

**Central Arizona Project  
Diving Requirements  
Amended: October 19, 2023**

This document summarizes the requirements for diving operations conducted by contractors on CAP property, either in support of CAP work or in support of other work that occurs over or adjacent to CAP. This document is to be provided to the dive contractor upon signing of the contract.

*Note: No divers are to enter CAP waters without a CAP representative on site.*

**I. General Requirements for All Diving Operations**

- A. Regulatory Requirements.** Conventional hardhat and lightweight surface-supplied and scuba diving operations must conform to the more stringent requirements of this document or to 29 CFR 1910, Subpart T, "Commercial Diving Operations." If an issue or item is not addressed in these requirements, look to the regulations contained in the U.S. Navy Diving Manual, volumes I through V, for guidance.
- B. Dive Plan and Hazard Analysis.** A dive plan and hazard analysis must be prepared and submitted before each diving activity. Diving equipment may be brought to the worksite only after the plan and hazard analysis have been submitted to and reviewed by CAP.

The dive plan and hazard analysis must specifically address safety procedures for each separate diving location or mode and include procedures that ensure compliance with these and referenced standards. If conditions change, all diving operations are to cease until conditions are reevaluated and appropriate controls have been implemented. A Safe Practices Manual must be kept at the dive site.

All personnel involved must review the dive plan and hazard analysis before suiting up. As a minimum, the plan must contain the following:

1. Names and duties of dive team members, including the dive supervisor.
2. Date, time, and location of the dive operation.
3. Diving mode to be used (scuba, surface-supplied air, etc), including a description of the backup air supply.
4. A description of the work divers will perform, and inspection requirements.

5. Surface and underwater conditions, including visibility, temperature, thermal protection, and currents.
6. Activity hazard analysis for each phase of work, including the hazards of flying after diving.
7. Maximum depth and bottom time (make altitude adjustments to dive tables for dives at altitudes of 1000 feet or more above sea level).
8. Emergency management plan, including emergency procedures, means of notification, telephone numbers for ambulance, doctors, and Divers Alert Network; locations of evacuation routes; and other emergency assistance protocols.
9. Lockout/tagout procedures, including how to deal with differential water pressures due to unequal water elevations.
10. Equipment servicing records, procedures, and checklists and requirements for special tools and equipment.
11. Safety measures to protect team members working on the canal slope (i.e., non-divers assisting with the removal of equipment or divers from the water), to include:
  - a. The use of a personal floatation device (PFD).
  - b. A readily accessible ring buoy with a minimum of 90' of 3/8 line attached. (Throw bags may be used in addition to, but not as a substitute for ring buoys.)
  - c. A safety line placed across the canal approximately 10 yards downstream of the work area. Alternatively, a restraint system adjusted such that the employee cannot end up in the water can be used in place of the safety line.

### **C. Diver qualifications.**

- (1) Divers must not take part in diving operations if they have colds, sinus or ear infections, alcohol or drug intoxication or its aftereffects, fatigue, acute illness or vertigo, or any other medical condition that may impair their ability to safely perform a dive operation.
- (2) Divers performing work for CAP, including those on stand-by, must have a certificate of training from a recognized diving school.
- (3) Divers may dive to depths greater than 100 feet seawater equivalent only if they have previous experience diving to the maximum depth required in the planned dive.

- (4) Divers must be at least 18 years old and be fully familiar with the equipment, diving system and emergency procedures to be used.
- (5) Divers must have a medical evaluation within the 12 months previous to the dive certifying that the diver is physically fit for diving. (See "submittals" below).
- (6) All dive team members must be trained in CPR, first aid (American Red Cross standard course, or equivalent), and oxygen first aid. Note: CPR courses must include hands-on training. Online training, by itself, is unacceptable.
- (7) Prior to mobilizing on site and commencing diving operations, the dive supervisor must submit to CAP for review satisfactory evidence that all dive team members have met the above requirements.

**D. Supervision.** A designated, experienced, onsite dive supervisor must personally supervise all diving operations. Additionally, divers may only enter the water when a CAP representative is onsite, unless written permission has been given by the CAP Safety Department or other CAP representative.

**E. Equipment.** Use a tagging or logging system to record equipment modification, repair, testing, calibration, or maintenance services. Include the date and type of work performed and the name or initials of the person who did the work.

**a. Air Compressor System.** Compressors that supply air to the surface-supplied air (SSA) diver must have a volume cylinder with a check valve on the inlet side, a pressure gauge, a relief valve, a drain valve, and a carbon monoxide filter and alarm system. Compressors must have the capacity to overcome any line loss or other losses and deliver a minimum of 4.5 cubic feet per minute to each diver at the maximum working depth. Air compressor intakes must be located away from areas containing exhaust or other contaminants. Respirable air supplied to a diver, or to air tanks, must not contain:

1. Carbon monoxide (CO) greater than 10 parts per million (ppm).
2. Carbon dioxide (CO<sub>2</sub>) greater than 1,000 ppm.
3. Oil mist greater than 5 milligrams per cubic meter.
4. A noxious or pronounced odor.

Air from the compressor system must be tested for air purity at least every six (6) months, by taking samples at the connection to the distribution system.

**b. Compressed Gas Cylinders.** Compressed gas cylinders must:

1. Be designed and maintained according to the applicable provisions of 29 CFR 1910.101(a).

2. Be stored in a ventilated area and protected from excessive heat.
3. Be secured against falling.
4. Have shutoff valves recessed into the cylinder or protected by a cap, except when in use, when manifolded, or when used for diving.

