DECOMPRESSION DIVING REQUEST

PROJECT TITLE and DESCRIPTION	
DIVER SUBMITTING REQUEST	DATE
E-MAIL ADDRESS	PHONE NUMBER

		Yes	No
1.0	**QUALIFICATIONS**		
1.1	**Certification and Authorization**	**Yes**	**No**
A.	Will all divers be trained and certified by an accredited diving association (e.g. TDI, IANTD) recognized by NOAA for the equipment, depth and gas mixtures to be used on this project?	☐	☐
B.	Will all divers be currently authorized to dive by the NOAA Diving Program (NDP) or another NOAA-approved reciprocity partner?	☐	☐
C.	Are all training certifications for NOAA divers on file at the NOAA Diving Center (NDC) and are reciprocity partner Letters of Reciprocity (LORs) attached to the dive plan?	☐	☐
1.2	**Proficiency Requirements**	**Yes**	**No**
A.	Will all divers have logged a minimum of 12 dives within a six month period prior to the project start date?	☐	☐
B.	Will all divers log a minimum of one (1) dive within the previous 30-day period prior to the project start date in the equipment configuration to be used (e.g. perform work-up dives)?	☐	☐
2.0	**EQUIPMENT**		
2.1	**General**	**Yes**	**No**
A.	Will all valve and regulator systems for primary (bottom) gas supplies be configured in a redundant manner that allows continuous gas delivery in the event of failure of any one component?	☐	☐
B.	In addition to a mask and fins, will all divers carry or wear the following equipment:	☐	☐
	1. Exposure suit?	☐	☐
	2. Buoyancy Compensator Device (BCD) (e.g. dual bladder wings or single bladder and dry suit)?	☐	☐
	3. Redundant lift bags and line reels?	☐	☐
	4. Sufficient deco gases to complete decompression?	☐	☐
	5. Decompression tables specific for the mix being used?	☐	☐
	6. Redundant NOAA-approved decompression computers using the Buhlmann 16 or the ZH-L16 GF algorithm?	☐	☐
	7. Cutting Devices?	☐	☐
	8. Signaling Devices?	☐	☐

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2.2	SCUBA Cylinders	Yes	No
A.	Will all scuba cylinders used for dives > 130 feet be outfitted with DIN valves?	☐	☐
B.	Will single cylinders be used for bottom gas? (If 'Yes', go to 2.2 C; if 'No', go to 2.2 D)	☐	☐
C.	Will an auxiliary gas supply, with adequate volume to reach the next gas supply, be available?	☐	☐
D.	Will all dual cylinders be connected by a dual manifold with an adjustable isolation valve on the backpack/ harness assembly so divers can reach each cylinder and isolation valve?	☐	☐
E.	Will all SCUBA cylinders used for decompression be color-coded?	☐	☐
F.	Will the maximum operating depth (MOD), based on a maximum partial pressure of oxygen (PO_2) of 1.6 ATA of each breathing gas/cylinder (other than air) be displayed on the cylinder with marking tape or lettering facing both inward towards the diver and outwards so other divers can identify the cylinder contents?	☐	☐
2.3	**SCUBA Regulators**	**Yes**	**No**
A.	Will all dual cylinders be outfitted with redundant scuba regulators?	☐	☐
B.	Will all regulators used with oxygen supplies be secured in a way (e.g., pouch or bungee) that reduces the possibility of inadvertent use at depths that would result in a hyperoxic exposure?	☐	☐
C.	Will the primary supply regulator be configured with a hose of adequate length to facilitate effective emergency gas sharing in the anticipated environment?	☐	☐
2.4	**Buoyancy Control**	**Yes**	**No**
A.	Will all divers have the capability to achieve positive buoyancy at all depths?	☐	☐
B.	Will all divers use dual-bladder BCDs with separate inflator hoses, or single-bladder BCDs with a variable volume drysuit, each with separate inflator hoses?	☐	☐
C.	When wearing dual cylinders, will top and bottom dump valves be provided for the primary bladder, with a top dump valve standard for the redundant backup bladder?	☐	☐
D.	Will each bladder be capable of achieving positive buoyancy at all depths and be outfitted with an over pressurization relief valve?	☐	☐
2.5	**Depth and Cylinder Pressure Gauges**	**Yes**	**No**
A.	Will each diver have a redundant means of monitoring depth?	☐	☐
B.	Will at least one (1) of the depth monitoring devices be capable of recording the maximum depth obtained during dives for display once at the surface?	☐	☐
C.	Will each gas supply have its own dedicated submersible pressure gauge?	☐	☐
2.6	**Dive Timing Devices**	**Yes**	**No**
A.	Will each diver have a redundant means of tracking dive time?	☐	☐

