
(t) Include policy that diving equipment must be fitted to the individual diver.
(u) Ensure policy states when working with other agencies, CG divers will follow reference (c).
(v) Emphasize that Operational Risk Management (ORM) shall be used prior to conducting dive operations, and will include command cadre (CO, XO or Operations Officer), personnel involved in the dive, and supporting personnel. The review must include the qualification and proficiency level of all personnel involved in the dive mission, including the diver tenders.

(4) The Assistant Commandant for Operations shall review the following items for inclusion into reference (c):

(a) Review qualification policy to include periodicity.
(b) Review policies addressing use of CG diving gear for recreational dives including policies for high risk recreational dives.
(c) Consider communication requirements for dives, specifically optimum types and use.

(d) Review and update guidance for command level diving program inspection responsibilities/check list.
(e) In the section that addresses mission planning and ORM, consider including a list of alternatives to diving that should be considered when risk of diving is determined to be high and cannot be sufficiently mitigated. Consider listing the hazards that could put a dive mission in the high risk category (red), or at a minimum in the medium risk category (yellow), when using the Green, Amber, Red (GAR) risk assessment model. List mitigating strategies such as getting more experienced divers to the unit for temporary duty, doing workup dives, using a Remote Operating Vehicle (ROV), etc.
(f) Review and clarify policy for securing sonar, propellers, overboard discharge, and intakes prior to any CG dive operation in the vicinity of a ship or cutter, to include the possible contribution of synergetic or convergence caustic effects (when acoustics are either higher or lower than ambient conditions) due to stratification of water layers or the overlaying ice.
(g) Review the need for a requirement for tending lines to be marked at set increments, or as recommended by reference (c) at 10 foot increments.
(h) Review and clarify the policy regarding the emergency medical response requirements in the event of a diving mishap.

(5) With respect to dive standardization and site visits the following actions are directed:

(a) The Assistant Commandants for Operations and Human Resources shall ensure staffs are resourced at appropriate levels to ensure completion of the Dive Program Safety Survey (DPSS) visits for all diving units annually.
(b) The Assistant Commandants for Operations and Human Resources shall revisit and evaluate the existing Memorandum of Understanding with the Navy to maximize use of Navy dive trainers for scheduled dive visits (Dive Program Safety Survey). Ensure that they are cognizant of CG diving mission requirements.
(c) The Assistant Commandants for Operations and Human Resources shall develop a dive training and inspection program similar to other objective evaluation programs such as Aviation Standardization (STAN) visits. Such a program shall provide published visit dates, clear inspection criteria, training as necessary, and have visibility to unit commanders and operational commanders.
(d) The Assistant Commandant for Operations shall establish policy to schedule a dive safety visit and diver operations refresher training to all polar icebreakers approximately sixty days prior to planned deployments.
(e) The Area Commanders, applicable District Commanders, and the Deployable Operations Group shall schedule and conduct Ready for Operations (RFO) assessments annually for all diving units and shall consider combining RFOs with annual Dive Program Safety Survey (DPSS) visits.

(6) The Assistant Commandants for Operations and Human Resources shall complete the following actions with respect to training:

(a) Unit Level Training for diver support functions:
1. Formal initial and proficiency training in Emergency Evacuation Hyperbaric Stretcher (EEHS) chamber operations shall be provided to diving supervisors and CG members that will assist with EEHS operations.
2. All health care providers assigned to support dive operations shall be trained in the Navy's Recognition and Treatment of Dive Injuries course.
3. The adequacy of Personnel Qualification Standards (PQS) provided in reference (c) for diver tenders shall be reviewed and validated.
4. The Personnel Qualification Standards (PQS) for underway and inport OOD shall be reviewed and validated to determine adequacy in requiring familiarization with the requirements of safe diving operations in the vicinity of the ship.

(b) Formal/Resident Training and Initial Qualification of divers:
1. The CG-specific dive training course(s) shall be formalized with pre-determined training objectives and syllabi. CG divers will take this course immediately following graduation from the Naval Dive and Salvage Training Center (NDSTC) diving courses.
2. The CG-specific course will encompass diving supervisor duties; use of dry suits; diving on aids to navigation; cold water/ice diving; underwater ship's husbandry; Ports, Waterways, and Coastal Security (PWCS) mission requirements; and the use of and maintenance of dive logs. The cold water/ice diving portion of the course will include information from the National Science Foundation's ice diving expert, who has provided training to CG divers at the McMurdo Station.
3. A CG-specific dry suit training syllabi/Personnel Qualification Standard (PQS) for currently qualified divers shall be developed to include requirements for developing and maintaining proficiency.

(c) The Assistant Commandant for Human Resources shall investigate the use of the Training Management Tool (TMT) to facilitate tracking of dive team proficiency to allow commands to track training.

(7) The Assistant Commandant for Operations shall complete the following with respect to diving equipment:

(a) Validate Diving Equipment Authorized for U.S. Navy use (ANU) list as appropriate for USCG Missions.
(b) Standardize CG diving equipment to facilitate improved maintenance and training.
(c) Consider establishing a requirement for fitted diving equipment.
(d) Consider using dive computers.

(e) Explore current technology and consider requirement for voice communications for CG dives for certain dive profiles. Evaluate the adequacy of current requirements for dive side communications with divers.

(8) The Assistant Commandants for Operations and Human Resources shall complete the following with respect to assignment and billeting issues:

(a) Develop a tracking system for all Coast Guard trained divers to gain optimum use of training investment and to provide data for assignment decision criteria.
(b) Research and analyze the reuse of diving skills and the flow of divers through different types of units, billet structure, and advancement/promotion gates, and to address the application of the Assignment Priority System to enlisted skills.
(c) Identify staffing gaps and take appropriate action in filling diving units with the correct mix of qualified divers. The gaps should be displayed in a manner allowing unit commanders, operational commanders and diving program management full visibility of dive assignment shortfalls.