**F. Accident reporting.** Any accident which results in injury or property damage must be immediately reported to the dive supervisor and CAP. A detailed, written report of all such incidents addressing the causal factors and appropriate prevention strategies must be submitted to the CAP within seven calendar days of the incident.

## II. Surface-Supplied Air Diving

**A. Auxiliary Air Supply.** An auxiliary air supply must be provided during all dives. The auxiliary air supply must have a standby compressor or air flasks with a capacity of 72 cubic feet or more. Compressors that are used for diving operations must not be used for any other purpose. The auxiliary air supply must meet the requirements in the subsection, "Air Compressor System."

**B. Decompression.** A recognized decompression specialist must prepare decompression tables. Post decompression times inside and outside decompression chambers.

**C. Decompression Chamber.** The following circumstances require an onsite, dual-lock, multiplace decompression chamber (capable of recompressing the diver to a minimum of 165 feet seawater equivalent) and trained operating personnel:

- (1) Diving operations that are outside the no-decompression limits or to depths greater than 100 feet seawater
- (2) When surface recompressing capabilities are recommended by the decompression specialists, Dive Supervisor, or where necessitated by onsite conditions.
- (3) Decompression chambers must accommodate at least two persons.

**D. Decompression Dives.** Divers engaged in dives outside no-decompression limits or engaged in mixed-gas diving must remain awake and close to an attended decompression chamber for at least one hour following the dive. The diver must be able to contact a decompression chamber facility during the four-hour period immediately following treatment or after leaving the water.

- E. Communications.** All divers and standby divers must be equipped with communication systems that permit simultaneous, two-way conversations between the diver, their tender, other divers and tenders, and the dive supervisor. Communication systems must be operable from the time the diver puts on their helmet or mask until it is removed. Upon loss of communications all in-water dive operations are to cease until communications can be restored.
- F. Minimum Crew Size.** Two divers must be available for all diving operations. The standby diver must be available, suited up, and ready to dive in an emergency. The standby diver must not serve as a tender. The minimum crew must consist of at least four persons: the dive supervisor, a diver, a standby diver, and a tender. For each diver added to the crew, one tender must also be added.
- G. Reserve Breather Gas Supply.** Each diver using lightweight SSA must carry a reserve breather gas tank. When heavy, deep-sea diving gear is used, when diving to depths exceeding 100 feet of seawater, or when diving outside the no-decompression limits, the standby diver must have an extra breathing gas hose for the working diver.

### III. Scuba Diving

- A. Requirement.** *Scuba diving is permitted only when sanctioned by the contract specifications and authorized in writing by CAP.*
- B. Maximum Depths.** Limit scuba diving to depths and times that will not require decompression staging as set forth in the U.S. Navy Standard Air Decompression Tables. Scuba dive depths must not exceed 100 feet of seawater after altitude adjustment.
- C. Compressed Air.** Oxygen or mixed gases are prohibited, except for up to 40 percent nitrox, when used in accordance with the National Oceanic and Atmospheric Administration (NOAA) Diving Manual: Diving for Science and Technology, Chapter 15, "Nitrox Diving" and Appendix VII, "Nitrox Dive Tables." Use only open circuit scuba systems.
- D. Diving Equipment.** A recognized approving agency must approve scuba diving equipment. Use and maintain scuba diving equipment in accordance with the manufacturer's recommendations.
- E. Tether.** A tether must be utilized at all times when performing scuba diving to ensure a connection between the diver and their tender. The tether line must be attached to the diver and it shall be continuously tended from the surface.
- F. Buddy system.** A dive may be made singly if the dive is less than 20 feet deep, there is little current, and visibility is good (at the discretion of the dive

supervisor). All other dives with scuba gear must use a buddy system. Buddy pair divers must maintain visual contact.

- G. Communications. All divers and standby divers must be equipped with communication systems that permit simultaneous, two-way conversations between the diver, their tender, other divers and tenders, and the dive supervisor. Communication systems must be operable from the time the diver puts on their helmet or mask until it is removed. Upon loss of communications all in-water dive operations are to cease until communications can be restored.
- H. **Standby Diver.** A standby diver must be provided for each diver or buddy pair. The standby diver must be a qualified, fully equipped scuba diver and remain on the water surface, close to the diver. The standby diver must also have a tether line, tended from the surface.
- I. **Standard Equipment.** Scuba divers must wear buoyancy compensators and have a depth indicating device, timing device, cutting tool, flashlights, compass, submersible pressure gauge (or integrated dive computer) to monitor cylinder/system air pressure, and an alternate second stage air source, such as an octopus or safe second.

## Submittals

The following information must be submitted to and approved by CAP prior to mobilizing on site:

1. The Dive Plan and Hazard Analysis
2. Evidence of training for each diver for the method of diving to be used.
3. For dives exceeding a depth greater than 100 feet seawater equivalent, evidence that the divers have had previous experience diving to the maximum depth.
4. Evidence of a medical evaluation for each diver, conducted within 12 months previous to the date of the dive. With respect to this item, CAP requests only a one-page document (for each diver) with the following information (please do not send actual diver medical information to CAP):
  - a. The name of the diver
  - b. The name of the medical provider
  - c. The date of the most recent medical exam (must be within 12 months of the dive date)
  - d. A signed statement, by the medical provider, that the diver is fit to dive.
5. Evidence of first aid, CPR, and oxygen first aid training and current certification for each dive team member
6. Insurance certificates in accordance with contract requirements.