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		Yes	No
2.7	**Signaling Devices**		
A.	Will each diver carry the following surface signaling devices:	☐	☐
	1. Surface Marker Buoy (SMB)?	☐	☐
	2. Signal mirror?	☐	☐
	3. Whistles or other audible signaling devices?	☐	☐
B.	Will dives be conducted within two (2) hours of sunset? (If 'Yes', go to 2.7 C; if 'No', go to 2.8)	☐	☐
C.	Will each diver also carry a flashlight and/or strobe light?	☐	☐
2.8	**Lift Bag and Line Reel**	**Yes**	**No**
A.	Will each diver carry a lift bag (minimum of 50 pounds buoyancy) and a line reel with line equal to 1.5 times the maximum depth anticipated during a dive?	☐	☐
B.	Is it understood that redundant lift bags and line reels may be required at the discretion of the on-site Diving Supervisor?	☐	☐
2.9	**Support Boats**	**Yes**	**No**
A.	Will there be a means of extracting an unconscious victim from the water in a timely manner at all times during decompression diving operations?	☐	☐
B.	In addition to any NOAA small boat requirements, will each boat carry an oxygen resuscitator capable of ventilating an unconscious victim and a minimum of one (1) SCUBA cylinder of each type of decompression gas used on the dive?	☐	☐
2.10	**Hyperbaric Chamber**	**Yes**	**No**
A.	Will a hyperbaric chamber be accessible within two (2) hours of the dive site?	☐	☐
B.	Will a plan be prepared and verified to transport an injured diver to a hyperbaric chamber within the required time frame?	☐	☐
C.	Does the hyperbaric chamber meet American Society of Mechanical Engineers (ASME), American Bureau of Shipping (ABS), or equivalent standards??	☐	☐
D.	If a portable hyperbaric stretcher will be used, will evacuation scenarios be demonstrated/practiced with a local Emergency Medical System (EMS)?	☐	☐
3.0	**EQUIPMENT**		
3.1	**General**	**Yes**	**No**
A.	Will all gases used for diving be of breathing quality?	☐	☐
B.	Will all breathing mixtures to be used for diving be analyzed for oxygen content using an oxygen analyzer?	☐	☐
C.	Is it understood that all breathing gases must test within acceptable parameters as specified in the dive tables or computers used?	☐	☐
D.	Will each diver confirm the following information prior to commencing diving:	☐	☐