(9) With respect to Operational Risk Management (ORM) the following actions are directed:

(a) Commanders and Commanding Officers with operational and oversight responsibility for dive teams to reinforce the use of ORM and Team Coordination Training (TCT) on a consistent basis. Actions should include regular examination of unit operations, discussion of case studies and inclusion in mission planning sessions; as well as, ensuring required ORM/TCT training requirements are met with quality, effective events.
(b) The Area and District Commanders, and the Deployable Operations Group shall reaffirm to their unit commanders the requirement to conduct an Operational Risk Management review prior to every dive evolution with command cadre, personnel involved in the dive, and supporting personnel. The review must include the qualification and proficiency level of all personnel involved in the dive evolution, including the diver tenders.
(c) The Assistant Commandant for Human Resources shall institute requirements for unit level ORM instructions specific to their respective missions and capabilities.

(10) The Assistant Commandants for C4IT and Operations shall investigate compatibility issues between the Coast Guard Standard Workstation III and the Navy Dive Reporting System (Dive logs) or other alternatives to meet the need to standardize Coast Guard diving log keeping and requirements.

(11) The Assistant Commandant for Operations and Assistant Commandant for Human Resources shall complete the following corrective action to address issues which, although found not to have been causal, nevertheless contributed to the mishap in some way: Promulgate policy regarding cutter crew readiness standards to include a fleet-wide cutter alcohol policy and fatigue standards.

(12) Area Commanders shall complete the following corrective actions to address issues which, although found not to have been causal, nevertheless contributed to the mishap in some way:
(a) Establish policies for Blue and Red nose initiation ceremonies & polar bear swims.
(b) Develop port call targets or standards.

(13) The following HEALY specific corrective actions shall be completed:

(a) The Assistant Commandants for Operations and Human Resources shall enforce the HEALY's "seven year assignment policy" (3 years on ship, and 4 years at the Naval Engineering Support Unit) in accordance with ALCOAST 064/00 or develop an adequate alternative.
(b) The Assistant Commandants for Operations and Human Resources shall review the manning standards and Days Away from Homeport (DAHP) requirements for HEALY and other cutters with dive teams attached.
(c) The Assistant Commandants for Engineering and Logistics Resources shall review the adequacy of HEALY's Operation and Logistics Support Plan (OLSP) and update as necessary.
(d) The Assistant Commandants for Operations and Human Resources shall designate first tour Junior Officers (JOs) afloat, not assigned as student engineers on board HEALY, as Deck Watch Officers as their primary duty as is the practice in the rest of the Coast Guard Cutter fleet.
(e) The Pacific Area Commander in conjunction with the Assistant Commandants for Operations and Human Resources shall conduct an organizational climate review on HEALY to answer the question, "Does HEALY's design and manning effect good order & discipline?"

(14) Polar Icebreaker Program related corrective actions. Uncertain program future, support for unique science missions, OPTEMPO requirements (206 DAHP average), operations in an isolated and hazardous environment, existing budget authority arrangements, and fragmentation of program oversight at Headquarters (HQ) and PACAREA have placed an excessive burden upon the Polar Class Icebreakers' crews who are required to train, maintain and operate the vessels and were determined to have contributed to the mishap. To address these issues the Assistant Commandants for Operations and Human Resources shall:

(a) Charter a study team to assess the organization of USCG polar icebreaker program management to include HQ, MLC Pacific, and PACAREA and make recommendations for improvement.
(b) Consider establishment of a requirement for a physician vice physician assistant on Polar Class Icebreakers (WAGBs) when deployed to isolated polar regions in light of fact that WAGBs no longer routinely deploy with aviation detachments.
(c) Develop a Polar Ice/High Latitude Operations Manual to clarify WAGB mission priorities and reporting requirements to include dive operations and mission employment.
(d) Make the Prospective Operations Officer's (POPS) course mandatory for all Polar Class icebreaker Operations Officers.
(e) Establish systematic and sustainable training program for icebreaker personnel in order to facilitate a sustainable career track within an officer subspecialty for ice operations.

(15) The following additional actions are directed for the purpose of process improvement for the investigative and review processes:

(a) The Judge Advocate General shall consider revising the Administrative Investigation Manual (AIM) to address the need for the Mishap Analysis Board to have access to witnesses before the Administrative Investigation members during particular types of investigations. The importance of understanding the roles of the MAB and AIM members shall be stressed to help explain differences to witnesses.
(b) The Assistant Commandant for Human Resources shall review the safety investigation process for potential process improvements, including a review of training and job aids for the use of the DOD Human Factors Classification System.
(c) The Assistant Commandant for Human Resources shall provide additional information to field units and their operational chains of command on the purpose and necessary procedures of a Mishap Analysis Board.

(16) The Assistant Commandant for Operations shall conduct a formal organizational risk assessment for all Coast Guard operational mission areas from an oversight and policy perspective to identify, clarify, and mitigate associated risks particularly with respect to rapidly expanding/emerging mission areas. CG-wide program/risk assessments shall also be required when significant changes occur in CG-wide organization & OPTEMPO.

(17) Within 30 days of receipt of this letter, the Assistant Commandants listed above shall provide the Director of Health and Safety with a list of Offices assigned each task for entry into the mishap remedial action tracking system.

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Dist: CG-00, CG-09, CG-01, CG-092, CG-094, CG-1, CG-3, CG-4, CG-5, CG-6, CG-8, CG-A
All Area and District Commanders
CGPC
All CG Diving Units
Naval Diving and Salvage Training Center
Naval Experimental Dive Unit