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3.1	General (continued)	Yes	No
	1. Fraction of oxygen (FO_2) of his/her scuba cylinder(s)?	☐	☐
	2. PO_2 cut off depth (MOD) and appropriate gas mixture(s) to be used for each phase of the dive?	☐	☐
	3. Planned maximum depth and bottom time for the dive?	☐	☐
	4. Availability of adequate volumes of gas as determined by review of cylinder pressures?	☐	☐
E.	Will nitrox and/or 100% oxygen be used during ascent and/or decompression stops?	☐	☐
F.	Will all divers calculate and carrying the required volume of breathing gases needed for each phase of the dive, plus reserves?	☐	☐
G.	Will the "rule-of-thirds" (one third to get to the dive site, one-third to reach the first decompression stop, and one-third reserve) be followed on all decompression dives?	☐	☐
H.	Will all divers carry sufficient gas to complete all phases of the dive including descent, on-the-bottom, ascent, and decompression independent of surface support?	☐	☐
I.	Will all divers carry sufficient gas to complete in-water decompression for the next deeper depth and bottom time planned?	☐	☐
3.2	**Oxygen**	**Yes**	**No**
A.	Will there be a means of extracting an unconscious victim from the water in a timely manner at all times during decompression diving operations?	☐	☐
B.	Will all breathing gases used while performing in-water decompression contain the same or greater oxygen content as that used during the bottom phase of the dive?	☐	☐
C.	Will all gas systems, components, and storage containers used with oxygen mixtures above 40% by volume, be formally cleaned in accordance with the NOAA Diving Manual (current edition)?	☐	☐
3.3	**Air**	**Yes**	**No**
A.	Will compressed air used with oxygen concentrations greater than 40% or when used in the preparation of nitrox breathing mixtures with greater than 40% oxygen as the enriching agent, meet or exceed CGA Grade E standards?	☐	☐
4.0	**MANNING REQUIREMENTS**		
4.1	**Minimum Personnel and Capabilities**	**Yes**	**No**
A.	Bottom Divers		
	1. Will there be a minimum of two (2) divers functioning as a buddy team?	☐	☐
	2. Will divers remain in such proximity to each other to render immediate assistance if necessary at all times during the dive; and if separated, initiate the standard separated buddy procedure?	☐	☐
B.	Support Divers		
	1. Will there be two (2) standby divers, each of which is capable of reaching the bottom or one (1) dedicated safety diver with the bottom team?	☐	☐
	2. Will all divers required to dive to the bottom be appropriately trained, experienced, and outfitted to perform such dives?	☐	☐

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4.2	Minimum Topside Personnel	Yes	No
A.	Diving Supervisor		
1.	Will the on-site Diving Supervisor remain at the surface at all times during diving operations?	☐	☐
2.	Has the on-site Diving Supervisor been approved by the NDCSB?	☐	☐
B.	Vessel Captain		
1.	Will the vessel captain remain on the vessel at all times during diving operations?	☐	☐
2.	Is it understood that the vessel captainWill all divers calculate and carrying the required volume of breathing gases needed for each phase of the dive, plus reserves?	☐	☐

5.0 MINIMUM OPERATIONAL REQUIREMENTS

5.1	Dive Planning	Yes	No
A.	Dive condition limits: Is it understood that the on-site Diving Supervisor and the vessel captain shall assess current and predicted weather conditions, sea state, and current speed and direction, then decide whether or not diving can be safely initiated?	☐	☐
B.	Diver Communications		
1.	Will all bottom divers be able to signal topside personnel at all times during the dive?	☐	☐
2.	Will there be a signaling protocol established that allows the differentiation between routine and emergency situations?	☐	☐

5.2	Decompression Calculation	Yes	No
A.	Are the decompression tables to be used on the dives approved by the NDCSB?	☐	☐
B.	Is it understood that the use of dive computers and/or computer based decompression generating software programs must be approved by the NDCSB?	☐	☐
C.	Will each diver carry a set of decompression dive tables, including one (1) over and one (1) under contingency time schedules?	☐	☐

5.3	Maximum Depth and Bottom Time	Yes	No
A.	Is it understood that the maximum depth for decompression diving using open-circuit SCUBA equipment and breathing air is 170 feet?	☐	☐
B.	Will the maximum oxygen partial pressure of all decompression gases be 1.6 ATA or less and bottom mixes be 1.4 ATA of less?	☐	☐
C.	Will all bottom times be within the maximum allowable exposure time for a given partial pressure of oxygen as listed in Table 15.2, Appendix D NOAA Diving Manual (4th Edition)?	☐	☐
D.	Is it understood that all repetitive dives must be approved by the on-site Diving Supervisor?	☐	☐

5.4	Diving Procedures	Yes	No
A.	Descent		
1.	Is it understood that the on-site Diving Supervisor will determine the procedure for descending to the bottom (i.e., use of down-line versus 'free dropping')?	☐	☐
2.	Is it understood that should any member of the bottom team get separated during descent and cannot locate another diver within five (5) minutes of reaching the bottom, he/she shall terminate the dive and begin ascent/decompression?	☐	☐

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5.4	Diving Procedures (continued)	Yes	No
B.	On-bottom: Is it understood that the on-site Diving Supervisor must approve any decision to remove and stage decompression cylinders once on the bottom?	☐	☐
C.	Ascent: Is it understood that the on-site Diving Supervisor must approve the procedure for ascending to the surface (i.e., use of ascent-line versus 'drift decompression')?	☐	☐
D.	Surface Interval: Is it understood that no additional dives will be made until all members of the dive team have completed their in-water decompression and have been on the surface for a minimum of 30 minutes?	☐	☐
5.5	**Contingency Protocols**	**Yes**	**No**
A.	Will all the dive team members know and follow the technical diver contingency protocols outlined in Section 9.0 of this document?	☐	☐
B.	Is it understood that following the occurrence of any contingency scenarios, a post-dive 'stand down' will be initiated to thoroughly review the incident and establish corrective actions?	☐	☐
C.	Is it understood that if the contingency scenario is deemed a “near-miss”, a Diving Incident Report, NOAA Form 57-03-01, must be completed and submitted in accordance with NAO 209-123, Section 5.02b.1 (b)?	☐	☐

6.0 DIVE PLAN

6.1	Submission and Review Requirements	Yes	No
A.	Is it understood that in accordance with NOAA Scientific Diver Standards and Safety Manual (NSDSSM), diving projects involving non-standard open circuit scuba diving equipment and techniques must be approved by the NOAA Diving Control and Safety Board (NDCSB) before diving activities begin?	☐	☐
B.	Is it understood that in order to evaluate the proposed diving activities, this dive plan must be submitted to the NDCSB through the Line Office Diving Officer indicated in Section 8.0 for review a minimum of 45 days prior to the commencement of diving operations?	☐	☐
C.	Will all decompression diving activities conducted in association with this plan meet the criteria specified in the NSDSSM to qualify for the scientific exemption?	☐	☐

7.0 EXPLANATIONS

7.1 Explain all 'No' responses indicated above on this request.

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7.2 Provide a brief overview of the diving activities to be conducted.

7.3 What are the goals, objectives, and tasks to be completed?

7.4 Provide the location and a description of where the dives will be conducted.

7.5 Provide names, affiliations, roles/responsibilities, and qualifications of participants.

7.6 What are the scheduled dates for the operation?

7.7 Provide the name and contact information for the primary and secondary hyperbaric chambers to be indicated on the DEAP.

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8.0 APPROVALS and ENDORSEMENTS

UNIT DIVING SUPERVISOR NAME	UNIT DIVING SUPERVISOR SIGNATURE	DATE

LINE/STAFF OFFICE DIVING OFFICER NAME	LINE/STAFF OFFICE DIVING OFFICER SIGNATURE	DATE

9.0 TECHNICAL DIVER CONTINENCY PROTOCOLS

In order to increase safety during decompression dives, the following protocols have been developed as the primary responses to the identified emergencies.

9.1 Out of gas - Bottom mix

Begin gas sharing with dive buddy and abort the dive, observing decompression schedule during ascent.

9.2 Out of gas - Decompression nitrox/trimix cylinder

At the beginning of decompression, the support divers shall bring one spare staging mix cylinder for each group of bottom divers, in accordance with normal operational protocols. Any further stage gas failure will warrant gas sharing of stage mix. Divers shall communicate any problem to the in-water support diver who shall retrieve and deliver additional spare stage mix cylinder(s) to divers as needed.

9.3 Out of gas - Decompression oxygen cylinder

The support divers will carry extra deco gas and will be with bottom divers during the first gas switch during decompression. Any deco oxygen failure from bottom diver's supply will require a support diver to transport a deco oxygen cylinder for attachment to the bottoms diver's harness for use as the gas source during the completion of decompression. Any further stage gas failure would warrant gas sharing of stage mix if necessary. Bottom divers shall communicate the problem to in-water support divers whom shall then retrieve and deliver spare stage mix cylinder to the bottom divers.

9.4 Gas failure - Source of problem unknown

Bottom divers with an unknown gas failure shall reach back and close the isolation valve then determine the cause of failure. The diver shall notify their dive buddy of the problem, abort the dive and follow decompression schedule during ascent.

9.5 Aborted dive procedures

The bottom divers may abort any planned decompression dive and return directly to the surface if a depth of 150 FSW and an elapsed time of five (5) minutes has not been exceeded (U.S. Navy Standard Air Compression Tables - current edition). If a depth of 150 FSW or an elapsed time of five (5) minutes has been exceeded during a planned decompression dive, bottom time divers must complete all decompression stops as scheduled. Bottom divers may elect to deploy a lift bag to signal to the surface support team and dive vessels. At such time the bottom divers shall be recovered by the primary support vessel. Upon review of the bottom divers dive profile, the dive team may elect to make a second drop. On a repetitive dive, the abort procedure will require an additional in-water decompression stop and the bottom divers must follow the dive computer or contingency table.

9.6 Omitted decompression

If a bottom diver is asymptomatic, the diver must repeat all stops deeper than and including the 40 FSW stop. The diver shall multiply the 30 FSW, 20 FSW, and 10 FSW stop times by 1.5. The bottom diver shall maximize PO_2 by using the most hyperoxic gas appropriate for the depth without exceeding a PO_2 of 1.6 ATA. If a bottom diver is symptomatic, the diver must be placed on oxygen, hydrated, and evacuated to the nearest recompression facility.

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9.7 Oxygen toxicity hit

Hyperoxia can occur at a PO_2 of > 1.4 ATA. Hyperoxic oxygen convulsions will present themselves in two (2) phases. Phase 1 will place the diver in a state of convulsions, with no respiration, and the diver is likely to clinch their teeth which may serve to keep the regulator mouthpiece in the diver's mouth. In Phase 2 the diver will be relaxed and will start to hyperventilate (breathe fast). The second phase poses a significant risk of drowning if the regulator mouthpiece is allowed to fall out of their mouth. Dive planning should ensure PO_2 during all phases of the dive, except decompression, remains significantly below 1.6 ATA. In the unlikely event of any Con-VENTID symptoms, an asymptomatic diver shall immediately gain control of the symptomatic diver and begin ascent.

9.8 Dive team unable to reach down-line

If a dive team is unable to reach the down-line during deployment, the divers shall abort the dive and return to the surface. The divers shall then be recovered to the primary support vessel and may elect to make a second drop.

9.9 Dive team separated during deployment

If a dive team finds themselves separated from their buddy(ies) during deployment, the divers should abort the dive after searching for team members for five (5) minutes and return to the surface. Divers will deploy a lift bag to signal to the surface support team and dive vessel(s). The divers shall be recovered to the primary support vessel and may elect to make a second drop.

9.10 Dive team separated on dive site

The Research (bottom) Divers will remain in constant contact (visual range and close enough to render immediate assistance) at all times during the dive. At no time during the dive (regardless of visibility), will the Bottom Divers be separated by more than fifteen (15) feet. Separated divers will perform a visual search for each other for one minute before returning to the base of the down-line. Once at the down-line separated divers will allow no more than four minutes to reunite. If the divers have not found one another within five (5) minutes they will abort the dive and head to the surface using appropriate ascent techniques and decompression procedures.

9.11 Dive team separated, swept off dive site

Upon separation of buddy pair, unable to locate each other, the divers should independently shoot a bag to the surface and commence their own decompression. Divers shall exercise normal decompression procedures, and expect to see Support Diver in the water above them.

9.12 Dive team swept off dive site

Divers stay together; attempt to regain position on dive site and abort if necessary. If unable to return to the dive site, abort the dive and commence ascent under an inflated lift bag. Exercise appropriate decompression procedures.

9.13 Diver entanglement on bottom

Divers shall carry at least two knives and an additional cutting tool, either EMT scissors or a seatbelt cutter. If entangled, notify other diver(s) of problem. Evaluate the nature of entanglement and attempt to free self or signal buddy for assistance. If using the standby diver mode, separated from buddy and entangled without remedy, inflate bag to surface with penciled distress message on slate attached by snap hook to the bag. The standby diver from primary support vessel shall then enter the water and search for the entangled diver. The other diver, if separated and successfully decompressing on a lift bag, shall be accompanied by the Small Boat. Both vessels will maintain radio contact with each other, but the primary support vessel will remain with the entangled diver and the designated Diving Supervisor will monitor the situation topside. If using the on-bottom safety diver mode, given this contingency or similar difficulties in which a pair of divers will need to assist the expedition team at the bottom, the second dive team of the day (if available) will deploy to assist the entangled diver.

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9.14 Dive team unable to locate ascent-line

Remain mindful of bottom time (BT). Divers can either shoot a lift bag on a reel to the surface and begin decompression ascent on the bag line, or, if adequate gas supply is available, take an additional five (5) minutes to search and extend to the next bottom time group. Divers must be on a line beginning ascent by five (5) minutes past original plan. Divers shall carry hard copies of planned decompression schedules and contingencies. Decompress according to the appropriate schedule or according to the dive computer. If divers come up on the bag line, surface support will shift to the divers' location, be they drifting or stationary. In the event of loss of ascent line, divers will shoot a lift bag and commence a drifting ascent under the bag.

9.15 Buoy or down-line breakaway

Divers shall shoot a bag to the surface on a line reel then decompress on the line in the same manner as if unable to locate the down-line.

9.16 Dive team reaches surface, but dive support vessel is gone

Research (bottom) divers stay together upon reaching surface. Use appropriate signaling device to signal surface craft.

9.17 Change of environmental conditions during dive

In the time interval between the beginning of a dive and the completion of decompression, it is possible for environmental conditions to change sufficiently to require adjustment to the dive plan.

A. Current Strength - A significant increase in current strength during a dive will make it more difficult for the divers to decompress if they are using a fixed down-line, subjecting the decompressing divers to the full strength of the current. Divers should consider “drift decompression” to be the preferred method in strong currents.

B. Surface Waves or Swell Height - A significant deterioration of sea conditions will make it more difficult for the divers to decompress because the ascent line (either a hard line anchored to the bottom or a drifting line suspended from a buoy) will rise and fall, sometimes violently, as the dive vessel strains on the line, if at anchor. Therefore, decompressing divers must take care not to hold to the ascent line too tightly, especially on the shallower stops where the effect is most pronounced. In instances where there is significant movement of the ascent line, divers should employ one or more lengths of "Jon line" to dampen the motion. One end of the Jon line is looped around the down-line and the other is clipped to the diver's "scooter ring." Otherwise the dive team should choose to use drift decompression.

C. Visibility - A significant decrease in visibility on the bottom will make it more difficult for the divers to work, but also might decrease the safety of the divers. Therefore, if the visibility decreases to less than ten (10) feet, the divers should consider terminating the dive.

D. Water Temperature - A decrease in water temperature, due to a deep-layer thermocline or to an alteration of current patterns, will affect diver comfort and, if significant, could affect safety. Divers should wear adequate thermal protection-a well-fitting wet suit and hood, or a dry suit. If water temperature decreases significantly, the dive should be terminated.

9.18 Initiation of subsequent dives

If any emergency arises while one team is in the water, a second team will not commence operations until the problem has been resolved and it has been deemed appropriate to make the second dive.